



Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
13/215-2000

May 30, 2025

Kevin White, P.E., Director
Regional Permit Coordination Office
Pennsylvania Department of Environmental Protection
400 Market Street
Rachel Carson State Office Building – 10th Floor
Harrisburg, PA 17101

**RE: Notice of Intent Regarding Section 401 Water Quality Certification Conditions
Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
East Whiteland Township, Chester County
Drumore, East Drumore, and Eden Townships, Lancaster County**

Dear Mr. White,

I am writing to provide notice that Transcontinental Gas Pipe Line Company, LLC (Transco) intends to re-submit applications for Erosion and Sediment Control Permits and a Water Obstruction and Encroachment Permit in connection with the Northeast Supply Enhancement Project (the "Project"), since the Erosion and Sediment Control Permits (Permit Nos. ESG3617801(1) and ESG00029170005) and Water Obstruction and Encroachment Permit (Permit No. E36-970) (together, "Permits") issued by the Pennsylvania Department of Environmental Protection (the "Department") for the Project expired in 2023. A copy of the Department's Water Quality Certification for the Project is enclosed.

The scope of the Project remains the same as described in the Permits and existing Water Quality Certification. The Project is a proposed expansion of Transco's existing system from Pennsylvania through New Jersey to New York, to provide 400,000 dekatherms per day (Dth/d) of incremental capacity to National Grid at Transco's existing Rockaway Transfer Point located approximately three miles offshore of the Rockaway Peninsula in Queens Borough, New York.

In Pennsylvania, as outlined in the Department's Water Quality Certification, the Project consists:

of approximately 10.17 miles of new 42-inch diameter natural gas pipeline in Drumore, East Drumore, and Eden Townships, Lancaster County Pennsylvania and the addition of one 21,902 horsepower

motor-driven compressor at the existing Compressor Station 200 in East Whiteland Twp., Chester County, PA. The Project, as proposed, will require approximately 212.2 acres of earth disturbance in this Commonwealth, permanent impacts to 25 linear feet of Wissler Run (HQ-WWF, MF), 10 linear feet of Fishing Creek (HQ-CWF, MF), 4 linear feet of an unnamed tributary to Fishing Creek (HQ-CWF, MF), 2 linear feet of an unnamed tributary to Conowingo Creek (HQ-CWF, MF), 44 linear feet of Conowingo Creek (HQ-CWF, MF), 27 linear feet of an unnamed tributary to Conowingo Creek, 18 linear feet of an unnamed tributary to Conowingo Creek (HQ-CWF, MF), 2 linear feet of an unnamed tributary to Stewart Run (HQ-CWF, MF), 15 feet of an unnamed tributary to Stewart Run (HQ-CWF, MF), 6 linear feet of Bowery Run (HQ-CWF, MF), 0.33 acre of temporary impacts to floodway, 1.73 acre of permanent impacts to floodway and; 1.99 acre of permanent impacts and 0.50 acre of temporary impacts to wetlands.

48 Pa. Bull. 3640 (June 16, 2018) (providing notice of Section 401 Certification for the Project).

Transco's consultants are confirming the wetland and watercourse surveys and other data required for the Erosion and Sediment Control Permits and Water Obstruction and Encroachment Permit in connection with the Project. Current data will be included with Transco's forthcoming applications. Transco commits to working with the Department in its review of the permit applications to ensure that if there have been any changes to the characteristics of the receiving waters or applicable water quality criteria and effluent limitations, that the Department has the information necessary to be reasonably assured that the Project will not violate applicable water quality standards. *See, e.g.*, 33 U.S.C. § 1341(a)(3),(4), and (5).

The Project is regulated by the Federal Energy Regulatory Commission ("FERC") and Transco has filed at FERC docket numbers CP17-101-007 and CP20-49-001a Petition with FERC for Expedited Reissuance of Certificate Authority which if granted will authorize Transco to construct and operate the Project. A copy of the Petition, as filed, is attached.

Transco is reviving the Project at the request of the federal administration and in consideration of the President's Executive Orders, *Declaring a National Energy Emergency* and *Unleashing American Energy*, issued on January 20, 2025. These Executive Orders make clear that infrastructure development, particularly in the Northeastern United States, is desperately needed. Transco's Project will enhance reliability, flexibility, and efficiency on a critical part of Transco's system and provide access to crucial supplies of natural gas.

The Project will be able to deliver NextGen Gas from the Marcellus basin to markets in the Northeast United States. NextGen Gas is tracked from the wellhead to the delivery point and this pathway is among the lowest carbon intensive natural gas found anywhere in the world. Williams follows a strict certification process for these natural gas deliveries through implementation of its NextGen Gas program. Williams' NextGen Gas program is an industry leading measurement-based quantification, monitoring, reporting, and verification ("QMRV") program that certifies greenhouse emissions associated with the transportation and delivery of

natural gas across Williams' assets. Through partnership with a climate tech company called Context Labs, Williams collects and correlates data from multiple disparate sources, including satellites, planes, real-time ground-based monitoring devices, direct source-level measurement, and live operational data to provide the most reliable and comprehensive quantification of its natural gas supply chain emissions. Williams' NextGen Gas program offers real-time tracking of greenhouse gas emissions intensity (on both methane and carbon intensity basis) with the low emissions attributes of transported and delivered natural gas represented by a verified certificate, with independent attestation by KPMG. Williams' NextGen Gas program was designed to improve trust and transparency in emissions detection, quantification, and reporting and to further enhance operational excellence by helping identify opportunities for Williams to continue to reduce emissions. Williams is currently the only U.S. midstream company to have joined the internationally recognized Oil & Gas Methane Partnership (OGMP) 2.0 and its NextGen Gas program has been recognized as a Gold Standard compliant pathway to achieving the Level 5 reporting standard, the highest standard of reporting under the OGMP 2.0 framework.

Given the permitting history and the Department's previous review of the Project, in addition to the energy emergency and compelling need for natural gas in the Northeastern United States as explained herein, Transco respectfully requests that the Department make a permitting decision on or by August 29, 2025 so that Transco can begin construction by the end of the year. Transco is also submitting applications to both the New York State Department of Environmental Conservation and the New Jersey Department of Environmental Protection and is requesting expedited reviews by these agencies, as well.

Transco appreciates the Department's assistance and expeditious review of these applications. If you require any additional information that will facilitate the Department's review, please contact me at 281-433-8046 or via email at joseph.dean@williams.com. Alternatively, you can contact Sara Mochrie, Project Manager at WSP at 716-984-5280 or via email at Sara.Mochrie@WSP.com.

Sincerely,



Joseph Dean
Manager, Permitting

Enclosure:
PADEP Water Quality Certification – Northeast Supply Enhancement Project

cc (via e-mail):
Margaret O. Murphy, Senior Counsel
Tim Powell, Transco
Stephen Kellogg, Transco
Blake Clements, Transco
Daniel Merz, Esq. Transco

Sara Mochrie, WSP
Steven MacLeod, WSP
Kirsty Cronin, WSP

ATTACHMENT A



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

May 31, 2018

Mr. Joseph Dean
Transcontinental Pipe Line Company, LLC
2800 Post Oak Boulevard, Suite 900
Houston, TX 77056

Re: Water Quality Certification – Northeast Supply Enhancement Project
DEP Application No. WQ03-001
FERC Docket No. CP-17-101
Drumore & East Drumore Townships, Lancaster County
East Whiteland Township, Chester County.

Dear Mr. Dean:

This is in reference to your request for Water Quality Certification under Section 401 of the Federal Clean Water Act, submitted to our office on June 16, 2017. The request relates to the Transcontinental Gas Pipe Line Company, LLC – Northeast Supply Enhancement Project natural gas pipeline and compressor station upgrade project that will take place in Drumore, East Drumore, and Eden Townships, Lancaster County, and East Whiteland Township, Chester County.

The Department of Environmental Protection (DEP) has reviewed your request for Water Quality Certification and hereby grants the Water Quality Certification for the Northeast Supply Enhancement Project. The approved certification is attached.

Any person aggrieved by this action may file a petition for review pursuant to Section 19(d) of the Natural Gas Act, 15 U.S.C. 717r(d), with the Office of the Clerk, United States Court of Appeals for the Third Circuit, 21400 U.S. Courthouse, 601 Market Street, Philadelphia, PA 19106-1790 within 30 days of publication of this notice, or within 30 days of receipt of written notice of this action, whichever occurs first. Important legal rights are at stake, so you should show this document to a lawyer promptly.

If you have any questions, please contact me at 717.705.4799 or by email at scwilliams@pa.gov.

Sincerely,

Scott R. Williamson
Program Manager
Waterways & Wetlands Program

Enclosure

cc: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission
Karen Olsen, Transcontinental Gas Pipe Line Company, LLC
Heather Smiles, PA Fish and Boat Comm, Div. of Environmental Services (via email)
Pat Strong, US Army Corps of Engineers, Baltimore District (via email)
Nate Kurtz, Lancaster County Conservation District (via email)
John Hohenstein, DEP Southeast Regional Office (via email)
Joe Sofranko, Chester County Conservation District



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Southcentral Regional Office
909 Elmerton Avenue
Harrisburg, PA 17110-8200**

WATER QUALITY CERTIFICATION

**TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC, NORTHEAST SUPPLY
ENHANCMEENT PROJECT**

DEP File No. WQ03-001

FERC DOCKET NO. CP-17-101

**TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
Mr. Joseph Dean
Transcontinental Pipe Line Company, LLC
2800 Post Oak Boulevard, Suite 900
Houston, TX 77056**

**Drumore, East Drumore, and Eden Townships, Lancaster County and East Whiteland
Township Chester County, Pennsylvania
U.S. Army Corps of Engineers, Baltimore District**

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Southcentral Regional Office
Waterways and Wetlands Program

WATER QUALITY CERTIFICATION
DEP File No. WQ03-001

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC,
NORTHEAST SUPPLY ENHANCEMENT PROJECT
FERC DOCKET NO. CP-17-101

WQ03-001: Certification Request initiated by Transcontinental Gas Pipe Line Company, LLC ("Transco"), 2800 Post Oak Boulevard, Suite 900, Houston, TX 77056, Northeast Supply Enhancement Project in Drumore, East Drumore and Eden Townships, Lancaster County and East Whiteland Township, Chester County (Holtwood, Wakefield and Quarryville, PA Quadrangles, pipeline centered near Lat: 39° 51' 26.55"; Long: -76° 12' 42.87" and compressor station located at Lat: 40° 02' 56.16"; Long: -75° 35' 15.33") U.S. Army Corps of Engineers Baltimore District.

On March 27, 2017, Transcontinental Gas Pipe Line Company, LLC filed an application with the Federal Energy Regulatory Commission (FERC) under Section 7 of the Natural Gas Act (15 U.S.C. § 717f) seeking a certificate of public convenience and necessity to construct and operate its Northeast Supply Enhancement Project (FERC Docket No. CP-17-101).

On June 16, 2017, Transco requested a state water quality certification from the Pennsylvania Department of Environmental Protection (PADEP), as required by Section 401 of the Clean Water Act (33 U.S.C. § 1341), to ensure that the construction, operation and maintenance of the Northeast Supply Enhancement Project will protect water quality in Pennsylvania through compliance with State water quality standards and associated State law requirements, which are consistent with the requirements of the Clean Water Act.

The proposed Northeast Supply Enhancement Expansion Project facilities in Pennsylvania consists of approximately 10.17 miles of new 42-inch diameter natural gas pipeline in Drumore, East Drumore, and Eden Townships, Lancaster County Pennsylvania and the addition one 21,902 horsepower motor-driven compressor at the existing Compressor Station 200 in East Whiteland Twp., Chester Co., Pennsylvania. The purpose of the Northeast Supply Enhancement Project is to provide 400,000 Dekatherms per day of incremental capacity to National Grid at Transco's existing Rockaway Delivery Point offshore in Queens County, New York.

The proposed Northeast Supply Enhancement Project will require approximately 212.2 acres of earth disturbance in Pennsylvania, permanent impacts to 25 linear feet of Wissler Run (HQ-WWF, MF), 10 linear feet of Fishing Creek (HQ-CWF, MF), 4 linear feet of an unnamed tributary to Fishing Creek (HQ-CWF, MF), 2 linear feet of an unnamed tributary to Conowingo Creek (HQ-CWF, MF), 44 linear feet of Conowingo Creek (HQ-CWF, MF), 27 linear feet of an unnamed tributary to Conowingo Creek, 18 linear feet of an unnamed tributary to Conowingo Creek (HQ-CWF, MF), 2 linear feet of an unnamed tributary to Stewart Run (HQ-CWF, MF), 15 feet of an unnamed tributary to Stewart Run (HQ-CWF, MF), 6 linear feet of Bowery Run (HQ-CWF, MF), 0.33 acres of temporary impacts to floodway, 1.73 acres of permanent impacts to floodway and; 1.99 acres of permanent impacts and 0.50 acres of temporary impacts to wetlands.

PADEP published notice of its proposed state water quality certification in the *Pennsylvania Bulletin* on August 19, 2017, (Vol 47, No. 33 Pa.B.). No comments were received.

PADEP hereby issues Section 401 Water Quality Certification PADEP to Transcontinental Gas Pipe Line Company, LLC for the Northeast Supply Enhancement Project. PADEP certifies to Transcontinental Gas Pipe Line Company, LLC that the construction, operation and maintenance of the Project will not violate applicable State water quality standards set forth in 25 Pa. Code Chapter 93, provided Transcontinental Gas Pipe Line Company, LLC complies with the permitting programs, criteria and conditions established pursuant to State law and as part of the Water Quality Certification as follows:

1. Discharge Permit – Transco shall obtain and comply with a PADEP National Pollutant Discharge Elimination System (NPDES) permit for the discharge of water from the hydrostatic testing of the Northeast Supply Enhancement Project pursuant to Pennsylvania’s Clean Streams Law (35 P.S. §§ 691.1 – 691.1001) and all applicable implementing regulations (25 Pa. Code Chapter 92a) if such discharges are proposed.
2. Erosion and Sediment Control Permit – Transco shall obtain and comply with PADEP’s Chapter 102 Erosion and Sediment Control General Permit for Earth Disturbance Associated with Oil and Gas Exploration, Production, Processing or Treatment issued pursuant to Pennsylvania’s Clean Streams Law and Storm Water Management Act (32 P.S. §§ 680.1-680.17), and all applicable implementing regulations (25 Pa. Code Chapter 102).
3. Water Obstruction and Encroachment Permits: - Transco shall obtain and comply with a PADEP Chapter 105 Water Obstruction and Encroachment Permit for the construction, operation and maintenance of all water obstructions and encroachments associated with the Northeast Supply Enhancement Project pursuant to Pennsylvania’s Clean Streams Law, Dam Safety and Encroachments Act (32 P.S. §§ 673.1-693.27), and Flood Plain Management Act (32 P.S. §§ 679.101-679.601.) and all applicable implementing regulations (25 Pa. Code Chapter 105).

4. Water Quality Monitoring - PADEP retains the right to specify additional studies or monitoring to ensure that the receiving water quality is not adversely impacted by any operational and construction process that may be employed by Transco.
5. Operation – Transco shall at all times properly operate and maintain all Northeast Supply Enhancement Project facilities and systems of treatment and control (and related appurtenances) which are installed to achieve compliance with the terms and conditions of this State Water Quality Certification and all required permits, authorizations and approvals. Proper operation and maintenance includes adequate laboratory controls, appropriate quality assurance procedures, and the operation of backup or auxiliary facilities or similar systems installed by Transco.
6. Incidents Causing or Threatening Pollution – In compliance with 25 Pa. Code § 91.33, in the event of a spill or discharge of a polluting substance that may endanger downstream users of waters of the Commonwealth or would otherwise result in pollution or create the danger of pollution to waters of the Commonwealth, Transco shall contact the PADEP immediately by telephone, immediately implement their Spill Plan for Oil and Hazardous Materials, and take other steps or measures to abate the polluting discharge or danger thereof to waters of the Commonwealth and users of waters of the Commonwealth. Transco shall otherwise fully comply with 25 Pa. Code § 91.33. In the event of such spills or discharges, Transco shall contact PADEP using the 24 hour Emergency Response hotline--866.825.0208.
7. Inspection - The Northeast Supply Enhancement Project, including all relevant records, are subject to inspection at reasonable hours and intervals by an authorized representative of PADEP to determine compliance with this State Water Quality Certification, including all required State water quality permits and State water quality standards. A copy of this certification shall be available for inspection by the PADEP, or an authorized representative thereof, during such inspections of the Northeast Supply Enhancement Project.
8. Transfer of Projects – If Transco intends to transfer any legal or equitable interest in the Northeast Supply Enhancement Project which is affected by this State Water Quality Certification, Transco shall serve a copy of this certification upon the prospective transferee of the legal and equitable interest at least thirty (30) days prior to the contemplated transfer and shall simultaneously inform the PADEP Regional Office of such intent. Notice to PADEP shall include a transfer agreement signed by the existing and new owners containing a specific date for transfer of responsibility, coverage, and liability under the State Water Quality Certification and any permits, authorizations and approvals obtained to comply with the State Water Quality Certification. The new owner shall submit to PADEP a new application form for the State Water Quality Certification and any

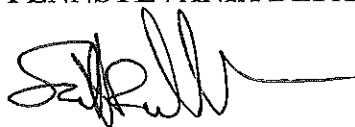
permits, authorizations and approvals required to comply with the State Water Quality Certification signed by the new owner.

9. Correspondence - All correspondence with and submittals to PADEP concerning this State Water Quality Certification shall be addressed to:

Department of Environmental Protection
Southcentral Regional Office
Program Manager, Waterways and Wetlands
909 Elmerton Avenue
Harrisburg, Pa, 17110

10. Reservation of Rights – PADEP may modify, suspend, or revoke this State Water Quality Certification if it determines that (i) PADEP becomes aware of new facts about the Northeast Supply Enhancement Project that warrant such action; or (ii) PADEP determines that Transco has not complied with the terms and conditions of this certification. PADEP may require additional measures to achieve compliance with any applicable law or regulation..
11. Other Laws - Nothing in this State Water Quality Certification shall be construed to preclude the institution of any legal action or relieve Transco from any responsibilities, liabilities, or penalties established pursuant to any applicable federal or state law or regulation.
12. Severability - The provisions of this State Water Quality Certification are severable and should any provision of this certification be declared invalid or unenforceable, the remainder of the certification shall not be affected thereby.

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION



Scott Williamson
Program Manager
Waterways and Wetlands Program

5/31/18

Date

ATTACHMENT B

UNITED STATES OF AMERICA

BEFORE THE

FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of

**Transcontinental Gas Pipe Line
Company, LLC**

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)
)
)

**Docket Nos. CP17-101-____
CP20-49-____**

**PETITION OF
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC FOR
EXPEDITED REISSUANCE OF CERTIFICATE AUTHORITY
(Northeast Supply Enhancement Project)**

Communications with respect to this application should be addressed to:

*Michael R. Pincus
Van Ness Feldman LLP
2000 Pennsylvania Avenue NW
Suite 6000
Washington, DC 20006
(202) 298-1833

Stephen A. Hatridge
Vice President & Assistant General Counsel
Transcontinental Gas Pipe Line Company, LLC
Post Office Box 1396
Houston, Texas 77251-1396
(713) 215-2312

*Dan Merz
Senior Counsel
Transcontinental Gas Pipe Line Company, LLC
Post Office Box 1396
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(281) 224-9269

Francesca Ciliberti Ayres
Senior Counsel
Transcontinental Gas Pipe Line Company, LLC
Post Office Box 1396
Houston, Texas 77251-1396
(720) 329-6374

A copy should also be sent to:

Liz Bowman
Vice President Federal Regulatory Affairs
The Williams Companies, Inc.
555 13th Street NW Suite 440W
Washington, D.C. 20004-1109
(202) 213-8223

Filed: May 29, 2025

* Designated to receive service in accordance with Rule 2010 of the Commission's Rules of Practice and Procedure. 18 C.F.R. § 385.2010.

