



Transcontinental Gas Pipe Line Company, LLC

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**NORTHEAST SUPPLY
ENHANCEMENT PROJECT**

EXHIBIT 39

RESOURCE REPORT 1, APPENDIX 1E

CUMULATIVE IMPACTS

PADEP CHAPTER 105/USACE SECTION 404 JOINT PERMIT APPLICATION

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August 2025

Exhibit 39
Resource Report 1, Appendix 1E
Cumulative Impacts



TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

**PADEP SECTION 401 WATER QUALITY CERTIFICATION APPLICATION
SUPPLEMENTAL INFORMATION FILING 1**

UPDATES TO THE CUMULATIVE IMPACT ANALYSIS

NORTHEAST SUPPLY ENHANCEMENT PROJECT

SEPTEMBER 2017

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ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
FERC	Federal Energy Regulatory Commission
GHG	greenhouse gas
HDD	horizontal directional drill
HUC	hydrologic unit code
HVDC	high-voltage direct current
N.NJ-NY-CT	Northern New Jersey, New York, and Connecticut
NEPA	National Environmental Protection Act
NJDEP	New Jersey Department of Environmental Protection
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries Service
NSA	noise-sensitive area
NYSDEC	New York State Department of Environmental Conservation
Project	Northeast Supply Enhancement Project
ROI	region of influence
ROW	right-of-way
RR	resource report
Transco	Transcontinental Gas Pipe Line Company
USACE	U.S. Army Corps of Engineers

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Exhibit 39 Resource Report 1, Appendix 1E - Cumulative Impact Analysis

Transco is providing an update to the cumulative impact analysis for the Project based on finalization of information pertaining to the existing environment and conditions and impact analysis for the Project.

1 Introduction

The National Environmental Protection Act (NEPA) requires the lead federal agency to consider the cumulative environmental effect of a proposed action. According to the Council on Environmental Quality (CEQ), a cumulative impact analysis should consider the potential environmental impacts resulting from “the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). In its June 24, 2005, memorandum providing federal agencies guidance on cumulative impact analysis, the CEQ advised that agencies have substantial discretion in determining the appropriate level of their cumulative impact analysis. The CEQ stated that an agency should relate the scope of its analysis to the magnitude of the environmental impacts of the proposed action. Hence, an analysis of cumulative effects involves defining the scope of other actions and their interrelationship with the proposed action.

Cumulative impacts can result from individually minor but collectively significant activities expected to occur in a similar location and during a similar period. Accordingly, a cumulative impacts analysis must identify and define the scope of other actions and their spatial or temporal overlap with a proposed action and alternatives. The following considerations form the basis of the cumulative impacts analysis:

- Does the proposed action affect resource areas that might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If a resource area is affected by the proposed action, could another action be expected to interact with and affect or be affected by impacts of the proposed action?
- If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

As a result, geographic distribution, intensity, duration, and historical effects of similar activities determine whether a particular activity may contribute cumulatively and significantly to the impacts of a proposed action on the resource areas identified in the existing environment

sections of the resource reports (RRs). In this analysis, the proposed action is the Northeast Supply Enhancement Project. The sections below describe (1) the scope of the analysis; (2) past, present, or reasonably foreseeable activities considered; (3) the potential for interaction between the Project and past, present, or reasonably foreseeable activities in time and place; and (4) assessment of the Project's incremental contribution to potential cumulative impacts.

2 Scope of Analysis

The scope of the cumulative impacts analysis includes resources directly or indirectly affected by the Project. If the Project results in no or negligible direct or indirect impacts on a resource, then the Project will not incrementally contribute to cumulative impacts. For the purposes of this analysis, a negligible impact means that no apparent or measurable adverse impacts are expected. RRs 2 through 9 assess the effects on environmental resources that could result from the Project. The Project's effects reflect the successful implementation of the environmental protection and mitigation measures described in the RRs and compliance with applicable federal, state, and local regulations and permit requirements that minimize impacts. Where the Project's potential beneficial impacts and minor or greater unavoidable direct or indirect adverse impacts occur, the resource was analyzed for the Project's incremental contributions to cumulative impacts.

The Project's onshore and offshore components and the potentially affected resources are identified on the figures provided in Attachment 1. Detailed information supporting the impact analysis is provided in the tables in Attachment 2. The detailed methodology that governed search efforts for onshore and offshore activities with potential cumulative impacts is presented in Attachment 3.

The Project's onshore and offshore facilities will have greater than negligible direct or indirect impacts on the resources listed in Table 2-1 and Table 2-2, respectively. The Project's impacts on these resources were analyzed to determine incremental contributions to cumulative impacts. For the purposes of this analysis, Madison/Raritan Bay Loops refers collectively to the Madison Loop and the onshore Raritan Bay Loop.

Transco is submitting the following update to the summary of resources analyzed to reflect the results of Transco's onshore transportation analysis submitted as part of Transco's June 6, 2017 Supplemental Information Filing as well as the results of Transco's cultural resources investigations of Compressor Station 206 as included in Transco's

Certificate Application dated March 27, 2017 (Volume 4), and in Transco's June 6 and June 30 Supplemental Information Filings.

Table 2-1
Summary of Resources Analyzed for Contribution to Cumulative Impacts Onshore

Resource	Analyzed for Contribution to Cumulative Impacts			
	Quarryville Loop	Madison/Raritan Bay Loops	Compressor Station 200	Compressor Station 206
Resource Report 2				
Groundwater	Construction <i>Only Wells or Springs within 150 feet</i>	Construction <i>Only Wells or Springs within 150 feet</i>	Construction <i>Only Wells or Springs within 150 feet</i>	Construction <i>Only Wells or Springs within 150 feet</i>
Surface Water	Construction	Construction	N/A	N/A
Wetlands	Construction	Construction	N/A	Construction
Resource Report 3				
Vegetation	Construction	Construction	N/A	Construction
Fishery Resources	Construction	Construction	N/A	N/A
Wildlife	Construction	Construction	Construction	Construction
Resource Report 4				
Cultural Resources ^a	N/A	N/A	N/A	TBD N/A
Resource Report 5				
Socioeconomics	Construction	Construction <i>Operation for taxes and revenues</i>	Construction	Construction <i>Operation for taxes and revenues</i>
Transportation ^b	TBD N/A	TBD N/A	TBD N/A	TBD N/A
Resource Report 6				
Geology ^c	Construction Karst terrain	N/A	N/A	N/A
Resource Report 7				
Soils	Construction	Construction	N/A	Construction
Resource Report 8				
Recreation	Construction	N/A	N/A	N/A
Landfills and Hazardous Waste Sites	N/A	Construction	N/A	Construction

Table 2-1
Summary of Resources Analyzed for Contribution to Cumulative Impacts Onshore

Resource	Analyzed for Contribution to Cumulative Impacts			
	Quarryville Loop	Madison/Raritan Bay Loops	Compressor Station 200	Compressor Station 206
Resource Report 9				
Air Quality	Construction	Construction	Construction	Construction and Operation
Noise	Construction	Construction	N/A	N/A
^a The historic architectural assessment report will be provided in a supplemental filing in the 2nd quarter of 2017 was provided in Transco's Certificate Application dated March 27, 2017; a supplemental architectural assessment was not required. ^b The traffic analysis will be provided in a supplemental filing in the 2nd quarter of 2017. was provided in Transco's Supplemental Information Filing dated June 6, 2017. ^c Karst investigations are ongoing for the Quarryville Loop and a summary report will be provided in a supplemental filing in the 2nd quarter of 2017. Key: N/A = Not analyzed; Project impacts are negligible TBD = to be determined				

Transco is submitting the following update to the summary of resources analyzed to reflect the results of Transco's cultural resources investigations as included in Transco's June 6 and June 30 Supplemental Information Filings.

Table 2-2
Summary of Resources Analyzed for Contribution to Cumulative Impacts Offshore

Resource	Analyzed for Contribution to Cumulative Impacts
Resource Report 2	
Surface Water, specifically Turbidity and Sediment Transport	Construction
Resource Report 3	
Fishery Resources	Construction
Marine Wildlife, including Threatened & Endangered Species	Construction
Resource Report 4	
Cultural Resources	TBD N/A
Resource Report 5	
Socioeconomics	Construction Operation
Resource Report 7	
Contaminated Sediment	TBD
Resource Report 9	
Air Quality	Construction
Noise	Construction

3 Activities Considered

Transco identified past, present, and reasonably foreseeable future activities in the region by contacting regulatory agencies and planning boards and by searching publicly available information. In general, existing conditions described in each RR reflect the impacts of past and present activities. Since construction impacts of past projects occurred in the past, they will not overlap with construction of the Project. However, the analysis includes these projects if they had permanent impacts on similar resources (e.g., permanent non-wetland waterbody impacts that could pose potential cumulative impacts with the Project).

Transco identified reasonably foreseeable activities by researching publicly available information, including information for other Federal Energy Regulatory Commission (FERC)-regulated projects accessible through FERC's eLibrary, and consultations with state and local agencies and development authorities. Activities with impacts comparable in nature and magnitude with Project impacts were included on the list of past, present, and reasonably foreseeable future activities. The information sources searched included permit applications, municipal databases, and websites. In addition, letters of request were sent to county and township planning departments requesting information about development activities within 5 miles of the Project facilities. The primary sources of information about relevant offshore activities were the U.S. Army Corps of Engineers (USACE), FERC databases and websites, and published NEPA documents. Tables 1E-1 through 1E-4 and Table 1E-13 list the activities identified for consideration in the cumulative impacts analysis of the Project's onshore and offshore components, respectively, including the following information for each:

- Name or sponsor/proponent;
- Description;
- Current status and schedule (e.g., proposed for May 2017, under construction, completed);
- Location (state, county, township); and
- Activity type, including industrial, pipelines, channel maintenance and dredging, utilities, residential, and commercial.

Attachments 3 and 4 provide the bibliography of information sources used to develop the onshore and offshore activities described in Tables 1E-1 through 1E-4 and Table 1E-13, respectively.

Tables 1E-5 and 1E-14 describe the activity types, the potential adverse impacts associated with construction and operation, and the likely permits or authorizations required for the onshore and offshore activity types, respectively. These tables only include a description of those impacts likely to be greater than negligible in magnitude.

Transco identified potential non-jurisdictional facilities associated with the Project, including the electric power supply for Compressor Station 200 and the water, sewer, and electric power supply for Compressor Station 206. As described in Section 1.9 of RR 1, Transco does not have detailed routing information regarding the electric distribution line required for Compressor Station 206 as PSE&G has not yet initiated a formal routing study. However, the electric power supply line to Compressor Station 200 will likely use existing power lines, but it is unknown at this time if the poles will be replaced. However, negligible environmental impacts are expected. Similarly, Transco currently anticipates that the electric power, water, and sewer lines for Compressor Station 206 will be installed adjacent to the right-of-way (ROW) of the new permanent access road, resulting in negligible environmental impacts. Because these activities result in negligible impacts, they were not analyzed further.

4 Temporal and Geographic Distribution

Cumulative impacts may occur when multiple activities have impacts on the same resources (e.g., in the same watershed) during the same timeframe as the Project. The region of influence (ROI) for potential cumulative impacts is the physical space directly or indirectly affected by construction and operation of the Project. The ROI for each resource varies based on the potential for effects to extend beyond the area of direct impact. For example, effects on air quality may extend several miles, but impacts on geologic and soil resources likely will not extend beyond the construction boundaries. Tables 1E-6 and 1E-15 identify the onshore and offshore ROIs and the rationale for each ROI based on the types of impacts from the Project. These tables do not include an ROI for a resource if the evaluation in the relevant RR determined that the Project's impacts on that resource would be negligible.

Figures 1E-1 through 1E-12 in Attachment 1 show the locations of the onshore Project components within the ROIs for each resource examined, the locations of activities analyzed, and the locations of significant landmarks discussed in the assessment of cumulative impacts. For each onshore component, figures are provided at three different magnifications: county, intersected hydrologic unit code (HUC) 12 watersheds, and a 1-mile radius from the limits of disturbance. Similarly, Figures 1E-13 and 1E-14 in Attachment 1 show the locations of the Raritan Bay Offshore Loop at the county level and a 1-mile radius from the centerline. The offshore

figures are provided at two different magnifications: county and a 1-mile radius from the limits of disturbance.

For the resources examined, Tables 1E-7 through 1E-10 show the activities that overlap in time for construction or operation or overlap the geographic ROI of the onshore components; Table 1E-16 shows the overlap for the offshore components. The “YES” or “NO” within these tables indicate the resulting determination of whether an overlap exists for the timeframe for construction or operation, or the location of the activities within the Project’s ROI. If the construction start date was before the Project’s construction start date, after the Project’s operation start date, or if the activity has already been completed (“N/A”), then there is no temporal overlap for construction (“NO”). A temporal overlap occurs when an activity’s start date overlaps with the Project’s construction and operation period and was assumed to overlap if the activity’s construction start date was unknown. Activities currently in operation or that will be in operation in the future (any year identified) were considered to temporally overlap for operation (“YES”). If the distance of the activity from the Project exceeds a resource ROI, the table states “NO” for that activity and the resource examined. The top row of each table identifies the total number of activities that geographically overlap with the ROIs for the Project and that are considered further in the cumulative assessment.

Activities that did not temporally or geographically overlap with the Project, except for activities that were specifically requested by agencies, are not shown and not analyzed further.

5 Assessment of Onshore Cumulative Impacts

This analysis compares the incremental impacts of the onshore components of the Project with the potential cumulative impacts of the past, present, and reasonably foreseeable future activities considered. Publicly available information, including applications filed with federal and state agencies, professional judgment, and desktop analysis provided quantitative and qualitative information on the magnitude and nature of the impacts of past, present, and reasonably foreseeable future activities to determine the potential for cumulative impacts on the resources affected. Trends in past and current activities, such as ongoing operation and maintenance, and their environmental impacts were projected into the future for the expected life of the Project.

Tables 1E-11 and 1E-12 summarize potential cumulative impacts of the activities considered in the analysis based on publicly available quantitative information, the desktop analyses, and the Project’s incremental contribution. The analysis did not quantify impacts on a specific resource area when the ROI for those activities did not overlap with the Project, indicated

by “NO” in Tables 1E-7 through 1E-10 and “0” in Tables 1E-11 and 1E-12. Each section below discusses the potential cumulative impacts resulting from the activities considered and the Project’s incremental contribution.

The Elizabeth Avenue Elementary School and the NYNJ Expansion pipeline do not overlap the ROI for any resource areas of the onshore portions of the Project and completed construction. Therefore, these activities will not contribute to cumulative impacts associated with construction of the onshore portions of the Project and are not considered further in this evaluation.

5.1 Surface Water

Transco is providing the following update to reflect the identification of a water source for hydrostatic test waters for Compressor Station 206.

The ROI for cumulative impacts on surface water (non-wetland waterbodies) is the HUC 12 area in which the pipeline loops and compressor stations are located. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI and could contribute to cumulative impacts during construction include 10 activities for the Quarryville Loop and nine activities for the Madison Loop and onshore Raritan Bay Loop.

The construction activities associated with the Project pipeline loops and Compressor Station 206 will result in temporary direct or indirect impacts on non-wetland waterbodies from typical dry open-cut crossing construction activities, withdrawal and discharge of hydrostatic testing water for the pipeline loops, and use of municipal water for horizontal directional drill (HDD) crossings. Dry crossing construction activities, including trench dewatering, and/or construction-related storm water runoff result in temporary erosion and sedimentation. Increases in suspended sediments could alter the chemical, biological, and physical characteristics of the water column on a temporary basis. Quarryville Loop dry open-cut crossings include Wissler Run, Fishing Creek, and unnamed tributaries of the Susquehanna River. The dry open-cut crossings for the Madison/Raritan Bay Loops waterbody crossings include unnamed tributaries of Tennet Brook and Cheesequake Creek. An access road associated with Compressor Station 206 will cross two unnamed waterbodies, one ephemeral and one intermittent, that carry water after rain events. Transco will install culverts beneath the access road to enable water to flow unimpeded and ensure the temporary impact on these resources is negligible. Hydrostatic testing will withdraw water from the Muddy Run Reservoir for the Quarryville Loop, from Cheesequake Creek for the

Madison Loop, from a municipal water source for Compressor Station 200, and from the ~~TBD~~ a **municipal water source** for Compressor Station 206.

Fresh water from municipal sources will be used for the ~~Quarryville Loop HDD~~, Madison Loop HDD, Cheesequake HDD, Parkwood HDD, and Lockwood Marina HDD.

Erosion and Sedimentation

Quarryville Loop

The 10 activities identified as overlapping with the surface water ROI for the Quarryville Loop include two commercial, two electricity generation, one industrial, two pipeline, one solar energy, and two major transportation activities. Construction of the two commercial activities will occur in a centralized area on existing disturbed property without crossing any waterbodies and thus will not contribute to cumulative impacts on surface water. Construction of the York 2 Energy Center may occur at the same time as construction of the Quarryville Loop; however, the construction is occurring at the same site as Calpine's existing York Energy Center in Peach Bottom Township and does not cross the same waterbodies the Quarryville Loop (Power Engineering 2015). Construction of the Peach Bottom nuclear power plant occurred prior to 1974, when commercial operation began (Exelon 2017). Therefore, crossing waterbodies during construction will not occur for the electricity generating activities, and they will not contribute to cumulative impacts on surface water. Construction of the expansion at the Scalpy Hollow Timber sawmill and Keystone Solar are complete and will not contribute to cumulative erosion and sedimentation during construction. Of the two pipeline activities within the ROI, Atlantic Sunrise construction may occur in the same timeframe as construction of the Quarryville Loop. The Central Penn Line South segment of Atlantic Sunrise will begin at the existing Transco Mainline system in Lancaster County, Pennsylvania. Central Penn Line South will cross unnamed tributaries of Fishing Creek in Lancaster County at MP0.2 and MP0.3 (Transco 2015). The Central Penn Line South impacts on unnamed tributaries of Fishing Creek will occur approximately x miles from the location of the Quarryville Loop crossing of Fishing Creek. As shown in Figure 1E-3, the two major transportation activities within the ROI, South Lime Street Bridge and T-325 over Peters Creek, will not cross Wissler Run, Fishing Creek, or Conowingo Creek.

There is a potential for cumulative impacts on Fishing Creek from the construction impacts of the Central Penn Line South segment of Atlantic Sunrise when combined with the construction impacts of the Quarryville Loop. There will be no operational impacts. Because turbidity returns

to baseline conditions a short time after construction, the cumulative impacts on Fishing Creek will be minimal. In addition, construction of the Central Penn Line South segment of Atlantic Sunrise will likely be nearly complete when construction of the Quarryville Loop is beginning, so minimal construction overlap is expected. Transco will implement the Transco Procedures during the construction, post-construction restoration, and operation of both activities to minimize impacts. The effects of the activities on waterbodies will be temporary, and water quality will return to baseline conditions soon after each crossing is complete. As a result, there will be no significant contribution to cumulative impacts on surface water from construction of the Quarryville Loop.

Madison/Raritan Bay Loops

The nine activities identified as overlapping with the surface water ROI for the onshore Madison and Raritan Bay Loops include one commercial/residential, one electric generation, one pipeline, three residential, and three transportation activities. Construction of the commercial/residential and residential activities will occur in a centralized area on existing property without crossing Cheesequake Creek or the unnamed tributaries of Tennet Brook or Cheesequake Creek. The construction timeframe for the Middlesex Energy Center is unknown but may overlap with construction of the onshore Madison and Raritan Bay Loops. Given the site's location, the Middlesex Energy Center will not cross the unnamed tributaries of Tennet Brook or Cheesequake Creek. Construction of the New York Bay Expansion pipeline and the South Amboy Intermodal Center within the ROI occurred prior to 2017 and therefore will not contribute to cumulative impacts. The two remaining transportation activities, Route 9/35 Main Street Exchange and U.S. Route 9-Bordentown Avenue-Kenneth Avenue, consist of major improvements to existing roads and will not include crossing unnamed tributaries of Tennet Brook or Cheesequake Creek.

There is no potential for cumulative impacts on Tennet Brook or Cheesequake Creek from the above activities when combined with the onshore Madison and Raritan Bay Loops. As a result, there will be no significant contribution to cumulative impacts on surface water from construction of these Project facilities.

Withdrawal and Discharge of Hydrostatic Test Water

The commercial, residential, industrial, solar energy, and transportation activities identified as overlapping with the ROI for the Quarryville Loop and Madison and Raritan Bay Loops do not typically include withdrawal and discharge of water for construction or operation. At most, these

types of activities would use a small amount of water for dust control. The existing Peach Bottom Nuclear Power Plant and Sayreville Generating Station within the ROI do not obtain water from Muddy Run Reservoir or Cheesequake Creek (Lancaster Online 2015; Power Engineering 2015). The York 2 Energy Center will obtain water from Lake Conowingo. The water supply source for the Middlesex Energy Center is currently unknown; however, the water requirement for this project could be on the order of 1 million gallons per day, depending on the cooling technology used. Water supply sources for electricity-generating activities include surface water and wastewater treatment plant effluent. Given the distance between the Middlesex Energy Center and Cheesequake Creek, it is unlikely that Cheesequake Creek would be used as a water supply source. Of the two pipeline activities within the ROI, construction of the Central Penn South segment of Atlantic Sunrise may occur in the same timeframe as construction of the Quarryville Loop; however, the Rock Springs Expansion Project has already been completed. Construction of the Central Penn South segment will not involve the withdrawal of water from Muddy Run Reservoir and therefore will not contribute to cumulative impacts (Transco 2015).

Transco will withdraw water for construction in a manner that will not reduce water flow to a point that would impair flow or impact fish and recreational uses. In cooperation with local providers, water withdrawals will be conducted in a manner that will not reduce water availability to a point that would affect public usage. Therefore, the Project will not contribute to cumulative impacts from the withdrawal and discharge of water for construction.

Water for HDD

The commercial, residential, industrial, solar energy, and transportation activities identified as overlapping with the ROI of the pipeline loops may use small amounts of municipal water; however, the water supply sources and volumes required are unknown. Of the pipeline activities that overlap the ROI for surface water, construction of the Central Penn South segment of Atlantic ~~*Sunrise may occur in the same timeframe as construction of the Quarryville Loop and use municipal water for HDD.*~~ The Central Penn South segment of Atlantic Sunrise is expected to use water from the Conestoga River for HDD (Transco 2015). Electricity-generating activities typically use municipal water during operation for general operation and maintenance activities. However, the volume and source of water could not be identified.

There is a potential cumulative impact from the use of municipal water for HDD during construction of the Project pipeline loops when combined with other activities in the ROIs. However, the use of water for HDD during construction of the loops will be temporary. In cooperation with local providers, Transco will withdraw water in a manner that will not reduce

water availability to a point that would affect public usage. Therefore, the Project will not contribute to cumulative impacts from the use of municipal water for HDD during construction.

5.2 Groundwater

The ROI of cumulative impacts on groundwater is the HUC 12 area in which the pipeline loops and compressor stations are located. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI and that could contribute to cumulative impacts during construction include 10 activities for the Quarryville Loop and 13 activities for Compressor Station 200.

Construction of the pipeline loops may affect public or private water supply wells or springs within 150 feet of construction workspaces. Within the Quarryville Loop ROI, six private water supply wells and three private springs are located within or less than 10 feet of Project workspaces. Of these six, three wells are located within or less than 10 feet of Compressor Station 200 workspaces. In the unlikely event that construction of the Project temporarily affects the water quality or yield of a private or public well or spring, Transco will provide alternative sources of potable water or other compensation to the well owner(s). In the unlikely event that construction permanently affects a well or spring, Transco will repair, replace, or provide alternative sources of potable water.

The commercial, electricity generation, residential, industrial, solar energy, and transportation activities identified as overlapping with the ROI may use small amounts of groundwater from a private or public well or spring or perform construction activities in their vicinity. Of the pipeline activities that overlap the ROI for groundwater, construction of the Central Penn Line South segment of Atlantic Sunrise may occur in the same timeframe as construction of the Quarryville Loop. Construction of the New York Bay Expansion occurred in 2016 and will not contribute to cumulative impacts on public or private water supply wells or springs during construction of Compressor Station 200.

There is a potential cumulative impact on public or private water supply wells or springs within 150 feet of construction workspaces during construction of the Quarryville Loop when combined with the construction impacts of the Central Penn Line South segment of Atlantic Sunrise. If impacts occur, Transco will repair, replace, or provide alternative sources of potable water. Therefore, the Project will not contribute to cumulative impacts on public or private water supply wells or springs within 150 feet of construction workspaces.

5.3 Wetlands

The ROI for cumulative impacts on wetlands is the HUC 12 area in which the pipeline loops and compressor stations are located. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI and could contribute to cumulative impacts during construction include 10 activities for the Quarryville Loop, nine activities for the Madison Loop and onshore Raritan Bay Loop, and five activities for Compressor Station 206.