UNITED STATES OF AMERICA

BEFORE THE

FEDERAL ENERGY REGULATORY COMMISSION

In the Matter of

Transcontinental Gas Pipe Line
Company, LLC

)
)
)
)

Docket Nos. CP17-101-____
CP20-49-____

PETITION OF
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC FOR
EXPEDITED REISSUANCE OF CERTIFICATE AUTHORITY

On May 3, 2019, the Federal Energy Regulatory Commission (“FERC” or the “Commission”) issued an Order Issuing Certificate, as amended, authorizing Transcontinental Gas Pipe Line Company, LLC (“Transco”) to construct and operate the Northeast Supply Enhancement Project (“NESE Project” or “Project”).¹ The Commission explicitly found strong market demand for the Project and, based on the benefits the Project would provide and the minimal adverse impacts on landowners and surrounding communities, held the “public convenience and necessity requires approval of the [P]roject.”² Transco was—and still is—committed to the NESE Project. However, denial of Transco’s Clean Water Act (“CWA”) Section 401 applications by New York and New Jersey prevented Transco from constructing the Project.³ Nonetheless, strong market demand still exists for the Project, and with renewed interest in the additional firm

¹ *Transcon. Gas Pipe Line Co.*, 167 FERC ¶ 61,110, at P 2 (2019) (“Certificate Order”), *order denying reh’g and stay*, 171 FERC ¶ 61,031 (2020) (“Rehearing Order”), *vacated*, 187 FERC ¶ 61,145 (2024). The Certificate Order was amended in Docket No. CP20-49-000 to allow Transco to use an existing road to access Transco’s Compressor Station 206 in Somerset County, New Jersey in lieu of constructing an entirely new access road. *Transcon. Gas Pipe Line Co., LLC*, 172 FERC ¶ 61,036 (2020) (“Amendment Order”).

² Certificate Order at P 18.

³ Transco was denied necessary water quality certifications by both the New York State Department of Environmental Conservation (“NYSDEC”) and the New Jersey Department of Environmental Protection (“NJDEP”) on May 15, 2020. The Pennsylvania Department of Environmental Protection (“PADEP”) issued the water quality certificate on June 16, 2018.

transportation service, reliability, and delivery enhancement offered by the Project, Transco has re-engaged in discussions with officials in New York, New Jersey, and Pennsylvania. Transco is also engaged in negotiations with the Project Shippers (as hereinafter defined) to reinstate the precedent agreements subscribing to the full capacity of the Project.

President Trump’s executive orders *Declaring a National Energy Emergency*⁴ and *Unleashing American Energy*⁵ make clear that agencies, including FERC, have been directed to support infrastructure development, particularly in the northeastern United States where the NESE Project will enhance reliability, flexibility, and efficiency on a critical part of Transco’s system and provide access to crucial supplies of natural gas. Prompt reissuance of the certificate for the NESE Project would accomplish many of the goals of the President’s executive orders.

Therefore, Transco hereby files this petition for the reissuance of its certificate of public convenience and necessity authorizing Transco to construct and operate the NESE Project (“Petition”) pursuant to Rule 207 of the Commission’s Rules of Practice and Procedure, 18 C.F.R. § 385.207, Section 7(c) of the Natural Gas Act (“NGA”), 15 U.S.C. § 717f(c), and Part 157, Subpart A of the Commission’s regulations, 18 C.F.R. pt. 157, subpart A,.

Transco requests expedited action on this request by August 29, 2025, so that it can start construction on the Project by the end of the year.

⁴ *Declaring a National Energy Emergency*, Exec. Order No. 14156, 90 Fed. Reg. 8,433 (Jan 20, 2025).

⁵ *Unleashing American Energy*, Exec. Order No. 14154, 90 Fed. Reg. 8,353 (Jan. 20, 2025).

I.
GENERAL

The exact legal name of the petitioner is Transcontinental Gas Pipe Line Company, LLC, a limited liability company formed and existing under the laws of the State of Delaware. Transco's principal place of business is 2800 Post Oak Boulevard, Houston, Texas 77056-6106.

The names, titles, addresses and telephone numbers of the persons to whom correspondence and communications concerning this application are to be addressed are:

*Michael R. Pincus
Van Ness Feldman LLP
2000 Pennsylvania Avenue NW
Suite 6000
Washington, DC 20006
(202) 298-1833
mrp@vnf.com

Stephen A. Hatridge
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Post Office Box 1396
Houston, Texas 77251-1396
(720) 329-6374
francesca.ciliberti-ayres@williams.com

A copy should also be sent to:

Liz Bowman
Vice President Federal Regulatory Affairs
The Williams Companies, Inc.
555 13th Street NW Suite 440W
Washington, D.C. 20004-1109
(202) 213-8223
liz.bowman@williams.com

* Designated to receive service in accordance with Rule 2010 of the Commission's Rules of Practice and Procedure. 18 C.F.R. § 385.2010.

II.

DESCRIPTION OF EXISTING OPERATIONS

Transco is a natural gas pipeline company engaged in the transportation of natural gas in interstate commerce by means of its natural gas transmission system extending from Texas, Louisiana, and the offshore Gulf of America area, through Mississippi, Alabama, Georgia, South Carolina, North Carolina, Virginia, Maryland, Pennsylvania, and New Jersey, to its termini in the New York City metropolitan area.

III.

REQUESTED ACTION

By the instant Petition, Transco seeks reissuance of the certificate authorization for the NESE Project that the Commission authorized on May 3, 2019, as amended. The purpose, scope, and impacts of the Project have not changed. As described in the Certificate Order, the Project will enable Transco to provide 400,000 dekatherms per day (“Dth/d”) of incremental firm transportation capacity from Transco’s Compressor Station 195 in York County, Pennsylvania to Transco’s offshore Rockaway Transfer Point, an existing interconnection between the Lower New York Bay Lateral and the Rockaway Delivery Lateral in New York State waters, to serve residential and commercial customers in the New York City area.⁶ To facilitate this service, Transco is requesting authority to construct and operate the same facilities authorized in the Certificate Order, as amended.⁷

The Commission found strong market demand for the Project. The Commission found that Transco sufficiently demonstrated need for the Project based on the two precedent agreements subscribing to the full Project capacity.⁸ Specifically, the

⁶ Certificate Order at P 4.

⁷ *See id.* at P 4; Amendment Order at P 4.

⁸ Certificate Order at P 16.

Commission noted that “the number of residential and commercial natural gas customers has increased in the New York City market area.”⁹ The Commission also found that the Project would “provide needed ancillary reliability benefits by creating a second service feed into Brooklyn.”¹⁰ Filing in support of the Project, the Project Shippers, which are both local distribution companies (“LDCs”), were blunt: “This Project is critical to meeting the growing energy demands of our customers, provides numerous reliability benefits, and complements several major on-system reinforcement projects we are making to our gas system.”¹¹ The Project Shippers highlighted the environmental benefits of the Project explaining that “the NESE Project will allow us to continue converting thousands of customers each year from heavy fuels to cleaner natural gas.”¹² Based on this robust record, the Commission concluded that the Project, which has not changed, would provide public benefits by meeting this demand.¹³

During the FERC application process and after receiving certificate authorization, Transco diligently pursued the Project. Transco worked extensively with the NYSDEC, the NJDEP, and the PADEP to obtain the applicable water quality certifications under Section 401 of the CWA. In that effort, Transco provided multiple detailed technical submissions, responded to numerous requests for information, and conducted meetings and site visits with technical staff of multiple state and federal agencies. The PADEP granted the CWA Section 401 certification on June 16, 2018. However, notwithstanding those efforts, on May 15, 2020, NYSDEC denied Transco’s application for the segment of the

⁹ Rehearing Order at P 11.

¹⁰ *Id.* at P 13.

¹¹ Project Shippers’ Comments in Support, Docket No. CP17-101-000 (Apr. 2, 2019).

¹² *Id.*

¹³ *See* Certificate Order at P 18.

Project located in New York waters. NYSDEC's denial led NJDEP to deny similar permits for the expansion facilities located in New Jersey. Though NYSDEC's denial stated that Transco failed to demonstrate compliance with applicable water quality standards, underpinning the denial were (i) NYSDEC's determination that the NESE Project was inconsistent with the energy and climate policies, laws, and goals of New York under its Climate Leadership and Community Protection Act, and (ii) NYSDEC's position that there was a lack of need for the Project; rationale that is inconsistent with the Commission's findings in the Certificate Order and New York's limited authority under CWA Section 401.¹⁴ The denials of the CWA Section 401 certifications were the only hurdle preventing Transco from constructing the NESE Project.

Due to NYSDEC's and NJDEP's denials of the water quality certifications, Transco sought and received two extensions of time from the Commission to complete construction of the Project.¹⁵ The second and most recent extension of time order granted Transco an extension until May 3, 2024, to complete construction of the Project and place it into service.¹⁶ Significantly, Transco's certificate authority lapsed about a year ago. The Commission noted that it grants extensions of time "within a timeframe during which the environmental findings underlying the Commission's authorization can be expected to remain valid" and cited orders in which the Commission granted other even longer

¹⁴ NYSDEC's rationale is also inconsistent with current Environmental Protection Agency guidance clarifying the scope of a state's authority under CWA Section 401. *See* Clarification regarding the Application of Clean Water Act Section 401 Certification Memorandum, Peggy S. Browne, Acting Assistant Administrator (May 21, 2025), https://www.epa.gov/system/files/documents/2025-05/clarification-re-application-of-cwa-401-certification_may-2025.pdf ("A certifying authority's evaluation is limited to considering adverse impacts to water quality, and only such impacts insofar as they prevent compliance with applicable water quality requirements.").

¹⁵ *Transcon. Gas Pipe Line Co.*, 175 FERC ¶ 61,148 (2021) ("Extension Order I"); *Transcon. Gas Pipe Line Co.*, 186 FERC ¶ 61,038 (2024) ("Extension Order II").

¹⁶ Extension Order II at P 26.

extensions.¹⁷ The Commission explained: “To obtain a further extension, Transco will need to show that it is actively pursuing and remains committed to the project” by pursuing certifications from NYSDEC and NJDEP.¹⁸ That is precisely what Transco is doing. Transco is currently in discussions with officials in New York, New Jersey, and Pennsylvania to obtain the permits necessary to construct and operate the Project.

President Trump’s executive orders make clear the NESE Project is more important than ever. Executive Order 14154, *Unleashing American Energy*, directs agency heads to “use all possible authorities, including emergency authorities, to expedite the adjudication of Federal permits” for “any project . . . deem[ed] essential for the Nation’s economy or national security.”¹⁹ In addition, the Executive Order requires the White House Director of the National Economic Council and the Director of the Office of Legislative Affairs to prepare recommendations to “facilitate the permitting and construction of interstate energy transportation and other critical energy infrastructure, including, but not limited to, pipelines, particularly in regions of the Nation that have lacked such development in recent years.”²⁰ The NESE Project, which is designed to serve a pipeline-constrained area of the country where LDCs are seeking greater and more diverse natural gas supplies, neatly fits that bill.

More to the point, Executive Order No. 14156, *Declaring a National Energy Emergency*, highlights how “dangerous State and local policies” in the Northeast “jeopardize our Nation’s core national defense and security needs, and devastate the

¹⁷ *Id.* at P 25 (citing *Const. Pipeline Co.*, 165 FERC ¶ 61,081, at P 16 (2018); *Mountain Valley Pipeline, LLC*, 185 FERC ¶ 61,208, at P 20 (2023)).

¹⁸ *Id.* at 17.

¹⁹ Exec. Order No. 14154 § 5(d), 90 Fed. Reg. at 8,355-56.

²⁰ *Id.* § 5(e)(i), 90 Fed. Reg. at 8,356.

prosperity of not only local residents but the entire United States population.”²¹ Therefore, the Executive Order directs agencies to “identify and use all relevant lawful emergency and *other authorities available to them to expedite* the completion of all authorized and appropriated infrastructure.”²² That is what this Petition seeks to accomplish. The Commission should use its available and appropriate statutory authority to reinstate the authorization for the NESE Project.²³

The need for the Project remains. Market conditions have not changed—except that the need for energy supply in the Northeast has become even more urgent—in the year since the deadline to place the Project into service lapsed. As recently highlighted in the Northeast Power Coordinating Council’s (“NPCC”) *Northeast Gas/Electric System Study*, existing gas infrastructure in New York is unable to meet the demand for most electric generators during a cold snap.²⁴ While many generators in downstate New York—where the Project is intended to serve—are dual-fuel capable, very few electric generators have firm transportation entitlements, exposing electric generation to risk in the event of an extreme weather event or a pipeline outage.²⁵

The supply shortfall in the New York market continues to exist and there is a strong need for the Project capacity to alleviate these constraints. Although the original precedent agreements for the Project were terminated in accordance with their terms, Transco and the

²¹ Exec. Order No. 14156 § 1, 90 Fed. Reg. at 8,434.

²² *Id.* § 3(a) (emphasis added).

²³ Additional Executive Orders also emphasize the need for prompt Commission action granting Transco’s Petition. *See* Exec. Order No. 14262, *Strengthening the Reliability and Security of the United States Electric Grid*, 90 Fed. Reg. 15,521 (Apr. 8, 2025); Exec. Order No. 14260, *Protecting America from State Overreach*, 90 Fed. Reg. 15,513 (Apr. 8, 2025); Exec. Order No. 14270, *Zero-based Regulatory Budgeting to Unleash American Energy*, 90 Fed. Reg. 15,643 (Apr. 9, 2025).

²⁴ Northeast Power Coordinating Council, *Northeast Gas/Electric System Study*, at 5 (Jan. 21, 2025), <https://tinyurl.com/2wpftzpe>.

²⁵ *Id.* at 5-6.

Project Shippers are negotiating to reinstate the precedent agreements for the full capacity of the Project, demonstrating the enduring need for the Project. Consistent with Ordering Paragraph (B)(4) of the Certificate Order, Transco will file a written statement affirming that it has executed contracts for service at the levels provided for in the precedent agreements that the Commission relied upon in authorizing the Project, prior to commencing construction.²⁶ Compliance with this requirement will ensure that Project construction will only start after the service agreements for the Project capacity are in effect.

The Commission has authorized infrastructure projects with initial in-service deadlines of up to nine years from the date of certification.²⁷ The Certificate Order was issued less than six years ago and only lapsed last year. Thus, recertifying the Project falls well within the Commission's accepted timeframes. Moreover, as recent as last year, the Commission found that the information supporting its public convenience and necessity determinations for the Project had not gone stale.²⁸ Significantly, in the Commission's most recent State of the Markets Report, almost all major natural trading hubs in the country saw price reductions in the last year, with the relevant and notable exception of Transco Zone

²⁶ Certificate Order, Ordering Para. (B)(4).

²⁷ *Mountain Valley Pipeline, LLC*, 180 FERC ¶ 61,117, at P 19 and Ordering Paras. (A) and (B) (2022) (extending the in-service deadline to October 13, 2026 for a project that received its initial certificate order on October 13, 2017), *order on reh'g*, 182 FERC ¶ 61,046 (2023). *See also*, *Iroquois Gas Transmission System, L.P.*, 190 FERC ¶ 61,112 (2025) (extending the in-service deadline to March 25, 2027 for a project that received its initial certificate order on March 25, 2022, to allow the company to receive air permits from the NYSDEC and the Connecticut Department of Energy and Environmental Protection); *Driftwood LNG LLC & Driftwood Pipeline LLC*, 186 FERC ¶ 61,112 (2024), *on reh'g*, 188 FERC ¶ 61,017 (2024) (extending the in-service deadline to April 18, 2029 for a project that received its initial authorization orders on April 18, 2019); *Mountain Valley Pipeline, LLC*, 185 FERC ¶ 61,208 (2023) (extending the in-service deadline to June 18, 2026 for a project that received its initial certificate order on June 18, 2020); *National Fuel Gas Supply Corp.*, 179 FERC ¶ 61,226 (2022) (extending the in-service deadline to December 31, 2024 for a project that received its initial certificate order on February 3, 2017).

²⁸ Extension Order II at P 19.

N.Y., which experienced a 14 percent increase in natural gas prices.²⁹ As articulated in Executive Order 14156, *Declaring a National Energy Emergency*, the Nation’s “insufficient energy production, transportation, refining, and generation constitutes an unusual and extraordinary threat to our Nation’s economy, national security, and foreign policy.”³⁰ The NESE Project addresses these serious concerns in short order.

Reissuing certificate authority for the Project is the most economically and environmentally effective way to resolve the supply shortfall and pipeline constraints in the New York market area. The Commission has already thoroughly examined the Project’s market need, effect on existing shippers, effect on other pipelines and their captive customers, and landowners and surrounding communities.³¹ Importantly, Transco is uniquely positioned as it already has facilities serving this region which allows the NESE Project to utilize existing rights-of-way, minimizing impacts on the environment and landowners. As the Commission noted, approximately 97 percent of the Quarryville Loop will be located within and alongside the existing Transco Mainline right-of-way, and 100 percent of the Madison Loop will be located within and alongside the existing Transco Lower Bay Loop C right-of-way.³² Also, as the Commission recognized, “Transco . . . has actively worked with local stakeholders, including homeowners and landowners, as well as federal and state agencies to develop the proposed pipeline route, as well as evaluating 39 sites for the placement of Compressor Station 206.”³³ Significantly, Transco has

²⁹ FERC, *2024 State of the Markets: Staff Report*, at 17 (Mar. 20, 2025), <https://www.ferc.gov/news-events/news/SMR-2024>.

³⁰ Exec. Order No. 14156 § 1.

³¹ See Certificate Order at PP 12-18.

³² *Id.* at P 17.

³³ *Id.*

obtained all of the onshore permanent right-of-way necessary to construct and operate the Project in Pennsylvania, and all but two tracts onshore in New Jersey.³⁴

The Commission prepared an in-depth Environmental Impact Statement (“EIS”) to fulfill its obligations under the National Environmental Policy Act. The EIS concluded that while the construction and operation of the Project would result in some adverse environmental impacts, the impacts would be reduced to less-than-significant levels with the implementation of mitigation measures.³⁵ The Commission’s record in this proceeding does not reflect any changes to the Project or any new information that calls into question the Commission’s prior findings supporting its approval of the Project. As explained below, the Commission can properly and reasonably rely on its previously prepared comprehensive EIS for the Project in reinstating the certificate authority.

IV. **MARKET SUPPORT**

As explained in the Certificate Order, Transco held an open season for the Project. As a result of the open season, Transco executed two binding precedent agreements for the entire 400,000 Dth/d of transportation service created by the Project. Specifically, Transco executed binding precedent agreements with two LDCs, one for 211,300 Dth/d for a term of 15 years, and the other for 188,700 Dth/d for a term of 15 years (together, “Project Shippers”).

Despite Project delays caused by New York and New Jersey, the Project Shippers remained committed to the Project. It was not until after the certificate authority lapsed that the precedent agreements were terminated in accordance with their terms.

³⁴ The offshore rights needed for the Project are tied in with the CWA Section 401 certifications from New York and New Jersey.

³⁵ Certificate Order at P 29.

Transco and the Project Shippers are negotiating to reinstate the precedent agreements for the full capacity of the Project. Just as before, these precedent agreements will represent 100 percent of the firm transportation capacity created by the Project, demonstrating strong market need for the Project.

V. **RATES**

As part of this Petition, Transco proposes the same rates as authorized by the Commission in the Certificate Order. To the extent necessary, Transco requests the Commission adopt its previous rates with respect to the NESE Project.³⁶

VI. **PUBLIC CONVENIENCE AND NECESSITY**

In the Certificate Order, the Commission found that issuing a certificate for the NESE Project was consistent with the Commission's Certificate Policy Statement and required by the present and future public convenience and necessity under Sections 7(c) and 7(e) of the NGA.³⁷ The Commission's Certificate Policy Statement explains that in deciding whether to authorize the construction of major new pipeline facilities, the Commission will balance the public benefits against the potential adverse consequences of the project. In evaluating new pipeline construction, the Commission's goal is to give appropriate consideration to the enhancement of competitive transportation alternatives, the possibility of overbuilding, subsidization by existing customers, the applicant's

³⁶ Certificate Order at PP 19-27.

³⁷ *Id.* at P 13.

responsibility for unsubscribed capacity, the avoidance of unnecessary disruptions of the environment, and the unneeded exercise of eminent domain.³⁸

Under the Certificate Policy Statement, the threshold requirement for existing pipelines proposing new projects is that the pipeline must be prepared to support the project financially without relying on subsidization from existing customers. The next step is to determine whether the applicant has made efforts to eliminate or minimize any adverse effects the project might have on the applicant's existing customers, existing pipelines in the market and their captive customers, or landowners and communities affected by the route of the new pipeline. If residual adverse effects on these interest groups are identified after efforts have been made to minimize them, the Commission will evaluate the project by balancing the evidence of public benefits to be achieved by the project against the residual adverse effects of the project. This is essentially an economic test. Only when the benefits of a project outweigh the adverse effects of the project on economic interests will the Commission proceed to complete an environmental analysis of the project, where other interests are considered.³⁹

A. No Financial Subsidies From Existing Shippers

The Commission has consistently determined that where a pipeline proposes to charge incremental rates for new construction, the pipeline must satisfy the threshold requirement that the project will not be subsidized by existing shippers.⁴⁰ Consistent with the Certificate Order, Transco continues to propose the same incremental recourse rate

³⁸ *Certification of New Interstate Natural Gas Pipeline Facilities*, 88 FERC ¶ 61,227, at pp. at 61,747-48 ("Certificate Policy Statement"); *corrected*, 89 FERC ¶ 61,040 (1999), *order on clarification*, 90 FERC ¶ 61,128, *further clarified*, 92 FERC ¶ 61,094 (2000).