The construction activities associated with the Project pipeline loops will result in temporary direct or indirect impacts on wetlands, including 11 wetlands along the Quarryville Loop, 19 wetlands along the Madison/Raritan Bay Loops, and 2 wetlands along the access road to Compressor Station 206. No wetland impacts are associated with construction of Compressor Station 200.

Quarryville Loop

Ten activities overlap with the wetlands ROI for the Quarryville Loop, including two commercial, two electricity generation, one industrial, two pipeline, one solar energy, and two major transportation activities. Construction of the commercial, electricity generation, industrial, solar energy, and transportation activities identified as overlapping with the ROI may affect wetlands; however, their specific impacts are unknown. Of the two pipeline activities within the ROI, only construction of the Central Penn Line South segment of Atlantic Sunrise may occur in the same timeframe as construction of the Quarryville Loop. The Central Penn Line South segment of Atlantic Sunrise will cross multiple wetlands in Lancaster County, including one wetland in Drumore Township that is within the wetlands ROI. Table 1E-12 summarizes the anticipated wetland impacts of the Central Penn Line South segment of Atlantic Sunrise estimated to occur within the ROI of the Quarryville Loop.

Madison/Raritan Bay Loops

The nine activities identified as overlapping with the wetland ROI for the Madison/Raritan Bay Onshore Loops include one commercial/residential, one electricity generation, one pipeline, three residential, and three transportation activities. Construction of the commercial/residential, electricity generation, residential, and transportation activities identified as overlapping with the ROI may affect wetlands; however, their specific impacts are unknown. Construction of two pipeline activities and one transportation activity within the ROI occurred prior to 2017 and may have affected wetlands; however, the specific impacts are unknown. The two remaining transportation activities, Route 9/35 Main Street Exchange and U.S. Route 9-Bordentown

Avenue-Kenneth Avenue, consist of major improvements to existing roads and may also affect wetlands.

Compressor Station 206

Table 1E-10 identifies five residential activities as overlapping with the wetlands ROI for Compressor Station 206. Although the specific impacts on wetlands are unknown, these developments are large enough that impacts on wetlands may occur.

Construction and operation of the activities described above may result in a cumulative impact on wetlands in the ROI when combined with the wetland impacts from construction of the Quarryville Loop, Madison/Raritan Bay Loops, and Compressor Station 206. Table 1E-11 summarizes the known wetland impacts from the activities analyzed and the Project. Transco will implement the Transco Procedures to minimize impacts on wetlands and restore wetland conditions to the extent practicable. Additionally, the USACE issues permits under Section 10/404 of the Clean Water Act for construction of utility lines through jurisdictional waters of the United States, including wetlands, and requires mitigation or compensation to ensure there is no net loss of wetlands or wetland functions. Any other activities affecting wetlands within the ROI would similarly need to acquire appropriate state and federal wetland permits, which will ensure the mitigation of any unavoidable impacts. Transco will submit to the USACE a compensatory mitigation plan to ensure the minimization of Project impacts on wetlands; therefore, the Project will not significantly contribute to cumulative impacts on wetlands.

5.4 Vegetation

The ROI for cumulative impacts on vegetation is the HUC 12 area in which the pipeline loops and compressor stations are located. As shown in Tables 1E-7 through 1E-10, construction activities that overlap the ROI and that could contribute to cumulative impacts include 10 activities for the Quarryville Loop, 10 activities for the Madison/Raritan Bay Loops, and five activities for Compressor Station 206.

Impacts on vegetation from construction of the Project will occur primarily within the existing ROW for pipeline facilities. Work in areas where the ROW will be widened could result in a long-term conversion of existing forest in upland and wetland areas to herbaceous or scrub/shrub communities and limited conversion to impervious surface associated with the aboveground facilities. Construction and operation of Compressor Station 206 will result in forest fragmentation, increases in forest edges, and removal of forest interiors. The related impacts on adjacent intact forests may include edge effects that extend inward a few hundred feet from

Compressor Station 206 workspaces. Construction activities associated with the pipeline loops will result in temporary direct or indirect impacts on surrounding vegetative cover that has been disturbed. Vegetation disturbance includes vegetation modification, soil compaction, and the spread of invasive plant species. Modification of existing vegetative cover will occur as described above from revegetation activities. Impacts on revegetated areas will be temporary, and the cover will eventually return to baseline conditions. Soil compaction could result from the use of heavy machinery and construction equipment and could reduce the percolation of water into the soil and negatively impact trees and herbaceous plants. Additionally, construction of the Project could result in the introduction or spread of non-native noxious and invasive plant species, which could increase competition for native species.

The commercial, electricity generation, residential, industrial, solar energy, and transportation activities identified as overlapping with the ROI may include clearing vegetation for new construction; however, their specific impacts are unknown.

Quarryville Loop

Of the pipeline activities that overlap the ROI for vegetation, construction of the Rock Springs Expansion occurred in 2015 and will not overlap with the Project construction timeframe. Construction of the Central Penn Line South segment of the Atlantic Sunrise pipeline will have a similar effect on vegetation as the Project, including both direct and indirect impacts.

Table 1E-12 shows the combined permanent impacts of the Central Penn Line South segment of Atlantic Sunrise and the Quarryville Loop due to the removal and modification of vegetation. Additionally, both activities will contribute to soil compaction, potential crushing of herbaceous plants, and the inadvertent spread of non-native noxious or invasive plants within the HUC 12 watershed. Both activities will restore disturbed vegetation, follow best management practices (BMPs) to minimize impacts, utilize erosion controls, protect topsoil in agricultural areas, mitigate subsoil compaction, adhere to Noxious and Invasive Plant Management Plans (see Attachment 10, to Appendix 1B of RR 1), and take appropriate action if areas do not revegetate properly. In addition, impacts on vegetation from construction of the Quarryville Loop represent less than 6 percent of the cumulative loss of upland forest/woodland land cover type from activities within the ROI and will not contribute to significant cumulative impacts from loss of vegetation.

Madison/Raritan Bay Loops

Of the pipeline activities that overlap the ROI for vegetation, construction of the New York Bay Expansion occurred in 2016 and will not overlap with the Project's construction timeframe.

Table 1E-11 shows the estimated impacts on vegetation of the New York Bay Expansion within the ROI; however, the majority of impacts from activities within the ROI are unknown. Based on desktop analyses, the Project's permanent impacts on vegetation represent approximately 0.01 percent of upland forest/woodland land cover type within the ROI. Therefore, the Project will not contribute to significant cumulative impacts on vegetation.

Compressor Station 206

Table 1E-10 identifies five residential activities as overlapping with the vegetation ROI for Compressor Station 206. Although the specific impacts on vegetation are unknown, impacts on vegetation may occur. Permanent loss of vegetation associated with construction of Compressor Station 206 represents approximately 0.05 percent of upland forest/woodland land cover type within the ROI. Therefore, the Project will not contribute to significant cumulative impacts on vegetation.

5.5 Fishery Resources

The ROI for cumulative impacts on fishery resources is the HUC 12 area in which the Project pipeline loops and compressor stations are located. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI and that could contribute to cumulative impacts during construction include 10 activities for the Quarryville Loop and nine activities for the Madison Loop and onshore Raritan Bay Loop.

Construction activities associated with the onshore pipeline loops, including typical construction activities from dry crossings, HDD, and withdrawal and discharge of hydrostatic test water, may result in temporary direct or indirect impacts on fisheries. Impacts on fisheries from dry crossing construction activities may include direct or indirect mortality and injury, temporary sensory disturbances, temporary habitat loss/modification, and increased competition/predation. ~~Along the Quarryville Loop, Transco will use HDD, a trenchless construction method, to cross Conowingo Creek and an unnamed tributary of Conowingo Creek.~~ Transco will also use HDD to cross unnamed tributaries of Tennent Brook and Cheesequake Creek and the open-water estuary along the Madison Loop. This crossing method will avoid or minimize effects on fishery resources within the waterbodies. Although unlikely, HDD activities may result in an inadvertent release of drill fluid, causing a temporary increase in turbidity. Hydrostatic testing can impact fish by injury or mortality due to entrainment; by reducing stream flow and supply, increasing sedimentation, and spreading non-native invasive species; and from chemical releases. Hydrostatic testing will use approximately 1.7 million gallons of water from the Muddy Run Reservoir for the Quarryville

Loop and approximately 462,000 gallons from Cheesequake Creek for the Madison/Onshore Raritan Bay Loops.

As described in Section 5.1, the commercial, electricity generation, residential, industrial, solar energy, and transportation activities identified as overlapping with the ROI will not impact surface water and therefore would not affect fisheries.

Typical Construction Activities

Of the pipeline activities within the ROI, construction of the Central Penn Line South segment of Atlantic Sunrise in Lancaster County, Pennsylvania, may occur in the same timeframe as construction of the Quarryville Loop. Construction of the Central Penn Line South segment of Atlantic Sunrise will have similar impacts on fisheries from crossing unnamed tributaries to Fishing Creek in Lancaster County (Transco 2015). The Central Penn Line South impacts on unnamed tributaries of Fishing Creek will occur approximately 0.23 miles from the location of the Quarryville Loop crossing of Fishing Creek. Typical pipeline construction activities will be similar to those of the Project and result in similar impacts, including stream bank disturbances, bank vegetation removal, and the potential modification of flows.

There is a potential for cumulative impacts on fish in Fishing Creek from the Project's construction activities combined with construction of the Central Penn Line South segment of Atlantic Sunrise. As noted in Section 5.1, construction of the Central Penn Line South segment of Atlantic Sunrise will likely be completed as construction of the Quarryville Loop is commencing, so minimal construction overlap is expected. Both activities will also work within construction windows approved by state and federal authorities to protect any fisheries of special concern. Additionally, construction for both activities will be temporary, and water quality will return to baseline conditions following construction. As a result, there will be no significant contribution to cumulative impacts on fisheries from construction.

Withdrawal and Discharge of Hydrostatic Test Water

As noted in Section 5.1 above, construction of the Central Penn Line South segment of Atlantic Sunrise will not withdraw water from the Muddy Run Reservoir for hydrostatic testing and therefore will not contribute to cumulative impacts on fisheries. There is a potential cumulative impact on fisheries from water withdrawal for hydrostatic testing of the Madison Loop when combined with withdrawal of water for the Middlesex Energy Center. However, hydrostatic testing will be temporary. Water withdrawals for construction will occur using screens placed on intake hoses and in a manner that will not reduce water flow to a point that would impair flow or impact

fish and recreational uses. Therefore, the Project will not contribute to cumulative impacts on fisheries from the withdrawal and discharge of water for construction.

5.6 Wildlife

The ROI for cumulative impacts on wildlife is the HUC 12 area in which the pipeline loops and compressor stations are located. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI and that could contribute to cumulative impacts during construction include 10 activities for the Quarryville Loop, 10 activities for the Madison/Raritan Bay Loops, 13 activities for Compressor Station 200, and five activities for Compressor Station 206.

In general, construction of a pipeline project may directly injure or kill wildlife by collisions with vehicles and equipment, mobile species traversing workspaces (particularly during breeding season), herbicide use, accidental fires, and open trenches potentially resulting in falls. Temporary impacts on wildlife can result from sensory disturbances from displacement, stress, and potential disorientation by artificial lights. Short-term impacts on wildlife can result from habitat loss/modification and increased predation.

Quarryville Loop

The 10 activities identified as overlapping with the wildlife ROI for the Quarryville Loop include two commercial, two electricity generation, one industrial, two pipeline, one solar energy, and two major transportation activities. Construction of the industrial, solar energy, electricity generation, and one of the pipeline (Rock Springs Expansion) activities identified as overlapping with the ROI will not occur at the same time as Project construction. The two major transportation activities and the two commercial activities identified as overlapping with the ROI will likely include potential impacts on wildlife. Impacts on wildlife from construction of the Central Penn Line South segment of Atlantic Sunrise will be very similar to those of the Project and will likely include potential mortality/injury, sensory disturbances, habitat modification/loss, and increased predation. However, both projects will minimize impacts on wildlife to the extent practicable by implementing BMPs, avoiding habitat areas of concern when practicable, restoring workspaces after construction, and mitigating affected wetland wildlife habitat. Most impacts will be temporary and will cease after construction.

Madison/Raritan Bay Loops

The activities identified as overlapping with the wildlife ROI for the Madison/Raritan Bay Onshore Loops include one commercial/residential, one electricity generation, two pipeline, three residential, and three transportation activities. Construction of the commercial/residential,

electricity generation, residential, and transportation activities identified as overlapping with the ROI may affect wildlife; however, specific impacts are unknown. One pipeline activity and one transportation activity within the ROI occurred prior to 2017 and may have affected wildlife; however, the specific impacts are unknown. The two remaining transportation activities, Route 9/35 Main Street Exchange and U.S. Route 9-Bordentown Avenue-Kenneth Avenue, consist of major improvements to existing roads and may also affect wildlife.

Compressor Station 200

Table 1E-9 identifies three commercial, six residential, two commercial/residential, and two pipeline activities as overlapping with the wildlife ROI for Compressor Station 200. Although the specific impacts on wildlife are unknown, these developments are large enough that impacts on wildlife may occur. Because the Project's expansion at Compressor 200 will be modifications to an existing facility, there will be no contribution to cumulative impacts on wildlife.

Compressor Station 206

Table 1E-10 identifies five residential activities as overlapping with the wildlife ROI for Compressor Station 206. Although the specific impacts on wildlife are unknown, these developments are large enough that impacts on wildlife may occur.

Table 1E-12 shows the combined impact of construction of the Central Penn Line South segment of Atlantic Sunrise and the Quarryville Loop from removal and modification of vegetation that is potential wildlife habitat. The Project and Atlantic Sunrise will use similar measures to avoid, minimize, and mitigate impacts on wildlife habitat, including restoring disturbed vegetation, following BMPs to minimize impacts, co-locating with existing ROWs to the extent practicable, and taking appropriate action if areas do not revegetate properly. As a result, the Project will not contribute to a significant cumulative impact on wildlife or wildlife habitat.

5.7 Cultural Resources

Transco is submitting the following update to reflect the results of Transco's cultural resources investigations as included in Transco's June 6 and June 30 Supplemental Information Filings.

The region of influence (ROI) for cumulative impacts on archaeological resources would be the direct area of potential effect (APE), the immediate area of ground disturbance around Compressor Station 206. Construction of Compressor Station 206 will avoid the three archaeological sites in the vicinity of the project site that are outside of the APE. In addition, as shown in Tables 1E-7 through 1E-10, no activities that could result in cumulative impacts overlap

the Compressor Station 206 APE or ROI. **In addition, no direct or indirect impacts will occur on architectural properties or historic districts listed on the National Register of Historic Places near Compressor Station 206.** The proposed site of Compressor Station 206 is **TBD** associated with any historic architectural resources. *(The historic architectural assessment will be provided in a supplemental filing in the 2nd quarter of 2017.)*

Since no activities will occur that overlap the ROI of Compressor Station 206, **and no direct or indirect impacts on archaeological or architectural resources that are historical properties will occur**, there is no potential for cumulative impacts on archaeological or architectural resources from construction of Compressor Station 206.

5.8 Socioeconomics

The ROI for cumulative impacts on socioeconomics is the county or counties in which the pipeline loops and compressor stations are located. Tables 1E-7 through 1E-10 identify activities located within the socioeconomic ROI, including 11 activities for the Quarryville Loop, 16 activities for the Madison/Raritan Bay Loops, 16 activities for Compressor Station 200, and 12 activities for Compressor Station 206. Of these, only some will have construction periods that potentially overlap the construction periods of the Project facilities.

The construction activities associated with the Project will result in temporary beneficial impacts on the economy, employment, and income; housing; and taxes and revenues. Specifically, the economies within the ROI will benefit during the period of construction from Transco's purchases of locally available materials and services, workers' expenditures of a portion of their salaries, and the indirect and induced economic and employment effects that are supported by Transco's and the associated workforce's local spending. Direct economic benefits from the Project include a payroll of \$41 million and local material purchases of \$18 million in Pennsylvania and a payroll of \$39 million and local material purchases of \$17 million in New Jersey. The construction jobs themselves will be an employment benefit for the local and non-local workers that Transco hires and an indirect benefit for the local communities. Rental housing and accommodation vacancy rates within the ROI will temporarily decrease during construction of the Project facilities, creating a temporary benefit for the proprietors and for the communities in the form of hotel taxes. Project-related spending and the Project workforce will generate sales and use taxes at the state and municipal levels, benefiting the local jurisdictions in which the loops and compressor stations are located. During operation of the Madison/Raritan Bay Loop and Compressor Station 206, these facilities will generate \$1.25 million in annual property taxes to the affected municipalities in New Jersey (estimated \$775,000 to Old Bridge Township, \$225,000

to Sayreville Borough, and \$25,000 to Franklin Township). The underground portions of natural gas transmission pipelines are exempt from property taxes in Pennsylvania (including Public Utility Realty Tax and the Realty Transfer Tax). However, local governments may impose applicable property taxes on aboveground facilities. The expanded Compressor Station 200 facility in East Whiteland Township may generate additional property taxes above its current assessed rate when it becomes operational.

Economy, Employment, and Income, Housing, and Taxes and Revenues

The activities within the socioeconomic ROI that may overlap the Project facilities' construction period include six activities for the Quarryville Loop, nine activities for the Madison/Raritan Bay Loops, 12 activities for Compressor Station 200, and nine activities for Compressor Station 206. Overlapping activity types include pipelines, electricity generation, major transportation, industrial, commercial, commercial/residential, and residential, in descending order of socioeconomic impact intensity.

Construction associated with large-scale development for pipelines, electricity generation, major transportation, and industrial activities frequently create large (>100 person) construction workforces and employment opportunities, increased spending in the local communities, and indirect economic effects that support jobs, incomes, and profits in related industries. Associated with the large construction workforces are a demand for temporary housing and accommodations in the local communities during the period of construction. Typically, hiring locally and within commuting distance of the construction location mitigates this demand. The workforce that seeks temporary housing benefits the local economies by renting housing and accommodations, temporarily decreasing vacancy rates and generating local hotel tax revenues. During construction, activities of this magnitude generate temporary sales and use tax revenues for the local and state jurisdictions through construction-related purchases of materials and services and spending by the construction workforces. During operation, aboveground pipeline facilities and electricity-generation activities typically generate property taxes for local jurisdictions. Property taxes are also assessed on underground pipelines in New Jersey municipalities, but underground pipelines are exempt from property taxes in Pennsylvania.

Construction of commercial, residential, and non-major transportation activities typically generates relatively smaller-scale workforces, local spending, housing demands, tax revenues, and indirect economic benefits. However, they could potentially create noticeable socioeconomic effects and benefits in the local community. Many of the commercial, residential, and commercial/residential activities identified in Tables 1E-7 through 1E-10 met thresholds of at least

100,000 square feet or 50 units of proposed development. Given their scale, construction of these activities along with the Project facilities could potentially contribute to a temporary cumulative impact on employment, housing, and economic and tax benefits. However, these activities would not likely compete for the same workers as pipeline, electricity generation, and major transportation activities, nor would their temporary demand for worker housing be as high.

There is a potential for cumulative socioeconomic benefits in Lancaster and Middlesex counties from construction of the activities within the ROI when combined with the Quarryville and Madison/Raritan Bay Loops. One pipeline and three major transportation activities overlap the Quarryville Loop, and one electricity generation and three major transportation activities overlap the Madison/Raritan Bay Loops. These are large-scale developments that will require large construction workforces, increase spending in the local communities, and create indirect economic effects that support jobs, incomes, and profits in related industries. One non-major transportation activity overlaps the Madison/Raritan Bay Loops' construction, but because it consists of safety and operational improvements to one or more roadways in Sayreville Borough, Middlesex County, its contribution to socioeconomic cumulative impacts is expected to be negligible. The commercial and residential activities with overlapping construction periods will produce beneficial socioeconomic effects and are not expected to create adverse effects from demands on housing or labor supply. The cumulative effects of these activities with the Project will be temporary (i.e., limited to the construction periods) and proportional to the relatively short lengths of the Quarryville and Madison/Raritan Bay Loops (approximately 10 miles and 3 miles, respectively).

There is a potential for cumulative socioeconomic impacts in Chester and Somerset counties from construction activities within the ROI when combined with Compressor Station 200 and Compressor Station 206. One pipeline potentially overlaps Compressor Station 200 construction and one pipeline and one industrial activity potentially overlap Compressor Station 206 construction. These are large-scale developments that will require large construction workforces, increase spending in the local communities, and create indirect economic effects that support jobs, incomes, and profits in related industries. The remaining construction activities are commercial, residential, and transportation activities. The cumulative socioeconomic effect of construction associated with the activities listed above when combined with construction of the Compressor Station 200 expansion and Compressor Station 206 will be beneficial and temporary.

During operation, the Madison/Raritan Bay Loops, Compressor Station 206, and the expanded portion of Compressor Station 200 will generate new, permanent tax benefits from

property taxes assessed by the local jurisdictions in New Jersey and Pennsylvania. In Pennsylvania, underground portions of natural gas transmission pipelines are exempt from ad valorem property taxes; however, local Pennsylvania taxing entities may tax aboveground facilities. In addition, the activities within the ROI of the Madison/Raritan Bay Loop, Compressor Station 206, and Compressor Station 200 will likely generate property taxes (with the exception of underground pipelines in Pennsylvania). The socioeconomic benefit of the above activities, when combined with Madison/Raritan Bay Loop and Compressor Station 206, may be significant and permanent.

5.9 Transportation

Transco is submitting the following update to reflect the results of Transco's onshore transportation analysis submitted as part of Transco's June 6, 2017 Supplemental Information Filing. Based on the Supplemental Information to Resource Report 5 (Attachment 1 to Volume 1 dated June 6, 2017), Project impacts to traffic and transportation resources would be negligible. As a result, the Project will not contribute to cumulative impacts on traffic and transportation. The scope of the cumulative impacts analysis only includes resources directly or indirectly affected by the Project, therefore the text below which was included in Transco's Certificate Application dated March 27, 2017 is being removed.

~~The ROI for cumulative impacts on transportation extends outward 1 mile from the workspaces during construction of the pipeline loops and compressor stations. Tables 1E-7 through 1E-10 identify activities located within the transportation ROI. Of those, only some have construction periods that will potentially overlap the Project facilities, including one activity for the Quarryville Loop, two activities for the Madison/Raritan Bay Loops, and two activities for Compressor Station 200. No activities potentially overlap Compressor Station 206.~~

~~Construction of the Project facilities will result in a temporary increase in traffic from worker commutes and material deliveries. In addition, construction of the Quarryville and Madison/Raritan Bay Loops across roadways (except any crossings using HDD) will require diversion of traffic to alternate routes. The potential effect of these traffic impacts will be to delay non-Project roadway users.~~

~~Of the activities that overlap the transportation ROI and construction period, only one is a major, non-residential activity, which may generate traffic impacts. Construction of the Central Penn Line South segment of Atlantic Sunrise may overlap with the Quarryville Loop construction~~

period. As with the Quarryville Loop, construction traffic associated with Central Penn Line South will consist of worker commutes and material deliveries by heavy and light trucks. In addition, the Central Penn Line South road crossings that do not involve HDD will require temporary traffic diversions of non-Project vehicles.

Two residential activities overlap the Madison/Raritan Bay Loops' transportation ROI and two overlap Compressor Station 200's transportation ROI, and both may overlap temporally with construction of the Project. None of the residential developments' construction start dates are known, so to be conservative, their potential cumulative construction impacts are considered. The workforce commuter trips and material delivery trips associated with these residential developments could contribute to a temporary increase in traffic; none of the residential developments are expected to cause traffic diversions or require construction across roadways.

There is potential for cumulative impacts on transportation from construction of the activities described above when combined with the Quarryville Loop, Madison/Raritan Bay Loops, and Compressor Station 200. Transco will submit a Traffic and Transportation Management Plan and will institute BMPs to minimize any disruptions of traffic and create reasonable alternate routes for vehicles and non-motorized vehicles in instances where those might be necessary. Similar BMPs will be implemented during construction of the Central Penn Line South segment of Atlantic Sunrise. The cumulative effects will be temporary and limited to the brief construction period. Therefore, the onshore Project facilities will not contribute significantly to cumulative impacts on traffic during construction.

5.10 Geology

The ROI for cumulative impacts on geologic resources are the temporary and permanent workspaces for the pipeline loops and compressor stations. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI that could contribute to cumulative impacts during construction include two activities for the Quarryville Loop.