³⁹ *Fla. Gas Transmission Co.*, 132 FERC ¶ 61,040, at PP 17-18, *order on reh'g*, 133 FERC ¶ 61,156 (2010), *reh'g denied*, 134 FERC ¶ 61,086 (2011).

⁴⁰ *Transcon. Gas Pipe Line Corp.*, 98 FERC ¶ 61,155, at p. 61,552 (2002).

designed to recover the incremental cost of service attributable to the Project facilities, as previously approved by the Commission.⁴¹ Therefore, the Project satisfies the Commission's threshold requirement under the Policy Statement that the Project is not subsidized by existing shippers.⁴²

B. Transco Has Eliminated or Minimized Potential Adverse Effects

The Commission has recognized three specific areas where the applicant has the responsibility of identifying and mitigating potential adverse effects of a project: the interests of the applicant's existing customers, the interests of competing existing pipelines and their captive customers, and the interests of landowners and surrounding communities. Transco identified and the Commission acknowledged in the certificate authorization process potential minor adverse effects on these interest holders and explained how any potential adverse impacts have been or will be mitigated or eliminated in the design or implementation of the Project, and those effects have not changed.

1. The Project Will Have No Adverse Impact on Transco's Existing Customers

There will be no adverse rate impact on Transco's existing customers because the Project is incrementally priced, as noted above.⁴³ Moreover, there will be no adverse effect on service to Transco's existing customers because the proposed expansion facilities are designed to provide incremental service to meet the needs of the project shippers, without degrading service to Transco's existing customers.⁴⁴ In fact, existing shippers will benefit from the additional capacity available in a constrained area of Transco's system.

⁴¹ Certificate Order at P 14.

⁴² *Id.*

⁴³ *Id.*

⁴⁴ *Id.* at P 15.

2. The Project Will Have No Adverse Effect on Existing Pipelines Serving the Market or Their Captive Customers

The Project Shippers will use the capacity provided under the Project to serve the incremental growth requirements of their markets, not to displace existing service providers. Therefore, the Project will have no adverse effect on competing existing pipelines or their captive customers.⁴⁵

3. The Project Minimizes Impacts on Landowners and Other Stakeholders

The Commission has recognized that every pipeline construction project will cause some short-term impacts to landowners.⁴⁶ However, the proposed facilities were designed to minimize impact on the community and the environment, as the Commission determined in the EIS and Certificate Order, as amended. Transco developed a preferred route that minimized impacts on the community and the environment, as the Commission found. In Pennsylvania, Transco already possessed or acquired the permanent rights needed to construct and operate the Project, and Transco still has those rights. In New Jersey, Transco has all the permanent rights needed to construct and operate the Project, except in two discrete locations. In order to minimize Project impacts on landowners and communities, Transco evaluated 20 potential sites for the location of the new Compressor Station 206. The preferred site was chosen based on criteria such as property availability, access to electric power, pipeline hydraulics, land use and land development, site terrain, water table and storm water management, site accessibility, and potential impacts to nearby residences. As the Commission noted in the Certificate Order, these steps appropriately minimized

⁴⁵ *Id.*

⁴⁶ Certificate Policy Statement, 88 FERC ¶ 61,227 at pp. 61,747-48.

adverse impacts on landowners, as did the later amendment which was designed to address access to the new Compressor Station 206.⁴⁷

C. The Public Benefits of the Project Outweigh Any Potential Adverse Effects

The Commission has consistently found a need for additional natural gas supply to meet residential and commercial demands due to population and market growth within the New York market area.⁴⁸ Through the addition of new firm transportation capacity, the NESE Project would immediately improve the resiliency and reliability of gas service to residential and commercial loads—and help to reduce gas prices—in New York City, including during peak demand days. As noted above, this is entirely consistent with the purpose of the *Unleashing American Energy* and *Declaring a National Energy Emergency* executive orders.

Although the original precedent agreements for the Project were terminated in accordance with their terms, Transco and the Project Shippers are negotiating the reinstatement of the precedent agreements for the full capacity of the Project. Just as before, these agreements will represent 100 percent of the firm transportation capacity that will be created by the Project.

The Commission has already found that Transco's efforts minimized the adverse impacts on existing shippers, other pipelines and their captive customers, and landowners and surrounding communities.⁴⁹ The Commission also recognized the significant benefits that the Project offers.⁵⁰ Transco is not proposing to change the scope of the Project, the

⁴⁷ Certificate Order at P 17; Amendment Order at PP 12-13.

⁴⁸ Certificate Order at P 16; *see* Rehearing Order at PP 11-13; Extension Order I at P 14; Extension Order II at P 19.

⁴⁹ Certificate Order at P 17.

⁵⁰ *Id.* at P 16; Rehearing Order at PP 11-13; Extension Order I at P 14; Extension Order II at P 19.

facilities to be constructed, the route of the Project, or the purpose of the Project. Indeed, Transco also already has all of the permanent easements necessary to construct and operate the Project in Pennsylvania and, with the exception of two tracts, has all of the permanent easements necessary for the Project in New Jersey. Transco is working closely with landowners to obtain the property rights for required temporary workspace. Accordingly, the Commission's finding that the public benefits outweigh any potential adverse impact is still valid.

The Commission should reissue certificate authority for the Project based on the Commission's analysis and findings in the Certificate Order, Rehearing Order, Amendment Order, and as supplemented in this Petition.

VII.

ENVIRONMENTAL IMPACTS

The scope of the Project and its facilities have not changed since the Certificate Order, as amended by the Amendment Order. With this Petition, Transco is proposing to construct and operate the exact same Project the Commission previously authorized. Transco confirms that it intends to construct the same facilities, in the same right-of-way, and use the same construction workspace and methods as previously approved by the Commission. This demonstrates that there is no new information that “provides a seriously different picture of the environmental landscape.”⁵¹ Therefore, the Commission is not required to prepare a supplemental EIS for reissuance of certificate authority for the Project.

⁵¹ *Sierra Club v. FERC*, 68 F.4th 630, 649 (D.C. Cir. 2023) (quoting *Stand Up for California! v. DOI*, 994 F.3d 616, 629 (D.C. Cir. 2021) and *Friends of Cap. Crescent Trail v. FTA*, 877 F.3d 1051, 1060 (D.C. Cir. 2017)), *opinion vacated and superseded on other grounds*, No. 20-1512, 2023 WL 5537562 (D.C. Cir. Aug. 25, 2023)).

Transco is working with the relevant permitting agencies to update permit applications. Specifically, Transco has updated its General Conformity analysis under the Clean Air Act. The Commission issued a final General Conformity Determination (“GCD”) for the Project on January 25, 2019.⁵² Pursuant to 40 C.F.R. § 93.157(b), the conformity status of an action automatically lapses five years from the date the necessary agencies are notified pursuant to 40 C.F.R. § 93.155, unless the action has been completed or a continuous program to implement the action has commenced. Neither the Project nor its estimated emissions have changed since the GCD was issued in 2019, where the only emissions subject to General Conformity were nitrogen oxides (“NO_x”) (as a precursor to ozone).

To mitigate/offset NO_x emissions, the GCD required either direct mitigation projects or the purchase of Emission Reduction Credits (“ERCs”). Since the GCD was issued, the ozone non-attainment status of the NJ-NY-CT interstate Air Quality Control Region (“AQCR”) 43 is now classified as “severe,” which lowered the applicability threshold for volatile organic compounds (“VOC”) emissions from 50 tons per year (“tpy”) to 25 tpy. This change results in the Project’s VOCs now also being subject to General Conformity. Based on this change, and the timeframe for Project construction, Transco proposes to purchase ERCs as mitigation/offsets for the estimated Project VOC emissions; and, as provided in the GCD, to offset Project NO_x emissions with ERCs. Transco has confirmed that there are sufficient ERCs and Creditable Emission Reductions (“CERs”) available for both NO_x and VOCs to fully cover the most conservative Project emission

⁵² See Northeast Supply Enhancement Project, Final Environmental Impact Statement, Docket No. CP17-101-000, at App. I (Jan. 25, 2019).

estimates. No other emissions from the Project are subject to General Conformity. Attached are the updated reports to support the General Conformity analysis as Exhibit Z-1.

VIII. **LANDOWNER NOTIFICATION**

As noted above, the Project has not changed since the issuance of the Certificate Order, as amended by the Amendment Order. Transco will provide notice to affected landowners consistent with the Commission's landowner notification requirements of Section 157.6(d) of the Commission's regulations, 18 C.F.R. § 157.6(d). Transco has attached an appropriate Form of Notice of Petition for the Commission's convenience.

IX. **TIMING FOR REISSUANCE**

Transco requests that the Commission issue an order reissuing the authorizations for the NESE Project by August 29, 2025. To meet this expedited schedule, Transco requests the Commission utilize shortened procedures under Section 157.6(c), 18 C.F.R. § 157.6(c) and Rule 802 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.802. Transco also requests waiver of a hearing under Rule 801, 18 C.F.R. § 385.801, and waiver of any other requirements to facilitate this request. Reauthorization by this date will enable Transco to complete construction of the Project facilities and place the Project in service by November 2027.

X. **OTHER AUTHORIZATIONS**

Transco is not aware of any other application to supplement or effectuate the proposals set forth herein which must be or is to be filed by Transco, any of Transco's customers, or any other person with any other federal, state, or other regulatory body.

XI. **EXHIBITS**

Transco incorporates by reference the exhibits from the original application for the NESE Project, with the exception of the following exhibit attached to support Transco's Petition for Expedited Reissuance of Certificate Authority:

Exhibit Z-1 – Updated General Conformity Reports. Transco prepared updated reports necessary to support the General Conformity analysis.

XII. **CONCLUSION**

Transco recognizes that this is a novel Petition to the Commission. Despite strong customer demand, expressed market for the Project, and numerous reliability and supply benefits for the Project, through no fault of its own Transco was forced to abandon plans for the Project just one year ago. This strong demand still exists. Transco requests the Commission reinstate the certificate for the NESE Project to allow it to pursue the Project and begin construction as soon as possible.

WHEREFORE, Transco respectfully requests:

1. That the Commission issue an order reissuing the certificate of public convenience and necessity for the NESE Project based on the existing record before FERC granting Transco authority under Sections 7(c) and 7(e) of the NGA to construct and operate the Project;

2. That the Commission issue a final order granting the authorizations requested herein by August 29, 2025;

3. That this Petition be processed in accordance with the shortened procedures set forth in Rules 801 and 802 of the Commission's Rules of Practice and Procedure, 18 C.F.R. §§ 385.801 and 385.802, and, in connection therewith, Transco requests that the intermediate decision procedure be omitted and waives oral hearing and the opportunity for filing exceptions to the decision of the Commission and that the Commission issue the Form of Notice of Petition attached hereto; and

4. That the Commission grant such other and further relief as may be proper and appropriate.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE
COMPANY, LLC

By /s/ Francesca Ciliberti

Francesca Ciliberti

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Transcontinental Gas Pipe Line Company, LLC

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Houston, TX 77056

Dated: May 29, 2025

CERTIFICATE OF SERVICE

I hereby certify that I have this day served, in accordance with the provisions of Rule 2010 of the Commission's Rules of Practice and Procedures, the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding. Dated at Houston, Texas, this 29th day of May 2025.

/s/ Francesca Ciliberti

Francesca Ciliberti

Senior Counsel

Transcontinental Gas Pipe Line Company, LLC

2800 Post Oak Blvd.

Houston, TX 77056

***Federal Register* Notice**

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Transcontinental Gas Pipe Line	)	Docket Nos. CP17-101-__
Company, LLC	)	CP20-49-__

NOTICE OF PETITION

(DATE)

Take notice that on May 29, 2025, Transcontinental Gas Pipe Line Company, LLC (Transco), PO Box 1396, Houston, Texas 77251, filed in the above referenced docket a Petition pursuant to section 7(c) of the Natural Gas Act (NGA) for reissuance of its certificate for its proposed Northeast Supply Enhancement Project. Specifically, Transco requests reissuance of certificate authority to: (i) construct a 10.17-mile, 42-inch-diameter loop in Lancaster County, Pennsylvania; (ii) construct a 3.43-mile, 26-inch-diameter loop in Middlesex County, New Jersey; (iii) construct a 23.49-mile, 26-inch-diameter loop in Middlesex County, New Jersey and in New York State waters; (iv) add 21,902 horsepower (hp) at its existing Compressor Station 200 in Chester County, Pennsylvania; (v) construct a new 32,000 hp compressor station (Compressor Station 206) in Somerset County, New Jersey; and (vi) construct various additional facilities. Transco states that the Northeast Supply Enhancement Project will provide 400,000 dekatherms per day of firm transportation service. Transco estimates the cost of the project to be approximately \$926.5 million, all as more fully set forth in the application which is on file with the Commission and open to public inspection.

In addition to publishing the full text of this document in the Federal Register, the Commission provides all interested persons an opportunity to view and/or print the contents of this document via the Internet through the Commission's Home Page (<http://www.ferc.gov>). From the Commission's Home Page on the Internet, this information is available on eLibrary. The full text of this document is available on eLibrary in PDF and Microsoft Word format for viewing, printing, and/or downloading. To access this document in eLibrary, type the docket number excluding the last three digits of this document in the docket number field.

User assistance is available for eLibrary and the Commission's website during normal business hours from FERC Online Support at (202) 502-6652 (toll free at 1-866-208-3676) or email at ferconlinesupport@ferc.gov, or the Public Reference Room at (202) 502-8371, TTY (202) 502-8659. E-mail the Public Reference Room at public.referenceroom@ferc.gov.

Any questions concerning this application may be directed to Francesca Ciliberti-Ayres, Transcontinental Gas Pipe Line Company, LLC, PO Box 1396, Houston, Texas 77251, by telephone at (720) 329-6374.

On May 18, 2016, Commission staff granted Transco's request to utilize the Pre-Filing Process and assigned Docket No. PF16-5-000 to staff activities involved in the Northeast Supply Enhancement Project. The Commission previously conducted its proceeding in Docket Nos. CP17-101-000 (project) and CP20-49-000 (amendment), as noted in the caption of the Notice. On May 3, 2019, the Commission issued an Order Issuing Certificate for the Project in Docket No. CP17-101-000 and, on July 16, 2022, issued an Order Amending Certificate in Docket No. CP20-49-000.

Pursuant to section 157.9 of the Commission's Rules of Practice and Procedure,¹ within 90 days of this Notice the Commission staff will either: complete its environmental review and place it into the Commission's public record (eLibrary) for this proceeding; or issue a Notice of Schedule for Environmental Review. If a Notice of Schedule for Environmental Review is issued, it will indicate, among other milestones, the anticipated date for the Commission staff's issuance of the final environmental impact statement (FEIS) or environmental assessment (EA) for this proposal. The filing of an EA in the Commission's public record for this proceeding or the issuance of a Notice of Schedule for Environmental Review will serve to notify federal and state agencies of the timing for the completion of all necessary reviews, and the subsequent need to complete all federal authorizations within 90 days of the date of issuance of the Commission staff's FEIS or EA.

PUBLIC PARTICIPATION

There are three ways to become involved in the Commission's review of this project: you can file comments on the project, you can protest the filing, and you can file a motion to intervene in the proceeding. There is no fee or cost for filing comments or intervening. The deadline for filing a motion to intervene is 5:00 pm Eastern Time on [DATE]. How to file protests, motions to intervene, and comments is explained below.

The Commission's Office of Public Participation (OPP) supports meaningful public engagement and participation in Commission proceedings. OPP can help members of the public, including landowners, community organizations, Tribal members and others, access publicly available information and navigate Commission processes. For public inquiries and assistance with making filings such as interventions, comments, or requests for rehearing, the public is encouraged to contact OPP at (202) 502-6595 or OPP@ferc.gov.

¹ 18 C.F.R. § 157.9.

Comments

Any person wishing to comment on the project may do so. Comments may include statements of support or objections, to the project as a whole or specific aspects of the project. The more specific your comments, the more useful they will be.

Protests

Pursuant to sections 157.10(a)(4)² and 385.211³ of the Commission's regulations under the NGA, any person⁴ may file a protest to the application. Protests must comply with the requirements specified in section 385.2001⁵ of the Commission's regulations. A protest may also serve as a motion to intervene so long as the protestor states it also seeks to be an intervenor.

To ensure that your comments or protests are timely and properly recorded, please submit your comments on or before **[DATE]**.

There are three methods you can use to submit your comments or protests to the Commission. In all instances, please reference the Project docket number **[docket no.]** in your submission.

- (1) You may file your comments electronically by using the [eComment](#) feature, which is located on the Commission's website at www.ferc.gov under the link to [Documents and Filings](#). Using eComment is an easy method for interested persons to submit brief, text-only comments on a project;
- (2) You may file your comments or protests electronically by using the [eFiling](#) feature, which is located on the Commission's website (www.ferc.gov) under the link to [Documents and Filings](#). With eFiling, you can provide comments in a variety of formats by attaching them as a file with your submission. New eFiling users must first create an account by clicking on "[eRegister](#)." You

² 18 C.F.R. § 157.10(a)(4).

³ 18 C.F.R. § 385.211.

⁴ Persons include individuals, organizations, businesses, municipalities, and other entities. 18 C.F.R. § 385.102(d).

⁵ 18 C.F.R. § 385.2001.

will be asked to select the type of filing you are making; first select “General” and then select “Comment on a Filing”; or

- (3) You can file a paper copy of your comments or protests by mailing them to the following address below. Your written comments must reference the Project docket number (**docket no.**).

To file via USPS:

Debbie-Anne A. Reese, Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

To file via any other courier:

Debbie-Anne A. Reese, Secretary
Federal Energy Regulatory Commission
12225 Wilkins Avenue
Rockville, Maryland 20852

The Commission encourages electronic filing of comments (options 1 and 2 above) and has eFiling staff available to assist you at (202) 502-8258 or FercOnlineSupport@ferc.gov.

Persons who comment on the environmental review of this project will be placed on the Commission’s environmental mailing list, and will receive notification when the environmental documents (EA or EIS) are issued for this project and will be notified of meetings associated with the Commission’s environmental review process.

The Commission considers all comments received about the project in determining the appropriate action to be taken. **However, the filing of a comment alone will not serve to make the filer a party to the proceeding.** To become a party, you must intervene in the proceeding. For instructions on how to intervene, see below.

Interventions

Any person, which includes individuals, organizations, businesses, municipalities, and other entities,⁶ has the option to file a motion to intervene in this proceeding. Only intervenors have the right to request rehearing of Commission orders issued in this proceeding and to subsequently challenge the Commission’s orders in the U.S. Circuit Courts of Appeal.

⁶ 18 C.F.R. § 385.102(d).

To intervene, you must submit a motion to intervene to the Commission in accordance with Rule 214 of the Commission's Rules of Practice and Procedure⁷ and the regulations under the NGA⁸ by the intervention deadline for the project, which is **[DATE]**. As described further in Rule 214, your motion to intervene must state, to the extent known, your position regarding the proceeding, as well as your interest in the proceeding. For an individual, this could include your status as a landowner, ratepayer, resident of an impacted community, or recreationist. You do not need to have property directly impacted by the project in order to intervene. For more information about motions to intervene, refer to the FERC website at <https://www.ferc.gov/resources/guides/how-to/intervene.asp>.

There are two ways to submit your motion to intervene. In both instances, please reference the Project docket number **[docket no.]** in your submission.

- (1) You may file your motion to intervene by using the Commission's [eFiling](#) feature, which is located on the Commission's website (www.ferc.gov) under the link to [Documents and Filings](#). New eFiling users must first create an account by clicking on "[eRegister](#)." You will be asked to select the type of filing you are making; first select "General" and then select "Intervention." The eFiling feature includes a document-less intervention option; for more information, visit <https://www.ferc.gov/docs-filing/efiling/document-less-intervention.pdf>; or
- (2) You can file a paper copy of your motion to intervene, along with three copies, by mailing the documents to the address below. Your motion to intervene must reference the Project docket number **[docket no.]**.

To file via USPS:

Debbie-Anne A. Reese, Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

To file via any other courier:

Debbie-Anne A. Reese, Secretary
Federal Energy Regulatory Commission
12225 Wilkins Avenue
Rockville, Maryland 20852

⁷ 18 C.F.R. § 385.214.

⁸ 18 C.F.R. § 157.10.

The Commission encourages electronic filing of motions to intervene (option 1 above) and has eFiling staff available to assist you at (202) 502-8258 or FercOnlineSupport@ferc.gov.

Protests and motions to intervene must be served on the applicant either by mail at: Francesca Ciliberti-Ayres, Transcontinental Gas Pipe Line Company, LLC, PO Box 1396, Houston, Texas 77251, by telephone at (720) 329-6374. Any subsequent submissions by an intervenor must be served on the applicant and all other parties to the proceeding. Contact information for parties can be downloaded from the service list at the eService link on FERC Online. Service can be via email with a link to the document.

All timely, unopposed⁹ motions to intervene are automatically granted by operation of Rule 214(c)(1).¹⁰ Motions to intervene that are filed after the intervention deadline are untimely, and may be denied. Any late-filed motion to intervene must show good cause for being late and must explain why the time limitation should be waived and provide justification by reference to factors set forth in Rule 214(d) of the Commission's Rules and Regulations.¹¹ A person obtaining party status will be placed on the service list maintained by the Secretary of the Commission and will receive copies (paper or electronic) of all documents filed by the applicant and by all other parties.

TRACKING THE PROCEEDING

Throughout the proceeding, additional information about the project will be available from the Commission's Office of External Affairs, at **(866) 208-FERC**, or on the FERC website at www.ferc.gov using the "eLibrary" link as described above. The eLibrary link also provides access to the texts of all formal documents issued by the Commission, such as orders, notices, and rulemakings.

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

⁹ The applicant has 15 days from the submittal of a motion to intervene to file a written objection to the intervention.

¹⁰ 18 C.F.R. § 385.214(c)(1).

¹¹ 18 C.F.R. § 385.214(b)(3) and (d).

Docket No(s).

- 7 -

Intervention Deadline: 5:00 pm Eastern Time on [DATE].

Debbie-Anne A. Reese,
Secretary.

Exhibit Z-1 – Updated General Conformity Reports

Air Quality Mitigation Plan

Docket # CP17-101-000

PREPARED FOR



Transcontinental Gas Pipe Line
Company, LLC

DATE

15 May 2025



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APPENDIX A CONSTRUCTION EMISSION TRACKING PLAN V5

1. INTRODUCTION

Transcontinental Gas Pipe Line Company, LLC. (Transco) has prepared this Mitigation Plan for the proposed Northeast Supply Enhancement Project (NESE or Project) at the request of the Federal Energy Regulatory Commission (FERC).

Based on the Project scope, General Conformity (GC) has been triggered for the Project in Air Quality Control Region (AQCR) 43 also known as the NY-NJ-CT Interstate AQCR. AQCR 43 is designated severe nonattainment for ozone and is a maintenance area for particulate matter of 2.5 microns in diameter or less (PM_{2.5}). Emissions of oxides of nitrogen (NO_x) and volatile organic compounds (VOC) are subject to GC to address severe ozone nonattainment. Emissions of PM_{2.5} and precursors NO_x and sulfur dioxide (SO₂) are subject to GC to address the PM_{2.5} maintenance area status. Due to the proposed construction scope and schedule for this Project, projected one-year air emissions from construction in the NY-NJ-CT Interstate region are estimated to exceed the GC threshold value of 25 tons per year (tpy) of NO_x and VOC for Year 2 of the project. Estimated emissions of PM_{2.5}, and SO₂ are well below the respective GC thresholds of 100 tpy. Construction activities are anticipated to be completed in two years, with the majority of construction in Year 2 of the project.

Emissions can be offset by retiring Emissions Reduction Credits (ERCs) or mitigated by funding a project (or projects) that results in a reduction of emissions of the pollutants subject to GC. In both cases, the reduction must exceed the project emissions by a ratio established in applicable regulations. The mitigation projects must be located in the same area where the proposed Project emissions will occur. Due to the change in overall Project schedule, previously explored mitigation projects are no longer viable options for mitigation of activities associated with this Project. ERCs have been acquired or have been identified as available to demonstrate sufficient and excess emissions offsets are available for mitigation.

2. GENERAL CONFORMITY REQUIREMENTS

The GC regulations, 40 Code of Federal Regulations (CFR) part 93, Subpart B, were established under the Clean Air Act (CAA) to ensure that actions conducted or sponsored by federal agencies are consistent with state air quality goals. FERC, under the National Environmental Policy Act (NEPA) process, must consider the impact of “major” federal actions on environmental, natural, cultural, and socioeconomic resources including impacts to air that trigger GC. The GC review process is designed to ensure that air pollutant emissions, as a result of planned federal activities, would not affect the state’s ability to achieve attainment with the National Ambient Air Quality Standards (NAAQS).

The GC regulations are applicable in non-attainment and maintenance areas. The NESE GC analysis encompasses offshore New Jersey and New York, Middlesex and Somerset counties in New Jersey, and Lancaster and Chester counties in Pennsylvania. As discussed in Section 2.1, GC has been triggered for the Project in AQCR 43 only, also known as the NY-NJ-CT

Interstate AQCR. No ongoing operational emission sources not otherwise exempt from GC requirements will be constructed in the Project offshore area or these counties; therefore, only emissions from construction-related activities are subject to GC requirements.

The GC regulations apply to all federal actions except for those federal actions excluded from review. The New York State Department of Environmental Conservation (NYSDEC) and the New Jersey Department of Environmental Protection (NJDEP) have not promulgated rules incorporating Federal GC regulations by reference or establishing its own GC regulations. As specified in 40 CFR Part 93, Subpart B, if a State has not developed its own GC rule or formally adopted the Federal GC rule, then the provisions in 40 CFR Part 93 Subpart B apply.

Most state and federal air quality regulations are directed toward emissions from stationary sources, including New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), and Maximum Achievable Control Technology (MACT) standards. There are no stationary sources for the Project in the Pennsylvania and New Jersey counties, or New Jersey/New York offshore area that are not regulated by a major or minor source permit. However, mobile sources also contribute to air pollution, and may contribute to non-attainment of the NAAQS. The mobile sources and fugitive emissions associated with the proposed Project construction in the Pennsylvania and New Jersey counties, or New Jersey/New York offshore area are the subject of this GC analysis.

Under GC, the nonattainment designation for ozone requires an evaluation of NO_x and VOC emissions. The maintenance designation for PM_{2.5} requires an evaluation of PM_{2.5} and specified PM_{2.5} precursors including NO_x and SO₂.

2.1 GENERAL CONFORMITY DETERMINATION

Transco conservatively estimates NO_x emissions as a range of 632.6 to 672.5 tons and VOC emissions as a range of 27.4 to 29 tons from Year 2 of construction activities in AQCR 43, also known as NY-NJ-CT Interstate AQCR, exceeding the GC threshold of 25 tpy of both pollutants. Regulations at 40 CFR § 93.158 provide the criteria for determining conformity. The criterion found at 40 CFR § 93.158(a)(2), applies to precursors of ozone, NO_x and VOC, along with PM_{2.5} and its precursors NO_x and SO₂, the pollutants at issue for the GC analysis:

“The total direct and indirect emissions from the action are fully offset within the same nonattainment or maintenance area (or nearby area of equal or higher classification provided the emissions from that area contribute to the violations, or have contributed to violations in the past, in the area with the Federal action) through a revision to the applicable State Implementation Plan (SIP) or a similarly enforceable measure that effects emissions reductions so that there is no net emissions of that pollutant.”

Emissions can be offset by retiring ERCs that result in an annual reduction of emissions for the pollutants of concern. ERCs of sufficient and excess quantities will be acquired from

sources within AQCR 43 to offset the estimated high-end range NO_x and VOC emissions from the Year 2 construction activities.

3. MITIGATION PLAN IMPLEMENTATION

The construction activities for the NESE Project will principally take place in calendar year 2 of the Project. As such, air emissions from construction will also occur in that period. To demonstrate there are sufficient and excess emission offsets for the Project, Transco has acquired or identified ERCs available for purchase that can be retired to generate offsets in AQCR 43 at any point during construction. Transco will track actual construction emissions of NO_x, VOC and PM_{2.5} in accordance with the Construction Emission Tracking Plan included as Appendix A.



APPENDIX A CONSTRUCTION EMISSION TRACKING PLAN V5

**Raritan Bay Loop Equipment Operation Information**

HDD Equipment							
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments

**Raritan Bay Loop Equipment Operation Information**

Pipelay Related Equipment							
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments

**Raritan Bay Loop Equipment Operation Information**

Dredging & Reinstatement Related Equipment							
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments

Note: These tables should be used to provide information for equipment that has changed or was not previously included in initial equipment listing. All columns must be filled for equipment listed.

**Raritan Bay Loop Equipment Operation Information**

Survey Equipment							
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments

**Raritan Bay Loop Equipment Operation Information**

Quayside Disposal Processing Equipment: Upland Inputs							
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments

Note: These tables should be used to provide information for equipment that has changed or was not previously included in initial equipment listing. All columns must be filled for equipment listed.

**Compressor Station 206 Equipment Operation Information**

Station 206 Equipment						
Equipment Type	Fuel	Horsepower	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments

**Madison Loop Equipment Operation Information**

Madison Loop Equipment						
Equipment Type	Fuel	Horsepower	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments

Note: These tables should be used to provide information for equipment that has changed or was not previously included in initial equipment listing. All columns must be filled for equipment listed.

Station 206 Equipment Operation Information

Station 206 Equipment							Base Case			
Base Case							2020	2020	2020	
Equipment Type	Fuel	Assumed Horsepower	Confirm Base Case (Y or N)	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments	NOx Emissions (tons)	VOC Emissions (tons)	PM _{2.5} Emissions (tons)
Tractor W/Trailer	Diesel	320		x				1.0	0.1	0.1
Air Compressor	Diesel	85		x				0.7	0.0	0.1
Generator	Gasoline	13		x				0.1	0.2	0.0
Ext-Boom RT Hoe	Diesel	330		x				0.0	0.0	0.0
RT Forklift	Diesel	185		x				0.2	0.0	0.0
Welding Rigs	Diesel	345		x				24.8	3.3	2.5
60 ft Man lift	Diesel	95		x				0.6	0.0	0.0
Ramax Compactor	Gasoline	22		x				0.1	0.1	0.0
Excavator	Diesel	350		x				1.1	0.1	0.1
Side boom	Diesel	330		x				1.4	0.1	0.1
Crane	Diesel	175		x				1.0	0.1	0.1
							Total	30.9	4.0	2.9

Notes:

For tracking purposes, provide hours and fuel consumptions where "x" noted for each piece of equipment.

Where not consistent with Base Case (as indicated by "N"), provide the modified equipment information in the "New Onshore Equipment" tables.

Where additional equipment not listed is on site, provide the modified equipment information in the "New Onshore Equipment" tables.

2020 Pollutant Emissions Total accounts for construction equipment only.

On-Road commuter vehicles will tracked and estimated seperately. Vehicle emissions estimates are included in General Conformity Totals.

**Madison Loop Equipment Operation Information**

Madison Loop Equipment								Base Case		
Base Case								2020	2020	2020
Equipment Type	Fuel	Assumed Horsepower	Confirm Base Case	Hours	Fuel Consumption	Rated Firing Rate (gal/hr)	Comments	NOx Emissions	VOC Emissions	PM _{2.5} Emissions
Tractor W/Trailer	Diesel	320		x				2.3	0.1	0.2
Air Compressor	Diesel	85		x				0.8	0.0	0.1
Generator	Gasoline	13		x				0.1	0.1	0.0
RT hoe	Diesel	330		x				1.4	0.2	0.2
Crane	Diesel	185		x				0.0	0.0	0.0
Welding Rigs	Diesel	345		x				13.3	1.8	1.3
Front End Loader	Diesel	95		x				0.5	0.1	0.1
Dozer	Diesel	22		x				1.5	0.1	0.1
Excavator	Diesel	350		x				1.3	0.1	0.1
Side boom	Diesel	330		x				4.4	0.2	0.2
HDD Rig	Diesel	175		x				1.4	0.1	5.1
							Total	26.9	2.9	7.3

Notes:

For tracking purposes, provide hours and fuel consumptions where "x" noted for each piece of equipment.

Where not consistent with Base Case (as indicated by "N"), provide the modified equipment information in the "New Onshore Equipment" tables.

Where additional equipment not listed is on site, provide the modified equipment information in the "New Onshore Equipment" tables.

2020 Pollutant Emissions Total accounts for construction equipment only.

On-Road commuter vehicles will tracked and estimated seperately. Vehicle emissions estimates are included in General Conformity Totals.



Raritan Bay Loop Equipment Operation Information

HDD Equipment									Base Case		
									2020	2020	2020
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Confirm Base Case (Y or N)	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments	NOx Emissions (tons)	VOC Emissions (tons)	PM _{2.5} Emissions (tons)
Morgan Onshore HDD -	MOB	Kenworth	450		x	x	24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
		Backhoe	300		x	x	16.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	DeMOB	Kenworth	450		x	x	24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	HDD Drilling & Pullback	Drill Rig CAT Power Unit	1750		x	x	95.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	4.9	0.3	0.2
	HDD Drilling & Pullback	Mud Rig Genset-MQ	350		x		19.1	By operating hours - Run-time meter	0.6	0.0	0.0
	HDD Drilling & Pullback	Trackhoe - 240	177		x	x	9.6	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.2	0.0	0.0
	HDD Drilling & Pullback	Forklift - 10,000# & Over	130		x		7.1	By operating hours - Run-time meter	0.1	0.0	0.0
	HDD Drilling & Pullback	R.T. Crane 50-75 Ton	275		x		15.0	By operating hours - Run-time meter	0.1	0.0	0.0
	HDD Drilling & Pullback	Triplex Pump	540		x	x	29.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.9	0.1	0.0
	HDD Drilling & Pullback	Kenworth	450		x	x	24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
Ambrose East Offshore HDD	MOB	W751 Generator	425		x	x	23.2	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	1.3	0.1	0.1
		W751 Aux Generator	160		x	x	8.7	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.5	0.0	0.0
		Jacking Compressors	525		x	x	28.6	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.5	0.0	0.0
		50T Cherry picker	250		x		13.6	By operating hours - Run-time meter	0.3	0.0	0.0
		400 Amp Welder	32.7		x		1.8	By operating hours - On-site personnel	0.0	0.0	0.0
		20KW Generator	30		x	x	1.6	By operating hours / Fuel consumption -- On-site personnel/ Fuel meter	0.1	0.0	0.0
		Light Plant	24.8		x		1.4	By operating hours - Run-time meter	0.2	0.0	0.0
		250 cfm Aircompressor	80		x	x	4.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	DeMOB	Kenworth	450		x	x	24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	HDD Drilling & Pullback	Drill Rig CAT Power Unit	1750		x	x	95.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	2.6	0.2	0.1
Ambrose West Offshore HDD	HDD Drilling & Pullback	Mud Rig Genset-MQ	350		x		19.1	By operating hours - Run-time meter	0.3	0.0	0.0
	HDD Drilling & Pullback	Trackhoe - 240	177		x	x	9.6	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.1	0.0	0.0
	HDD Drilling & Pullback	Forklift - 10,000# & Over	130		x		7.1	By operating hours - Run-time meter	0.0	0.0	0.0
	HDD Drilling & Pullback	R.T. Crane 50-75 Ton	275		x		15.0	By operating hours - Run-time meter	0.1	0.0	0.0
	HDD Drilling & Pullback	Triplex Pump	540		x		29.4	By operating hours - Run-time meter	0.5	0.0	0.0
	HDD Drilling & Pullback	Kenworth	450		x	x	24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	MOB	W750 Generator	325		x	x	17.7	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	1.2	0.1	0.1
		Jacking Compressors	525		x	x	28.6	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.6	0.0	0.0
		50T Cherry picker	250		x		13.6	By operating hours - Run-time meter	0.4	0.0	0.0
		400 Amp Welder	32.7		x		1.8	By operating hours - On-site personnel	0.0	0.0	0.0
W541 - Crane Barge		20KW Generator	30		x	x	1.6	By operating hours / Fuel consumption -- On-site personnel/ Fuel meter	0.1	0.0	0.0
		Light Plant	24.8		x		1.4	By operating hours - Run-time meter	0.2	0.0	0.0
		250 cfm Aircompressor	80		x	x	4.4	By operating hours / Fuel consumption -- On-site personnel/ Fuel meter	0.0	0.0	0.0
	DeMOB	Kenworth	450		x	x	24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	HDD Drilling & Pullback	Drill Rig CAT Power Unit	1750		x	x	95.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	3.1	0.2	0.1
	HDD Drilling & Pullback	Mud Rig Genset-MQ	350		x		19.1	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.3	0.0	0.0
	HDD Drilling & Pullback	Trackhoe - 240	177		x	x	9.6	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.1	0.0	0.0
	HDD Drilling & Pullback	Forklift - 10,000# & Over	130		x		7.1	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	HDD Drilling & Pullback	R.T. Crane 50-75 Ton	275		x		15.0	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.1	0.0	0.0
	HDD Drilling & Pullback	Triplex Pump	540		x		29.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.5	0.0	0.0
Morgan Offshore HDD -		W541-Hoist Engine	400		x		21.8	By operating hours - Run-time meter	1.3	0.1	0.1
		W541-Swing Engine	525		x		28.6	By operating hours - Run-time meter	1.7	0.1	0.1
		W541-Auxiliary Generator	85		x		4.6	By operating hours - Run-time meter	0.5	0.0	0.0
		Deck Winch #1	238		x		13.0	By operating hours - Run-time meter	0.1	0.0	0.0
		Deck Winch #2	160		x		8.7	By operating hours - Run-time meter	0.1	0.0	0.0
		400 Amp Welder	32.7		x		1.8	By operating hours - On-site personnel	0.0	0.0	0.0
		20KW Generator	30		x		1.6	By operating hours - On-site personnel	0.2	0.0	0.0
		Light Plant	24.8		x		1.4	By operating hours - Run-time meter	0.3	0.0	0.0
		250 cfm Aircompressor	80		x	x	4.4	By operating hours - On-site personnel	0.0	0.0	0.0
	MOB	Kenworth	450		x	x	24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
CP Cable Drill - Onshore	DeMOB	Kenworth	450		x	x	24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	HDD Drilling & Pullback	Drill Rig CAT Power Unit	1750		x	x	95.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	3.1	0.2	0.1
	HDD Drilling & Pullback	Mud Rig Genset-MQ	350		x		19.1	By operating hours - Run-time meter	0.4	0.0	0.0
	HDD Drilling & Pullback	Trackhoe - 240	177		x	x	9.6	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.2	0.0	0.0
	HDD Drilling & Pullback	Forklift - 10,000# & Over	130		x		7.1	By operating hours - Run-time meter	0.0	0.0	0.0
	HDD Drilling & Pullback	R.T. Crane 50-75 Ton	275		x		15.0	By operating hours - Run-time meter	0.1	0.0	0.0
	HDD Drilling & Pullback	Triplex Pump	540		x	x	29.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.6	0.0	0.0
	MOB	Kenworth	450		x		24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	DeMOB	Kenworth	450		x		24.5	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.0	0.0	0.0
	HDD Drilling & Pullback	Drill Rig CAT Power Unit	1750		x		95.4	By operating hours and/Fuel consumption - Run-time meter -Fuel meter	0.1	0.0	0.0
CP Cable Drill - Offshore	HDD Drilling & Pullback	Mud Rig & Reclaimer Pumps	350		x		19.1	By operating hours - Run-time meter	0.0	0.0	0.0
		400 Amp Welder	32.7		x		1.8	By operating hours - On-site personnel	0.0	0.0	0.0
		20KW Generator	30		x		1.6	By operating hours - On-site personnel	0.0	0.0	0.0
		Light Plant	24.8		x		1.4	By operating hours - Run-time meter	0.0	0.0	0.0
		250 cfm Aircompressor	80		x		4.4	By operating hours - On-site personnel	0.0	0.0	0.0
		Crawler Crane	95		x			By operating hours - Run-time meter	0.0	0.0	0.0
	Shallow Water Tug	660		x		32.7	By operating hours - Run-time meter	0.0	0.0	0.0	
Totals									29.3	2.0	1.5

Notes:

For tracking purposes, provide hours and fuel consumptions where "x" noted for each piece of equipment.

Where not consistent with Base Case (as indicated by "N"), provide the modified equipment information in the "New Marine Equipment" tables.

Where additional equipment not listed is on site, provide the modified equipment information in the "New Marine Equipment" tables.