Karst terrain causes land subsidence, the local downward movement of surface material when subsurface cavities collapse and groundwater levels decline. A limited extent of potential karst terrain (0.4 mile) is located along the easternmost end of the Quarryville Loop. *(Karst investigations are being carried out along the Quarryville Loop, and a summary report and discussion of impacts will be provided in a supplemental filing in the 2nd quarter of 2017.)*

The two activities identified as overlapping with the ROI for the Quarryville Loop include two pipeline activities that may be affected by geologic hazards such as karst terrain. Of the two

identified pipeline activities within the ROI, the Rock Springs Expansion project has already been completed. However, construction of the Central Penn Line South segment of Atlantic Sunrise will occur in the same timeframe as construction of the Quarryville Loop in 2018. The Central Penn Line South segment of Atlantic Sunrise will cross 27.8 miles of karst terrain, of which 16.3 miles occur in Lancaster County.

There is potential for cumulative impacts on karst terrain from construction of the Central Penn Line South segment of Atlantic Sunrise when combined with the Quarryville Loop. Construction of Central Penn Line South will overlap temporally with construction of the Quarryville Loop, and construction of both will cross karst topography. However, Transco will implement sufficient measures to prevent adversely affecting a shallow, potential sinkhole-related feature, and other methods for removing shallow bedrock (e.g., expansive grouts) will be evaluated, designed, and implemented. As a result, there will not be a significant cumulative impact associated with karst terrain.

5.11 Soils

The ROI for cumulative impacts on soils are the temporary and permanent workspaces for the pipeline loops and the new compressor station. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI that could contribute to cumulative impacts during construction include two activities for construction of the Quarryville Loop and one activity for construction of the Madison/Raritan Bay Loops. No activities overlap the ROI for Compressor Station 206; therefore, no cumulative impacts on soils will occur within the ROI for Compressor Station 206.

Construction activities associated with the pipeline loops and compressor station will result in temporary direct or indirect impacts on soils—specifically, soil compaction and disturbance of fragipan and agricultural soils on the Quarryville Loop and Madison/Raritan Bay Loops. Soil compaction can affect soil productivity, e.g., by impacting surface hydrology and root growth. Unintentional mixing of the fragipan horizons within the overlying soil horizons has the potential to degrade agricultural productivity. Disturbances of farmland may result in short-term decreases in agricultural productivity. Construction also has the potential to disturb previously contaminated soils. Seven active sites with confirmed contamination occur within 0.25 mile of the Madison/Raritan Bay Loops and the proposed site for Compressor Station 206.

Compaction and Disturbance of Soils

The two pipeline activities identified as overlapping with the ROI for the Quarryville Loop may include impacts on soils. Of the two identified pipeline activities within the ROI, the Rock

Springs Expansion project has already been completed. However, construction of the Central Penn Line South segment of Atlantic Sunrise will occur in the same timeframe as construction of Quarryville Loop in 2018.

The one activity identified as overlapping with the ROI for the Madison/Raritan Bay Onshore Loops is the New York Bay Expansion. Construction of this activity was completed in 2016; therefore, this activity will not contribute to cumulative impacts on soil disturbance from construction of Madison/Raritan Bay Onshore Loops.

There is potential for cumulative impacts on soil from construction of the Central Penn Line South segment of Atlantic Sunrise and the Quarryville Loop. However, for both activities, Transco will prevent permanent soil compaction by testing topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Transco also will plow severely compacted agricultural areas and subsoil before replacing segregated topsoil. If subsequent construction and cleanup activities result in further compaction, Transco will conduct additional tilling. If Transco identifies fragipan soils in agricultural areas, proper handling during excavation will prevent unintentional mixing of the fragipan soils within the overlying soil horizons. As a result, construction of the Quarryville Loop will not contribute to cumulative impacts from compaction and disturbance of soils.

Disturbance of Contaminated Soil

No activities overlap with the ROI for Compressor Station 206. However, one pipeline activity overlaps with the ROI for the Madison/Raritan Bay Onshore Loops. Construction of the New York Bay Expansion occurred in 2016. As a result, this activity will not contribute to cumulative impacts on contaminated soil from construction of the Madison/Raritan Bay Onshore Loops. In addition, if contamination is encountered, Transco will adhere to its Unanticipated Discovery of Contamination Plan and Materials Management Plan to mitigate potential impacts (see Attachment 1B-8 to RR 1). Transco will monitor excavations during construction for evidence of potential contamination. As a result, there will be no cumulative impacts on soil contamination from construction of the Madison/Raritan Bay Loops and Compressor Station 206.

5.12 Land Use

The ROI for cumulative impacts on land use extends outward 1 mile from the construction and operation of the pipeline loops and compressor stations. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI that could contribute to cumulative impacts include five activities for the Quarryville Loop, three activities for the Madison/Raritan Bay Loops, four

activities for Compressor Station 200, and one activity for Compressor Station 206. The one residential activity overlapping with the ROI for Compressor Station 206 does not overlap temporally with construction.

The construction activities associated with the pipeline loops and compressor stations will result in temporary direct or indirect impacts through disturbances at recreational areas. During construction, impacts on recreational areas may include noise and dust from equipment, temporary traffic delays when equipment is being moved, and the visual effects from removing vegetation and excavating soils. Transco will use water trucks to limit dust and notify recreational areas prior to construction activities, such that impacts will be short-term and temporary. In addition, the Madison/Raritan Bay Loops are within 0.25 mile of seven landfill/hazardous waste sites, and Compressor Station 206 is within 0.25 mile of two landfill/hazardous waste sites.

Construction Near Recreational Areas

The five activities identified as overlapping with the land use ROI for construction of the Quarryville Loop include one industrial, one major transportation, one solar, and two pipeline activities that may include impacts on recreational areas. Of the two pipeline activities within the ROI, Atlantic Sunrise construction may occur in the same timeframe as construction of the Quarryville Loop; however, the Rock Springs Expansion Project has already been completed. The Atlantic Sunrise construction will not affect the same recreational areas crossed by the Quarryville Loop (Muddy Run Recreation Park, Muddy Run State Game Lands, Silver Top Stables, and Fishing Creek Nature Preserve). The one major transportation activity, the Penn RBR: South Lime Street Bridge Project, will not overlap temporally with construction and operation of the Quarryville Loop, as bridge replacement will take place over an eight-month period in 2020. In addition, the activity is not located near a recreational area crossed by the Quarryville Loop. Construction of the expansion at the Scalpy Hollow Timber sawmill and Keystone Solar Project are complete; therefore, no cumulative impacts are expected.

There is no potential for cumulative impacts on recreational areas from construction of the activities above when combined with construction of the Quarryville Loop.

Impacts on Landfills and Hazardous Waste Sites

The four activities identified as overlapping with the ROI for the Madison/Raritan Bay Onshore Loop include two pipeline and two residential activities that may include construction activities with potential impacts on seven contaminated sites within 0.25 mile of the Project workspace. One of the two residential activities, La Mer Development, was constructed in 2016

and thus will not contribute to cumulative impacts on landfills and hazardous waste sites. Although the Windermere Townhomes development has not yet been constructed and may overlap with the construction period of the Madison/Raritan Bay Loops, it is unlikely to contribute to cumulative impacts on landfills and hazardous waste sites because it will not be located in those areas. The two pipeline activities, the New York Bay Expansion project and New York New Jersey (NYNJ) Expansion project, were constructed in 2016 and 2012, respectively. As a result, there is no potential for cumulative impacts on landfills and hazardous waste sites from the above activities when combined with construction of the Madison/Raritan Bay Onshore Loop.

The one residential activity identified as overlapping with the ROI for Compressor Station 206 occurred in 2016. Therefore, landfills and hazardous waste sites will not be disturbed at the same time. As a result, there is no potential for cumulative impacts on landfills and hazardous waste sites from this activity when combined with the construction of Compressor Station 206.

5.13 Air Quality

The ROI considered in the evaluation of onshore cumulative air quality impacts includes the regional airshed within 10 miles of the air emission sources associated with the Project. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI that could contribute to cumulative impacts include two activities for the Quarryville Loop, two activities for the Madison/Raritan Bay Loops, two activities for Compressor Station 200, and 19 activities for Compressor Station 206.

Construction Emissions

Construction of the activities identified in Tables 1E-7 through 1E-10 and the ongoing development of gas production reserves are all expected to involve the use of construction equipment that will generate emissions of pollutants such as carbon monoxide (CO), particulate matter (PM₁₀ and PM_{2.5}), sulfur dioxide (SO₂), and nitrogen oxides (NO_x).

As described in Section 9.2.4.1 of RR 9, construction will result in temporary emissions from fugitive dust, construction vehicles, and equipment. The majority of air emissions generated during onshore construction will be particulate matter in the form of fugitive dust that will result from clearing, grading, excavation, and vehicle traffic on roadways. However, major activities identified Tables 1E-7 through 1E-10 would implement fugitive dust control plans to comply with federal, state or local requirements. The cumulative effects will be temporary and limited to the brief construction period. Therefore, the Project will not make a significant contribution to cumulative impacts on air quality during construction.

Construction emissions will occur in the Northern New Jersey, New York, and Connecticut (N.NJ-NY-CT) area, an ozone nonattainment area. The combined emissions from onshore and offshore trigger a general conformity review based on NO_x emissions in the N.NJ-NY-CT ozone nonattainment area. However, Transco will offset NO_x emissions by an air quality project, which will ensure that the NO_x emissions conform to the applicable State Implementation Plan and will not interfere with plans to attain or maintain compliance with National Ambient Air Quality Standards. Full mitigation of NO_x emissions is required under General Conformity, therefore, the Project will not contribute to cumulative impacts on ozone nonattainment.

Operational Emissions

Transco will construct and operate Compressor Station 206, a new 32,000 ISO (International Organization for Standardizations) hp compressor station. Table 1E-10 identifies all past, present, and reasonably foreseeable activities that occur or are proposed to occur within 10 miles from Compressor Station 206. Air quality modeling completed for the proposed operational emissions from Compressor Station 206 demonstrates that emissions, including existing background air quality, will not cause or contribute to a violation of the National Ambient Air Quality Standards. Therefore, operation of Compressor Station 206 will not contribute to cumulative air quality impacts.

Greenhouse Gases and Climate Change

Although climate change is a global concern, this cumulative analysis considers the potential cumulative effects of climate change in the area of the Project. Greenhouse gas (GHG) emissions are a primary cause of climate change. Emissions of GHGs from the Project and all past, present, and reasonably foreseeable activities identified in Table 1E-10 would not have any direct effects on the environment in the area of the Project.

Currently, there is no standard methodology to determine how the proposed Project's relatively small incremental contribution to GHGs would translate into physical effects of the global environment. The GHG emissions from the construction and operation of the Project along with past, present, and reasonably foreseeable actions would be negligible compared to the global GHG emission inventory. Therefore, neither the construction nor operation of the Project would contribute to GHG cumulative effects or climate change.

5.14 Noise

The ROI for cumulative impacts on noise is 0.25 mile from the pipeline loops and compressor stations during construction and 1 mile from the compressor stations during

operation. There are no noise impacts from operation of the pipeline loops. As shown in Tables 1E-7 through 1E-10, activities that overlap the ROI and could contribute to cumulative impacts during construction and operation include two activities for the Quarryville Loop and two activities for the Madison/Raritan Bay Loops.

HDD activities during construction associated with the pipeline loops will result in temporary direct impacts on noise-sensitive areas (NSAs). HDD crossings use noise-generating equipment at both entry and exit sites. NSAs within 0.5 mile of all planned HDD crossings include residential areas, with the nearest at a distance of 120 feet from an HDD exit site. HDD activities will generate relatively high noise levels for long periods during construction. Noise attributable to the drill operations at some of the HDD entry and exit sites could exceed the sound level guideline of 55 decibels at the closest NSAs. In addition, due to the potential for operating during nighttime hours, HDD operations could affect NSAs.

During operation, this Project will be required to comply with FERC noise regulations in 18 CFR 157.206[d][5], which require that the noise attributable to any compressor engine or modifications during full-load operation not exceed a day-night average sound level (Ldn) of 55 dBA at any noise-sensitive areas.

Quarryville Loop

~~The two pipeline activities identified as overlapping with the ROI for the Quarryville Loop may have noise impacts during construction. Of the two pipeline activities within the ROI, only Atlantic Sunrise has the potential to occur in the same timeframe as construction of the Quarryville Loop in 2018. Three HDD crossings would take place during construction of the Central Penn Line South segment of Atlantic Sunrise. Noise impacts from Atlantic Sunrise would also occur during site grading, clearing, grubbing, and trenching operation and, overall, could contribute to noise impacts within the ROI. However, the nearest HDD crossing for Atlantic Sunrise is approximately 10 miles north of the Quarryville Loop workspace (Transco 2015). Noise impacts from use of construction equipment for site clearing, grading, excavations, and HDD are generally limited to within 0.25 mile because noise attenuates quickly in air. Therefore, there is no potential for cumulative impacts from noise.~~

Madison/Raritan Bay Loops

The one pipeline and two residential activities identified as overlapping with the ROI for the Madison/Raritan Bay Onshore Loop may include noise impacts. One of the residential activities, La Mer Development, was constructed in 2016. The construction date for the

Windermere Townhomes development is not known and may overlap with the construction period of the Madison/Raritan Bay Loops. Noise impacts from construction may result from the use of equipment for site clearing and grubbing. Noise from this activity is expected to be negligible. Construction of the New York Bay Expansion occurred in 2016, and operation is scheduled to begin in 2017. This activity does not overlap temporally with construction of the Madison/Raritan Bay Loops and will not contribute to cumulative impacts from noise. Therefore, the HDD crossings for the Madison/Raritan Bay Loops will not contribute to cumulative noise impacts in the ROI.

6 Assessment of Offshore Cumulative Impacts

Transco is adding the following information regarding proposed wind farms near the Project area in New York State waters per FERC's Environmental Information Request number 4 dated July 21, 2017.

This analysis compares the incremental impacts of the offshore components of the Project with the potential cumulative impacts of past, present, and reasonably foreseeable future activities considered. Publicly available information, including applications filed with federal and state agencies, professional judgment, and desktop analysis provided quantitative and qualitative information on the magnitude and nature of impacts of past, present, and reasonably foreseeable future activities to determine the potential for cumulative impacts on the resources affected. Trends in past and current activities, such as ongoing operation and maintenance, and their environmental impacts were projected into the future for the expected life of the Project.

The Project's offshore facilities will have greater than negligible direct or indirect impacts on the resources listed in Table 2-2 in Section 2. The impacts on these resources were analyzed to determine incremental contributions to cumulative impacts. Table 1E-13 lists the activities identified for consideration in the cumulative impacts analysis of offshore components, and Table 1E-14 lists the activity types, potential adverse impacts, and the permits that are likely to be required. Table 1E-15 identifies the offshore ROIs and the rationale for each ROI based on the types of impacts from the Project. Figures 1E-13 and 1E-14 in Attachment 1 show the locations of each of the offshore activities listed in Table 1E-13 that occur within the ROI of the offshore Raritan Bay Loop, the ROIs for each resource examined, and the locations of significant landmarks discussed in the assessment of cumulative impacts. Table 1E-16 identifies the activities that overlap in time or overlap the offshore geographic ROI for the resources examined.

The Neptune Cable utilities activity and the Rockaway Delivery Lateral pipeline activity (see Table 1E-13) are within the ROI for all resource areas of the offshore Raritan Bay Loop.

However, construction occurred prior to 2014 and these activities have negligible impacts associated with their operation. The D&R Canal Dredging, Empire State Connector, Plumb Beach Storm Drainage Reduction, Rockaway to Norton Point Storm Damage Reduction, Sandy Hook Dredging, and Sea Bright to Manasquan Storm Damage Reduction activities were determined to not overlap with the ROI. Therefore, these activities will not contribute to offshore cumulative impacts associated with construction of the offshore Raritan Bay Loop and are not considered further in this evaluation.

The Statoil Wind US, LLC and NYSERDA Master Plan offshore wind activities (see Table 1E-13) are not within the region of influence (ROI) for all resource areas of the offshore Raritan Bay Loop and are unlikely to overlap with the construction timeframe. The ROI for cumulative impacts on surface water resources is hydrologic unit code HUC 12, which coincides with the 3 nautical mile (nm) New York State boundary. The Statoil Wind US, LLC lease is near the 12 nm territorial sea boundary, well beyond the state boundary. The NYSERDA Master Plan study area is intended to encompass any potential wind farm in that area and is beyond the 12 nm territorial sea boundary.

In general, the development of offshore wind projects requires a multi-year permitting process prior to construction. Neither of these activities are in the permitting process; thus, the construction of the offshore Raritan Bay Loop would be completed prior to the construction of any offshore wind activities. Offshore wind projects also require a submarine transmission cable from an offshore substation to an onshore substation. The landfall location for the cable may occur anywhere along the coastline, depending on the location of the offshore wind farm. Each wind farm may connect directly to the onshore grid via one transmission cable, or multiple wind farms may connect to one transmission cable, or a combination of these options. At this time both of these offshore wind projects are in the planning stage; therefore, the location of the submarine cable systems for offshore wind activities is speculative and not reasonably foreseeable at this time. For the above reasons, offshore wind activities are not considered further in this evaluation.

Table 1E-17 summarizes potential cumulative impacts of the activities considered in the analysis based on publicly available quantitative information, the desktop analyses, and the Project's incremental contribution. The analysis did not quantify impacts on a specific resource area when the activities did not overlap the offshore geographic ROI, indicated by "NO" in Table 1E-16. The following sections discuss the potential cumulative impacts as a result of the activities considered and the Project's incremental contribution.

6.1 Surface Water

Transco is submitting the following update to reflect the results of Transco's hydrodynamic sediment modeling. The results of the analysis support the qualitative assessment that turbidity conditions return to normal shortly after sediment-disturbing activities occur.

The ROI for cumulative impacts on surface water resources is the HUC 12. As shown in Table 1E-16, 11 activities overlap the surface water ROI and could contribute to cumulative impacts on surface water, including seven channel maintenance and dredging activities, one pipeline, two storm damage reduction activities, and one utilities activity.

Dredging, trenching, and backfilling for installation of the offshore Raritan Bay Loop will cause sediment disturbance and turbidity during the estimated 12-month construction period. However, excavation at any given location along the route will generally be limited to periods as short as a few hours and as long as a few weeks. Considering sediment type, the strength of the currents in the offshore Project area, and the duration and rate of sediment-disturbing activities **described in the Hydrodynamic and Sediment Transport Modeling Results – Base Case Simulations (see Attachment 8)**, ambient turbidity conditions **are expected to return between 0.7 to 12.5 hours and within 0 to 4,331 feet** shortly following completion of each proposed offshore excavation activity. **Subsequent to filing its FERC Application, Transco decided to install the pipeline in certain offshore areas using a jet trencher to minimize turbidity impacts. The jet trencher enables pre-installed pipeline to be lowered into emulsified sediments without the direct removal or excavation of the underlying sediment.** ~~(Results of the hydrodynamic sediment modeling and a complete analysis of potential effects from Project-related suspended sediments will be provided in a supplemental filing in the 2nd-quarter of 2017.)~~

Most of the channel maintenance and dredging activities within the ROI are ongoing activities with similar impacts and may overlap temporally with construction of the offshore Raritan Bay Loop. Four of these activities are not ongoing or would be unlikely to overlap temporally because of the infrequency of dredging—the Jamaica Bay Dredging and Beach Nourishment, Great Kills Harbor Dredging, the New York Harbor Maintenance Dredging, and the New York Harbor Maintenance Dredging. The Great Kills Harbor Dredging will occur from deep water in Lower New York Bay to the entrance of the New York Harbor for 1.9 miles along its west side. Previous maintenance dredging occurred in 2003 and 2014, indicating the frequency of dredging for this location will not overlap with construction of the offshore Raritan Bay Loop. Maintenance

dredging activities will occur on waterways that are historically federal navigation projects. As shown on Figure 1E-13 in Attachment 1, the New York Harbor Deepening and related activities will occur from deep water in the Atlantic Ocean through the Ambrose Channel in Raritan Bay and into the Upper New York Bay. The New York and New Jersey Harbor Deepening, initiated in 1989 and completed in 2016, consisted of providing 50-foot-deep water access to six container terminals in the Ports of New York and New Jersey. Because completion of the deepening occurred in 2016, New York Harbor maintenance dredging is not likely to occur in 2019 during construction of the offshore Raritan Bay Loop. The purpose of the New York Harbor maintenance activity is to reduce navigation hazards and damages by removing abandoned piers, wharves, derelict vessels and debris, and repairing deteriorated shore structures; there is some potential for temporary disturbances to sediment and turbidity. Two storm damage reduction activities were identified as overlapping with the surface water ROI. The Jones Beach Inlet to East Rockaway Phase I Groin Construction completed construction and does not overlap temporally. The Jones Beach Inlet to East Rockaway Phase II Beachfill, located more than 8 miles from the offshore Raritan Bay Loop, may disturb sediment and temporarily increase turbidity, returning to ambient conditions shortly following completion.

The Lower New York Bay Extension Maintenance activity will occur at 10 sections of the existing pipeline, most of which is located in close proximity to the offshore Raritan Bay Loop. Maintenance activities will lower the pipeline using a dynamic positioning-enabled vessel affecting an approximately 5-foot wide trench and approximately 12.5 feet on either side of the trench where the displaced sediments will settle. Following completion of the Lower New York Bay Extension Maintenance trench excavation and pipeline lowering, Transco will immediately backfill the trench using the excavated sediments, thereby stabilizing any displaced sediments. Overall, the activity is not expected to result in an increase in turbidity. The activity will occur between September and October 2017 and will not overlap the timeframe for construction of the offshore Raritan Bay Loop (Transco 2017).

The proposed route of the submarine segment of the Poseidon high voltage direct current (HVDC) submarine cable is parallel to the existing Neptune RTS cable, which runs underground and underwater from Sayreville, New Jersey, to New Cassel, New York, and began operation in 2007. Based on its co-location with the Neptune cable, the alignment of the Poseidon cable will cross the alignment of the offshore Raritan Bay Loop at two distinct locations, as shown in Figure 1E-14 in Attachment 1. The Poseidon HVDC installation will include jet plow embedment, HDD installation, and dredging within a temporary cofferdam at the New York landfall location, and

these activities will generate suspended sediments temporarily during installation of the cable (Poseidon 2013). If construction of the Poseidon HVDC submarine cable is likely to overlap with the Project construction, Transco will coordinate construction such that both activities do not occur concurrently at either of the crossing locations, thereby minimizing the potential for a cumulative impact.

Cumulative impacts on Raritan Bay from sediment disturbance and turbidity during construction of the above activities may occur when combined with construction of the offshore Raritan Bay Loop if the activities occur at the same time. The effects of the activities on surface water will be temporary, and water quality will return to baseline conditions following completion of each activity. **As noted above, the modeled distance to which ambient conditions return represents a small portion of HUC 12, which is the ROI for fishery resources.** As a result, there will be no significant contribution to cumulative impacts on surface water from construction of the offshore Raritan Bay Loop. ~~(Results from the sediment transport modeling will be filed in a supplemental filing in the 2nd quarter of 2017.)~~

6.2 Fishery Resources

Transco is submitting the following update to reflect the information in Table 2.3-12 of the final Resource Report 2.

The ROI for cumulative impacts on fishery resources is HUC 12. As shown in Table 1E-16, 11 activities overlap the ROI and could contribute to cumulative impacts, including seven channel maintenance and dredging activities, one pipeline, two storm damage reduction activities, and one utility activity. As noted above in Section 6.1, five channel maintenance and dredging activities and the Jones Beach Inlet to East Rockaway Phase I Groin Construction storm damage reduction activity do not overlap temporally with construction of the offshore Raritan Bay Loop and will not contribute to cumulative impacts.

The construction activities of dredging, trenching and excavation, HDD, pile driving, and ~~TBD~~ withdrawal and discharge of hydrostatic test water may result in direct or indirect impacts on resources such as fish and benthic communities. These impacts would be due to the disturbance of sediments, increased turbidity, noise, and visual disturbances. Impacts from typical construction activities include mortality, injury, sensory disturbance, and temporary habitat loss and modification. Within the direct footprints of the HDD entry and exit pits, as well as any steel piles and spuds, 100% mortality of the sessile and slow-moving benthic community is assumed. HDD activities will not disturb the seafloor between the entry and exit pits. Transco is

consulting with the New Jersey Department of Environmental Protection (NJDEP), New York State Department of Environmental Conservation (NYSDEC), and NOAA Fisheries regarding appropriate strategies for mitigating any unavoidable adverse impacts that Project construction may have on fishery resources. *(Additional information resulting from consultation with the NJDEP, NYSDEC, and NOAA Fisheries will be provided in a supplemental filing **as it is available** in the 2nd quarter of 2017.)* The use of seawater for hydrostatic testing may result in entrainment or impingement of larvae and small juvenile fish that are unable to escape the flow of intake hoses. ~~Approximately TBD gallons~~ **Up to approximately 3.5 million gallons** of seawater will be required for all offshore hydrostatic tests.