2020 Pollutant Emissions Total accounts for construction equipment only.

On-Road commuter vehicles will tracked and estimated separately. Vehicle emissions estimates are included in General Conformity Totals.



Raritan Bay Loop Equipment Operation Information

Base Case		Pipeline Related Equipment						Base Case					
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower (confirm)	Confirm Base Case (Y or N)	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments	2020 NOx Emissions (tons)	2020 VOC Emissions (tons)	2020 PM _{2.5} Emissions (tons)		
Pipeline Spread/Mob/Demob	Shallow Water Barge	Caterpillar 3412 DITA 580kW	778			x	88.0	System Royston - Remote data transfer	1.9	0.1	0.1		
		Volvo D12 MG-RC 225kW	302			x	88.0	System Royston - Remote data transfer	0.0	0.0	0.0		
		Additional GE6 for pipeline ops 800kW	1073			x	88.0	System Royston - Remote data transfer	0.9	0.0	0.0		
Pipeline Spread	Anchor Handling <12ft WD	Tug Boat	660			x	71.0	By fuel consumption - Fuel meter	0.6	0.0	0.0		
		Anchor Barge #37 Barge	99		x			By operating hours - on site personnel	0.0	0.0	0.0		
		Tug Boat	660			x	71.0	By fuel consumption - Fuel meter	0.5	0.0	0.0		
	Beach Pull	110kW Diesel Hydraulic Power Unit	147					By operating hours - On-site personnel	0.1	0.0	0.0		
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248		x			By operating hours - On-site personnel	0.1	0.0	0.0		
		Tug Boat	2000			x	71.0	By fuel consumption - Fuel meter	8.2	0.3	0.3		
	Anchor Handling >12ft WD	Tug Boat	2000			x	71.0	By fuel consumption - Fuel meter	8.2	0.3	0.3		
		Caterpillar 3412 DITA 580kW	778			x	88.0	System Royston - Remote data transfer	13.0	0.5	0.5		
		Volvo D12 MG-RC 225kW	302			x	88.0	System Royston - Remote data transfer	0.0	0.0	0.0		
	Shallow Water Barge	Additional GE6 for pipeline ops 800kW	1073			x	88.0	System Royston - Remote data transfer	6.0	0.2	0.3		
		Dockside Crane	332		x			By operating hours - on site personnel	0.4	0.0	0.0		
		Pipeline Barge Tug	Tug Boat	1500			x	71.0	By fuel consumption - Fuel meter	5.8	0.2	0.2	
Diving/Construction Support Spread	Dive Barge	W571	1502		x		81.9	By operating hours - Run-time meter	10.9	0.4	0.5		
		Deck Winches	300		x		16.4	By operating hours - Run-time meter	0.2	0.0	0.0		
		400 Amp Welder	32.7		x		1.8	By operating hours - On-site personnel	0.0	0.0	0.0		
		20kW Generator	30		x		1.6	By operating hours - Run-time meter	0.2	0.0	0.0		
		Light Plant	24.8		x		1.4	By operating hours - Run-time meter	0.3	0.0	0.0		
		250 cfm Aircompressor	80		x		4.4	By operating hours - On-site personnel	0.1	0.0	0.0		
		Tug 2000 HP TBN	2000			x	71.0	By fuel consumption - Fuel meter	11.4	0.5	0.4		
		Crew Boat (Main Eng)	980		x		53.4	By operating hours - Run-time meter	4.4	0.1	0.1		
		-(Aux engine)	12		x		0.7	By operating hours - Run-time meter	0.0	0.0	0.0		
		M4000 Crane	400		x		21.8	By operating hours - Run-time meter	0.2	0.0	0.0		
		400 Amp Welder	32.7		x		1.8	By operating hours - On-site personnel	0.0	0.0	0.0		
		20kW Generator	30		x		1.6	By operating hours - Run-time meter	0.0	0.0	0.0		
		Light Plant	24.8		x		1.4	By operating hours - Run-time meter	0.0	0.0	0.0		
		250 cfm Aircompressor	80		x		4.4	By operating hours - On-site personnel	0.0	0.0	0.0		
		W263 Deck Winches	225		x		12.3	By operating hours - Run-time meter	0.0	0.0	0.0		
Equipment needed for Jet Trencher	Barge + Tug	W061 Deck Winches	300		x		16.4	By operating hours - Run-time meter	0.1	0.0	0.0		
		M4000 Crane	400		x		21.8	By operating hours - Run-time meter	0.4	0.0	0.0		
		400 Amp Welder	32.7		x		1.8	By operating hours - On-site personnel	0.0	0.0	0.0		
		20kW Generator	30		x		1.6	By operating hours - Run-time meter	0.1	0.0	0.0		
		Light Plant	24.8		x		1.4	By operating hours - Run-time meter	0.2	0.0	0.0		
		250 cfm Aircompressor	80		x		4.4	By operating hours - On-site personnel	0.0	0.0	0.0		
		2000 HP Tugboat	2000		x		71.0	By fuel consumption - Fuel meter	7.3	0.3	0.3		
		Crew Boat (Main Eng)	980		x		53.4	By operating hours - Run-time meter	1.7	0.0	0.0		
		-(Aux engine)	12		x		0.7	By operating hours - Run-time meter	0.0	0.0	0.0		
		Jetter	1250kw Generator	1676		x	92.3	By operating hours and Fuel consumption - Run-time meter - Fuel meter	2.4	0.2	0.1		
		HDD Crew Boat	Crew Boat (Main Eng)	600		x	32.7	By operating hours - Run-time meter	0.8	0.0	0.0		
		-(Aux engine)	150		x		8.2	By operating hours - Run-time meter	0.3	0.0	0.0		
		Samantha Miller LCV	Boat (Main Eng)	600		x	32.7	By operating hours - Run-time meter	3.3	0.1	0.1		
		-(Aux engine)	150		x		8.2	By operating hours - Run-time meter	0.7	0.0	0.0		
		Guard Vessel # 1	Boat (Main Eng)	600		x	32.7	By operating hours - Run-time meter	7.1	0.2	0.2		
-(Aux engine)	150		x		8.2	By operating hours - Run-time meter	1.5	0.1	0.1				
Daily Crew / Utility	HDD Water Delivery OSV	Main Eng	850		x		46.3	By operating hours - Run-time meter	2.9	0.1	0.1		
		-(Aux engine)	150		x		8.2	By operating hours - Run-time meter	0.4	0.0	0.0		
		~Bow Thruster	300		x		16.4	By operating hours - Run-time meter	1.0	0.0	0.0		
	Pre-comm OSV	Boat (Main Eng)	850		x		46.3	By operating hours - Run-time meter	0.9	0.0	0.0		
		-(Aux engine)	150		x		8.2	By operating hours - Run-time meter	0.1	0.0	0.0		
		~Bow Thruster	300		x		16.4	By operating hours - Run-time meter	0.3	0.0	0.0		
		Totals									105.0	4.0	4.0

Notes:

For tracking purposes, provide hours and fuel consumptions where "x" noted for each piece of equipment.

Where not consistent with Base Case (as indicated by "N"), provide the modified equipment information in the "New Marine Equipment" tables.

Where additional equipment not listed is on site, provide the modified equipment information in the "New Marine Equipment" tables.

2020 Pollutant Emissions Total accounts for construction equipment only.

On-Road commuter vehicles will be tracked and estimated separately. Vehicle emissions estimates are included in General Conformity Totals.



Barataria Bay Loop Equipment Operation Information

Dredging & Reinstatement Related Equipment									Base Case		
Base Case									2020	2020	2020
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower (confirm)	Confirm Base Case (Y or N)	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments	NOx Emissions (tons)	VOC Emissions (tons)	PM ₁₀ Emissions (tons)
Dredging Spread	Dredging	UPLAND W551 Clam Rig (Main Engine)	2545		x		138.7	By operating hours - Run-time meter	18.4	0.9	1.0
		UPLAND W551 Clam Rig (Aux Engine)	460		x		25.1	By operating hours - Run-time meter	4.7	0.2	0.2
		HARS W551 Clam Rig (Main Engine)	2545		x		138.7	By operating hours - Run-time meter	17.9	0.8	0.9
		HARS W551 Clam Rig (Aux Engine)	460		x		25.1	By operating hours - Run-time meter	2.3	0.1	0.1
		Tug 2000 HP TBN	2000			x	71.0	By fuel consumption - Fuel meter	57.8	2.3	2.2
		Tug 2000 HP TBN	2000			x	71.0	By fuel consumption - Fuel meter	57.8	2.3	2.2
		Crew Boat (Main Eng)	980		x		53.4	By operating hours - Run-time meter	27.1	0.6	0.6
Scow Barge Spread (one / 1each)	Dredge Material Transportation	-(Aux engine)	12		x		0.7	By operating hours - Run-time meter	0.2	0.0	0.0
		Dump Scow #1	286		x		15.6	By operating hours - On-site personnel	1.4	0.0	0.0
		Dump Scow #2	286		x		15.6	By operating hours - On-site personnel	1.4	0.0	0.0
		Dump Scow #3	286		x		15.6	By operating hours - On-site personnel	1.4	0.0	0.0
		Dump Scow #4	286		x		15.6	By operating hours - On-site personnel	1.4	0.0	0.0
Clamshell Reinstatement Spread	Reinstatement	Clam Rig (Main Engine)	2545		x		138.7	By operating hours - Run-time meter	37.9	1.8	2.0
		Clam Rig (Aux Engine)	460		x		25.1	By operating hours - Run-time meter	6.5	0.3	0.3
		Tug 2000 HP TBN	2000			x	71.0	By fuel consumption - Fuel meter	34.9	1.4	1.3
		Tug 2000 HP TBN	2000			x	71.0	By fuel consumption - Fuel meter	34.9	1.4	1.3
		Crew Boat (Main Eng)	980		x		53.4	By operating hours - Run-time meter	16.4	0.3	0.4
		-(Aux engine)	12		x		0.7	By operating hours - Run-time meter	0.1	0.0	0.0
		W551 Clam Rig (Main Engine)	2545		x		138.7	By operating hours - Run-time meter	37.9	1.8	2.0
	Mining Sand	W551 Clam Rig (Aux Engine)	460		x		25.1	By operating hours - Run-time meter	6.5	0.3	0.3
		Tug 2000 HP TBN	2000			x	71.0	By fuel consumption - Fuel meter	34.9	1.4	1.3
		Tug 2000 HP TBN	2000			x	71.0	By fuel consumption - Fuel meter	34.9	1.4	1.3
		Crew Boat (Main Eng)	980		x		53.4	By operating hours - Run-time meter	16.4	0.3	0.4
		-(Aux engine)	12		x		0.7	By operating hours - Run-time meter	0.1	0.0	0.0
		Dump Scow #1	286		x		15.6	By operating hours - On-site personnel	0.9	0.0	0.0
		Dump Scow #2	286		x		15.6	By operating hours - On-site personnel	0.9	0.0	0.0
		Dump Scow #3	286		x		15.6	By operating hours - On-site personnel	0.9	0.0	0.0
		Dump Scow #4	286		x		15.6	By operating hours - On-site personnel	0.9	0.0	0.0
		Reinstatement Spread for all other pipeline segments	Toyo Dredge Pump	W571	1502		x		81.9	By operating hours - Run-time meter	3.4
Deck Winches	300				x		16.4	By operating hours - Run-time meter	0.1	0.0	0.0
Toyo Pump	425				x		23.2	By operating hours - On-site personnel	0.8	0.1	0.0
400 Amp Welder	32.7				x		1.8	By operating hours - On-site personnel	0.0	0.0	0.0
20kW Generator	30				x		1.6	By operating hours - Run-time meter	0.1	0.0	0.0
Light Plant	24.8				x		1.4	By operating hours - Run-time meter	0.1	0.0	0.0
250 cfm Aircompressor	80				x		4.4	By operating hours - On-site personnel	0.0	0.0	0.0
Tug 2000 HP TBN	2000					x	71.0	By fuel consumption - Fuel meter	4.6	0.2	0.2
Crew Boat (Main Eng)	980				x		53.4	By operating hours - Run-time meter	2.1	0.0	0.0
-(Aux engine)	12				x		0.7	By operating hours - Run-time meter	0.0	0.0	0.0
Totals									468.0	18.2	18.4

Notes:

For tracking purposes, provide hours and fuel consumptions where "x" noted for each piece of equipment.

Where not consistent with Base Case (as indicated by "N"), provide the modified equipment information in the "New Marine Equipment" tables.

Where additional equipment not listed is on site, provide the modified equipment information in the "New Marine Equipment" tables.

2020 Pollutant Emissions Total accounts for construction equipment only.

On-Road commuter vehicles will be tracked and estimated separately. Vehicle emissions estimates are included in General Conformity Totals.

Raritan Bay Loop Equipment Operation Information

Survey Equipment									Base Case			
Base Case									2020	2020	2020	
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower (confirm)	Confirm Base Case	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments	NOx Emissions	VOC Emissions	PM _{2.5} Emissions	
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	600		x		32.7	By operating hours - Run-time meter	0.3	0.0	0.0	
		--(Aux engine)	150		x		8.2	By operating hours - Run-time meter	0.1	0.0	0.0	
Post Jet Burial Survey Campaign	Post Pipeline Burial Survey	Crew Boat (Main Eng)	600		x		32.7	By operating hours - Run-time meter	0.1	0.0	0.0	
		--(Aux engine)	150		x		8.2	By operating hours - Run-time meter	0.0	0.0	0.0	
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	600		x		32.7	By operating hours - Run-time meter	0.1	0.0	0.0	
		--(Aux engine)	150		x		8.2	By operating hours - Run-time meter	0.0	0.0	0.0	
									Totals	0.6	0.0	0.0

Notes:

For tracking purposes, provide hours and fuel consumptions where "x" noted for each piece of equipment.

Where not consistent with Base Case (as indicated by "N"), provide the modified equipment information in the "New Marine Equipment" tables.

Where additional equipment not listed is on site, provide the modified equipment information in the "New Marine Equipment" tables.

2020 Pollutant Emissions Total accounts for construction equipment only.

On-Road commuter vehicles will tracked and estimated separately. Vehicle emissions estimates are included in General Conformity Totals.

Raritan Bay Loop Equipment Operation Information

Quayside Disposal Processing Equipment: Upland Inputs									Base Case		
Base Case									2020	2020	2020
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower (confirm)	Confirm Base Case	Hours	Fuel Consumption (gals)	Rated Firing Rate (gal/hr)	Comments	NOx Emissions	VOC Emissions	PM _{2.5} Emissions
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	675		x		36.8	By operating hours - Run-time meter	0.6	0.0	0.0
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	350		x		19.1	By operating hours - On-site personnel	0.0	0.0	0.0
		Komatsu PC 360 (Hyd Excavator)	270		x		14.7	By operating hours - Run-time meter	0.1	0.0	0.0
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)	220		x		12.0	By operating hours - Run-time meter	0.6	0.1	0.1
Totals									1.4	0.1	0.1

Notes:

For tracking purposes, provide hours and fuel consumptions where "x" noted for each piece of equipment.

Where not consistent with Base Case (as indicated by "N"), provide the modified equipment information in the "New Marine Equipment" tables.

Where additional equipment not listed is on site, provide the modified equipment information in the "New Marine Equipment" tables.

2020 Pollutant Emissions Total accounts for construction equipment only.

On-Road commuter vehicles will be tracked and estimated separately. Vehicle emissions estimates are included in General Conformity Totals.



Raritan Bay Loop Vehicle Emissions

Vehicle Emissions					Base Case		
Base Case					2020	2020	2020
CONSTRUCTION PHASE	POB Per 24 hr shift (confirm)	Days	Confirm Base Case (Y or N)	Comments	NOx Emissions	VOC Emissions	PM _{2.5} Emissions
Morgan Onshore HDD -	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Morgan Offshore HDD -	x	x		By operating days - On-site personnel	0.1	0.0	0.0
CP Cable Drill - Onshore	x	x		By operating days - On-site personnel	0.0	0.0	0.0
CP Cable Drill - Offshore	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Ambrose East Offshore HDD	x	x		By operating days - On-site personnel	0.2	0.1	0.1
Ambrose West Offshore HDD	x	x		By operating days - On-site personnel	0.2	0.1	0.1
WS41 - Crane Barge	x	x		By operating days - On-site personnel	0.2	0.1	0.1
Pipeline Spread	x	x		By operating days - On-site personnel	0.2	0.1	0.0
Mob/Demob							
Pipeline of Ambrose HDD String	x	x		By operating days - On-site personnel	0.1	0.0	0.0
Pipeline of Morgan HDD String	x	x		By operating days - On-site personnel	0.1	0.0	0.0
Pipeline Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	x	x		By operating days - On-site personnel	0.2	0.1	0.1
Pipeline Spread from MP14.5 - MP16.5 (Shallow Water)	x	x		By operating days - On-site personnel	0.1	0.0	0.0
Pipeline Spread from M16.5 - MP 29.3 (West of Ambrose)	x	x		By operating days - On-site personnel	0.3	0.1	0.1
Pipeline Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	x	x		By operating days - On-site personnel	0.2	0.1	0.1
Above Water Tie-in/ Spool @ MP16.6	x	x		By operating days - On-site personnel	0.1	0.1	0.0
Pipe Delivery Spread	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Diving/Construction Support Spread	x	x		By operating days - On-site personnel	0.4	0.2	0.1
Jet Trencher	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Daily Crew/Utility	x	x		By operating days - On-site personnel	0.4	0.2	0.1
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipeline Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	x	x		By operating days - On-site personnel	0.2	0.1	0.1
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	x	x		By operating days - On-site personnel	0.4	0.2	0.1
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	x	x		By operating days - On-site personnel	0.1	0.0	0.0
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Scow Barge Spread (one / 1each)	x	x		By operating days - On-site personnel	0.2	0.1	0.1
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipeline Transition (MP12.5-MP16.6)	x	x		By operating days - On-site personnel	0.2	0.1	0.1
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	x	x		By operating days - On-site personnel	0.7	0.3	0.2
Reinstatement Spread for Morgan HDD Pit Excavation	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	x	x		By operating days - On-site personnel	0.1	0.0	0.0
Reinstatement Spread for Anchorage Area	x	x		By operating days - On-site personnel	0.1	0.0	0.0
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	x	x		By operating days - On-site personnel	0.1	0.0	0.0
Reinstatement Spread for all other pipeline segments	x	x		By operating days - On-site personnel	0.1	0.0	0.0
Pre Lay Survey Campaign	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Post Jet Burial Survey Campaign	x	x		By operating days - On-site personnel	0.0	0.0	0.0
As Built Survey Campaign	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Soil Transport	x	x		By operating days - On-site personnel	26.8	4.5	19.4
Trucking of Pipe to Storage Yard	x	x		By operating days - On-site personnel	0.0	0.0	0.0
Totals					31.8	6.8	20.9

Notes:

For tracking purposes, provide operating days for vehicles for each activity.

For tracking purposes, provide an average roundtrip vehicle mileage.

Where not consistent with Base Case (as indicated by "N"), provide the modified vehicle information.

Where additional activity not listed is on site, provide the modified vehicle information.

2020 Pollutant Emissions Total accounts for construction equipment only.

On-Road commuter vehicles will tracked and estimated separately. Vehicle emissions estimates are included in General Conformity Totals.



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Air Quality Technical Report

Explanatory Information for General
Conformity Evaluation
Northeast Supply Enhancement Project
Federal Energy Regulatory Commission
Docket # CP17-101-000

PREPARED FOR



Transcontinental Gas Pipe Line
Company, LLC

DATE

15 May 2025



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ACRONYMS AND ABBREVIATIONS

Acronym	Description
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
AQS	Air Quality System

Acronym	Description
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
EMD	Electric motor driven
ERCs	emission reduction credits
ERM	Environmental Resources Management
FDCP	Fugitive Dust Control Plan
FERC	Federal Energy Regulatory Commission
GC	General Conformity
GCD	General Conformity Determination
GHG	greenhouse gas
MACT	Maximum Achievable Control Technology
MOVES	Motor Vehicle Emission Simulator
NAAQS	National Ambient Air Quality Standards
NESE	Northeast Supply Enhancement
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO ₂	nitrogen dioxide
NO _x	oxides of nitrogen
NSPS	New Source Performance Standard
OTR	ozone transport region
PADEP	Pennsylvania Department of Environmental Protection
PM	particulate matter
PM ₁₀	particulate matter of 10 microns in diameter or less
PM _{2.5}	particulate matter of 2.5 microns in diameter or less
ppb	parts per billion
ppm	parts per million
RR9	Resource Report 9
SIP	State Implementation Plan
SO ₂	sulfur dioxide

Acronym	Description
Project	Northeast Supply Enhancement Project
tpy	tons per year
Transco	Transcontinental Gas Pipeline Company, LLC.
U.S	United States
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

REVISIONS TO AIR QUALITY TECHNICAL REPORT

Update in Response to:	Comment:	Response/Information Location:
June 27, 2018 Data Request #2.c	"provide emissions and accompanying calculations associated with transporting the dredge material to the alternate sites identified in (a) and/or (b) above;"	Transportation of dredge materials associated with alternative scenarios are detailed in Appendix B, Section 3.2 and Appendix C calculations
June 27, 2018 Data Request #2.d	"if the emissions associated with the alternate disposal sites would result in an increase in overall construction emissions in the New York-New- Jersey-Connecticut Interstate Air Quality Control Region, provide revised conservative emission estimates to cover the potential increase should the USACE deny use of the HARS"	Detailed calculations provided in response to the DR dated June 27, 2018 are included in Appendix C.
June 27, 2018 Data Request #3.a	"provide the new total volume of dredge material resulting from the additional burial depth" <should the pipeline burial depth of 15 feet be required>.	Construction activities and transportation of dredge materials associated with alternative scenarios are detailed in Appendix B, Section 3.2 and Appendix C calculations
June 27, 2018 Data Request #3.b	"indicate whether the clamshell dredge would still be used to perform trenching; if not, provide the equipment that would be used and the associated emissions estimates from the new construction equipment/method;"	Construction activities and transportation of dredge materials associated with alternative scenarios are detailed in Appendix B, Section 3.2 and Appendix C calculations
June 27, 2018 Data Request #3.c	"indicate whether the construction schedule would change, potentially shifting into a second calendar year, as a result of the increased burial depth".	As noted throughout the AQTR, construction activities have been revised to occur in 2020 (as opposed to 2019)
June 27, 2018 Data Request #6	Revised on-road MOVES2014a emission factor table.	Complete on-road emission factors have been provided in updated/revised MOVES output files included in Appendix D.
July 10, 2018 Data Request #5.a	Clarify the construction method that would be used to install the Raritan Bay Loop between MP 35.2 and MP 35.5. The May 11 filing indicates that excavation of this segment would be accomplished using an environmental clamshell bucket (13,152 cubic yards excavated), whereas the Pipelay Related Equipment table in Appendix C of the AQTR suggests MP 30.4	Clarification has been provided in Appendix B, Section 3.0 and Appendix C calculations

Update in Response to:	Comment:	Response/Information Location:
	to MP 35.5 would be installed using the jet trencher (0 cubic yards excavated).	

REVISIONS TO AIR QUALITY TECHNICAL REPORT

UPDATE IN RESPONSE TO:	COMMENT:	RESPONSE/INFORMATION LOCATION:
July 10, 2018 Data Request #5.b	Clarify the volume of sediment that would be excavated for the Ambrose Channel HDD entry and exit pits. The May 11 filing indicates that 14,050 cubic yards would be excavated for the west HDD pit and 32,450 cubic yards would be excavated for the east HDD pit, whereas Table 2 of Appendix B and the Dredging & Reinstatement Related Equipment table in Appendix C of the AQTR appears to indicate that a total of 14,050 cubic yards would be excavated for both HDD pits	Clarification has been provided in Appendix B, Section 3.0 and Appendix C calculations
July 10, 2018 Data Request #5.c	Provide the volume of backfill (reinstatement) that was assumed in estimating the air emissions provided in the AQTR. The May 11 filing and previous filings by Transco indicate that an estimated 666,660 cubic yards of backfill would be needed to restore preexisting contours from all areas disturbed by the various equipment used to install the Raritan Bay Loop (e.g., clamshell, jet trencher, hand jet).	Volumes are provided in Appendix B, Table 2
July 2018 Construction Schedule Updates	In the Paved Roads (Commuter and Delivery Vehicles) PM _{2.5} calculation, the winter multiplier was removed from the assumed silt loading factor; transporting of dredge materials will not occur during the winter months. The factor was changed to the ubiquitous baseline for roads with Average Daily Trips (ADT) <500.	Appendix A, Section 3.1.2 and Appendix C calculations

UPDATE IN RESPONSE TO:	COMMENT:	RESPONSE/INFORMATION LOCATION:
August 17, 2018 Data Request #1.b	File, as applicable, revised SO ₂ emissions by applying an appropriate correction factor as outlines in USEPA <i>Guidance Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories</i>	Clarification has been provided in Appendix A, Section 3.0 and Appendix C calculations SO ₂ emissions for marine vessels are now based on use of ULSD

REVISIONS TO AIR QUALITY TECHNICAL REPORT

UPDATE IN RESPONSE TO:	UPDATE	RESPONSE/INFORMATION LOCATION:
October 23, 2018 Data Request #2.a	Provide a revised AQTR with updated construction emission estimates to address the following: Deep burial of the Raritan Bay Loop beneath the Raritan Bay Channel and the Chapel Hill Channel, including the increased use of clamshell dredges to excavate the trench and place backfill, and increased scow movements associated with each activity	Clarification has been provided in Appendix B Section 3.0 and Appendix C calculations.
October 23, 2018 Data Request #2.b	Provide a revised AQTR with updated construction emission estimates to address the following: Use of clamshell dredge, including increased scow movements, to excavate and backfill the Raritan Bay Loop trench between mileposts (MPs) 25.2 to 25.6 and MPs 33.5 to 33.9, instead of using a jet trencher as originally proposed for these segments	Clarification has been provided in Appendix B Section 3.0 and Appendix C calculations.
October 23, 2018 Data Request #2.c	Provide a revised AQTR with updated construction emission estimates to address the following: During excavation, the use of clamshell dredges fitted with environmental buckets instead of traditional buckets as originally proposed	Clarification has been provided in Appendix B Section 3.0 and Appendix C calculations.

UPDATE IN RESPONSE TO:	UPDATE	RESPONSE/INFORMATION LOCATION:
October 23, 2018 Data Request #2.d	Provide a revised AQTR with updated construction emission estimates to address the following: A lower-bound and upper-bound estimates of emissions (e.g. "scenarios" per section 3.2 in Transco's July 25, 2018 AQTR) pending the USACE permitting decisions regarding the use of Historic Area Remediation Site for disposition of the dredged materials	Clarification has been provided in Section 2.0, Appendix B Section 3.0 and Appendix C calculations.

REVISIONS TO AIR QUALITY TECHNICAL REPORT

UPDATE IN RESPONSE TO:	COMMENT:	RESPONSE/INFORMATION LOCATION:
October 23, 2018 Data Request #2.e	Provide a revised AQTR with updated construction emission estimates to address the following: A lower-bound and upper-bound estimates of emissions associated with the added handling and disposal of dredge material excavated from MPs 24.0 to 24.8 and MPs 35.2 to 35.5 pending the New York State Department of Environmental Conservation permitting decisions to allow side-casting the dredge spoil	Clarification has been provided in Section 2.0, Appendix B Section 3.0 and Appendix C calculations.
October 23, 2018 Data Request #2.f	Provide a revised AQTR with updated construction emission estimates to address the following: For each scenario, include a separate accounting of construction emission estimates associated with dredging by vendor(s) for use as backfill in the Raritan Bay Loop. Transco should explicitly estimate these in the AQTR regardless of whether they would reduce NOx construction emissions, as discussed in question 1	Clarification has been provided in Appendix B Section 3.0 and Appendix C calculations.
April 2025, Technical report update	Updated technical report following project restart	Updates throughout technical report

1. INTRODUCTION

Transcontinental Gas Pipe Line Company, LLC. (Transco) has prepared this updated Air Quality Technical Report for the proposed Northeast Supply Enhancement Project (NESE or Project) at the request of the Federal Energy Regulatory Commission (FERC).

Based on the Project scope, location and construction schedule filed to the FERC on January 19, 2018 (Accession Number: 20180119-5168) to supplement the original schedule communicated to FERC in Transco's March 27, 2017 application for a Certificate of Public Convenience and Necessity (Certificate Application), General Conformity (GC) has been triggered for the Project in Air Quality Control Region (AQCR) 43, also known as the NY-NJ-CT Interstate AQCR. AQCR 43 is designated severe nonattainment for ozone and is a maintenance area for particulate matter of 2.5 microns in diameter or less (PM_{2.5}). Oxides of nitrogen (NO_x) and volatile organic compounds (VOC) are subject to GC in order to address severe ozone nonattainment. Emissions of PM_{2.5} and precursors NO_x and sulfur dioxide (SO₂) are subject to GC in order to address PM_{2.5} maintenance area status. Based on the proposed construction schedule, air emissions from construction in the NY-NJ-CT Interstate region are estimated to exceed the GC threshold value of 25 tons per year of NO_x and VOC in Year 2 of construction activities. Estimated emissions of PM_{2.5}, and SO₂ are below the GC thresholds of 100 tons per year for each pollutant. Construction activities are anticipated to be completed in two years. The GC regulations, 40 Code of Federal Regulations (CFR) part 93, Subpart B, were established under the Clean Air Act (CAA) to ensure that actions conducted or sponsored by federal agencies are consistent with state air quality goals.¹

The GC review process is designed to ensure that air pollutant emissions, as a result of planned federal activities, would not affect the state's ability to achieve attainment with the National Ambient Air Quality Standards (NAAQS). The GC regulations are applicable in non-attainment and maintenance areas. Included in the NESE GC analysis, in addition to AQCR 43, are offshore New Jersey and New York, Middlesex and Somerset counties in New Jersey, and Lancaster and Chester counties in Pennsylvania. The offshore areas and additional counties are designated as maintenance areas for PM_{2.5}. Both Pennsylvania counties, both New Jersey counties, and the offshore New Jersey/New York area are designated as non-attainment areas for ozone. No ongoing operational emission sources not otherwise exempt from GC requirements will be constructed in the offshore area and these counties; therefore only emissions from construction related activities are subject to GC requirements. Operational emissions will occur from stationary sources identified in Section 1.1; however, those sources are regulated by a major or minor source permit and are exempt from the GC requirements.

1.1 PROJECT OVERVIEW

The proposed Project is an expansion of the existing Transco interstate natural gas transmission pipeline system that will enable Transco to provide 400,000 dekatherms per day of incremental firm transportation of natural gas from the existing Compressor Station

¹ As submitted within the Certificate application, submitted to FERC March 27, 2017. Docket No. CP17-101

195 in York County, Pennsylvania to the Rockaway Transfer Point in New York State waters. Figure 1 provides a Project overview map showing the locations of the proposed facilities in Pennsylvania, New Jersey, and New York.

The proposed Pennsylvania portion of the Project includes:

- Construction of 10.2 miles of new natural gas 42-inch diameter pipeline in Lancaster County, Pennsylvania (currently referred to as the Quarryville Loop);
- Modification to existing Compressor Station 200 in Chester County; and
- New Mainline Valve facilities and modifications to existing mainline valve facilities.

The proposed onshore New Jersey portion of the Project includes:

- Construction of 3.4 miles of new natural gas 26-inch diameter pipeline in Middlesex County, New Jersey (currently referred to as the Madison Loop);
- Construction of 0.2 mile of new natural gas 26-inch diameter pipeline in Middlesex County, New Jersey (currently referred to as the Raritan Bay Loop);
- Construction and operation of new Compressor Station 206 in Somerset County; and
- New Mainline Valve facilities and modifications to existing mainline valve facilities.

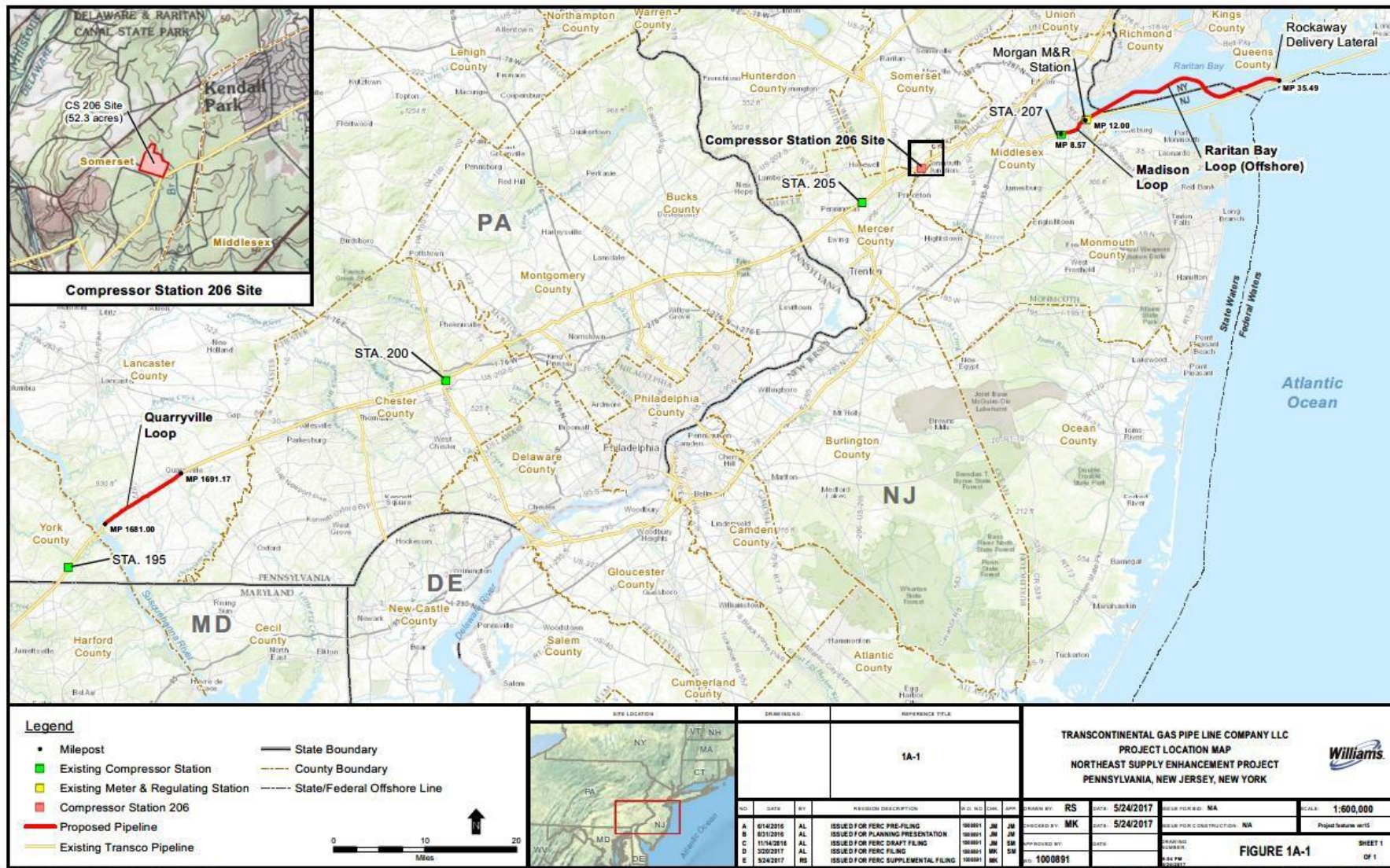
The proposed offshore New Jersey and New York portion of the Project includes:

- Construction of 23.3 miles of new natural gas 26-inch diameter pipeline from Middlesex County, New Jersey to the Rockaway Transfer Point in Lower New York Bay, New York (currently referred to as the Raritan Bay Loop).

GC applies only in areas designated as maintenance or non-attainment for one or more NAAQS. The two Pennsylvania counties and the two New Jersey counties, as well as the New Jersey/New York offshore area are designated maintenance areas for PM_{2.5} and non-attainment areas for ozone. The specific Project components relevant to this GC analysis include:

- Quarryville Loop;
- Station 200;
- Station 206;
- Madison Loop; and
- Raritan Bay Loop.

FIGURE 1 NORTHEAST SUPPLY ENHANCEMENT PROJECT LOCATION MAP



1.2 EXISTING AIR QUALITY

Resource Report 9 (RR9),² as well as Transco's responses to FERC data requests,³ including this filing, describe the existing air quality and noise conditions associated with the NESE Project, evaluate the potential impact of construction and operation of the Project on these resources, and identify the proposed mitigation measures to avoid or minimize those potential impacts. The information necessary to develop RR9 was derived from equipment vendor data sheets, desktop analysis, and a review of available literature. The following information is provided as an overview of the information contained in the RR9 specific to GC for the aboveground locations of the Project in southeastern Pennsylvania and central and coastal New Jersey. Additional information can be found in the Project's FERC docket; including the filings previously referenced.

The climate within Pennsylvania is quite varied and not easily generalized to a single classification. Although it is located in the humid continental zone of the North American Continent, Pennsylvania's location along the spine of the Appalachian Mountain Range offers locally diverse climate zones based mainly on elevation. For the purpose of this Project, climate discussion is focused on the southeastern portion of Pennsylvania where Lancaster and Chester Counties are located. The average annual temperature across the region is 52 degrees Fahrenheit (°F). The region's coldest temperatures occur during the winter months and on average range between 25 and 40 °F. The warmest temperatures occur during the summer months and on average range between 70 and 85 °F. Pennsylvania's warmest temperatures are found in the southeast part of the state. During the summer, southeastern Pennsylvania can experience approximately 75 percent more days with high temperatures above 90 °F, compared to the state average. Average annual precipitation generally ranges between 40 and 45 inches, with a fairly even distribution of precipitation throughout the year.

Project sites in New Jersey are in the central climate zone, which is generally represented by conditions in Newark, New Jersey. Topography in eastern New Jersey is primarily flat. Land use in northeast New Jersey is comprised of large, developed urban areas interspersed with rural type land use. Temperatures generally range from 8°F to 99°F with an annual mean temperature of 56°F. Maximum daily summer temperatures have occasionally exceeded 100°F. In the winter, low temperatures rarely drop below zero in the Newark area; below zero temperatures are more frequent in the western part of New Jersey. Precipitation is uniformly distributed throughout the year and Newark receives on average 47.72 inches of precipitation annually. The central climate zone of New Jersey experiences occasional extreme precipitation events resulting from remnants of tropical storms passing over the area or occasional heavy snow storms in the winter. The prevailing wind direction in the central climate zone is from the southwest (Office of the New Jersey State Climatologist [ONJSC] 2017).

² As submitted within the Certificate application, submitted to FERC March 27, 2017. Docket No. CP17-101

³ Transco filed with the commission responses to data requests on: 6/1/17, 6/30/17, 7/21/17, 10/10/17, 12/4/17, 5/10/18, 6/27/18, 7/10/18 and 8/21/18.



The CAA of 1970, 42 U.S. Code 7401 et seq., amended in 1977 and 1990, is the primary federal statute governing air pollution. The CAA designates six pollutants as criteria pollutants, for which NAAQS are promulgated to protect public health and welfare. The six criteria pollutants are particulate matter (including particulate matter of 10 microns in diameter or less [PM_{10}] and 2.5 microns in diameter or less [$PM_{2.5}$]), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead, and ground level ozone. Volatile organic compounds (VOC) are not a criteria pollutant but are analyzed because VOC are precursors to ground-level ozone formation.

Air quality monitoring data from the U.S. Environmental Protection Agency (USEPA) Air Data website for calendar years 2022-2024 was reviewed to characterize background air quality for regulated criteria pollutants. Air quality monitoring stations representative of the ambient background in the Project areas were considered for obtaining monitored values. Background air quality data for the Project areas located in Pennsylvania (Quarryville Loop and Station 200) are presented in Table 1 (USEPA 2024). Background air quality data for the Project areas located in New Jersey (Madison Loop, Station 206 & Raritan Bay Loop) are presented in Table 2 (USEPA 2024).

Air quality designations for counties included in the Project were originally presented in RR9 section 9.2.3. The applicable areas for GC analyses are those areas designated as maintenance or non-attainment areas for one or more criteria pollutants which are the Pennsylvania and New Jersey counties, and offshore New Jersey/New York area. Attainment status determinations for these counties are listed in Table 3.