Transco is submitting the following update to reflect the results of Transco's hydrodynamic sediment modeling as included in the September 7 Supplemental Information Filing. The results of the analysis support the qualitative assessment that turbidity conditions return to normal shortly after sediment-disturbing activities occur.

Typical Construction Activities

The activities with potential impacts on surface water, as described above in Section 6.1, also have potential to cause mortality, injury, and temporary habitat loss and modification from disturbance of sediment and benthic communities. The Lower New York Bay Extension Maintenance activity will occur between September and October 2017 and will not overlap the timeframe for construction of the offshore Raritan Bay Loop. Cumulative impacts on fishery resources in Raritan Bay may result from construction of the above activities when combined with construction of the offshore Raritan Bay Loop if all the activities occur at the same time. Fish are likely to temporarily relocate to adjacent areas of the waterway during construction activities as a natural avoidance response and are expected to return to the area soon after activity ceases. Each of the activities are expected to occur within construction windows approved by the state and federal authorities to avoid spawning and larval periods. **Considering sediment type, the strength of the currents in the offshore Project area, and the duration and rate of sediment-disturbing activities described in the Hydrodynamic and Sediment Transport Modeling Results – Base Case Simulations (see Attachment 8), ambient turbidity conditions return between 0.7 to 12.5 hours and within 0 to 4,331 feet following completion of each proposed offshore excavation activity. Subsequent to filing its FERC Application, Transco decided to install the pipeline in certain offshore areas using a jet trencher to minimize turbidity impacts. The jet trencher enables pre-installed pipeline to be lowered into emulsified sediments without the direct removal or excavation of the underlying sediment.** Water

quality will return to baseline conditions and the benthic community will naturally recolonize following the completion of each activity. As a result, there will be no significant contribution to cumulative impacts on fishery resources from construction of the offshore Raritan Bay Loop. *(Results of the hydrodynamic sediment modeling will be provided in a supplemental filing in the 2nd quarter of 2017.)*

Withdrawal and Discharge of Hydrostatic Test Water

None of the activities that overlap the ROI for fishery resources is expected to use seawater for hydrostatic testing; therefore, no cumulative impacts will occur.

6.3 Marine Wildlife, Including Threatened and Endangered Species

The ROI for cumulative impacts on marine wildlife and threatened and endangered species is HUC 12. As shown in Table 1E-16, 11 activities overlap the ROI and could contribute to cumulative impacts, including seven channel maintenance and dredging activities, one pipeline, two storm damage reduction activities, and one utilities activity. As noted above in Section 6.1, five channel maintenance and dredging activities, the Lower New York Bay Extension Maintenance activity, and the Jones Beach Inlet to East Rockaway Phase I Groin Construction storm damage reduction activity do not overlap temporally with construction of the offshore Raritan Bay Loop and will not contribute to cumulative impacts.

Dredging, trenching, and excavation for installation of the offshore Raritan Loop may result in direct or indirect impacts on marine wildlife from typical construction activities, including horizontal directional drill, pile driving, and hydrostatic test water withdrawal and discharge. Effects on birds and marine mammals may result from accidental strikes and injuries, increased noise and vibrations, visual disturbances, and water withdrawal and discharge. Construction-related impacts include mortality, injury, sensory disturbance, habitat loss and modification, and increased predation. Underwater equipment and marine vessel traffic may cause mortality, injury, and temporary habitat loss and modification. HDD and pile-driving activities affect marine mammals who communicate acoustically. Construction effects on Atlantic sturgeon, sea turtles, and the North Atlantic right whale are expected to be temporary. Transco will continue consultation with NOAA Fisheries to determine the need for additional measures to minimize impacts on marine mammals.

Transco is submitting the following update to reflect the results of Transco's hydrodynamic sediment modeling, as included in the September 7 Supplemental

Information Filing. The results of the analysis support the qualitative assessment that turbidity conditions return to normal shortly after sediment-disturbing activities occur.

Typical Construction Activities

The activities with potential impacts on surface water as described above in Section 6.1 also have the potential to cause similar mortality, injury, and temporary habitat loss and modification from disturbance of sediment, use of underwater equipment, and marine vessel traffic. Cumulative impacts on marine wildlife in Raritan Bay may result from construction of the offshore Raritan Bay Loop when combined with the other activities if they all occur at the same time. Marine mammals are likely to relocate to adjacent areas of the waterway during construction activities as a natural avoidance response and return to the area soon after the activity ceases. Each activity is expected to follow seasonal management area speed restrictions for the New York/New Jersey Harbor from November 1 through April 30 to protect the North Atlantic right whale as mandated by NOAA Fisheries. Each of the activities will also occur within construction windows approved by the state and federal authorities to avoid spawning and larval periods.

Considering sediment type, the strength of the currents in the offshore Project area, and the duration and rate of sediment-disturbing activities described in the Hydrodynamic and Sediment Transport Modeling Results – Base Case Simulations (see Attachment 8), ambient turbidity conditions return between 0.7 to 12.5 hours and within 0 to 4,331 feet following completion of each proposed offshore excavation activity. Subsequent to filing its FERC Application, Transco decided to install the pipeline in certain offshore areas using a jet trencher to minimize turbidity impacts. The jet trencher enables pre-installed pipeline to be lowered into emulsified sediments without the direct removal or excavation of the underlying sediment. The effects of the activities will be temporary; water quality will return to baseline conditions and the benthic components of marine reptiles' diet will naturally recolonize following the completion of each activity. As a result, there will be no significant contribution to cumulative impacts on marine wildlife from construction of the offshore Raritan Bay Loop. ~~(Results of the hydrodynamic sediment modeling will be provided in a supplemental filing in the 2nd quarter of 2017.)~~

6.4 Cultural Resources

Transco is submitting the following update to reflect the results of Transco's cultural resources investigations as included in Transco's June 6 and June 30 Supplemental Information Filings.

The ROI for cumulative impacts on cultural resources is the direct APE, which is an approximately 5,000-foot wide corridor centered on the offshore Raritan Bay Loop pipeline route. As shown in Table 1E-16, six activities overlap the ROI and could contribute to cumulative impacts on cultural resources.

Construction activities associated with the offshore Raritan Bay Loop **would not affect potential archaeological resources, as no indications of submerged paleo-landscapes or of drowned archaeological components were observed during geotechnical surveys. As a result, the Project will not contribute to cumulative impacts on cultural resources associated with the construction of the offshore Raritan Bay Loop.** ~~may result in temporary direct or indirect impacts on archaeological resources. (Offshore surveys are ongoing and results will be provided in a supplemental filing in the 2nd quarter of 2017).~~

Archaeological Resources

The six activities identified within the ROI that may contribute to archaeological resources impacts include four channel maintenance and dredging activities, one pipeline activity, and one utilities activity.

The four channel maintenance and dredging activities will occur on waterways that are historically federal navigation projects regulated by the USACE. As a federal agency, the USACE is responsible for complying with Section 106 of the NHPA. Per Section 106 requirements, consultation on federal actions is required to determine (1) historic resources in the APE prior to approval, and (2) a resolution or avoidance of any potential adverse impacts. The USACE implements a historic properties review procedure (33 CFR 325) specifically to fulfill Section 106 requirements for USACE permit applications. Therefore, activities approved by the USACE comply with Section 106 and would include mitigation measures designed to avoid or minimize direct impacts on archaeological resources. In addition, if direct impacts are unavoidable, recovery of the resources would occur prior to construction.

The Lower New York Bay Extension Maintenance activity will not affect properties listed, or eligible for listing, in the National Register of Historic Places (Transco 2017).

The Poseidon HVDC has an undetermined construction start date. If construction for the Poseidon HVDC activity occurs during the same construction timeframe as the offshore Raritan Bay Loop, there may be impacts on archaeological resources. However, developers plan to install the submarine cable for the Poseidon HVDC activity within the seabed of the New York Bight, parallel to the existing Neptune RTS Cable. The analysis performed for the Poseidon HVDC

indicated the absence of any previously reported pre-contact period archaeological deposits and lack of evidence for archaeologically sensitive, contextually intact relict landforms in the proposed route (Poseidon 2013). Therefore, this activity will avoid impacts on archaeological resources.

Therefore, the project has no potential for cumulative impacts on archaeological resources.

6.5 Socioeconomics

The ROI for cumulative impacts on socioeconomics is the counties intersected by the offshore Raritan Bay Loop and workspaces, including one onshore contractor yard and offshore vessel support facility along the Arthur Kill. County boundaries technically extend offshore, and so the offshore loop passes through Middlesex and Monmouth counties, New Jersey, and Richmond and Queens counties, New York. The contractor yard, owned by Construction and Marine Equipment Co. Inc. (C&ME facility), is in Union County, New Jersey. As shown in Table 1E-16, 18 activities overlap the ROI and could contribute to cumulative socioeconomic impacts.

Construction activities associated with the offshore Raritan Bay Loop will result in temporary beneficial impacts on the economy, employment, and income, as well as taxes and revenues. Specifically, the local economies will benefit during the period of construction from Transco's purchases of locally available materials and services and employment of local workers. Direct economic benefits include local material purchases of \$59 million and a construction payroll of \$136 million, which includes local offshore construction workers. These local purchases may generate temporary indirect benefits for suppliers in related industries. Similarly, locally hired construction workers may create induced economic benefits in their communities of residence by spending portions of their salaries locally. During operation, the offshore Raritan Bay Loop will generate annual submerged land easement fees of \$275,000 to New Jersey and \$9.8 million to New York.

Of the activities that spatially overlap the socioeconomic ROI, there is a potential for seven activities to overlap temporally with the offshore Raritan Bay Loop. Construction of the Poseidon HVDC activity will generate temporary economic, employment, and income benefits to local communities in the ROI primarily through local purchases of supplies, hiring of local service providers, and employment of local construction workers. Channel maintenance and dredging activities managed by the USACE may employ local contractors and vessel service providers, generating a temporary economic benefit in the region. Raritan Bay vessel crossing improvements, the marine transportation activity, will not likely make a significant contribution to

cumulative economic benefits during construction. Local construction support vessels may be hired, but the overall economic effect of the activity may be negligible. The socioeconomic effect of construction of the offshore Raritan Bay Loop, when combined with construction of these activities, will be a temporary and cumulative beneficial effect.

Fourteen activities will be operational or ongoing concurrently with the offshore Raritan Bay Loop, including pipelines, utilities, and channel maintenance and dredging. During operation, pipelines and utilities within the ROI will generate submerged land easement fees to the respective states. Ongoing maintenance and dredging of the channels in the ROI will support continuous, and in some cases increased, vessel transits throughout the region. As a result, the maintained and dredged channels will facilitate maritime commerce in the region, generating long-term economic benefits for local communities and persons employed in related industries. The cumulative socioeconomic effect of the operation of the offshore Raritan Bay Loop, when combined with operation of the additional activities, will be long-term or permanent, beneficial, and potentially significant.

6.6 Contaminated Sediment

The ROI for cumulative impacts on sediment is a 1-mile-wide corridor centered along the centerline of the offshore Raritan Bay Loop. As shown in Table 1E-16, six activities overlap the ROI and could contribute to cumulative impacts associated with disturbance of contaminated sediments.

Where construction of the offshore Raritan Bay Loop requires trenching with a clamshell dredge or jet sled, the areas will be mechanically backfilled to restore the seabed to pre-construction conditions. The trenching and backfilling will disturb areas where elevated levels of contaminants are present. The Raritan Bay Slag National Priorities List site cleanup Areas 7 and 11 (Jetty Sector) are located within the offshore Project workspaces in the New Jersey portion of Raritan Bay. Contamination associated with Areas 7 and 11 may be present in the Raritan Bay sediment crossed by the offshore Project route, including the Morgan Shore Approach HDD. Sediment sampling results identified sediments that meet Class A standards considered to have no appreciable contamination, and dredging and in-water placement at approved locations can generally proceed, and sediments that meet Class B and C standards and dredging and disposal may proceed with several restrictions or stringent requirements. *(A complete offshore environmental sampling report will be provided in a supplemental filing in the 2nd quarter of 2017.)* The majority of material and undissolved contaminants will likely resettle within 0.5 mile of the disturbance.

The six activities identified within the ROI that may contribute to soil contamination are four channel maintenance and dredging activities, one pipeline activity, and one utilities activity. Several of these activities are not ongoing or are unlikely to overlap temporally because of the infrequent dredging, including the Great Kills harbor dredging, New York and New Jersey Harbor Deepening, the New York Harbor Maintenance Dredging, and the Lower New York Bay Extension Maintenance activity. The purpose of the New York Harbor Maintenance activity is to reduce hazards to and damages from navigation by removing abandoned piers, wharves, and derelict vessels and debris, and repairing deteriorated shore structures. As shown on Figure 1E-13, this activity will occur in the upper reaches of New York Harbor and will not disturb the same sediment as the Offshore Raritan Bay Loop. In addition, the USACE follows a Dredged Material Management Plan for the Port of New York and New Jersey, which addresses disposal and placement of dredged material from navigational dredging activities. The Dredged Material Management Plan discusses contaminant-reduction methods, which aid in reducing exposure to contaminated sediments through source tracking and remediation, and decontamination technologies, which aid in treating contaminated materials. The Poseidon HVDC may overlap with construction of the offshore Raritan Bay Loop. The impacts of sediment contamination on the water column are expected to be minimal because the sediments disturbed by jet plow embedment of the submarine cable will contain chemical constituents comparable to existing surface sediment (ESS Group, Inc. 2013). Any suspended sediment plumes would dissipate rapidly after construction activities cease.

There is TBD potential for cumulative impacts from sediment contamination due to multiple construction activities in the ROI combined with construction of the offshore Raritan Bay Loop. Any suspended sediment will dissipate after construction activities cease. *(Additional information will be submitted in a supplemental filing in the 2nd quarter of 2017).*

6.7 Air Quality

The ROI for cumulative impacts on air includes the regional airshed within 10 miles of the air emission sources associated the offshore Raritan Bay Loop. As shown in Table 1E-16, five activities overlap the ROI and could contribute to cumulative impacts on air during construction. Several of these activities are not ongoing or would be unlikely to overlap temporally because of the infrequent dredging, including the New York and New Jersey Harbor Deepening, the New York Harbor Maintenance Dredging, and the Lower New York Bay Extension Maintenance activity. The channel maintenance and dredging activities that may overlap with the construction timeframe of the offshore Raritan Bay Loop will use barge-mounted dredges, which generate

minimal air emissions during use. The Poseidon HVDC installation will include equipment that will generate emissions temporarily during installation of the cable.

As noted in Section 5.13, the combined emissions from onshore and offshore trigger a general conformity review based on NO_x emissions in the N.NJ-NY-CT ozone nonattainment area. However, Transco will offset NO_x emissions by an air quality project, which will ensure that the emissions conform to the applicable State Implementation Plan and will not interfere with plans to attain or maintain compliance with National Ambient Air Quality Standards. Full mitigation of NO_x emissions is required under General Conformity, therefore, the Project will not contribute to cumulative impacts on ozone nonattainment.

6.8 Noise

The ROI for cumulative impacts on noise is a 0.5-mile-wide corridor centered along the centerline of the offshore Raritan Bay Loop. As shown in Table 1E-16, six activities overlap the ROI and could contribute to cumulative impacts on noise during construction.

HDD activities associated with construction of the offshore Raritan Bay Loop will result in temporary direct or indirect impacts in NSAs. Noise impacts occur within a few hundred feet of the activity. HDD crossings use noise-generating equipment at both entry and exit sites. NSAs within 0.5 mile of Ambrose HDD crossing may include recreational activities. HDD activities will generate relatively high noise levels for long periods during construction.

The activities identified within the ROI that may contribute to noise impacts during HDD efforts are four channel maintenance and dredging activities, one pipeline activity, and one utilities activity. Several of these activities are not ongoing or would be unlikely to overlap temporally because of the infrequent dredging, including the Great Kills harbor dredging, New York and New Jersey Harbor Deepening, the New York Harbor Maintenance Dredging, and the Lower New York Bay Extension Maintenance activity. The channel maintenance and dredging activities that may overlap with the construction timeframe of the offshore Raritan Bay Loop will use barge-mounted dredges, which generate minimal noise during use. The New York Harbor Maintenance activity involves the removal or maintenance of marine structures (piers, wharfs, vessels), which may result in temporary noise impacts; however, these will occur in the upper reaches of the New York Harbor. Installation of the Poseidon HVDC submarine cable may overlap with construction of the offshore Raritan Bay Loop. In addition, the Poseidon HVDC will implement HDD to install its submarine cable where it makes landfall, which could contribute to noise impacts. However, as shown on Figure 1E-13, Poseidon HVDC plans to make landfall on the New Jersey shore

approximately 6 miles away from the Ambrose HDD and on the New York shore approximately 24 miles away from the Ambrose HDD. Noise impacts from the use of construction equipment and HDD are generally limited to within 0.25 mile because noise attenuates quickly in air. Therefore, construction activities from the Poseidon HDVC activity will not contribute to significant impacts on noise.

Cumulative impacts on noise from the construction associated with the above activities may occur when combined with construction of the offshore Raritan Bay Loop if the activities occur at the same time. These activities involve construction and maintenance efforts that may utilize heavy machinery and thus increase noise at nearby NSAs. The effects of these activities on noise will be temporary and will return to baseline conditions soon after construction is completed. As a result, there will be no significant contribution to cumulative noise impacts from the construction of the offshore Raritan Bay Loop.



TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

APPENDIX 1E TO RESOURCE REPORT 1

CUMULATIVE IMPACT ANALYSIS

ATTACHMENT 2

TABLES

NORTHEAST SUPPLY ENHANCEMENT PROJECT

MARCH 2017

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Table 1E-1
Past, Present, and Reasonably Foreseeable Onshore Activities - Quarryville Loop

Project	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
Keystone Solar	The project, which includes 4,500 solar panels erected on 78 acres on the farm of Gerald and Linda Dreider at Deaver Road and Route 272, will cost \$65 million and produce 15 megawatts (MW) of electricity for Pennsylvania Power and Light.	2012	2012	PA	Lancaster	East Drumore	Solar Energy
Rock Springs Expansion (CP14-504)	Proposal to construct and operate natural gas pipeline facilities in Lancaster County, Pennsylvania and Cecil County, Maryland. The Project consisted of approximately 11.17 miles, 20-inch diameter pipeline lateral, a 4,000 horsepower (hp) compressor station, and appurtenant facilities in Lancaster County and Cecil County.	2015	2016	PA	Lancaster		Pipeline
York 2 Energy Center	The York 2 Energy Center is a 76 MW, dual-fueled, combined-cycle electric generating facility that will provide enhanced reliability to the regional power market. It is under construction on the same site as Calpine's York Energy Center in Peach Bottom Township, Pennsylvania. The project is expected to begin commercial operations by the summer of 2017. The Pennsylvania Department of Environmental Protection issued an Air Quality Major Facility Plan Approval Prevention of Significant Deterioration Permit. The existing and proposed expansion both obtain water from Lake Conowingo for cooling.	2016	2017	PA	York	Peach Bottom	Electricity Generation
Atlantic Sunrise (CP15-138-000)	The project will consist of compression and looping of the Transco Leidy Line in Pennsylvania along with a greenfield pipeline segment, referred to as the Central Penn Line, connecting the northeastern Marcellus producing region to the Transco mainline near Station 195 in southeastern Pennsylvania. Additional existing Transco facilities are being added or modified to allow gas to flow bi-directionally. The preliminary project design includes a total of approximately 183 miles of new greenfield pipe (Central Penn Line North and Central Penn Line South), two pipeline loops totaling about 12 miles (Chapman Loop, Unity Loop), two and one-half miles of existing pipeline replacement, two new compressor facilities in Pennsylvania, and other facility additions or modifications in five states (Pennsylvania, Maryland, Virginia, North Carolina, South Carolina). Central Penn Line South would consist of 126.3 miles of new 42-inch-diameter pipeline in Pennsylvania with an MAOP of 1,480 psig. The proposed route of Central Penn Line South is adjacent to (or co-located with) existing pipeline or electric transmission utility rights-of-way (ROWs) for approximately 14.2 miles. Central Penn Line South would begin at MP 1,683.3 of the existing Transco Mainline system in Lancaster County, Pennsylvania.	2017	2018	PA	Clinton, Columbia, Lancaster, Lebanon, Luzerne, Lycoming, Northumberland, Schuylkill, Susquehanna, and Wyoming Counties	Multiple, including Drumore	Pipeline
Eastern Shore Natural Gas Company (CP17-28-000)	Eastern Shore proposes to construct, own, operate, and maintain the 2017 Expansion Project facilities to provide up to an aggregate of 86,437 dekatherms per day (Dth/d) of additional firm natural gas transportation capacity in order to meet market demand. The 2017 Expansion Project facilities consist of (1) approximately 33 miles of pipeline looping in Pennsylvania, Maryland, and Delaware; (2) upgrades to existing metering facilities; (3) installation of an additional 3,550 hp compressor unit at the existing Daleville Compressor Station; and (4) approximately 17 miles of new mainline extension and the addition of two pressure control stations in Sussex County, Delaware.	2017	2017	PA	Lancaster & Chester		Pipeline
Mariner East II (OR14-40)	Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project that would expand existing pipeline systems to provide natural gas liquid (NGL) transportation of up to 350,000 barrels per day. The project involves installing approximately two parallel pipelines within a 306-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania to SPLP's Marcus Hook facility in Delaware County, Pennsylvania with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, Pennsylvania to the Marcus Hook facility, paralleling the initial line for approximately 255 miles.	2017	2018	PA	17 Counties, including Chester and Lancaster		Pipeline
Scalpy Hollow Timber	Sawmill and lumber processing extension. Applied for NPDES Stormwater Construction permit for discharge to Fishing Creek.	2017	2017	PA	Lancaster	Drumore	Industrial

Table 1E-1
Past, Present, and Reasonably Foreseeable Onshore Activities - Quarryville Loop

Project	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
T-325 over Peters Creek	Bridge restoration/replacement at Peters Creek Road over Peters Creek in Fulton Township. Anticipated cost is \$487,500.	2018	2019	PA	Lancaster	Fulton	Major Transportation
South Lime Street Bridge	Bridge replacement at S. Lime Street over tributary to the south fork of Beaver Creek: March 9, 2020 to November 20, 2020 (eight months). Anticipated cost is \$1,485,000.	2020	2020	PA	Lancaster	Quarryville Borough	Major Transportation
US 30 Bypass	Reconstruction of the U.S. 30 bypass involves widening to six lanes east of Reeceville Road; reconstruction only west of Reeceville Road; and completing Airport Road and PA 113 interchanges. The estimated cost is \$835 million.	2020	2028	PA	Chester	Sadsbury, Valley, Caln, and East Caln Townships; Coatsville and Downingtown	Major Transportation
Peach Bottom Nuclear Power Plant	Air Quality (AQ) General Plan Approval for a two-unit nuclear generation facility (2599 MW capacity). Peach Bottom seeks extended operating license (additional 20 years). Current operating licenses expire in 2033 and 2034.	N/A	Operating	PA	Lancaster	Drumore	Electricity Generation
Poultry Barn	Proposed poultry barn construction. Applied for NPDES Stormwater Construction Permit Conservation Dist. Technical review is expected to be completed January 13, 2017.	TBD	TBD	PA	Lancaster	East Drumore	Commercial
S&A Kreider And Sons Farm Expansion	Farm expansion. Applied for NPDES Stormwater Construction Pmt Conservation Dist. Technical review expected to be completed by January 2017.	TBD	TBD	PA	Lancaster	East Drumore	Commercial

Table 1E-2
Past, Present, and Reasonably Foreseeable Onshore Activities - Madison/Raritan Bay Loops

Project	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
NYNJ Expansion	The construction and operation of approximately 20.0 miles of natural gas pipeline and associated equipment and facilities in New Jersey, New York, and Connecticut. 15.2 miles consist of new 30-inch-diameter pipeline in the boroughs of Staten Island and Manhattan, New York and the cities of Bayonne, Jersey City, and Hoboken, New Jersey, and 4.8 miles consist of 42-inch-diameter replacement pipeline in the borough of Staten Island, New York and the City of Linden, New Jersey. It crosses the lower Hudson River and Kill Van Kull using HDD. Texas Eastern also abandoned 8.95 miles of existing 12-, 20-, and 24-inch-diameter pipeline in the city of Linden, New Jersey and the borough of Staten Island, New York. The project also included seven new metering and regulating (M&R) stations and modification of existing compressor stations. (CP11-56)	2012	2013	NY & NJ			Pipeline
Route 35 Improvements	This safety improvement and congestion relief project along a 1.25 mile stretch of Route 35 will raise the level of Route 35 by as much as 4 ft, with the highest increases in elevation at the culverts. Other work involves roadway rehabilitation, widening, drainage and safety improvements, replacement of a pair of culverts and improvements to four intersections. Anticipated cost is \$15.7 million.	2013	2015	NJ	Middlesex	Old Bridge	Major Transportation
Woodbridge Delivery Lateral (CP14-18)	This project involves the construction and operation of a new natural gas lateral pipeline designed to transport natural gas from Transco's existing mainline system, originating at its mainline in Middlesex County, New Jersey, to the Woodbridge Energy Center, a natural gas-fired electricity-generating power plant currently under construction by CPV Shore, LLC (CPV) in Woodbridge, Middlesex County, New Jersey.	2014	2015	NJ	Middlesex		Pipeline
Elizabeth Ave. Elementary School	NJDEP General Permit Construction Activity Stormwater (GP) was issued on 8/30/16 and expires on 2/28/17.	2016	2016	NJ	Somerset	Franklin Township	Commercial
Interchange 125	This \$72.3 million upgrade involves the construction of a new interchange including four new ramps to and from the Garden State Parkway; the replacement of the Garden State Parkway Northbound and Southbound bridge structures; eight traffic lanes and seven traffic lanes, respectively; widening of Main Street Extension, reconstruction of Chevalier Avenue, and the construction of a new ramp toll plaza. The project also includes the construction of 10 sign structures, six retaining walls, reconstructing the stormwater drainage system, mainline and ramp lighting, traffic signal systems, striping and guide rail from Milepost 125.7 to Milepost 128.1 in Sayreville, New Jersey. NJDEP Permit Construction Activity Stormwater (GP) New permit application.	2016	2018	NJ	Middlesex	Sayreville	Major Transportation
New York Bay Expansion (CP15-527)	The project includes the installation of additional horsepower at three existing Transco compressor facilities, in addition to uprating the existing Lower New York Bay Lateral and replacing 0.2 miles of 42-inch pipe in Middlesex County, New Jersey. The project will also include modifications of existing Transco meter and regulating stations in Middlesex County, New Jersey, and Richmond County, New York. Nearly all of the work is confined to existing company property or ROWs. Includes: Compressor Station 200 in Chester County, Pennsylvania – Uprate total station horsepower from 30,860 hp to 33,000 hp (2,140 hp increase), Compressor Station 303 in Essex County, New Jersey; regear existing gear box Unit 1; uprate Unit 1 from 25,000 hp to 27,500 hp; Compressor Station 207 in Middlesex County, New Jersey addition of 11,000 hp; and replace 0.25 miles (in three segments) of Transco's Lower New York Bay Lateral Mainline "C" 42-inch diameter pipeline (LNYB Replacements) in Middlesex County, New Jersey.	2016	2017	PA, NJ, NY	Chester, PA; Richmond, NY; Middlesex, NJ		Pipeline

Table 1E-2
Past, Present, and Reasonably Foreseeable Onshore Activities - Madison/Raritan Bay Loops

Project	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
South Amboy Intermodal Center	Project to link several major regional routes and modes of transportation into one central point of transfer. Improvements in the South Amboy waterfront vicinity may include rail and bus transit plazas, arterial and site access road improvements, bridge reconfiguration, bulkheading and breakwater development, ferry terminal, and pedestrian access to rail and bus facilities in 2016, City of South Amboy requested the addition of \$9.4 million in congressionally designated funds to the South Amboy Intermodal Center.	2017	2018	NJ	Middlesex	South Amboy City	Major Transportation
Route 18	This project consists of pavement reconstruction and resurfacing of New Jersey Route 18, and will also include mitigation for flooding and drainage problems. This project provides repair and replacement of curbs and sidewalks, and milling and resurfacing of most of the roadway within the project limits. In addition, upgrades will be made to all curb ramps, and midblock crosswalks that do not meet current ADA criteria. If warranted, the project will include upgrading of traffic signals and lighting within the project limits. Total construction funding needed is expected to be \$26.8 million.	2018	2018	NJ	Middlesex	East Brunswick	Major Transportation
Route 9/35 & Main Street Interchange	Construction of acceleration lane from Route 9 Northbound to Route 9/35 Northbound and improvement to Route 9/35 Southbound ramp. Anticipated funding is \$22.6 million.	2021	2021	NJ	Middlesex	Sayreville	Major Transportation
Sayreville Generating Station	An existing 290 megawatt (MW) combined cycle gas-fired power plant; applied for a Title V Permit Minor Modification Application for changes to emissions.	N/A	Operating	NJ	Middlesex	Sayreville	Electricity Generation
Alfieri Property Development	529 apartment and townhome units and office buildings on the Alfieri property near Garden State Parkway Exit 120.	TBD	TBD	NJ	Middlesex	Old Bridge	Commercial/ Residential
Garden Grove on Nine	Residential development featuring 120 apartment units in five 3-story buildings.	TBD	TBD	NJ	Middlesex	Old Bridge Township	Residential
La Mer Development	Kaplan Companies development of 135 units (townhome or multi-family) on approximately 32 acres of residential real estate property in Sayreville, New Jersey. The development will be an addition to the existing La Mer residential development, which has grown to over 1,500 units since the beginning of development in the late 1980s. The preliminary site plan shows the 135 unit-project as a development in three phases.	TBD	TBD	NJ	Middlesex	Sayreville	Residential
Middlesex Energy Center	Stonegate Power is now developing the Middlesex Energy Center, a 560-NW power plant to be constructed in Sayreville, New Jersey. Stonegate Power is in the process of securing all federal, state, and local approvals for the power facility, to be constructed on a former landfill. NJDEP Permit Construction Activity Stormwater (GP) permit effective August 31, 2016, expiration February 28, 2017. Stonegate Power also applied for a Prevention of Significant Deterioration permit from the New Jersey Department of Environmental Protection.	TBD	TBD	NJ	Middlesex	Sayreville	Electricity Generation
The Point at Sayreville	Mixed-use development featuring more than 400 acres of waterfront retail and housing. 711,000 sq ft of retail space will be open for business during summer 2017.	TBD	TBD	NJ	Middlesex	Sayreville	Commercial/ Residential
US Route 9-Bordentown Avenue- Kenneth Avenue	Safety and operational Improvements.	TBD	TBD	NJ	Middlesex	Sayreville	Transportation
Windermere Townhomes	Townhome development of 74 new townhomes.	TBD	TBD	NJ	Middlesex	Sayreville	Residential

Table 1E-3
Past, Present, and Reasonably Foreseeable Onshore Activities – Compressor Station 200

Project	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
East Side Expansion (CP14-17)	This project consists of the construction and operation of pipeline looping and associated facilities by Columbia Gas Transmission, LLC (Columbia) in Chester County, Pennsylvania and Gloucester County, New Jersey. Columbia also plans to modify one interconnect in New York, three compressor stations in Pennsylvania and one compressor station in Maryland.	2014	2015	PA	Chester		Pipeline
New York Bay Expansion (CP15-527)	The project includes the installation of additional horsepower at three existing Transco compressor facilities, in addition to uprating the existing Lower New York Bay Lateral and replacing 0.2 miles of 42-inch pipe in Middlesex County, New Jersey. The project will also include modifications of existing Transco meter and regulating stations in Middlesex County, New Jersey, and Richmond County, New York. Nearly all of the work is confined to existing company property or ROWs. Includes: Compressor Station 200 in Chester County, Pennsylvania – Uprate total station horsepower from 30,860 hp to 33,000 hp (2,140 hp increase), Compressor Station 303 in Essex County, New Jersey; regear existing gear box Unit 1; uprate Unit 1 from 25,000 hp to 27,500 hp; Compressor Station 207 in Middlesex County, New Jersey addition of 11,000 hp; and replace 0.25 miles (in three segments) of Transco's Lower New York Bay Lateral Mainline "C" 42-inch diameter pipeline (LNYB Replacements) in Middlesex County, New Jersey.	2016	2017	PA, NJ, NY	Chester, PA; Richmond, NY; Middlesex, NJ		Pipeline
White Oak Mainline Expansion (CP15-18)	Includes approximately 7.2 miles of 16-inch diameter pipeline loop and associated facilities in Chester County, Pennsylvania, as well as facilities in the state of Delaware.	2016	2016	PA	Chester		Pipeline
Eastern Shore Natural Gas Company (CP17-28-000)	Eastern Shore proposes to construct, own, operate, and maintain the 2017 Expansion Project facilities to provide up to an aggregate of 86,437 dekatherms per day (Dth/d) of additional firm natural gas transportation capacity in order to meet market demand. The 2017 Expansion Project facilities consist of (1) approximately 33 miles of pipeline looping in Pennsylvania, Maryland, and Delaware; (2) upgrades to existing metering facilities; (3) installation of an additional 3,550 horsepower compressor unit at the existing Daleville Compressor Station; and (4) approximately 17 miles of new mainline extension and the addition of two pressure control stations in Sussex County, Delaware.	2017	2017	PA	Lancaster & Chester		Pipeline
Mariner East II (OR14-40)	Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project that would expand existing pipeline systems to provide natural gas liquid (NGL) transportation of up to 350,000 barrels per day. The project involves installing approximately two parallel pipelines within a 306-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania to SPLP's Marcus Hook facility in Delaware County, Pennsylvania with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, Pennsylvania to the Marcus Hook facility, paralleling the initial line for approximately 255 miles.	2017	2018	PA	17 Counties, including Chester and Lancaster		Pipeline
Atwater Commercial	Commercial development featuring 9.38 acres of a bank pad, hotel, and restaurants. Currently in the planning phase.	TBD	TBD	PA	Chester	East Whiteland Township	Commercial
Atwater-Lot 13 subdivision (for commercial use)	Commercial development on 36.11 acres featuring two lots/units.	TBD	TBD	PA	Chester	East Whiteland Township	Commercial
Exton Square Mall Parking Lot Expansion	Expanding 53.7 acres of commercial parking lot and garage to accommodate a total of 263 parking spaces.	TBD	TBD	PA	Chester	West Whiteland Township	Commercial
Glen Loch II Subdivision	Residential development featuring 108 units: 48 twin and 60 townhouse lots on 56.5 acres built in three phases.	TBD	TBD	PA	Chester	West Whiteland Township	Residential

Table 1E-3
Past, Present, and Reasonably Foreseeable Onshore Activities – Compressor Station 200

Project	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
Great Valley Corporate Center	Expansion of the existing corporate center with mixed-use development featuring 600 residential units, 820,000 sq ft of office space, 25,000 sq ft of retail space, 70,000 sq ft of hotel space, and road improvements, costing \$9 million- approved by East Whiteland Board of Supervisors November 9, 2016.	TBD	TBD	PA	Chester	East Whiteland Township	Commercial/ Residential
Marquis at Exton	Residential development featuring 240 apartments on 21.5 acres.	TBD	TBD	PA	Chester	West Whiteland Township	Residential
Parkview at Oaklands	Residential development featuring 276 apartments on 36.07 acres, reviewed by Chester County in November 2016.	TBD	TBD	PA	Chester	West Whiteland Township	Residential
PECO Electric Power Supply	At Compressor Station 200, PECO will provide a new electrical service which will extend from a current PECO substation along an existing ROW for approximately 0.9-mile. Modifications to PECO's existing infrastructure are expected to be minor, potentially requiring the replacement/addition of poles in their existing utility corridor.	TBD	TBD	PA	Chester	East Whiteland	Utility
Sage Atwater	31.8-acre site proposed for nursing home/assisted living institution on three lots.	TBD	TBD	PA	Chester	Tredyffrin	Residential
Swedesford Square Apartments	Residential development featuring 244 apartments on 24.08 acres; 9,743 sq ft clubhouse and five garage buildings; reviewed by Chester County and East Whiteland October 2016; East Whiteland Board of Supervisors approved subdivision plan on December 14, 2016; has stormwater issues to be discussed and infiltration requirements; concerns with the geology of the property; known for sinkholes.	TBD	TBD	PA	Chester	East Whiteland Township	Residential
Townes at Malvern	Residential development featuring 64 townhomes and 2 single family homes on 9.5 acres; township traffic engineer submitted favorable review and Chester County Conservation District gave preliminary approval; East Whiteland Board of Supervisors approved Final Plan November 9, 2016.	TBD	TBD	PA	Chester	East Whiteland Township	Residential
Whiteland Village Mixed Use Development	Mixed-use development. Still under discussion: 73 acres with Continuing Care Retirement Community zoning; proposal consists of residential units, offices, and retail.	TBD	TBD	PA	Chester	East Whiteland Township	Commercial/ Residential

Table 1E-4
Past, Present, and Reasonably Foreseeable Onshore Activities – Compressor Station 206

Project	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
Leidy Southeast Expansion (CP13-551)	The project by Transco generally consists of the following: (1) installing approximately 29.8 miles of new 42-inch-diameter pipeline in four separate segments in Mercer, Somerset, and Hunterdon Counties, New Jersey, and Monroe and Luzerne Counties, Pennsylvania; (2) adding compression and modifying existing Compressor Stations 205, 515, 517, and 520 in Mercer County, New Jersey, and Luzerne, Columbia, and Lycoming Counties, Pennsylvania, respectively; (3) modifying existing compressor stations in North Carolina (1 facility), Virginia (5 facilities), and Maryland (1 facility); and (4) modifying existing meter and regulating stations, mainline valves (MLV), and 3 pig launchers and receivers.	2014	2015	NJ & PA	Hunterdon, Somerset, and Mercer, NJ; Luzerne and Monroe, PA		Pipeline
Local Provider - Water Supply	At Compressor Station 206, a local utility provider (if available) will install a water supply connection adjacent to the permanent access road to the site.	TBD	TBD	NJ	Somerset	Franklin	Utility
Local Provider - Sewer Connection	At Compressor Station 206, a local utility provider (if available) will install a sewer connection adjacent to the permanent access road to the site.	TBD	TBD	NJ	Somerset	Franklin	Utility
Middlesex Apple Orchard Solar	Middlesex Apple Orchard is a 6.7 MW solar project for seven different county buildings (total 40 acres).	2014	2014	NJ	Middlesex	Apple Orchard	Solar Energy
Pinnacle Communities	Residential development featuring 384 units.	2015	2016	NJ	Somerset	Franklin Township	Residential
Cambridge Crossing	Residential development featuring 85 townhome units.	2016	2016	NJ	Middlesex	South Brunswick	Residential
Cyalume Specialty Products	NJDEP Air Permit. Cyalume Specialty Products' application for Preconstruction Permit (PCP) to construct, install, and operate the 58235B manufacturing process at Cyalume's new manufacturing facility. Process equipment installation in November 2016.	2016	2016	NJ	Somerset	Franklin Township	Industrial
Elizabeth Ave. Elementary School	NJDEP Permit Construction Activity Stormwater (GP) was issued on 8/30/16 and expires on 2/28/17.	2016	2016	NJ	Somerset	Franklin Township	Commercial
Garden State Expansion (CP15-89)	The expansion project by Transco will provide up to 180,000 Dth/d of natural gas service in two phases to a new delivery point with New Jersey Natural Gas in Burlington County, New Jersey. No expansion of the pipeline is required. Rather, the project will include the installation of a new compressor station and a meter and regulating station on land located in Burlington County, New Jersey. It will also require modifications and the addition of compression at an existing compressor station. Phase 1 in service during the first half of 2017; phase 2 will be in service during the 4th quarter of 2017. Project cost: \$116 million.	2016	2017	NJ	Mercer, Burlington		Pipeline
Oaks at Cranbury	Residential development featuring 196 townhouse units.	2016	2017	NJ	Middlesex	South Brunswick	Residential
Point of Woods	Residential development featuring 70 single-family units.	2016	2017	NJ	Middlesex	South Brunswick	Residential
Princeton Manor	349-unit community for 55+ adults including an 11,500 square foot (sq ft) clubhouse (under construction).	2016	2017	NJ	Middlesex	South Brunswick	Residential
PSEG Electric Power Supply	At Compressor Station 206, PSEG will provide a new electrical service. At this time, Transco does not have detailed routing information regarding the electric distribution line required for Compressor Station 206 as PSE&G has not yet initiated a formal routing study. Transco is in consultation with PSE&G, and will provide additional information to FERC as the design of this non-jurisdictional facility progresses.	TBD	TBD	NJ	Somerset	Franklin	Utility
The Villagio	Residential community for adults 55+. Development of 210 single-family units and clubhouse (under construction as of November 2016)	2016	2017	NJ	Middlesex	South Brunswick	Residential
Wawa Food Market And Fueling Station	NJDEP Permit Construction Activity Stormwater (GP) was issued on August 18, 2016 and expired on February 28, 2017.	2016	2017	NJ	Somerset	Franklin Township	Commercial
Engel Burman @ Somerset, LLC	Mixed-use development featuring 100,000 square feet (sq ft) of commercial and residential space with136 living units and 278 parking spaces.	TBD	TBD	NJ	Somerset	Franklin Township	Commercial/ Residential
F. Greek Development Warehouse Industrial Buildings	F. Greek Development was granted an amended site plan with minor subdivision by the Franklin Township Planning Board for a two-lot subdivision on which it proposed to build warehouses	TBD	TBD	NJ	Somerset	Franklin Township	Industrial

Table 1E-4
Past, Present, and Reasonably Foreseeable Onshore Activities – Compressor Station 206

Project	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
	(granted March 5, 2014). Both properties are zoned for manufacturing/distribution. The property at 22 Roosevelt Avenue is (or will be) a warehouse-like "flex building" of 86,400 sq ft on 7 acres that is being marketed for lease (leases are divisible to 4,800 sq ft). It has 18 loading docks and 136 parking spaces. The property at 24 Roosevelt Ave has not been built and is advertised as a "build to suit building" of 122,350 sq ft on 9 acres with 20 loading docks, 1 drive-in, and 86 parking spaces. A stormwater detention facility is located at approximately 23 Roosevelt Avenue. The total project was originally described as 208,750 sq ft in the site plan submitted to Somerset County Land Development Committee; FL-0804:009-14S site plan number.						
Gelbard	Residential development featuring 55 single-family units approved 2016.	TBD	TBD	NJ	Middlesex	South Brunswick	Residential
Hamilton Commons	Mixed-use development featuring 25,450 sq ft commercial; 61 attached units.	TBD	TBD	NJ	Somerset	Franklin Township	Commercial/ Residential
Pratt Retail Specialties	Pratt Retail Specialties (Pratt) is planning to install and operate a bubble cushion production line at their warehouse located at 200 Docks Corner Road in Dayton, New Jersey. The facility will produce packaging material and store it until it is ready to be shipped out by delivery trucks. The facility will be permitted for the installation and operation of one production line used to produce a laminated bubble cushion material. NJDEP granted an Air Pollution Control Preconstruction Permit and Certificate to Operate Construction of a New Source on March 30, 2016; expires March 29, 2021. The application was found to satisfy all applicable requirements of the New Jersey Air Pollution Control regulations (The permit documents show that a Bubble Cushion Line #1 was installed on February 15, 2015).	TBD	TBD	NJ	Middlesex	Dayton	Industrial
Proposed Warehouse Addition	NJDEP Permit Construction Activity Stormwater (GP) was issued on January 13, 2016 and expired on February 28, 2017.	TBD	TBD	NJ	Middlesex	South Brunswick Twp	Commercial
Recon Services, LLC	Mixed-use development featuring 9,250 sq ft commercial and 84 attached units.	TBD	TBD	NJ	Somerset	Franklin Township	Commercial/ Residential
Somerset Douglas	Residential development featuring 114 units.	TBD	TBD	NJ	Somerset	Franklin Township	Residential
Summerfields	Residential development featuring 900 units and a 33,200 sq ft office.	TBD	TBD	NJ	Somerset	Franklin Township	Residential
Wilson Farm Senior Housing	Residential development featuring 75 affordable senior housing units.	TBD	TBD	NJ	Middlesex	South Brunswick	Residential
Key: ADA = Americans with Disabilities Act AQ = Air Quality Dth/d = dekatherms per day GP = General Permit Hp = horsepower LNYB = Lower New York Bay M&R = meter and regulating MW = megawatts NGL = natural gas liquid NJDEP = New Jersey Department of Environmental Protection NPDES = National Pollutant Discharge Elimination System PCP = Preconstruction Permit ROW = right-of way sq ft = square feet SPLP = Sunoco Pipeline, L.P.							

TABLE 1E-5
Types of Potential Adverse Impacts and Permits and Authorizations for Onshore Activities

Activity Type	Potential Adverse Impacts from Construction and Operation	USACE Section 10/404 Permits	USFWS Consultation: Section 7 Endangered Species Act/BGEPA/MBTA	USEPA Section 404, NPDES, CAA Permits	FAA Notice of Proposed Construction	FERC Approval and PHMSA Safety Analysis	NOAA Consultation: Marine Mammal Protection Area, Essential Fish Habitat, Section 7 Endangered Species Act	U.S. Coast Guard Notice to Mariners/Aids to Navigation and Obstructions/Marine Activity Approval	State SHPO Section 106 NHPA Consultation	State Section 401 CWA Water Quality Certificate, SPDES Permits, and Hydrostatic Test Water Discharge Permit	State Consultations: Protected Species and Habitats	State Air Quality Permits, Title V Operating Permits, or Acid Rain Permits	State Wetlands Permits	State or Conservation District Erosion and Sediment Control	State Coastal Zone Management Act Consistency
Onshore Activities															
Industrial	New activities require clearing and grading undeveloped land; water may be used in industrial processes and discharged to surface waters; may result in filling of wetlands and waterbodies; noise from construction activities and equipment; air emissions from construction and from operation for some types of industrial facilities; conversion of land from undeveloped to industrial may remove vegetation and habitat; impacts on historic properties and cultural artifacts from construction activities; spills or leaks of hazardous materials could impact soils or groundwater; major projects will increase traffic during construction, require use of public services, create jobs, and provide socioeconomic benefits.	●	●	●	●				●	●	●	●	●	●	
Pipeline	New activities require clearing and grading undeveloped land for workspaces; temporary impacts on waterbodies due to removal for clearing, grading, filling; use of surface water for hydrostatic testing and discharges to surface waters; removal of vegetation may contribute to fragmentation of wildlife habitat; noise from construction activities; air emissions from construction activities and compressor stations; impacts on historic properties and cultural artifacts from construction activities; major projects will increase traffic during construction, require use of public services, create jobs, and provide socioeconomic benefits.	●	●	●		●			●	●	●	●	●	●	
Solar Energy	New activities require clearing and grading undeveloped land; conversion of land from undeveloped to industrial may remove vegetation and habitat; land clearing and land conversion may cause fragmentation and loss of wildlife habitat and direct mortality; noise from construction activities; avoidance of new greenhouse gas with renewable energy; impacts on historic properties and cultural artifacts from construction activities; major projects will increase traffic during construction, require use of public services, create jobs, and provide socioeconomic benefits.	●	●	●	●				●	●	●		●	●	

TABLE 1E-5
Types of Potential Adverse Impacts and Permits and Authorizations for Onshore Activities

Activity Type	Potential Adverse Impacts from Construction and Operation	USACE Section 10/404 Permits	USFWS Consultation: Section 7 Endangered Species Act/BGEPA/MBTA	USEPA Section 404, NPDES, CAA Permits	FAA Notice of Proposed Construction	FERC Approval and PHMSA Safety Analysis	NOAA Consultation: Marine Mammal Protection Area, Essential Fish Habitat, Section 7 Endangered Species Act	U.S. Coast Guard Notice to Mariners/Aids to Navigation and Obstructions/Marine Activity Approval	State SHPO Section 106 NHPA Consultation	State Section 401 CWA Water Quality Certificate, SPDES Permits, and Hydrostatic Test Water Discharge Permit	State Consultations: Protected Species and Habitats	State Air Quality Permits, Title V Operating Permits, or Acid Rain Permits	State Wetlands Permits	State or Conservation District Erosion and Sediment Control	State Coastal Zone Management Act Consistency
Electric Generation	New activities require clearing and grading undeveloped land; clearing and land conversion may cause fragmentation and loss of wildlife habitat and direct mortality; use and discharge of surface water for cooling; potential filling of wetlands and waterbodies; noise from construction and operation; air emissions from operation; impacts on historic properties and cultural artifacts from construction activities; major projects will increase traffic during construction, require use of public services, create jobs, and provide socioeconomic benefits; many electric generating plants are major air emission sources.	●	●	●	●				●	●	●	●	●	●	
Other Utilities	New activities require clearing and grading undeveloped land; clearing and land conversion may cause fragmentation and loss of wildlife habitat; potential filling of wetlands and waterbodies; noise from construction activities and equipment; impacts on historic properties and cultural artifacts from construction activities; major projects will increase traffic during construction, require use of public services, create jobs, and provide socioeconomic benefits.	●	●	●	●				●	●	●		●	●	
Transportation	New activities require clearing and grading undeveloped land; clearing and land conversion may cause fragmentation and loss of wildlife habitat and direct mortality; potential filling of wetlands and waterbodies; air emissions may decrease if traffic congestion is relieved; noise from construction activities and equipment; impacts on historic properties and cultural artifacts from construction activities.	●	●	●					●	●	●		●	●	
Commercial	New activities require clearing and grading undeveloped land; clearing and land conversion may cause fragmentation and loss of wildlife habitat; potential filling of wetlands and waterbodies; noise from construction activities and equipment; vehicle emissions from increased population (urbanization); impacts on historic properties and cultural artifacts from construction activities; major projects will increase traffic during construction, require use of public services, create jobs, and provide socioeconomic benefits.	●	●	●	●				●	●	●		●	●	