TABLE 1 BACKGROUND AMBIENT AIR QUALITY DATA FOR PENNSYLVANIA AND AMBIENT AIR QUALITY STANDARDS

Air Pollutant	Averaging Period	Monitor Values	Monitoring Site (AQS ID & Location)	NAAQS
Carbon Monoxide	8-hour ^a	1.5 ppm	AQS 10-003-2004 Wilmington, DE	9 ppm
	1-hour ^a	1.8 ppm		35 ppm
Nitrogen Dioxide	Annual ^b	9.6 ppb	AQS 42-045-002 Chester, PA	75 ppb
	1-hour ^c	39.4 ppb		100 ppb
Ozone	8-hour ^d	0.065 ppm	AQS 42-029-0100 Chester, PA	0.070 ppm (2015 Standard)
PM _{2.5}	Annual ^e	8.5 µg/m ³	AQS 42-029-0100 Chester, PA	12 µg/m ³
	24-hour ^c	27.2 µg/m ³		35 µg/m ³
PM ₁₀	24-hour ^a	107 µg/m ³	AQS 42-071-0007 Lancaster, PA	150 µg/m ³
Sulfur Dioxide	3-hour ^a	6.1 ppb	AQS 34-039-0004 Elizabeth, NJ	1300 ppb
	1-hour ^f	5.0 ppb		75 ppb

Source: For NAAQS – USEPA Current NAAQS Table: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>
For monitor values - USEPA 2024: <https://www.epa.gov/outdoor-air-quality-data>

Note:

^a Maximum second-high (1 year) from 2022 to 2024 period. EPA Air Data does not provide SO₂ 3-hour values, so 1-hour second-high from 3-year period was used

^b Maximum annual average from the 2022 to 2024 3-year period

^c 98th percentile average over the 2022 to 2024 3-year period

^d Fourth high averaged over the 2022 to 2024 3-year period

^e Average over the 2022 to 2024 3-year period

^f 99th percentile averaged over the 2022 to 2024 3-year period

TABLE 2 BACKGROUND AMBIENT AIR QUALITY DATA FOR NEW JERSEY AND AMBIENT AIR QUALITY STANDARDS

Air Pollutant	Averaging Period	Monitor Values	Monitoring Site (AQS ID & Location)	NAAQS
Carbon Monoxide	8-hour ^a	1.7 ppm	AQS 34-039-0004 Elizabeth, NJ	9 ppm
	1-hour ^a	2.7 ppm		35 ppm
Nitrogen Dioxide	Annual ^b	8.0 ppb	AQS 34-023-0011 East Brunswick, NJ	75 ppb
	1-hour ^c	39.0 ppb		100 ppb
Ozone	8-hour ^d	0.072 ppm	AQS 34-023-0011 East Brunswick, NJ	0.070 ppm (2015 Standard)
PM _{2.5}	Annual ^e	7.5 µg/m ³	AQS 34-023-0011 East Brunswick, NJ	12 µg/m ³
	24-hour ^c	18.1 µg/m ³		35 µg/m ³
PM ₁₀	24-hour ^a	174 µg/m ³	AQS 42-101-0048 Philadelphia, PA	150 µg/m ³
Sulfur Dioxide	3-hour ^a	6.1 ppb	AQS 34-039-0004 Elizabeth, NJ	1300 ppb
	1-hour ^f	5.0 ppb		75 ppb

Source: For NAAQS – USEPA Current NAAQS Table: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>
 For monitor values - USEPA 2024: <https://www.epa.gov/outdoor-air-quality-data>

Note:

^a Maximum second-high (1 year) from 2022 to 2024 period. EPA Air Data does not provide SO₂ 3-hour values, so 1-hour second-high from 3-year period was used

^b Maximum annual average from the 2022 to 2024 3-year period

^c 98th percentile average over the 2022 to 2024 3-year period

^d Fourth high averaged over the 2022 to 2024 3-year period

^e Average over the 2022 to 2024 3-year period

^f 99th percentile averaged over the 2022 to 2024 3-year period

TABLE 3 COUNTY AIR QUALITY DESIGNATIONS

Location	AQCR	AQCR Name	Ozone	PM _{2.5}	NO ₂ , PM ₁₀ , CO, SO ₂
Pennsylvania					
Quarryville Loop (Lancaster County)	196	South Central Pennsylvania Intrastate	Lancaster Co Marginal Ozone Nonattainment Area, Northeast OTR	Attainment (2012) Maintenance - moderate (2006 and 1997)	Attainment
Compressor Station 200 Modification (Chester County)	45	Metropolitan Philadelphia Interstate	Philadelphia-Wilmington-Atlantic City (PA-NJ-MD-DE) Marginal Ozone Nonattainment Area, Northeast OTR	Attainment (2012) Maintenance - moderate (2006 and 1997)	Attainment
New Jersey					
Madison Loop – including horizontal directional drill (HDD) at transition to offshore (Middlesex County)	43	NY-NJ-CT Interstate	NY-NJ-CT Severe Ozone Nonattainment Area	Attainment (2012) Maintenance – former Subpart 1 (2006 and 1997)	Attainment
Compressor Station 206 (Somerset County)	43	NY-NJ-CT Interstate	NY-NJ-CT Severe Ozone Nonattainment Area	Attainment (2012) Maintenance – former Subpart 1 (2006 and 1997)	Attainment

Location	AQCR	AQCR Name	Ozone	PM _{2.5}	NO ₂ , PM ₁₀ , CO, SO ₂
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New Jersey / New York

Raritan Bay Loop – Offshore	43	NY-NJ-CT Interstate	NY-NJ-CT Severe Ozone Nonattainment Area	Attainment (2012) Maintenance – former Subpart 1 (2006 and 1997) ^a	Attainment
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Note:

^a Using nearest onshore county designation status

1.3 REGULATORY REQUIREMENTS FOR AIR QUALITY

The GC Rule applies to all federal actions except for those federal actions excluded from review. Exclusions apply to stationary source emissions regulated by a major or minor air permit program, actions deemed exempt because they are pre-determined to be de minimis (such as Federal land transfer actions) or related to transportation plans, programs, and projects under Title 23 U.S. Code of the Federal Transit Act, which are subject to Transportation Conformity.

Unlike the Pennsylvania Department of Environmental Protection (PADEP), the New York State Department of Environmental Conservation (NYSDEC) and the New Jersey Department of Environmental Protection (NJDEP) have not promulgated rules incorporating Federal GC regulations by reference or establishing their own GC regulations. As specified in 40 CFR Part 93, Subpart B, if a State has not developed its own GC rule or formally adopted the Federal GC rule, then the provisions in 40 CFR Part 93 Subpart B apply.

Most state and federal air quality regulations are directed toward emissions from stationary sources, including New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), and Maximum Achievable Control Technology (MACT) standards. There are no stationary sources for the Project in the Pennsylvania and New Jersey counties, or New Jersey/New York offshore area that are not regulated by a major or minor source permit. However, mobile sources also contribute to air pollution, and may contribute to non-attainment of the NAAQS. The mobile sources and fugitive emissions associated with the proposed Project construction in the Pennsylvania and New Jersey counties, and New Jersey/New York offshore area are the subject of this GC analysis.

Under GC, the nonattainment designation for ozone requires an evaluation of oxides of nitrogen (NO_x) and volatile organic compound (VOC) emissions. The maintenance designation for PM_{2.5} requires an evaluation of PM_{2.5}, and NO_x and SO₂ as the specified precursors of PM_{2.5}.

Since the prior submission there have been several state and federal air quality regulatory updates that are applicable for various segments in the oil and gas industry. The Project will be subject to the following additional regulations since the original project proposal:

- Station 206
 - Update State of the Art (SOTA) thresholds for source operations in N.J.A.C. 7:27-8 per revision dated September 21, 2023
 - Updated SO₂ performance testing requirements in Subpart KKKK per a revision dated October 7, 2022
 - Updated formaldehyde emission thresholds for new lean premix gas-fired turbines and new diffusion flame gas-fired turbines in Subpart YYYY per revision dated March 9, 2020
 - Centrifugal compressors and fugitive emission components per OOOOb

Williams intends to comply with all applicable federal and state air quality regulations through the construction and operation of the NESE project.

Under GC, the nonattainment designation for ozone requires an evaluation of oxides of nitrogen (NO_x) and volatile organic compound (VOC) emissions. The maintenance designation for $\text{PM}_{2.5}$ requires an evaluation of $\text{PM}_{2.5}$, and NO_x and SO_2 as the specified precursors of $\text{PM}_{2.5}$.

2. GENERAL CONFORMITY AND MITIGATION OPTIONS

As summarized in Section 3.0 and detailed in Appendix C, which provides air emissions estimates from construction, and as requested by the FERC, Transco estimates a range of 632.6 to 672.5 tons of NO_x emissions and 27.4 to 29 tons of VOC emissions from Year 2 construction activities in AQCR 43, also known as NY- NJ-CT Interstate AQCR. These emissions exceed the GC threshold of 25 tons per year (tpy) for both NO_x and VOC emissions. Regulations at 40 CFR § 93.158 provides the criteria for determining conformity. The criterion found at 40 CFR § 93.158(a)(2), applies to precursors of ozone; NO₂ and VOC, along with PM_{2.5} and its precursor SO₂, the pollutants at issue for the GC analysis:

"The total direct and indirect emissions from the action are fully offset within the same nonattainment or maintenance area (or nearby area of equal or higher classification provided the emissions from that area contribute to the violations, or have contributed to violations in the past, in the area with the Federal action) through a revision to the applicable State Implementation Plan (SIP) or a similarly enforceable measure that effects emissions reductions so that there is no net emissions of that pollutant."

Emissions can be offset by retiring Emissions Reduction Credits (ERCs) or mitigated by funding a project (or projects) that results in an annual reduction of emissions for the pollutants subject to GC; in both cases, the reduction must exceed the project emissions by a ratio as established in applicable regulations. Since AQCR 43 has been designated as a severe nonattainment area, the ERCs will be need to be retired at a ratio of 1.3:1 in accordance with 40 CFR 93.163(b)(1)(ii). Under the mitigation project option, mitigation must occur in the same year as construction pursuant to a 1:1 ratio or in the alternative no more than two times the length of time it takes to complete construction pursuant to a 1:15 ratio, where the states agree that they will hold to the air quality goals outlined in their SIPs. The May 2025 Air Quality Mitigation Plan is submitted as part of Transco's response to the FERC's April 2025 requests, along with this current Air Quality Technical Report.

To be considered an available mitigation option for GC analysis, the emission reduction project must be "from that area [which] contribute[s] to the violations, or have contributed to violations in the past, in the area with the Federal action." In other words, the area realizing the benefit from the mitigation project must be the same area where the proposed Project emissions will occur. As outlined in the 2025 Air Quality Mitigation Plan, Transco is committed to funding mitigation projects or ERCs to offset the complete, conservatively estimated amount of NO_x emissions from AQCR 43 to provide a net benefit to air quality environment in the local area.

3. AIR QUALITY IMPACTS

3.1 CONSTRUCTION EMISSIONS

Emissions generated during construction include exhaust emissions from mobile sources, primarily onshore and offshore construction equipment, and PM₁₀ and PM_{2.5} emissions in the form of fugitive dust that would result from clearing, grading, excavation, and vehicle traffic on paved and unpaved roadways. While most fugitive dust emissions settle quickly over short distances from a construction site, finer particulate matter emissions (PM₁₀ and PM_{2.5}) become airborne and can impact air quality in the region. Therefore, finer particulate matter emissions are estimated and included in the GC emission analysis, as are all criteria pollutants.

Implementation of Transco's Fugitive Dust Control Plan (FDCP) as outlined in the Attachment 3 to Appendix 1B of Resource Report 1, submitted to FERC on March 27, 2017, will ensure that the Project-related fugitive dust impacts are temporary and occur within or very near the construction area. Due to the minimization of fugitive dust as a result of the implementation of Transco's FDCP and the distance between construction projects, Transco believes that there will be no significant measurable cumulative effects due to fugitive dust. However, to provide a conservative assessment, PM₁₀ and PM_{2.5} emissions have been included in the GC analysis without taking credit for any likely reductions resulting from the implementation of the required FDCP.

Construction of the Project will involve the use of heavy equipment that would generate emissions of pollutants such as CO, PM₁₀ and PM_{2.5}, NO_x, SO₂ and greenhouse gases (GHGs). The type and quantity of equipment used will vary from site to site based on the type of facility under construction. Because pipeline construction moves through an area quickly, as detailed in Appendix A and Appendix B, air emissions associated with pipeline construction would be intermittent and short term. The majority of impacts would be further minimized because the construction activities would be spread over a large geographical area. Construction schedules are also highly variable and may not directly overlap. Although Project construction activities would result in short-term air emissions, long-term air quality in the region are not expected to be significantly affected.

Appendix A (Construction Emissions Estimation Process Description) describes the methodology that was used to calculate the estimated air emissions from the construction activities for the NESE Project. More specifically, it details the construction activity, phasing of the construction process specific to the Project, and emission calculations and assumptions used to develop the construction emission inventory as part of the GC analysis. As noted in Appendix A, Transco has consistently made use of conservative emissions estimates to quantify the maximum (though temporary) potential effects of construction activities.

Appendix B contains a summary of the construction equipment type and usage estimates needed to complete the Project. In Transco's response to Item 2 of the FERC's October 23, 2018 Data Request, air emission calculations were provided for three additional construction scenarios, which are also summarized in Appendix B. Appendix C contains the calculations used to estimate emissions associated with construction for the Project (as well as the three additional construction scenarios evaluated in Transco's response to Item 2 of the FERC's October 23, 2018 Data Request). Appendix D details the MOVES5 output files utilized to quantify equipment emission factors. Appendix E details Transco's estimate of land use acreage affected during construction of the

Project, consistent with Transco's May 11, 2018 filing (Accession Number: 20180511-5170) of Updated Resource Report Tables filed to the Commission.

3.2 OPERATIONAL EMISSIONS

As described in Section 1.1, the Project has proposed buried onshore and offshore pipeline components as well as a new compressor and modified compressor stations, and new and modified mainline valve facilities. There are no proposed facilities that will have ongoing operational emissions that are not regulated by a major or minor source permit. Therefore, impacts from ongoing operation are not anticipated.



APPENDIX A

CONSTRUCTION EMISSIONS ESTIMATION PROCESS DESCRIPTION

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1. INTRODUCTION

This document describes the methodology for calculating the air emissions from the construction activities for the proposed Northeast Supply Enhancement Project (NESE Project). An equipment and personnel inventory was estimated based on experience with projects of a similar size and with input from the construction contractor(s). Utilizing the equipment and personnel inventory, a pollutant emission inventory was prepared to evaluate the construction activities associated with the proposed Project in support of the Northeast Supply Enhancement Project Environmental Impact Statement (EIS). Emissions of VOC, NO₂, CO, SO₂, PM₁₀, PM_{2.5}, CO_{2e} and total HAPs were estimated to evaluate Project-related impacts for the EIS. The VOC, NO₂, PM_{2.5}, and SO₂ emissions were also estimated to address the requirements of the General Conformity Rule.

Construction emissions were calculated for the individual components of the proposed Project, including compressor stations, pipelines, pipeline loops, meter stations, and regulator stations. The categories include emissions from on-site (off-road) construction equipment, construction equipment and commuter vehicles traveling on the regional roadways (on-road), construction equipment exhaust, offshore marine vessel exhaust, and fugitive emissions from site clearing and excavation. The majority of construction related activities are currently scheduled to take place during a single calendar year (2027).¹

This document has been prepared for the Federal Energy Regulatory Commission (FERC) to support the information provided in March 27, 2017 application for a Certificate of Public Convenience and Necessity (Certificate Application) under Section 7c of the Natural Gas Act (NGA) and supplement information provided in the Air Quality Technical Reports filed on December 27, 2017, May 30, 2018, July 17, 2018, July 25, 2018, August 21, 2018, and November 29, 2018.

¹ Transportation of piping components for the Raritan Bay Loop is scheduled to occur in 2026 and has been accounted for as such.

2. CONSTRUCTION EQUIPMENT AND VEHICLES ANALYSIS METHODS AND DATA

Emissions from several categories of construction activities were estimated, including emissions from on-site (off-road) construction equipment (dozers, excavators, graders, etc.); haul vehicles (dump trucks, etc.); construction worker vehicles commuting to and from the site; construction equipment exhaust (equipment fuel); marine vessel equipment exhaust (equipment fuel) and fugitives from site earth working activities. Estimates of emissions associated with construction of the Project were originally provided to FERC in Resource Report 9, Appendix 9D, as part of the March 27, 2017 Certificate Application; supplemented by Transco's December 27, 2017, May 30, 2018, July 25, 2018, August 21, 2018, and November 29, 2018, Air Quality Technical Report. This Report supplements the December 27, 2017, May 30, 2018, July 25, 2018, August 21, 2018, and November 29, 2018 filings and reflects estimates of emissions associated with the most current construction schedule and plan.

The U.S. EPA Motor Vehicle Emission Simulator (MOVES) is a science emission modeling system that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases and air toxics. MOVES is comprised of a nonroad and an onroad model which are periodically updated, the most recent of which took place in November 2024. In previous versions of Transco's AQTR, Transco made use of the MOVES2014a and MOVES 2014b versions. The latest version of EPA's MOVES model is MOVES5 which was released in November 2024. From the U.S. EPA MOVES website: Compared to MOVES2014a and MOVES2014b, MOVES5 incorporates significant improvements in calculating nonroad equipment emissions.

Emission factors for on site (off-road) construction equipment were calculated using the nonroad model within the EPA MOVES5 model (November 2024) populated with regionally specific equipment data. The equipment data applied included model year distribution, horsepower ratings, load factors, usage activity, and equipment specific emission rates, taken from the model's database. For SO₂ and particulate matter emission factors associated with the off-road equipment, a diesel sulfur content of 15 parts per million (ultra-low sulfur diesel fuel) was assumed, based on EPA regulations for sulfur-in-fuel effective 2014.

Emission factors for on-road trucks and employee personal vehicles were calculated with the onroad model within the EPA MOVES5 model (November 2024) using motor vehicle data specific to the region and other default inputs. All equipment and trucks were conservatively assumed to be diesel fueled. Employee and contractor personal vehicles were assumed to be gasoline fueled. Emission factors for both on-road and off-road are based on construction year 2026 emission factors.

Emission factors for marine vessels were taken from the United States Environmental Protection Agency's *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* published in April 2009.

Input data describing the various individual construction activities are provided in the emission calculation tables in Appendix C of the Air Quality Technical Report. Construction equipment and vehicle usage was estimated based on anticipated daily hours of operation and length of project. The construction activity tables also contain the emission factors and emission rates used in the analysis. Example calculations for each category of construction activity are provided below.

3. CONSTRUCTION EMISSIONS SAMPLE CALCULATIONS

The following sections describe the equations utilized to estimate construction emissions performed as part of original application to FERC; updated as appropriate, as well as those included in the General Conformity (GC) analysis for the ozone non-attainment areas: Lancaster County in Pennsylvania, the Southern New Jersey, Philadelphia, Wilmington area, and the Northern New Jersey, New York City, Connecticut area. An example calculation for one equipment type for each equation is given. Please note that example calculations minimize significant digits of values and rounding may be noticed. Also, note that some equations are utilized for more than one equipment type.

3.1 FUGITIVE DUST (PARTICULATE) EMISSIONS

Fugitive dust emissions were calculated for three processes:

1. site grading, excavation and filling;
2. commuter and delivery trucks travel on paved roads;
3. construction equipment travel on unpaved roads; and
4. sandblasting activities.

Fugitive dust emissions from highway site drag out, welding activities and right-of-way (ROW) maintenance were determined to be insignificant as discussed in more detail in sections 3.1.5 through 7.

3.1.1 SITE GRADING, EXCAVATION, AND FILLING

Fugitive dust emissions from site grading, excavation, and filling activities are a result of the clearing of the pipeline ROW and facility construction; as well as the digging and filling of the pipe trench. To calculate particulate emission, the equations from AP-42 Sections 13.2.4 and 11.9 are applied. AP-42 Section 13.2.4 (Aggregate Handling and Storage Piles) accounts for dust emissions that occur at several points in the storage cycle, such as material loading onto the pile, disturbances by strong wind currents, and loadout from the pile. AP-42 Section 11.9 (Western Surface Coal Mining) provides a methodology to estimate particulate emissions based on the total hours of dozer operation devoted to earth material handling. Combining the estimation techniques from AP-42 Sections 13.2.4 and 11.9 into a single equation results in:

EQUATION 1:

$$PM_{2.5} \text{ Emissions (tons)} = \frac{EF_{MH} * \text{Tons Earth Moved}}{2000 \frac{lb}{ton}} + \frac{EF_D * \text{Dozer Hours of Operation}}{2000 \frac{lb}{ton}}$$

Where:



EQUATION 2:

$$EF_{MH} = k(0.0032) * \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

And:

EQUATION 3:

$$EF_D = 0.105 * \frac{5.7 * s^{1.5}}{M^{1.4}}$$

In Equation 1 and Equation 2, EF_{MH} equates to the materials handling emission factor outlined in AP-42 Section 13.2.4. Tons earth moved equals the estimated tons of earth disturbed as part of the Project. This includes both the estimated acres disturbed during the clearing of the ROW and the volume of earth excavated to dig the pipeline trench. In equation 1 and equation 3, EFD is used to estimate fugitive emissions from dozer operation as outlined in AP42 Section 11.9-2; hours of operation equals the estimated hours of operation for all dozers.