TABLE 1E-5
Types of Potential Adverse Impacts and Permits and Authorizations for Onshore Activities

Activity Type	Potential Adverse Impacts from Construction and Operation	USACE Section 10/404 Permits	USFWS Consultation: Section 7 Endangered Species Act/BGEPA/MBTA	USEPA Section 404, NPDES, CAA Permits	FAA Notice of Proposed Construction	FERC Approval and PHMSA Safety Analysis	NOAA Consultation: Marine Mammal Protection Area, Essential Fish Habitat, Section 7 Endangered Species Act	U.S. Coast Guard Notice to Mariners/Aids to Navigation and Obstructions/Marine Activity Approval	State SHPO Section 106 NHPA Consultation	State Section 401 CWA Water Quality Certificate, SPDES Permits, and Hydrostatic Test Water Discharge Permit	State Consultations: Protected Species and Habitats	State Air Quality Permits, Title V Operating Permits, or Acid Rain Permits	State Wetlands Permits	State or Conservation District Erosion and Sediment Control	State Coastal Zone Management Act Consistency
Residential	New activities require clearing and grading undeveloped land; clearing and land conversion may cause fragmentation and loss of wildlife habitat ; potential filling of wetlands and waterbodies; noise from construction activities and equipment; vehicular emissions from increased population (urbanization); impacts on historic properties and cultural artifacts from construction activities.	●							●						
Commercial/Residential	Same impacts as Commercial and Residential	●	●	●					●	●	●		●	●	
Key: BGEPA = Bald and Golden Eagle Protection Act CAA = Clean Air Act CWA = Clean Water Act FAA = Federal Aviation Administration FERC = Federal Energy Regulatory Commission MBTA = Migratory Bird Treaty Act NHPA = National Historic Preservation Act NOAA = National Oceanic and Atmospheric Administration NPDES = National Pollutant Discharge Elimination System PHMSA = Pipeline and Hazardous Materials Safety Administration SHPO = State Historic Preservation Office SPDES = State Pollutant Discharge Elimination System USACE = United States Army Corps of Engineers USEPA = United States Environmental Protection Agency USFWS = United States Fish and Wildlife Service															

Table 1E-6
Regions of Influence by Resource Type for Onshore Components

Environmental Resource	Description of Region of Influence		Potential Project Impacts
	Onshore Pipeline Loop	Aboveground Facilities	
Surface Water (Non-wetland Waterbodies)	HUC 12 PA Quarryville Loop: 20503061708 Muddy Run-Susquehanna River 20503061709 Fishing Creek-Susquehanna River 20503061711 Conowingo Creek 20503061501 West Branch Octoraro Creek	Compressor Station 200: 20402031004 Little Valley Creek-Valley Creek 20402050104 Valley Creek	Surface water impacts occur at the crossing location of a waterbody that includes in-water construction and some distance downstream for a conservative consideration of turbidity for waterbody crossings. Construction of the Quarryville Loop and the Madison/Raritan Bay Onshore Loops will cross waterbodies using either a dry-ditch method or horizontal directional drill (HDD). This will minimize the downstream distance of project impacts. No waterbodies are present within the site of Compressor Station 200. There are no waterbodies within the proposed site of Compressor Station 206, and the onshore Raritan Bay Loop does not cross any waterbodies.
	HUC 12 NJ Madison/Raritan Bay Loop: 20301050405 Tennent Brook-South River 20301040403 Waackaack Creek-Raritan Bay 20301040403 Waackaack Creek-Raritan Bay 20301040405 Raritan Bay-Lower Bay Deep	Compressor Station 206: 20301050312 Lower Millstone River	
Groundwater	HUC 12 PA Quarryville Loop: 20503061708 Muddy Run-Susquehanna River 20503061709 Fishing Creek-Susquehanna River 20503061711 Conowingo Creek 20503061501 West Branch Octoraro Creek	Compressor Station 200: 20402031004 Little Valley Creek-Valley Creek 20402050104 Valley Creek	Groundwater impacts from equipment use may occur within the construction workspace during construction until soils stabilize with vegetation and may temporarily affect the water quality or yield of a private or public well/spring.
	NJ Madison/Raritan Bay Loop: 20301050405 Tennent Brook-South River 20301040403 Waackaack Creek-Raritan Bay 20301040403 Waackaack Creek-Raritan Bay 20301040405 Raritan Bay-Lower Bay Deep	Compressor Station 206: 20301050312 Lower Millstone River	

Table 1E-6
Regions of Influence by Resource Type for Onshore Components

Environmental Resource	Description of Region of Influence		Potential Project Impacts
	Onshore Pipeline Loop	Aboveground Facilities	
Wetlands	HUC 12 PA Quarryville Loop: 20503061708 Muddy Run-Susquehanna River 20503061709 Fishing Creek-Susquehanna River 20503061711 Conowingo Creek 20503061501 West Branch Octoraro Creek	Compressor Station 200: 20402031004 Little Valley Creek-Valley Creek 20402050104 Valley Creek	Impacts on wetlands include filling in the construction workspace and indirect changes to hydrology. Implementation of the Transco Procedures and other mitigation measures will prevent construction impacts on wetlands from occurring outside the areas disturbed by the Project.
	HUC 12 NJ Madison/Raritan Bay Loop: 20301050405 Tennent Brook-South River 20301040403 Waackaack Creek-Raritan Bay 20301040403 Waackaack Creek-Raritan Bay 20301040405 Raritan Bay-Lower Bay Deep	Compressor Station 206: 20301050312 Lower Millstone River	
Fish	HUC 12 PA Quarryville Loop: 20503061708 Muddy Run-Susquehanna River 20503061709 Fishing Creek-Susquehanna River 20503061711 Conowingo Creek 20503061501 West Branch Octoraro Creek	Compressor Station 200: 20402031004 Little Valley Creek-Valley Creek 20402050104 Valley Creek	Impacts on fish can result from a variety of construction and operation activities that cause turbidity and noise or cause fish to avoid the area. Construction of the Quarryville Loop and the Madison/Raritan Bay Onshore Loops includes HDD crossings, removal of stream-side trees, temporary increases in sediment load, impingement and entrainment from withdrawal of hydrostatic test water, and disturbance if blasting occurs. The sites of Compressor Station 200 and Compressor Station 206 do not contain waterbodies and the onshore Raritan Bay Loop does not cross any waterbodies.
	HUC 12 NJ Madison/Raritan Bay Loop: 20301050405 Tennent Brook-South River 20301040403 Waackaack Creek-Raritan Bay 20301040403 Waackaack Creek-Raritan Bay 20301040405 Raritan Bay-Lower Bay Deep	Compressor Station 206: 20301050312 Lower Millstone River	

Table 1E-6
Regions of Influence by Resource Type for Onshore Components

Environmental Resource	Description of Region of Influence		Potential Project Impacts
	Onshore Pipeline Loop	Aboveground Facilities	
Vegetation	HUC 12 Quarryville Loop: 20503061708 Muddy Run-Susquehanna River 20503061709 Fishing Creek-Susquehanna River 20503061711 Conowingo Creek 20503061501 West Branch Octoraro Creek	Compressor Station 200: 20402031004 Little Valley Creek-Valley Creek 20402050104 Valley Creek	The impact on vegetation is limited to the areas disturbed by construction, which will occur primarily within the existing ROW for pipeline facilities. Soil compaction from heavy equipment can affect percolation and revegetation if appropriate best management practices (BMPs) are not implemented. Work in areas where the ROW will be widened could result in a long-term impact on wooded areas. Construction of the proposed site of Compressor Station 206 could result in a permanent conversion of existing forested areas to herbaceous or scrub/shrub communities. For aboveground facilities, the direct impact on vegetation is generally limited to the areas disturbed by construction. Compressor Station 206 will require some tree clearing, which could result in the indirect impact of forest fragmentation. Impacts on adjacent intact forests may include edge effects that extend inward a few hundred feet from workspaces.
	HUC 12 NJ Madison/Raritan Bay Loop: 20301050405 Tennent Brook-South River 20301040403 Waackaack Creek-Raritan Bay 20301040403 Waackaack Creek-Raritan Bay 20301040405 Raritan Bay-Lower Bay Deep	Compressor Station 206: 20301050312 Lower Millstone River	

Table 1E-6
Regions of Influence by Resource Type for Onshore Components

Environmental Resource	Description of Region of Influence		Potential Project Impacts
	Onshore Pipeline Loop	Aboveground Facilities	
Wildlife (terrestrial), including threatened and endangered species	HUC 12 PA Quarryville Loop: 20503061708 Muddy Run-Susquehanna River 20503061709 Fishing Creek-Susquehanna River 20503061711 Conowingo Creek 20503061501 West Branch Octoraro Creek	Compressor Station 200: 20402031004 Little Valley Creek-Valley Creek 20402050104 Valley Creek	Direct impact on wildlife is limited to the areas disturbed by construction, which will occur primarily within an existing ROW, including injury, sensory disturbance, and habitat loss. Impacts on wildlife that use habitat disturbed by the Project may be long-term or permanent due to fragmentation or loss. Compressor Station 206 will require some tree clearing, which could result in the indirect impact of forest fragmentation. These impacts on wildlife could extend beyond the disturbed areas, depending on the needs and tolerance of the species in the area.
	HUC 12 NJ Madison/Raritan Bay Loop: 20301050405 Tennent Brook-South River 20301040403 Waackaack Creek-Raritan Bay 20301040403 Waackaack Creek-Raritan Bay 20301040405 Raritan Bay-Lower Bay Deep	Compressor Station 206: 20301050312 Lower Millstone River	
Cultural Resources	PA Quarryville Loop: Area of Potential Effect: 400-foot corridor from the limit of disturbance from construction and operation ROWs, ATWS, temporary and permanent access roads, contractor yards, and all modified and new mainline valve facilities	Area of Potential Effect: construction and operation limit of disturbance	The impact area is called the area of potential effect (APE) as the zone of ground disturbance as approved by the Pennsylvania Historical and Museum Commission (PHMC) and New Jersey SHPO.
	NJ Madison/Raritan Bay Loop: Area of Potential Effect: 300-foot corridor from the limit of disturbance from construction and operation ROWs, ATWS, temporary and permanent access roads, contractor yards, and all modified and new mainline valve facilities		
Socioeconomics	PA Quarryville Loop: Lancaster County	Compressor Station 200 Chester County	Socioeconomic impacts may occur during construction from increased spending and tax revenues and an influx of people in the Project area that adds pressure on public services. Longer-term impacts occur from increased payments of taxes on the pipeline or aboveground facilities.
	NJ Madison/Raritan Bay Loop: Middlesex County,	Compressor Station 206 Somerset County	

Table 1E-6
Regions of Influence by Resource Type for Onshore Components

Environmental Resource	Description of Region of Influence		Potential Project Impacts
	Onshore Pipeline Loop	Aboveground Facilities	
Transportation	1 mile from construction ROWs, ATWS, temporary and permanent access roads, contractor yards, and modified and new mainline valve facilities.	1 mile from the boundary of the compressor station	Traffic impacts during construction from the additional vehicle trips generated by construction workers occur within the area typically traveled by workers to the Project site, from the Project site reflecting the typical commuting distance of construction and operation staff.
Soils and Geology	Construction and operation ROWs, ATWS, temporary and permanent access roads, contractor yards, and all modified and new mainline valve facilities	Construction and operation limit of disturbance PA: Compressor Station 200 within existing fence line and ATWS NJ: Compressor Station 206, limit of disturbance	Implementation of Transco's Plan and other mitigation measures will prevent construction impacts on soils and geology from occurring outside the areas disturbed by a project. Blasting is not anticipated for the Project. Geological hazards are not anticipated to adversely affect the loops. No adverse effects on constructability, operation, or integrity of the pipeline are anticipated from landslides, seismicity, soil liquefaction, or volcanism. U.S. Geological Survey (USGS) sources identify a limited amount of karst terrain resources near the Quarryville Loop. <i>(Karst investigations are being carried out along the Quarryville Loop, and a summary report will be provided in a supplemental filing in the 2nd quarter of 2017.)</i>

Table 1E-6
Regions of Influence by Resource Type for Onshore Components

Environmental Resource	Description of Region of Influence		Potential Project Impacts
	Onshore Pipeline Loop	Aboveground Facilities	
Land Use	Approximately 1 mile from construction and operation ROWs, ATWS, temporary and permanent access roads, contractor yards, and all modified and new mainline valve facilities	Approximately 1 mile from construction and operation work spaces of compressor stations	Land use impacts occur from the permanent conversion of lands for new aboveground facilities, such as for Compressor Station 206 and new mainline valve facilities. The land use surrounding the Project components reflects long-term development and use for residences, commerce, recreation, and some farmland in PA. The majority of the Project occurs within existing ROW, and a small portion of new ROW may require restrictions (e.g., construction of mainline valve facilities). Nearby residents may experience temporary noise, dust, and traffic. The PA loop is within 0.25 mile of state game lands and private recreation areas. No federal, state, or other public lands occur within 0.25 mile of Compressor Station 200, the onshore portion of the Madison/Raritan Bay Loop, or the proposed site for Compressor Station 206.
Visual	0.25 mile from construction and operation ROWs, ATWS, temporary and permanent access roads, contractor yards, and all modified and new mainline valve facilities	0.3 mile from aboveground facilities at compressor station sites	Visual impacts occur from the use of construction equipment and removal of vegetation, particularly in forested areas, and from the construction and operation of permanent, aboveground facilities. The nearest visual receptor to the proposed site for Compressor Station 206 is the New Jersey Buddhist Vihara and Meditation Center, approximately 0.3 mile to the southeast.

Table 1E-6
Regions of Influence by Resource Type for Onshore Components

Environmental Resource	Description of Region of Influence		Potential Project Impacts
	Onshore Pipeline Loop	Aboveground Facilities	
Air Quality-Construction	0.25 mile from construction and operation ROWs, ATWS, temporary and permanent access roads, contractor yards, and all modified and new mainline valve facilities	0.25 mile from construction work spaces	The impact of construction equipment emissions and fugitive dust could occur locally within the construction workspace due to dispersion downwind depending on atmospheric conditions. Fugitive dust emissions may travel farther depending on the soil characteristics and ambient conditions. Vehicle emissions associated with pipeline construction would disperse to within background concentrations, generally within several hundred feet.
Air Quality-Operation	N/A	16.1 kilometers (10 miles) from the center of the of the compressor station site	Compressor station emissions may disperse in a wider radius depending on atmospheric conditions. A distance of 50 kilometers (31 miles) is the limit of air quality modeling per EPA and dispersion modeling technical guidelines. Air emissions during operation of the pipeline will be limited to maintenance vehicles.
Noise-Construction	0.25 mile from construction and operation ROWs, ATWS, temporary and permanent access roads, contractor yards, and all modified and new mainline valve facilities 0.5 mile from horizontal direction drill or direct pipe installation	0.25 mile from the boundary of construction work spaces	Noise impacts can occur within 0.25 mile of the activity from the use of construction equipment for site clearing, grading, excavations, and pipe installation. Where HDD drilling occurs, there may be additional and broader reaching noise impacts because HDD activities may be conducted for 24 hours per day. NSAs within 0.5 mile of all planned HDD crossings include residential areas, with the nearest at a distance of 120 feet from an HDD exit site.

Table 1E-6
Regions of Influence by Resource Type for Onshore Components

Environmental Resource	Description of Region of Influence		Potential Project Impacts
	Onshore Pipeline Loop	Aboveground Facilities	
Noise-Operation	N/A	1 mile from the boundary of the compressor station	Noise impacts can occur from operation of compressors. The nearest residences are located within 0.5 miles or less from Compressor Station 200 206.
^a Radius of analysis area unless otherwise indicated. Key: APE = Area of Potential Effect ATWS = Additional Temporary Workspace HDD = Horizontal Directional Drill HUC = Hydrologic Unit Code N/A = Not applicable. The impacts of the project construction and operation are negligible. PHMC = Pennsylvania Historical and Museum Commission ROW = right-of way SHPO = State Historic Preservation Office			

Table 1E-7
Onshore Temporal and Geographical Overlap - Quarryville Loop

Activities (or Owner)	Construction Start Date	Overlaps	Operation Start Date	Overlaps	Activity Category	Distance from Project (miles)	Shared Region of Influence with the Project														
							Non-Wetland Waterbodies	Groundwater	Wetlands	Fish	Vegetation	Wildlife	Cultural	Socioeconomics	Transportation	Soils and Geology	Land Use	Visual	Air Quality - Construction	Noise - Construction	
Number of Activities That Overlap the ROI							10	10	10	10	10	10	2	11	5	2	5	2	2	2	
Quarryville Loop	2018	N/A	2019																		
Quarryville Loop ROI							HUC	HUC	HUC	HUC	HUC	HUC	0.00	COUNTY	1.00	0.00	1.00	0.25	0.25	0.25	
Atlantic Sunrise (CP15-138-000)	2017	YES	2018	YES	Pipeline	0.00	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Eastern Shore Natural Gas Company (CP17-28-000)	2017	NO	2017	YES	Pipeline	10.76	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	
Keystone Solar	2012	NO	2012	YES	Solar Energy	0.53	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	NO	NO	
Mariner East II (OR14-40)	2017	NO	2018	YES	Pipeline	25.21	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	
Peach Bottom Nuclear Power Plant	N/A	NO	Operating	YES	Electricity Generation	3.95	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	
Poultry Barn	TBD	YES	TBD	YES	Commercial	1.06	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	
Rock Springs Expansion (CP14-504)	2015	NO	2016	YES	Pipeline	0.00	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
S&A Kreider And Sons Farm Expansion	TBD	YES	TBD	YES	Commercial	2.56	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	
Scalpy Hollow Timber	2017	NO	2017	YES	Industrial	0.44	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	NO	NO	NO	
South Lime Street Bridge	2020	NO	2020	YES	Major Transportation	0.70	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	NO	NO	NO	
T-325 over Peters Creek	2018	YES	2019	YES	Major Transportation	4.93	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	
US 30 Bypass	2020	NO	2028	YES	Major Transportation	15.67	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	
York 2 Energy Center	2016	NO	2017	YES	Electricity Generation	5.33	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	

Table 1E-8
Onshore Temporal and Geographical Overlap - Madison/Raritan Bay Loops

Activities (or Owner)	Construction Start Date	Overlaps	Operation Start Date	Overlaps	Activity Category	Distance from Project (miles)	Shared Region of Influence with the Project														
							Non-Wetland Waterbodies	Groundwater	Wetlands	Fish	Vegetation	Wildlife	Cultural	Socioeconomics	Transportation	Soils and Geology	Land Use	Visual	Air Quality - Construction	Noise - Construction	
Number of Activities That Overlap the ROI							9	9	9	9	9	9	1	15	3	1	3	3	3	3	
Madison/Raritan Bay Loop	2018	N/A	2019																		
Madison/Raritan Bay Loop ROI							HUC	HUC	HUC	HUC	HUC	HUC	0.00	COUNTY	1.00	0.00	1.00	0.25	0.25	0.25	
Alfieri Property Development	TBD	YES	TBD	YES	Commercial/ Residential	1.95	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	
Elizabeth Ave. Elementary School	2016	NO	2016	YES	Commercial	8.66	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Garden Grove on Nine	TBD	YES	TBD	YES	Residential	2.52	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	
Interchange 125	2016	NO	2018	YES	Major Transportation	2.79	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	
La Mer Development	TBD	YES	TBD	YES	Residential	0.09	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	YES	YES	YES	
Middlesex Energy Center	TBD	YES	TBD	YES	Electricity Generation	2.13	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	
New York Bay Expansion (CP15-527)	2016	NO	2017	YES	Pipeline	0.00	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
NYNJ Expansion	2012	NO	2013	YES	Pipeline	9.57	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Route 18	2018	YES	2018	YES	Major Transportation	3.76	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	
Route 35 Improvements	2013	NO	2015	YES	Major Transportation	1.18	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	
Route 9/35 & Main Street Interchange	2021	NO	2021	YES	Major Transportation	1.48	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	
Sayreville Generating Station	N/A	NO	Operating	YES	Electricity Generation	2.96	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	
South Amboy Intermodal Center	2017	NO	2018	YES	Major Transportation	1.31	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	
The Point at Sayreville	TBD	YES	TBD	YES	Commercial/ Residential	3.23	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	
US Route 9-Bordentown Avenue- Kenneth Avenue	TBD	YES	TBD	YES	Transportation	1.09	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	
Windermere Townhomes	TBD	YES	TBD	YES	Residential	0.09	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	YES	YES	YES	
Woodbridge Delivery Lateral (CP14-18)	2014	NO	2015	YES	Pipeline	4.52	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	

Table 1E-9
Onshore Temporal and Geographical Overlap – Compressor Station 200

Activities (or Owner)	Construction Start Date	Overlaps	Operation Start Date	Overlaps	Activity Category	Distance from Project (miles)	Shared Region of Influence with the Project															
							Non-Wetland Waterbodies	Groundwater	Wetlands	Fish	Vegetation	Wildlife	Cultural	Socioeconomics	Transportation	Soils and Geology	Land Use	Visual	Air Quality - Construction	Air Quality - Operation	Noise - Construction	Noise - Operation
	Number of Activities That Overlap the ROI						13	13	13	13	13	13	1	16	4	1	4	2	2	14	2	4
Compressor Station 200	2019	N/A	2019																			
Compressor Station 200 ROI							HUC	HUC	HUC	HUC	HUC	HUC	0.00	COUNTY	1.00	0.00	1.00	0.30	0.25	10.00	0.25	1.00
Atwater Commercial	TBD	YES	TBD	YES	Commercial	3.37	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Atwater-Lot 13 subdivision (for commercial use)	TBD	YES	TBD	YES	Commercial	2.81	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
East Side Expansion (CP14-17)	2014	NO	2015	YES	Pipeline	5.82	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Eastern Shore Natural Gas Company (CP17-28-000)	2017	NO	2017	YES	Pipeline	19.54	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
Exton Square Mall Parking Lot Expansion	TBD	YES	TBD	YES	Commercial	2.17	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Glen Loch II Subdivision	TBD	YES	TBD	YES	Residential	1.61	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Great Valley Corporate Center	TBD	YES	TBD	YES	Commercial/ Residential	2.70	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Mariner East II (OR14-40)	2017	NO	2018	YES	Pipeline	0.84	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	NO	NO	YES	NO	YES
Marquis at Exton	TBD	YES	TBD	YES	Residential	2.96	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
New York Bay Expansion (CP15-527)	2016	NO	2017	YES	Pipeline	0.00	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Parkview at Oaklands	TBD	YES	TBD	YES	Residential	3.52	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Sage Atwater	TBD	YES	TBD	YES	Residential	3.58	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Swedesford Square Apartments	TBD	YES	TBD	YES	Residential	0.04	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	YES	YES	YES	YES	YES
Townes at Malvern	TBD	YES	TBD	YES	Residential	0.88	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	NO	NO	YES	NO	YES
White Oak Mainline Expansion (CP15-18)	2016	NO	2016	YES	Pipeline	19.80	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
Whiteland Village Mixed Use Development	TBD	YES	TBD	YES	Commercial/ Residential	1.17	YES	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO

Table 1E-10
Onshore Temporal and Geographical Overlap – Compressor Station 206

Activities (or Owner)	Construction Start Date	Overlaps	Operation Start Date	Overlaps	Activity Category	Distance from Project (miles)	Shared Region of Influence with the Project															
							Non-Wetland Waterbodies	Groundwater	Wetlands	Fish	Vegetation	Wildlife	Cultural	Socioeconomics	Transportation	Soils and Geology	Land Use	Visual	Air Quality - Construction	Air Quality - Operation	Noise - Construction	Noise - Operation
						Number of Activities That Overlap the ROI	5	5	5	5	5	5	0	11	1	0	1	0	0	19	0	1
Compressor Station 206	2018	N/A	2019																			
						Compressor Station 206 ROI	HUC	HUC	HUC	HUC	HUC	HUC	0.00	COUNTY	1.00	0.00	1.00	0.30	0.25	10.00	0.25	1.00
Cambridge Crossing	2016	NO	2016	YES	Residential	1.68	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Cyalume Specialty Products	2016	NO	2016	YES	Industrial	10.13	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
Elizabeth Ave. Elementary School	2016	NO	2016	YES	Commercial	10.09	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
Engel Burman @ Somerset, LLC	TBD	YES	TBD	YES	Commercial/ Residential	10.23	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
F. Greek Development Warehouse Industrial Buildings	TBD	YES	TBD	YES	Industrial	7.22	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Garden State Expansion (CP15-89)	2016	NO	2017	YES	Pipeline	7.87	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Gelbard	TBD	YES	TBD	YES	Residential	3.05	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Hamilton Commons	TBD	YES	TBD	YES	Commercial/ Residential	8.86	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Leidy Southeast Expansion (CP13-551)	2014	NO	2015	YES	Pipeline	3.77	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Middlesex Apple Orchard Solar	2014	NO	2014	YES	Solar Energy	5.86	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Oaks at Cranbury	2016	NO	2017	YES	Residential	5.93	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Pinnacle Communities	2015	NO	2016	YES	Residential	9.76	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Point of Woods	2016	NO	2017	YES	Residential	2.00	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Pratt Retail Specialties	TBD	YES	TBD	YES	Industrial	7.03	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Princeton Manor	2016	NO	2017	YES	Residential	0.44	YES	YES	YES	YES	YES	YES	NO	NO	YES	NO	YES	NO	NO	YES	NO	YES
Proposed Warehouse Addition	TBD	YES	TBD	YES	Commercial	6.87	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Recon Services, LLC	TBD	YES	TBD	YES	Commercial/ Residential	9.39	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Somerset Douglas	TBD	YES	TBD	YES	Residential	9.03	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Summerfields	TBD	YES	TBD	YES	Residential	9.56	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
The Villagio	2016	NO	2017	YES	Residential	2.08	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO
Wawa Food Market And Fueling Station	2016	NO	2017	YES	Commercial	8.77	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO
Wilson Farm Senior Housing	TBD	YES	TBD	YES	Residential	1.54	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO

Table 1E-11
Summary of Potential Cumulative Impacts for Madison/Onshore Raritan Bay Loop and Compressor Station 206

Activity/Project	Activity Category	CS Time Overlap	Loop Time Overlap	Non-wetland Waterbodies	Surface Water Use - Construction	Land Cover Types								NRHP (Potentially) Eligible Sites	Archaeological Resources	Non-Archaeological Resources	Socioeconomics					Recreation (Land)	Aesthetics (Land)		
						Agricultural Land	Upland Forest/Woodland	Industrial/Commercial Land	Transportation Land	Residential Land	Open Land	Wetlands	Open Water				Peak Employment (Construction)	Payroll (Construction)	Employment (Operation)	Vehicle Traffic (Construction)	Taxes and Fees (Operation)				
						Number	million gallons	acres	acres	acres	acres	acres	acres	acres	number of sites	number	number	number of jobs	million \$	number of jobs	trips per day	thousand \$	acres	acres	
Madison/Onshore Raritan Bay Loop						12	0.462	0.0	4.6	0.8	1.7	0.8	17.6	3.0	0.2					\$24			\$1,000	0	53.5
Compressor Station 206						2		0.0	8.4	0.0	0.0	0.0	4.8	1.4	0.0					\$15	2		\$275	0	22.4
Project Contribution, Percent						82.4%	100.0%	-	72.9%	0.0%	0.0%	100.0%	68.8%	71.0%	100.0%	-	-	-	-	100.0%	100.0%	-	100.0%	-	65.9%
Total Cumulative Impacts						17	0	0	11	19	4	1	33	6	0	0	0	0	0	39	2	0	1275	0	115
Cumulative Impacts of Activities Considered						3	0	0	3	19	4	0	10	2	0	0	0	0	0	0	0	0	0	39	
Alfieri Property Development	Commercial/ Residential	NO	YES	U	U	0	U	0	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0	
Cambridge Crossing	Residential	YES	NO	U	U	0	U	0	0	0	0	0	U	U	0	0	0	0	0	0	0	0	0	0	
Cyalume Specialty Products	Industrial	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0	
Elizabeth Ave. Elementary School	Commercial	YES	YES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0	
Engel Burman @ Somerset, LLC	Commercial/ Residential	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0	
F. Greek Development Warehouse Industrial Buildings	Industrial	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0	
Garden Grove on Nine	Residential	NO	YES	U	U	0	U	0	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0	
Garden State Expansion (CP15-89)	Pipeline	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gelbard	Residential	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hamilton Commons	Commercial/ Residential	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0	
Interchange 125	Major Transportation	NO	YES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0	
La Mer Development	Residential	NO	YES	U	U	U	U	U	U	U	U	U	U	U	0	0	0	U	U	U	U	U	U	U	
Leidy Southeast Expansion (CP13-551)	Pipeline	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0	
Middlesex Apple Orchard Solar	Solar Energy	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Table 1E-11
Summary of Potential Cumulative Impacts for Madison/Onshore Raritan Bay Loop and Compressor Station 206

Activity/Project	Activity Category	CS Time Overlap	Loop Time Overlap	Non-wetland Waterbodies	Surface Water Use - Construction	Land Cover Types								NRHP (Potentially) Eligible Sites	Archaeological Resources	Non-Archaeological Resources	Socioeconomics					Recreation (Land)	Aesthetics (Land)
						Agricultural Land	Upland Forest/Woodland	Industrial/Commercial Land	Transportation Land	Residential Land	Open Land	Wetlands	Open Water				Peak Employment (Construction)	Payroll (Construction)	Employment (Operation)	Vehicle Traffic (Construction)	Taxes and Fees (Operation)		
				Number	million gallons	acres	acres	acres	acres	acres	acres	acres	acres	number of sites	number	number	number of jobs	million \$	number of jobs	trips per day	thousand \$	acres	acres
Middlesex Energy Center	Electricity Generation	NO	YES	1	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
New York Bay Expansion (CP15-527)	Pipeline	NO	YES	2	U	U	3.1	19.47	4.4	U	10.2	1.8	U	U	U	U	U	U	U	U	U	U	39.3
NYNJ Expansion	Pipeline	NO	YES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oaks at Cranbury	Residential	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinnacle Communities	Residential	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
Point of Woods	Residential	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	0	0	0	0	0	0	0
Pratt Retail Specialties	Industrial	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Princeton Manor	Residential	YES	NO	U	U	U	U	U	U	U	U	U	U	0	0	0	0	0	0	U	0	U	0
Proposed Warehouse Addition	Commercial	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recon Services, LLC	Commercial/ Residential	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
Route 18	Major Transportation	NO	YES	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
Route 35 Improvements	Major Transportation	NO	YES	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
Route 9/35 & Main Street Interchange	Major Transportation	NO	YES	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Sayreville Generating Station	Electricity Generation	NO	YES	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
Somerset Douglas	Residential	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
South Amboy Intermodal Center	Major Transportation	NO	YES	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Summerfields	Residential	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
The Point at Sayreville	Commercial/ Residential	NO	YES	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
The Villagio	Residential	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	0	0	0	0	0	0	0

Table 1E-11
Summary of Potential Cumulative Impacts for Madison/Onshore Raritan Bay Loop and Compressor Station 206

Activity/Project	Activity Category	CS Time Overlap	Loop Time Overlap	Non-wetland Waterbodies	Surface Water Use - Construction	Land Cover Types								NRHP (Potentially) Eligible Sites	Archaeological Resources	Non-Archaeological Resources	Socioeconomics					Recreation (Land)	Aesthetics (Land)
						Agricultural Land	Upland Forest/Woodland	Industrial/Commercial Land	Transportation Land	Residential Land	Open Land	Wetlands	Open Water				Peak Employment (Construction)	Payroll (Construction)	Employment (Operation)	Vehicle Traffic (Construction)	Taxes and Fees (Operation)		
				Number	million gallons	acres	acres	acres	acres	acres	acres	acres	acres	number of sites	number	number	number of jobs	million \$	number of jobs	trips per day	thousand \$	acres	acres
US Route 9-Bordentown Avenue- Kenneth Avenue	Transportation	NO	YES	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Wawa Food Market And Fueling Station	Commercial	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
Wilson Farm Senior Housing	Residential	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	0	0	0	0	0	0	0
Windermere Townhomes	Residential	NO	YES	U	U	U	U	U	U	U	U	U	U	0	0	0	U	U	U	U	U	U	U
Woodbridge Delivery Lateral (CP14-18)	Pipeline	NO	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Key: 0 = information not needed due to outside ROI for those resources NA = not applicable U = unknown or unavailable information																							

Table 1E-12
Summary of Potential Cumulative Impacts for Quarryville Loop and Compressor Station 200

Activity/Project	Activity Category	CS Time Overlap	Loop Time Overlap	Non-wetland Waterbodies	Surface Water Use - Construction	Land Cover Types								NRHP (Potentially) Eligible Sites	Archaeological Resources	Non-Archaeological Resources	Socioeconomics					Recreation (Land)	Aesthetics (Land)
						Agricultural Land	Upland Forest/Woodland	Industrial/Commercial Land	Transportation Land	Residential Land	Open Land	Wetlands	Open Water				Peak Employment (Construction)	Payroll (Construction)	Employment (Operation)	Vehicle Traffic (Construction)	Taxes and Fees (Construction)		
				Number	million gallons	acres	acres	acres	acres	acres	acres	acres	acres	number of sites	number	number	number of jobs	million \$	number of jobs	trips per day	thousand \$	acres	acres
Quarryville Loop				13	1.7	95.2	5.1	1.3	1.9	2.6	8.3	2.5	0.2					\$27				31.4	196.3
Compressor Station 200				0														\$14				0	28.9
Project Contribution, Percent				72.2%	100.0%	12.1%	5.7%	5.8%	15.5%	13.3%	19.6%	36.0%	7.8%	-	-	-	0.0%	33.7%	-	-	0.0%	100.0%	20.3%
Total Cumulative Impacts				18	2	783	90	23	12	19	42	7	3	0	0	0	261	121	0	0	3674	31	1111
Cumulative Impacts of Activities Considered				5	0	688	85	21	10	17	34	4	3	0	0	0	261	80	0	0	3674	0	886
Atlantic Sunrise (CP15-138-000)	Pipeline	NO	YES	1	U	549	66.7	0.6	10.3	14.2	19.0	2.1	2.6	U	U	U	261	\$80	U	U	3674	U	664
Atwater Commercial	Commercial	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Atwater-Lot 13 subdivision (for commercial use)	Commercial	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
East Side Expansion (CP14-17)	Pipeline	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
Eastern Shore Natural Gas Company (CP17-28-000)	Pipeline	YES	YES	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
Exton Square Mall Parking Lot Expansion	Commercial	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Glen Loch II Subdivision	Residential	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Great Valley Corporate Center	Commercial/Residential	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Keystone Solar	Solar Energy	NO	YES	U	U	U	U	U	U	U	U	U	U	0	0	0	U	U	U	U	U	U	0
Mariner East II (OR14-40)	Pipeline	YES	YES	U	U	U	U	U	U	U	U	U	U	0	0	0	U	U	U	U	U	U	0
Marquis at Exton	Residential	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
New York Bay Expansion (CP15-527)	Pipeline	YES	NO	U	U	U	U	14.1	U	U	6.8	U	U	U	U	U	U	U	U	U	U	U	20.93
Parkview at Oaklands	Residential	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Peach Bottom Nuclear Power Plant	Electricity Generation	NO	YES	U	U	0	U	0	0	0	0	U	U	0	0	0	0	0	0	0	0	0	0
Poultry Barn	Commercial	NO	YES	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Rock Springs Expansion (CP14-504)	Pipeline	NO	YES	4	U	139.2	17.8	6.6	U	2.4	8	2.3	U	U	U	U	U	U	U	U	U	U	176.9

Table 1E-12
Summary of Potential Cumulative Impacts for Quarryville Loop and Compressor Station 200

Activity/Project	Activity Category	CS Time Overlap	Loop Time Overlap	Non-wetland Waterbodies	Surface Water Use - Construction	Land Cover Types								NRHP (Potentially) Eligible Sites	Archaeological Resources	Non-Archaeological Resources	Socioeconomics					Recreation (Land)	Aesthetics (Land)
						Agricultural Land	Upland Forest/Woodland	Industrial/Commercial Land	Transportation Land	Residential Land	Open Land	Wetlands	Open Water				Peak Employment (Construction)	Payroll (Construction)	Employment (Operation)	Vehicle Traffic (Construction)	Taxes and Fees (Construction)		
				Number	million gallons	acres	acres	acres	acres	acres	acres	acres	acres	number of sites	number	number	number of jobs	million \$	number of jobs	trips per day	thousand \$	acres	acres
S&A Kreider And Sons Farm Expansion	Commercial	NO	YES	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Sage Atwater	Residential	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Scalpy Hollow Timber	Industrial	NO	YES	U	U	U	U	U	U	U	U	U	U	0	0	0	U	U	U	U	U	U	0
South Lime Street Bridge	Major Transportation	NO	YES	U	U	U	U	U	U	U	U	U	U	0	0	0	U	U	U	U	U	U	0
Swedesford Square Apartments	Residential	YES	NO	U	U	U	U	U	U	U	U	U	U	0	0	0	U	U	U	U	U	U	24.1
T-325 over Peters Creek	Major Transportation	NO	YES	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
Townes at Malvern	Residential	YES	NO	U	U	U	U	U	U	U	U	U	U	0	0	0	U	U	U	U	U	U	0
US 30 Bypass	Major Transportation	NO	YES	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
White Oak Mainline Expansion (CP15-18)	Pipeline	YES	NO	0	0	0	0	0	0	0	0	0	0	0	0	0	U	U	U	0	U	0	0
Whiteland Village Mixed Use Development	Commercial/Residential	YES	NO	U	U	0	U	0	0	0	0	U	U	0	0	0	U	U	U	0	U	0	0
York 2 Energy Center	Electricity Generation	NO	YES	U	U	0	U	0	0	0	0	U	U	0	0	0	0	0	0	0	0	0	0
Key: 0 = information not needed due to outside ROI for those resources NA = not applicable U = unknown or unavailable information																							

Transco is adding information to Table 1E-13 regarding proposed offshore wind farms.

Table 1E-13
Past, Present, and Reasonably Foreseeable Offshore and Coastal Activities

Activity	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
Brooklyn Queens Interconnection	National Grid's 1.6 miles of 26-inch and 12-inch coated steel pipeline underneath the Rockaway Inlet beginning at Beach 169th Street in the Rockaways, parallel to the Marine Parkway Gil Hodges Memorial Bridge, to the intersection of Flatbush Avenue and Aviation Road in Brooklyn installed in a previously established cable area across the Rockaway Inlet. The new 12-inch pipeline connects National Grid's existing distribution systems in Brooklyn and Queens, providing a back-feed for both areas and ensuring adequate natural gas supplies for the Rockaways. The 26-inch pipeline will connect to the Williams Transco proposed Rockaway Delivery Lateral Project. In December 2011 the City issued a Negative Declaration, meaning the project would not have an adverse impact on the environment.	2013	2013	NY	Queens		Pipeline
Champlain Hudson Power Express	Two 5-inch diameter underwater cables in Lake Champlain and Hudson River to bring power to the New York metro area. Full project will run from the U.S.-Canadian border to the New York metro area. To avoid environmentally sensitive areas such as the PCB clean-up site in the Hudson River, the line will be taken out of Southern Lake Champlain and will follow Route 9 and the Canadian Pacific and CSX rail right-of-ways for 126 miles, re-entering the Hudson River south of Catskill. The line will also exit the Hudson and be buried underground for seven miles to bypass Haverstraw Bay. The power will be delivered to a converter station that will be built in Astoria Queens.	2018	2021	NY	Clinton, Essex, Queens		Utilities
D&R Canal Dredging Project	Dredging project in a 10-mile section of the Delaware & Raritan Canal (between Route 27 in Kingston and Amwell Road in East Millstone). Project expected to take four years and to remove 240,000 cubic yards of sediment. Project is scheduled to begin in November 2017 and active dredging will begin in summer 2018.	2018	2022	NJ	Somerset	Franklin Township	Channel Maintenance and Dredging
East Rockaway Inlet Maintenance	Maintenance of Infrastructure & Stewardship in a channel 12 feet deep (mean lower water [MLW]), 250 feet wide, about 0.9 mile long. Funding of \$7 million for dredging of 250,000 cubic yards of sand with placement on the eroded Atlantic Ocean Rockaway Beach shoreline. In fiscal year (FY) 17, approximately 270,000 cubic yards of sand were dredged and placed. Next maintenance dredging anticipated for FY 19 (contract ongoing).	2017	ongoing	NY	Queens		Channel Maintenance and Dredging
Empire State Connector	Two 6-inch submarine cable buried in the Erie Canal and the Hudson River to deliver energy from upstate New York to New York City. The Project will originate at a proposed converter substation near Utica, New York or Clay substation in Clay, New York and will terminate at the converter substation located near the Mott Haven substation in Bronx, New York or at the Gowanus substation in Brooklyn, New York. Empire notes that the final route and points of interconnection are subject to an ongoing review. The majority of the cable will be laid in a underwater trench below the Erie Canal and Hudson River. The installation will use waterjets to dig a temporary trench only a few inches wider than the six-inch diameter cable and a few feet deep (according to permit specifications).	TBD	2021-2022	NY	Oneida		Utilities

Transco is adding information to Table 1E-13 regarding proposed offshore wind farms.

Table 1E-13
Past, Present, and Reasonably Foreseeable Offshore and Coastal Activities

Activity	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
Great Kills Harbor Dredging	Maintenance dredging in a channel 10 feet deep, 150 feet wide, from deep water in Lower New York Bay to the entrance of the harbor and along its west side (1.9-mile channel). Dredged in 2002/2003 with the removal of approximately 136,428 cubic yards (CY) of sand, which was used in a beneficial manner as beach nourishment, placed along Great Kills Beach, Gateway National Recreation Area. The 2014 maintenance dredging was expected to involve the removal of up to approximately 315,000 CY of sand. Maintenance dredging of the Great Kills Harbor will be accomplished by pipeline dredge or similar plant. The entire channel will generally not require maintenance dredging; only areas where shoaling has reduced the depth of the channel will require dredging.	2014	ongoing	NY	Richmond		Channel Maintenance and Dredging
Jamaica Bay at Rockaway Inlet Dredging	Maintenance dredging of the entrance channel 20 feet deep at MLW, 1,000 feet wide, about 1.7 miles long and connecting two interior channels with deep water in the Atlantic Ocean. Recent maintenance dredging conducted in 2013 and in 2009 when approximately 330,000 cubic yards of material were removed, with beneficial reuse both at the HARS and at White Island in the Jamaica Bay Complex. FY 17, funding of \$251,000 was provided to continue environmental coordination with local sponsors to determine the most suitable beneficial use placement for the sand dredged material proposed for removal in the out-year. Presently, a condition survey is scheduled for Mar/Apr 2017 In FY 18, funding is required to complete Plans and Specifications for the next maintenance dredging of the channel.	2013	ongoing	NY	Queens		Channel Maintenance and Dredging
Jamaica Bay Dredging and Beach Nourishment	Emergency Dredging and Beach Nourishment. Emergency dredging at Jamaica Bay Inlet and beach nourishment at Rockaway Beach. South shore of Long Island, between Far Rockaway in Queens County and Atlantic Beach in Nassau County, Long Island, New York.	2017	2017	NY	Queens		Channel Maintenance and Dredging
Jones Inlet to East Rockaway Inlet Phase I Groin Construction	Coastal storm damage risk-reduction on Long Beach Island. \$38 million to H&L Construction; 250,000 tons of stone from New Jersey. Work hours are Monday through Friday 7:00 a.m. to 3:30 p.m.	2016	2018	NY	Queens		Storm Damage Reduction
Jones Inlet to East Rockaway Inlet Phase II Beachfill	Beachfill, dune crossings, planted vegetation. Total beach fill quantity is 4.7 million cubic yards of sand, and planting of 34 acres of dune grass. The contract is expected to be awarded in Fall 2017, and project will run from early 2018 to early 2020.	2018	2020	NY	Queens		Storm Damage Reduction
Lower New York Bay Extension Maintenance	Maintenance on 10 sections of the Lower New York Bay Extension (LNYBE), an existing 26-inch diameter natural gas pipeline located within New Jersey and New York state waters of the Lower New York Bay, Raritan Bay and the Atlantic Ocean under Nationwide Permit 3 (Maintenance) and Permits for Excavation and Fill in Navigable Waters. The total Project workspace encompasses a 19.3-acre area. The total length of the maintenance activities will be approximately 5.3 miles among the 10 sections of the pipeline. The 30-foot- wide right-of-way (ROW) of the existing pipeline will be utilized along each section to accommodate disturbance during maintenance activities. Approximately 715,092 cubic feet of seabed will be excavated in order to achieve the proposed lowering of the pipeline along these 10 sections of the LNYBE. Excavation of this sediment will allow vertical settlement of the pipeline, resulting in the lowering of approximately 27,977 feet of pipe to a minimum depth of 4 feet. The lowering will be conducted between September 2017 and October 2017 and is expected to be completed in 30 (24-hour) working days.	2017	2017	NY & NJ			Pipeline

Transco is adding information to Table 1E-13 regarding proposed offshore wind farms.

Table 1E-13
Past, Present, and Reasonably Foreseeable Offshore and Coastal Activities

Activity	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
Neptune Cable	The Neptune project provides up to 660 MW of electric power from the PJM Interconnection system to the Long Island Power Authority (LIPA) grid on Long Island via a 500-kilovolt (kV), direct current (DC) cable. The DC cable extends between two converter stations, one in Sayreville, New Jersey, and one on Duffy Avenue in the community of New Cassel in the Town of North Hempstead. The Sayreville converter station takes alternating current (AC) power from the PJM system and converts it to DC power, while the Duffy Avenue station converts DC power back to AC for use on the LIPA system. The DC cable runs approximately 50 miles under the Raritan River in New Jersey and the Atlantic Ocean, and an additional 15 miles buried alongside the Wantagh Parkway. The project interconnects to PJM in Sayreville at a nearby First Energy substation, and interconnects to the LIPA system at the Newbridge Road substation in Levittown.	2005	2007	NY & NJ			Utilities
New York and New Jersey Harbor Deepening Project	Initiated in 1989, the \$2.1 billion mega-project anticipated by nearly 30 years the expansion of the Panama Canal and the bigger cargo vessels it would bring to U.S. ports. Dredging and construction of four marsh restoration projects. 50-foot water access to the Port of New York and New Jersey's six container terminals by deepening the Ambrose Channel from deep water in the Atlantic Ocean to the Verrazano-Narrows Bridge, the Anchorage Channel from the Verrazano-Narrows Bridge to its confluence with the Port Jersey Channel, the Kill Van Kull Channel, the main Newark Bay Channel to Port Elizabeth and the Port Elizabeth and South Elizabeth tributary channels, the Arthur Kill Channel adjacent to the New York Container Terminal, and the Port Jersey Channel.	2004	2016	NY & NJ	Middlesex, Monmouth, Queens, Richmond		Channel Maintenance and Dredging
New York Harbor Maintenance	Channel Maintenance project to remove abandoned piers, wharves, derelict vessels and debris, and repairing deteriorated shore structures. The project purpose is to reduce hazards and damages of navigation. Removal projects have occurred in 11 reaches in the Port. Six reaches are still outstanding: Brooklyn 2B; Arthur Kill, Staten Island; Kill Van Kull, Staten Island; Shooters Island, New York & New Jersey; Linden, Carteret, Perth Amboy; Bayonne 2.	TBD	TBD	NY & NJ	Middlesex, Monmouth, Queens, Richmond		Channel Maintenance and Dredging
New York Harbor Maintenance Dredging	Maintenance dredging for a total of 31 miles in the New York Harbor Complex. In FY 18, requested funding could provide for completion of Plans and Specifications for possible future cycle maintenance where required in the channels (but funding still unknown). No funding received in FY 17.	TBD	ongoing	NY & NJ	Middlesex, Monmouth, Queens, Richmond		Channel Maintenance and Dredging
NYNJ Expansion	The construction and operation of approximately 20.0 miles of natural gas pipeline and associated equipment and facilities in New Jersey, New York, and Connecticut. 15.2 miles consist of new 30-inch-diameter pipeline in the boroughs of Staten Island and Manhattan, New York and the cities of Bayonne, Jersey City, and Hoboken, New Jersey, and 4.8 miles consist of 42-inch-diameter replacement pipeline in the borough of Staten Island, New York and the City of Linden, New Jersey. It crosses the lower Hudson River and Kill Van Kull using HDD. Texas Eastern also abandoned 8.95 miles of existing 12-, 20-, and 24-inch-diameter pipeline in the city of Linden, New Jersey and the borough of Staten Island, New York. The project also included seven new metering and regulating (M&R) stations and modification of existing compressor stations. (CP11-56)	2012	2013	NY & NJ	Richmond and Union		Pipeline

Transco is adding information to Table 1E-13 regarding proposed offshore wind farms.

Table 1E-13
Past, Present, and Reasonably Foreseeable Offshore and Coastal Activities

Activity	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
NYSERDA Offshore Wind	NYSERDA is developing a Master Plan to address potential future project areas for BOEM's consideration of offshore wind sites and to support the New York State's goal of encouraging development of 2,400 MW of wind energy by 2030. NYSERDA's offshore study area is outside the 12 nm territorial sea boundary.	TBD	TBD	NY			Offshore Wind
Plumb Beach Storm Drainage Reduction	Coastal storm protection through beach berm and terminal groins construction. Phase I, the beach berm, was constructed immediately prior to Hurricane Sandy, preventing what could have been significant structural damage to the Belt Parkway during the storm. The more than 100,000 cubic yards of sand was beneficially reused from Ambrose Channel dredging done as part of ongoing efforts to deepen the channels associated with the Port of New York and New Jersey. Phase II was completed over the course of 2013 and involved the construction of the stone groins and the breakwater.	NA	2013	NY			Storm Damage Reduction
Poseidon High Voltage/Direct Current (HVDC)	The 78-mile Poseidon line begins in South Brunswick, New Jersey and connects to Long Island at the Ruland Road substation in Melville, New York. From Raritan Bay, underwater in the outer New York Harbor and Atlantic Ocean until it reaches Long Island. Received interconnection approvals from the PJM Interconnection and the New York Independent System Operator. Filed Article VII application with the New York State Public Service Commission in September 2013. The Submarine Cable will make landfall at Jones Beach via HDD up to approximately 2,000-foot long. The Submarine Cable will be installed by a jet plow device that uses a process known as simultaneous lay and burial. Plans to begin operations in 2020.planned to begin operations in 2020.	TBD	2020	NY & NJ	Middlesex and Suffolk	South Brunswick, NJ and Huntington, NY	Utilities
Raritan and Sandy Hook Bay-Port Monmouth Storm Damage Reduction	Hurricane and storm damage reduction (construction of 7,070 feet of levees, 3,585 feet of floodwalls, 2,640 feet of dunes, and beach re-nourishment at 10-year intervals). Construction is underway for floodwall, levee, tide gate, and pump station.	2016	TBD	NJ	Monmouth	Middletown	Storm Damage Reduction
Raritan Bay Vessel Crossing Improvements	Ferry/marine vessel crossing improvements to facilitate present and future marine crossings of the North Jersey Coast Line bridge structure at Raritan Bay between Perth Amboy and South Amboy.	TBD	TBD	NJ	Middlesex	Sayreville Boro	Transportation-marine
Raritan River to Arthur Kill Cut–Off Channel Dredging	Maintenance dredging in a 20-foot deep and 800-foot wide channel to connect the Raritan River Channel with the southern end of the Arthur Kill Channel (approximately 1 mile in length) usually accomplished by a clamshell dredge. Dredged in 2000 to remove approximately 154,000 cubic yards of material used as remediation material. Last maintenance dredging cycle was completed in FY 2014. Project is in caretaker status, meaning USACE will perform minimal project operations activities.	2014	ongoing	NJ	Middlesex		Channel Maintenance and Dredging
Rockaway Delivery Lateral	Williams has added a new delivery point in New York City through the construction of a new 3.2 mile pipeline connecting the Transco pipeline's existing Lower New York Bay Lateral to the Rockaway Peninsula. The project, which was placed into service on May 15, 2015, included one mile of HDD and 2.2 miles of conventionally laid 26-inch pipeline connected to the existing Transco system by two 18-inch hot taps and a subsea manifold used for maintenance and testing. (CP13-36; CP13-132)	2014	2015	NY & NJ	Queens		Pipeline

Transco is adding information to Table 1E-13 regarding proposed offshore wind farms.

Table 1E-13
Past, Present, and Reasonably Foreseeable Offshore and Coastal Activities

Activity	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
Rockaway Inlet to Norton Point Storm Damage Reduction	In 1995, the Corps of Engineers, State and City of New York completed the initial construction of the Coney Island shoreline protection project, the Coney Island Reach. The Coney Island Reach consists of approximately 3 miles of beachfront which provides storm damage reduction to the densely populated urban communities and infrastructure located along the shoreline of Coney Island. The project includes periodic nourishment of the restored beaches for a period of 50 years. Beach nourishment, including stonework and beachfill, was completed on June 13, 2016.	NA	2016	NY	Kings	Brooklyn	Storm Damage Reduction
Sandy Hook Bay at Leonardo Dredging	Maintenance dredging of an entrance channel 8 feet deep, 150 feet wide, and approximately 2,500 feet long, from Sandy Hook Bay to the small boat harbor basin at Leonardo, New Jersey. The channel was last dredged in 1991 with the removal of approximately 59,000 cubic yards of sand, which was placed on the beach east of the East Jetty. Based on the condition survey performed in March 2013, the proposed maintenance dredging would involve the removal of approximately 40,000 cubic yards of material from the western half of the channel. During FY 15, maintenance dredging was performed and approximately 35,000 cubic yards of dredged material was removed and placed in a local upland confined disposal facility.	2015	ongoing	NJ	Middlesex & Monmouth		Channel Maintenance and Dredging
Sandy Hook Dredging	Maintenance dredging last performed in 2013 with removal of approximately 261,430 cy of gravel and sand, usually accomplished by a clamshell dredge. According to status report in New York Harbor -Maintenance and Stewardship-project, the USACE NY District will complete E&D and award a maintenance dredging contract for the Sandy Hook Channel with actual work performed during the fall of 2017.	2017	ongoing	NJ			Channel Maintenance and Dredging
Sea Bright to Manasquan Storm Damage Reduction	Periodic beach erosion control and hurricane protection project through beach re-nourishment and berm construction. Scheduled completion is Spring 2017.	NA	2017	NJ	Monmouth	Sea Bright	Storm Damage Reduction
South Amboy Ferry Service implementation	Proposed	TBD	TBD	NJ	Middlesex	Sayreville Boro	Transportation-marine

Transco is adding information to Table 1E-13 regarding proposed offshore wind farms.

Table 1E-13
Past, Present, and Reasonably Foreseeable Offshore and Coastal Activities

Activity	Description	Construction Start Date	Operation Start Date	State	County	Township	Activity Category
Statoil Wind US, LLC	Statoil was declared provisional winner of the Bureau of Ocean Energy management (BOEM) wind lease sale offshore in December 2016; the lease was secured April 1, 2017. The lease comprises an area that could potentially accommodate more than 1 gigawatt (GW) of offshore wind, with a phased development expected to start with 400-600 megawatts (MW). The New York Wind Energy Area is located 14 to 30 miles (30 to 60 kilometers [km]) offshore, spans 79,350 acres (321 km²), and occurs in water depths between 65 and 131 feet (20 to 40 meters). Statoil will conduct studies to understand the seabed conditions, the grid connection options, and wind resources involved in the lease site. The Statoil lease is near the 12 nm territorial sea boundary (9 nm outside the 3 nm state boundary).	TBD	TBD	NY			Offshore Wind
Key: AC = alternating current CY = cubic yards DC = direct current FY = fiscal year HARS = Historic Area Remediation Site HDD = horizontal directional drill HVDC = high voltage/direct current kV = kilovolt LIPA = Long Island Power Authority NYNJ = New York New Jersey USACE = United States Army Corps of Engineers							

Transco has updated Table 1E-14.

TABLE 1E-14
Types of Potential Adverse Impacts and Permits and Authorizations for Offshore Activities

Activity Type	Potential Adverse Impacts from Construction and Operation	USACE Section 10/404 Permits	USFWS Consultation: Section 7 Endangered Species Act/IBGEPA/MBTA	USEPA Section 404, NPDES, CAA Permits	FAA Notice of Proposed Construction	FERC Approval and PHMSA Safety Analysis	NOAA Consultation: Marine Mammal Protection Area, Essential Fish Habitat, section 7 Endangered Species Act	U.S. Coast Guard Notice to Mariners/Aids to Navigation and Obstructions/Marine Activity Approval	State SHPO Section 106 NHPA Consultation	State Section 401 CWA Water Quality Certificate and SPDES Permits	State Consultation: Protected Species and Habitats	State Air Quality Permits, Title V Operating Permits, or Acid Rain Permits	State Wetlands Permits	State or Conservation District Erosion and Sediment Control	NY Department of State Coastal Zone Management Act Consistency
Channel Maintenance and Dredging (offshore)	Marine species mortality, displacement, or injury from construction and operation; disruption of benthic and marine habitat from dredging; sedimentation, discharge, and turbidity from dredging activities and vessel traffic in offshore waters and coastal zones; noise and lighting from construction activities and equipment; major projects will increase vessel traffic during construction in offshore waters and coastal zones, require use of public services, create jobs, and provide socioeconomic benefits.	●	●		●		●	●	●	●	●				●
Pipeline (offshore)	Marine species mortality, displacement, or injury from construction and operation; disruption of benthic and marine habitats from dredging and pipeline placement; increased noise and lighting from construction activities and equipment; major projects will increase vessel traffic during construction in offshore waters and coastal zones, require use of public services, create jobs, and provide socioeconomic benefits; water may be used in construction or operational activities and discharged to offshore waters.	●	●	●		●	●	●		●	●				●
Coastal	New activities require clearing and grading undeveloped land; fragmentation of coastal wildlife habitat; removal of native vegetation; noise and lighting from construction activities and equipment; coastal erosion from construction activities or operational facility; water may be used in construction or operational activities and discharged to surface or offshore waters; impacts on historic properties and cultural artifacts from construction activities; major projects will increase traffic during construction in offshore waters and coastal zones, require use of public services, create jobs, and provide socioeconomic benefits.	●	●	●			●	●	●	●	●				●
Other Utilities	Water may be used in construction or operational activities and discharged to offshore waters; fragmentation or loss of marine and benthic habitat from dredging activities; noise and lighting from construction activities and equipment; marine species mortality, displacement, or injury from construction and operation; major projects will increase traffic during construction in offshore waters and coastal zones, require use of public services, create jobs, and provide socioeconomic benefits.	●		●	●		●	●		●	●				●

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Activity Type	Potential Adverse Impacts from Construction and Operation	USACE Section 10/404 Permits	USFWS Consultation: Section 7 Endangered Species Act/BGEPA/MBTA	USEPA Section 404, NPDES, CAA Permits	FAA Notice of Proposed Construction	FERC Approval and PHMSA Safety Analysis	NOAA Consultation: Marine Mammal Protection Area, Essential Fish Habitat, section 7 Endangered Species Act	U.S. Coast Guard Notice to Mariners/Aids to Navigation and Obstructions/Marine Activity Approval	State SHPO Section 106 NHPA Consultation	State Section 401 CWA Water Quality Certificate and SPDES Permits	State Consultation: Protected Species and Habitats	State Air Quality Permits, Title V Operating Permits, or Acid Rain Permits	State Wetlands Permits	State or Conservation District Erosion and Sediment Control	NY Department of State Coastal Zone Management Act Consistency
Storm Damage Reduction (offshore)	Increased coastal habitat from beach re-nourishment; increased vessel traffic in offshore waters and coastal zones; sedimentation and turbidity from construction activities; temporary displacement of marine species during construction activities; water may be used in construction or operational activities and discharged to offshore waters.	●		●			●	●		●	●				●
Key: BGEPA = Bald and Golden Eagle Protection Act CAA = Clean Air Act CWA = Clean Water Act FAA = Federal Aviation Administration FERC = Federal Energy Regulatory Commission MBTA = Migratory Bird Treaty Act NHPA = National Historic Preservation Act NOAA = National Oceanic and Atmospheric Administration NPDES = National Pollutant Discharge Elimination System PHMSA = Pipeline and Hazardous Materials Safety Administration SHPO = State Historic Preservation Office SPDES = State Pollutant Discharge Elimination System USACE = United States Army Corps of Engineers USEPA = United States Environmental Protection Agency USFWS = United States Fish and Wildlife Service															

Table 1E-15
Regions of Influence by Resource Type for Offshore Raritan Bay Loop

Environmental Resource	Quantitative Screening Criteria (miles)	Description of Region of Influence	Potential Project Impacts
Surface Water (Non-wetland Waterbodies)	HUC	HUC 12 020301040403 Waackaack Creek-Raritan Bay 020301040404 Staten Island East-Raritan Bay 020301040405 Raritan Bay-Lower Bay Deep 020302020901 Great South Bay-Atlantic Ocean 020302020903 Long Island-Atlantic Ocean Deep 020403010800 Atlantic Ocean-Deep	Surface water impacts generally occur at the location of the in-water work. Impacts include sediment disturbance, turbidity, and water withdrawal and discharge. Considering sediment type, the strength of the currents in the offshore Project area, and the duration and rate of sediment-disturbing activities, ambient turbidity conditions are expected to return shortly following completion of each proposed offshore excavation activity.
Fish	HUC	HUC 12 020301040403 Waackaack Creek-Raritan Bay 020301040404 Staten Island East-Raritan Bay 020301040405 Raritan Bay-Lower Bay Deep 020302020901 Great South Bay-Atlantic Ocean 020302020903 Long Island-Atlantic Ocean Deep 020403010800 Atlantic Ocean-Deep	Impacts on fishery resources generally occur at the location of trenching, pipelay, anchor placement, concrete mattress installation, and backfilling. Temporary effects on fish and benthic communities will result from disturbance of sediments, increased turbidity, increased noise and visual disturbances, and water withdrawal and discharge.
Marine Wildlife, including threatened and endangered species	HUC	HUC 12 020301040403 Waackaack Creek-Raritan Bay 020301040404 Staten Island East-Raritan Bay 020301040405 Raritan Bay-Lower Bay Deep 020302020901 Great South Bay-Atlantic Ocean 020302020903 Long Island-Atlantic Ocean Deep 020403010800 Atlantic Ocean-Deep	Impacts on marine wildlife generally occur at the location of trenching, pipelay, anchor placement, concrete mattress installation, and backfilling. Impacts on marine wildlife can occur due to increased turbidity, increased noise and visual disturbances, and water withdrawal and discharge. Concrete mats installed over cable crossings will result in permanent loss of habitat in those locations only.
Cultural Resources	0.9	The direct APE : Raritan Bay Loop (New Jersey): 3,500-5,000 foot corridor along the centerline Raritan Bay Loop (New York): 5,000 foot corridor along the centerline	Offshore archaeological surveys are complete; results will be provided in a supplemental filing in the 2 nd quarter of 2017.

Table 1E-15
Regions of Influence by Resource Type for Offshore Raritan Bay Loop

Environmental Resource	Quantitative Screening Criteria (miles)	Description of Region of Influence	Potential Project Impacts
Socioeconomics	County	Middlesex, Union, and Monmouth Counties, New Jersey; Queens and Richmond Counties, New York	Impacts from the increased construction vessel traffic and presence of in-water construction activities in the vicinity of the trenching and pipeline installation include interruption of commercial fishing vessels, restricted access to fishing grounds, and potential interference with charter transits (including whale watching or scuba charter boats). Additionally, vessels engaged in commercial shipping could be re-routed or experience slightly longer transits.
Soils	1	A 1-mile corridor along the trenching and excavation installation	Impacts on soils occur from the disturbance of contaminated sediment during in-water construction activities in the vicinity of the trenching.
Recreation	1	A 1-mile corridor along the trenching and excavation installation	Impacts on recreational activities occur from the increase in vessel traffic and noise during in-water construction in the vicinity of the trenching.
Air Quality-Construction	0.25	Within 0.25 mile of trenching/excavation	Impacts on air quality during construction occur from the use of marine vessels and <u>associated construction equipment</u> burning diesel fuel. Vessel emissions associated with pipeline construction would disperse to within background concentrations generally within several hundred feet.
Noise -Construction	0.50	Within 0.5 mile of trenching/excavation	Noise impacts occur from the equipment used for in-water construction activities and the associated vessel traffic within a few hundred feet of the activity.
Key: HUC = Hydrologic Unit Code			

Table 1E-16
Offshore Temporal and Geographical Overlap - Raritan Bay Loop

Activities	Construction Start Date	Overlap	Operation Start Date	Overlap	Activity Category	Distance from Project (miles)	Shared Region of Influence with the Project							
							Surface Water	Fish & Wildlife	Cultural	Socioeconomics	Soils	Commercial/Recreational Marine Use	Air Quality - Construction	Noise
Number of Activities that Overlap the ROI							11	11	6	17	6	6	5	6
Offshore Raritan Bay Loop	2018	N/A	2019	N/A										
Offshore ROI							HUC	HUC	0.95	COUNTY	1	1	0.25	0.50
Brooklyn Queens Interconnection	2013	NO	2013	YES	Pipeline	2.33	NO	NO	NO	YES	NO	NO	NO	NO
Champlain Hudson Power Express	2018	YES	2021	YES	Utilities	17.22	NO	NO	NO	YES	NO	NO	NO	NO
East Rockaway Inlet Maintenance	2017	NO	ongoing	YES	Channel Maintenance and Dredging	6.87	NO	NO	NO	YES	NO	NO	NO	NO
Great Kills Harbor Dredging	2014	NO	ongoing	YES	Channel Maintenance and Dredging	0.29	YES	YES	YES	YES	YES	YES	NO	YES
Jamaica Bay at Rockaway Inlet Dredging	2013	NO	ongoing	YES	Channel Maintenance and Dredging	1.17	YES	YES	NO	YES	NO	NO	NO	NO
Jamaica Bay Dredging and Beach Nourishment	2017	NO	2017	YES	Channel Maintenance and Dredging	6.15	YES	YES	NO	YES	NO	NO	NO	NO
Jones Inlet to East Rockaway Inlet Phase I Groin Construction	2016	NO	2018	YES	Storm Damage Reduction	8.75	YES	YES	NO	NO	NO	NO	NO	NO
Jones Inlet to East Rockaway Inlet Phase II Beachfill	2018	YES	2020	YES	Storm Damage Reduction	8.39	YES	YES	NO	NO	NO	NO	NO	NO
Lower New York Bay Extension Maintenance	2017	NO	2017	YES	Pipeline	0.00	YES	YES	YES	YES	YES	YES	YES	YES
New York and New Jersey Harbor Deepening Project	2004	NO	2016	YES	Channel Maintenance and Dredging	0.00	YES	YES	YES	YES	YES	YES	YES	YES
New York Harbor Maintenance	TBD	YES	TBD	YES	Channel Maintenance and Dredging	0.00	YES	YES	YES	YES	YES	YES	YES	YES
New York Harbor Maintenance Dredging	TBD	YES	ongoing	YES	Channel Maintenance and Dredging	0.00	YES	YES	YES	YES	YES	YES	YES	YES
NYNJ Expansion	2012	NO	2013	YES	Pipeline	7.39	NO	NO	NO	YES	NO	NO	NO	NO
Poseidon HVDC	TBD	YES	2020	YES	Utilities	0.00	YES	YES	YES	YES	YES	YES	YES	YES
Raritan and Sandy Hook Bay-Port Monmouth Storm Damage Reduction	2016	NO	TBD	YES	Storm Damage Reduction	4.17	NO	NO	NO	YES	NO	NO	NO	NO
Raritan Bay Vessel Crossing Improvements	TBD	YES	TBD	YES	Transportation-marine	1.74	NO	NO	NO	YES	NO	NO	NO	NO
Raritan River to Arthur Kill Cut–Off Channel Dredging	2014	NO	ongoing	YES	Channel Maintenance and Dredging	1.63	YES	YES	NO	YES	NO	NO	NO	NO
Sandy Hook Bay at Leonardo Dredging	2015	NO	ongoing	YES	Channel Maintenance and Dredging	5.43	NO	NO	NO	YES	NO	NO	NO	NO
South Amboy Ferry Service implementation	TBD	YES	TBD	YES	Transportation-marine	1.50	NO	NO	NO	YES	NO	NO	NO	NO

Table 1E-17
Summary of Cumulative Impacts for Offshore Raritan Bay Loop

Activity/Project	Activity Category	Time Overlap	Non-wetland Waterbodies	Dredged Material Volumes	Surface Water Use - Construction	Open Water	NRHP Eligible Sites	Archaeological Resources	Non-Archaeological Resources	Socioeconomics				Soil Contamination	Recreation (Construction)
										Peak Employment (Construction)	Payroll (Construction)	Employment (Operation)	Annual Taxes and Fees (Operation)		
			Number	million cubic yards	thousand gallons	acres	number of sites	number	number	number of jobs	million \$	number of jobs	million \$	number of sites	thousand acres
Raritan Bay Loop			4	0.25	21.5		4				\$136		10.1		25.6
Offshore Project Contribution, Percent			100.0%	100.0%	100.0%	-	100.0%	-	-	-	100.0%	-	100.0%	-	100.0%
Total Cumulative Impacts			4	0	22	0	4	0	0	0	136	0	10	0	26
Cumulative Impacts of Activities Considered			0	0	0	0	0	0	0	0	0	0	0	0	0
Brooklyn Queens Interconnection	Pipeline	YES	0	0	0	0	0	0	0	U	U	U	U	0	0
Champlain Hudson Power Express	Utilities	YES	0	0	0	0	0	0	0	U	U	U	U	0	0
East Rockaway Inlet Maintenance	Channel Maintenance and Dredging	YES	0	0	0	0	0	0	0	U	U	U	U	0	0
Great Kills Harbor Dredging	Channel Maintenance and Dredging	YES	U	U	U	U	U	U	U	U	U	U	U	U	U
Jamaica Bay at Rockaway Inlet Dredging	Channel Maintenance and Dredging	YES	U	U	U	U	0	0	0	U	U	U	U	0	0
Jamaica Bay Dredging and Beach Nourishment	Channel Maintenance and Dredging	YES	U	U	U	U	0	0	0	U	U	U	U	0	0
Jones Inlet to East Rockaway Inlet Phase I Groin Construction	Storm Damage Reduction	YES	U	U	U	U	0	0	0	0	0	0	0	0	0
Jones Inlet to East Rockaway Inlet Phase II Beachfill	Storm Damage Reduction	YES	U	U	U	U	0	0	0	0	0	0	0	0	0
Lower New York Bay Extension Maintenance	Pipeline	NO	0	0	0	0	0	0	0	0	0	0	0	0	0
New York and New Jersey Harbor Deepening Project	Channel Maintenance and Dredging	YES	U	U	U	U	U	U	U	U	U	U	U	U	U
New York Harbor Maintenance	Channel Maintenance and Dredging	YES	U	U	U	U	U	U	U	U	U	U	U	U	U
New York Harbor Maintenance Dredging	Channel Maintenance and Dredging	YES	U	U	U	U	U	U	U	U	U	U	U	U	U
NYNJ Expansion	Pipeline	YES	0	0	0	0	0	0	0	U	U	U	U	0	0
Poseidon HVDC	Utilities	YES	U	U	U	U	U	U	U	U	U	U	U	U	U
Raritan and Sandy Hook Bay-Port Monmouth Storm Damage Reduction	Storm Damage Reduction	YES	0	0	0	0	0	0	0	U	U	U	U	0	0

Table 1E-17
Summary of Cumulative Impacts for Offshore Raritan Bay Loop

Activity/Project	Activity Category	Time Overlap	Non-wetland Waterbodies	Dredged Material Volumes	Surface Water Use - Construction	Open Water	NRHP Eligible Sites	Archaeological Resources	Non-Archaeological Resources	Socioeconomics				Soil Contamination	Recreation (Construction)
										Peak Employment (Construction)	Payroll (Construction)	Employment (Operation)	Annual Taxes and Fees (Operation)		
			Number	million cubic yards	thousand gallons	acres	number of sites	number	number	number of jobs	million \$	number of jobs	million \$	number of sites	thousand acres
Raritan Bay Vessel Crossing Improvements	Transportation-marine	YES	0	0	0	0	0	0	0	U	U	U	U	0	0
Raritan River to Arthur Kill Cut–Off Channel Dredging	Channel Maintenance and Dredging	YES	U	U	U	U	0	0	0	U	U	U	U	0	0
Sandy Hook Bay at Leonardo Dredging	Channel Maintenance and Dredging	YES	0	0	0	0	0	0	0	U	U	U	U	0	0
South Amboy Ferry Service Implementation	Transportation-marine	YES	0	0	0	0	0	0	0	U	U	U	U	0	0
Key: 0 = information not needed due to outside ROI for those resources NA = not applicable U = unknown or unavailable information															