The total estimated acres disturbed in each county as part of the Project, originally provided with the certificate application and supplemented by the May 10, 2018 filing, are provided as Appendix E of this report. The estimated hours of operation for all dozers is calculated by multiplying the quantity of dozers by the estimated daily work hours and by the total days of the project component. An example of the calculations performed in Appendix C is provided below.

From Transco General Construction Emission Calculations in Appendix C; $PM_{2.5}$ emissions from site grading, excavation, and filling for the Quarryville Loop² are estimated as follows:

EQUATION 1 APPLIED TO QUARRYVILLE LOOP

$$PM_{2.5} \text{ Emissions} = \frac{1.70E-04 \frac{lb}{ton} * 579,547 \text{ tons}}{2000 \frac{lb}{ton}} + \frac{4.67 \frac{lb}{hr} * 7,335 \text{ hrs}}{2000 \frac{lb}{ton}} = 17.2 \text{ tons}$$

Where:

² Quarryville loop equates to 10.17 miles of greenfield pipeline in Lancaster County, Pennsylvania.

EQUATION 2 APPLIED TO QUARRYVILLE LOOP

$$EF_{MH} = k(0.0032) * \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} = 0.053(0.0032) * \frac{\left(\frac{6.4 \text{ mph}}{5}\right)^{1.3}}{\left(\frac{2.5\%}{2}\right)^{1.4}} = 1.70E - 04 \frac{lb}{ton}$$

In Equation 2 for the materials handling emission factor, U = mean wind speed (mph); calculated by averaging the 2012-2016 mean annual wind speeds for of Harrisburg, PA obtained from NWS Annual Climate reports.

TABLE 1 ANNUAL AVERAGE WIND SPEEDS: HARRISBURG, PA (2012-2016)

Year	Annual Average Wind Speed (mph)
2016	6.6
2015	6.5
2014	6.7
2013	6.1
2012	5.9
Average	6.4

Source: National Weather Service - State College, PA: <http://w2.weather.gov/climate/index.php?wfo=ctp>

In Equation 2 for the materials handling emission factor, M = material moisture content (%); from AP-42 Table 13.2.4.3. For materials handling associated with earth moving, Transco is utilizing the geometric mean moisture content of 2.5% for overburden. Tons of earth moved equals the sum of the acreage disturbed by the clearing of the ROW, taken from Land Use Tables, provided as Appendix E, and the volume of earth excavated to place the pipeline underground. To convert acreage into tonnage of earth, the acreage is multiplied by the average depth disturbed,³ and then converted to cubic yards.⁴ Transco estimates that the size of the pipeline trench will approximately be 8 feet deep, with a 5-foot width at the bottom and a 14-foot width at the top. Using this estimation and the equation for the area of a trapezoid, this equates to a 76 square foot cross section. Multiplying the trapezoidal area of the cross section by the length of the pipeline spread equates to the volume of earth excavated. Finally, after summing the volume of earth

³ Estimated to be 1 foot.

⁴ 1 Acre-feet = 1613.33 Cubic Yards

disturbed in the clearing of the ROW and volume of earth excavated to put the pipeline underground, multiplying by the density of the soil⁵ equates to tons of earth disturbed.

EQUATION 3 APPLIED TO QUARRYVILLE LOOP:

$$EF_D = 0.105 * \frac{5.7 * S^{1.2}}{M^{1.3}} = 0.105 * \frac{5.7 * 52\%^{1.2}}{7.9\%^{1.3}} = 4.67 \frac{lb}{hr}$$

In Equation 3, S = surface material silt content (%) for Silt Loam taken from Table 5-5 in "Estimating Particulate Matter Emissions from Construction Operations" the and M = material moisture content (%) from AP-42 Table 11.9-3. For moisture content associated with clearing and top soil removal by dozer, Transco is utilizing the geometric mean moisture content of 7.9% for overburden.

3.1.2 PAVED ROADS (COMMUTER AND DELIVERY VEHICLES)

Fugitive dust emissions from commuter and delivery vehicle traffic are a result of worker, contractor, and delivery truck travel on regional paved roads to and from the construction site. Particulate emissions from travel on paved roads are due to the resuspension of loose material on the road surface. To calculate particulate emissions the equations from AP-42 Section 13.2.1 are applied. AP-42 Section 13.2.1 (Paved Road) provides a methodology to estimate particulate emissions based on the total vehicle miles traveled. The resultant equation is:

EQUATION 4:

$$PM_{2.5} \text{ Emissions (tons)} = \frac{EF_P * \text{Total Commuter VMT}}{2000 \frac{lb}{ton}}$$

Where:

EQUATION 5:

$$EF_P = k(sL)^{0.91} * W^{1.02}$$

In Equation 4 and equation 5, EF_P = Paved Roads Emission Factor (AP-42 Section 13.2.1.3) and total commuter VMT (total vehicle miles traveled). VMT equals the estimated miles of travel on paved roads by workers personal vehicles, company trucks, contractor heavy duty trucks, and contractor trucks. For Quarryville Loop, the VMT is estimated as:

⁵ 2,360 pounds per cubic yard; The Soils of Pennsylvania, Table 1.1-2

TABLE 2 ON-ROAD VEHICLE MILES TRAVELED

Vehicle Description	Quantity	Average Round Trip (mi)	Days per Week	Weeks per Project	Days per Project	Total Miles
Worker Commute Vehicle	90	50	6	23	136	611,280
Company Trucks	20	50				135,840
Contractor HD Trucks	1	50				6,792
Water Delivery Trucks ¹	1	6.5				650
Contractor Trucks	45	50				305,640

¹Transco estimates 100 Water Delivery Trucks will be required

From Transco Construction Emission Calculations in Appendix C, PM_{2.5} emissions from vehicle travel on Paved Roads for Quarryville Loop are estimated as follows:

EQUATION 4 APPLIED TO QUARRYVILLE LOOP:

$$PM_{2.5} \text{ Emissions} = \frac{0.001 \frac{lb}{VMT} * 1,060,202 \text{ Total VMT}}{2000 \frac{lb}{ton}} = 0.8 \text{ tons}$$

Where:

EQUATION 5 APPLIED TO QUARRYVILLE LOOP:

$$EF_p = k(sL)^{0.91} * W^{1.02} = 0.00054(0.6)^{0.91} * (4.15)^{1.02} = 0.001 \frac{lb}{VMT}$$

In Equation 5, K = particle size multiplier taken from AP-42 Table 13.2.1-1; sL = road surface silt loading (g/m^2) from AP-42 Table 13.2.1-2;⁶ and W = average weight (tons) of the vehicles traveling the road. For the Quarryville Loop, W is estimated to be 4.15 tons as shown in Table 3.⁷

TABLE 3 ON-ROAD COMMUTER VEHICLE WEIGHTS

Vehicle Description	Quantity	Weight (tons)	Assumption
Worker Commute Vehicle	90	3	SUV
Company Trucks	20	2	Class 1 Light Duty
Contractor HD Trucks	1	8	Class 5
Water Trucks	1	8	Class 5
Contractor Trucks	45	7.25	Class 4: 4x4 Pickup
Average	-	4.15	

3.1.3. UNPAVED ROADS (CONSTRUCTION EQUIPMENT)

Fugitive dust emissions from equipment while on site are the result of equipment movement while on unpaved portions of the construction area. When a vehicle travels an unpaved road the force of the wheels on the road surface causes pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. To calculate particulate emissions, the equations from AP-42 Section 13.2.2 are applied. AP-42 Section 13.2.2 (Unpaved Road) provides a methodology to estimate particulate emissions based on the VMT. The resultant equation is:

⁶ Assumed silt loading - Ubiquitous Baseline for roads with ADT < 500

⁷ A similar methodology for calculating mean vehicle weight is applied to the emission estimates for Station 206, Station 200 and Madison Loop. The different onroad vehicles associated with the Raritan Bay Loop vary greatly in weight. An EF_p was developed for each category of onroad vehicle (commuter vehicle, dump truck and pipe delivery truck) based on the respective mean vehicle weight

EQUATION 6:

$$PM_{2.5} \text{ Emissions (tons)} = \frac{EF_{UP} * \text{Total Construction VMT}}{2000 \frac{lb}{ton}}$$

Where:

EQUATION 7:

$$EF_{UP} = k \left(\frac{s}{12} \right)^a * \left(\frac{W}{3} \right)^b$$

In Equation 6 and equation 7, EF_{UP} = Unpaved Roads Emission Factor as outlined in AP-42 Section 13.2.2.1 and Total Construction VMT = estimated miles of travel on unpaved roads by construction equipment⁸ (dozers, backhoes, graders, etc.). Transco did not account for commuter vehicle travel on unpaved surfaces as it has been determined that any such travel is insignificant.

From Transco Construction Emission Calculations in Appendix C; $PM_{2.5}$ emissions from equipment travel on Unpaved Roads for the Quarryville Loop are estimated as follows:

EQUATION 6 APPLIED TO QUARRYVILLE LOOP:

$$PM_{2.5} \text{ Emissions} = \frac{1.64 \frac{lb}{VMT} * 1,630 \text{ Total VMT}}{2000 \frac{lb}{ton}} = 1.3 \text{ tons}$$

Where:

EQUATION 7 APPLIED TO QUARRYVILLE LOOP:

$$EF_{UP} = k \left(\frac{s}{12} \right)^a * \left(\frac{W}{3} \right)^b = .15 \left(\frac{52\%}{12} \right)^{0.9} * \left(\frac{32.5 \text{ tons}}{3} \right)^{0.45} = 1.64 \frac{lb}{VMT}$$

In Equation 7, k = particle size multiplier from AP-42 Table 13.2.2-2; s = surface material silt content (%) for Silt Loam taken from Table 5-5 in the "Estimating Particulate Matter Emissions from Construction Operations"; exponent "a" is taken as directed from AP-42 Table 13.2.2-2, exponent "b" is taken as directed from AP_42 Table 13.2.2-2 and W= mean vehicle weight (tons).

⁸ Construction equipment is assumed to travel one half mile per day

TABLE 4 CONSTRUCTION EQUIPMENT WEIGHT

Equipment Type	Quantity	Weight (tons)
Tractor w/Trailer	6	10.0
RT Hoe	2	37.5
Front End Loader	2	23.8
Dozer	6	14.7
Excavator	8	37.5
Side Boom	10	53.4
Average	-	32.5

3.1.4. SANDBLASTING

Fugitive dust emissions from sandblasting activities are the result of preparing the pipe for the coating process. To calculate particulate emissions, the estimation process from AP-42 Section 13.2.6 was applied. AP-42 Section 13.2.6 (Abrasive Blasting) provides emission factors for particulates that calculate emissions based on pounds of abrasive utilized in the process.

EQUATION 8:

$$PM_{2.5} \text{ Emissions (tons)} = \frac{EF_{SB} * \text{Pounds of Abrasive Used}}{2000 \frac{lb}{ton}}$$

In Equation 8, EF_{SB} = Sandblasting Emission Factor (AP-42 Table 13.2.6) and Pounds of Abrasive Used = estimated total of abrasive used during sandblasting activities. From Transco Construction Emission Calculations in Appendix C, $PM_{2.5}$ emissions from sandblasting activities for Quarryville Loop are estimated as follows: ⁹

⁹ Construction equipment is assumed to travel one half mile per day

EQUATION 8 APPLIED TO QUARRYVILLE LOOP:

$$PM_{2.5} \text{ Emissions} = \frac{1.3 \frac{lb}{1,000 \text{ lb abrasive}} * 2.1 \text{ 1,000 lbs of abrasive}}{2,000 \frac{lb}{ton}} = 0.001 \text{ tons}$$

In Equation 8, to estimate the total amount of abrasive used for sandblasting activities, Transco estimates that 2 lbs of abrasive will be used per girth weld of pipe. The average joint length of the pipeline between girth welds is 50 feet. To calculate the number of girth welds per pipeline segment, the length of pipeline is divided by 50 ft. Equation 9 shows the calculation for determining the amount of abrasive used.

EQUATION 9 APPLIED TO QUARRYVILLE LOOP:

$$\begin{aligned} \text{1,000 lbs of abrasive} &= \frac{\frac{\text{Length of Pipeline}}{\text{Average joint length of pipeline}} * 2 \text{ lbs of abrasive per girth weld}}{1,000 \frac{lb}{1,000 \text{ lb}}} \\ &= \frac{\frac{10.17 \text{ miles} * 5,280 \frac{\text{feet}}{\text{mile}}}{50 \text{ feet}} * 2 \text{ lbs of abrasive per joint}}{1,000 \frac{lb}{1,000 \text{ lb}}} = 2.1 \text{ 1,000 lbs} \end{aligned}$$

3.1.5 HIGHWAY SITE-DRAG OUT

As emissions from highway site drag-out have been determined to be insignificant, the following guidance from AP-42 chapter 13.2.1 provides the following guidance:

“To adjust the baseline silt loadings for mug/dirt trackout, the number of trackout points is required. It is recommended that in calculating PM₁₀ emissions, six additional miles of road be added for each active trackout point from an active construction site, to the paved road mileage of the specified category within the county. In calculating PM_{2.5} emissions, it is recommended that three additional miles of road be added for each trackout point from an active construction site”

Assuming multiple drag-out sites per pipeline segment, Transco is accounting for greater than 1 million miles of paved road travel per Construction Spread thereby making the addition of highway site drag-out miles inconsequential.

3.1.6. WELDING EMISSIONS

Fugitive PM₁₀ emissions from welding activities are expected to be insignificant based on welding activities associated with similar, previous projects. Should this expectation change in the future, Transco will estimate fugitive particulate emissions at that time.

3.1.7. ROW MAINTENANCE

Emissions from ROW maintenance (mowing, etc.) following implementation are determined to be insignificant. Mowing of the ROW is an infrequent and short-duration activity.

3.2 ON-ROAD EMISSION SOURCES AND CALCULATIONS

Emissions associated with on-road vehicle traffic arriving and departing from the construction sites are estimated as part of the calculation process. Emissions from worker commuter vehicles, company trucks, contractor HD trucks, water delivery trucks and contractor trucks are estimated. On-road exhaust emissions are calculated by multiplying the total vehicle miles traveled by a developed emission factor using the EPA MOVES5 model. All equipment and vehicles, were conservatively assumed to be diesel fueled except worker commuter vehicles that are assumed to be gasoline fueled. For reference the MOVES5 outputs have been included in Appendix D. The sample equation shown in section 3.2.3 is consistent for the five vehicle types identified above.

3.2.1. ACTIVITY FACTORS

On-road activity factors are based on phasing and construction information provided by the Transco project team, and, when available, Transco's construction contractors. Based on the nature of the Project and timing of the FERC process, equipment listings and usage included in the original RR9 submittal and supplemental filings are based on Transco similarly sized projects; updated to reflect current construction schedule and plan as applicable.

Tables 5 provides on-road equipment listings and estimated vehicle quantity for the Quarryville Loop. The type of vehicle category included in the inventory and the number of each type of vehicle anticipated in use on any given day are shown in the tables. The round trip mileage¹⁰ is estimated at 50 miles¹¹ and will be refined as better information becomes available. Miles for Project (also known as vehicle-miles-traveled, or VMT) is the multiplication of quantity, average round trip and total days of the Project as provided by Transco. Transco has estimated that the Quarryville Loop project will take 136 days to construct.

¹⁰ Round Trip distance is the estimated average distance traveled daily by a single vehicle for each vehicle category

¹¹ Water delivery trucks will be traveling to and from a hydrant 3.25 miles from the project site.

TABLE 5 QUARRYVILLE LOOP ON-ROAD EQUIPMENT AND MILES TRAVELLED

Description	Quantity	Round Trip (mi)	Miles for Project (mi)
Worker Commuter Vehicles	90	50	611,280
Company Trucks	20	50	135,840
Contractor HD Trucks	1	50	6,792
Water Deliver Trucks	1	6.5	650
Contractor Trucks	45	50	305,640

3.2.2. ON-ROAD EMISSION FACTORS

The MOVES2014a (MOVES) emission model was originally used in early 2017 and updated in May 2018 to develop the emission factors for the Project. Since then, the EPA MOVES model has been updated several times to improve accuracy of emission factor estimations. Therefore, the calculations have been updated to use output factors from the latest version of the model, MOVES5.

The following summarizes MOVES inputs used for developing the on-road vehicles (associated with construction) emission factor data sets provided in Appendix D of the Air Quality Technical Report:

- Description (optional): NESE Construction EF On-road
- Scale:
 - Model: Onroad
 - Domain/Scale: National
 - Calculation type: Inventory
- Time Spans
 - Time Aggregation Level: Month
 - Select year: 2026
 - Days: Workday and Weekday (both selected)
 - Months: January and July (summer and winter used to confirm most conservative emission factor used for annual basis)

- Hours: All
- Geographic Boundaries
 - Region: County
 - New York Queens County (selected as representative for the project)
- Vehicles/Equipment: On Road Vehicles
 - fuel/source type combinations selected:
 - Gasoline and Diesel Fuel Passenger Truck
 - Gasoline and Diesel Fuel Light Commercial Truck
 - Gasoline and Diesel Fuel Combination Long-haul Truck
 - Gasoline and Diesel Fuel Combination Short-haul Truck
 - Gasoline and Diesel Fuel Refuse Truck
- Road Type: Selected types
 - Rural Unrestricted
 - Rural Restricted
 - Urban Unrestricted
 - Urban Restricted
- Pollutants and Processes
 - All available pollutants and processes selected including (but not limited to)
 - Total Gaseous Hydrocarbons (all processes)
 - VOCs
 - CO
 - NO_x
 - Primary Exhaust PM_{2.5}
 - Primary Exhaust PM₁₀
 - SO₂
 - Atmospheric CO₂
 - Hazardous Air Pollutants (HAPs)
 - 1,3-Butadiene
 - Acetaldehyde
 - Acrolein
 - Benzene
 - Formaldehyde
- Managed Input Data Sets: Not selected
- Strategies: Rate of Progress: Not selected

- Output
 - General Output:
 - Server none used
 - Database: NESE2_onroad_out
 - Units: Grams, MMBtu, Miles
 - Output Emissions: all defaults used.
- Advanced Performance: None appropriate, or selected.

MOVES results include emission factor values for a range of time frames, both weekend and weekday values as well as summer and winter values. As noted, emission factors for mobile emission sources (on-road and off-road/non-road) vary based on temperature and external conditions, so seasonal variations (and temperature changes) will slightly impact the emission factors generated by MOVES. For each piece of equipment, the most conservative emission factor modeled (winter versus summer, and weekday versus weekend) was selected for use in the emission calculations on a pollutant-by-pollutant basis. While the variability within emission factors generally represented a less than 1% difference across all options, the additional level of conservatism was included to provide the maximum potential emissions in the inventory. Table 6 documents the MOVES emissions factors utilized in this analysis. "MOVES Eq Type" notes the selected MOVES equipment type to represent the specific equipment listed by Transco.

TABLE 6 ON-ROAD MOVES5 EMISSION FACTORS

Description	MOVES Equipment Type	Emission Factors											
		HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3- Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde
Worker Commute Vehicles	Passenger Truck	0.1	3.3	0.2	3.0E-03	2.64E-03	3.2E-03	435.0	1.6E-04	4.6E-04	2.8E-05	1.7E-03	6.3E-04
Company Trucks	Light Commercial Truck	0.1	1.9	1.0	3.74E-02	3.44E-02	1.9E-03	567.6	3.8E-04	5.4E-03	9.4E-04	1.1E-03	1.1E-02
Delivery Trucks	Combination Short-haul Truck	0.1	2.3	4.1	3.08E-02	2.84E-02	5.6E-03	1668.9	6.1E-05	2.6E-03	3.0E-04	1.7E-04	3.0E-03
Water Delivery Trucks	Combination Short-haul Truck	0.1	2.3	4.1	3.08E-02	2.84E-02	5.6E-03	1668.9	6.1E-05	2.6E-03	3.0E-04	1.7E-04	3.0E-03
Contractor trucks	Light Commercial Truck	0.1	1.9	1.0	3.74E-02	3.44E-02	1.9E-03	567.6	3.8E-04	5.4E-03	9.4E-04	1.1E-03	1.1E-02

3.2.3. EXAMPLE ON-ROAD EMISSION CALCULATION

On-road exhaust emissions are calculated by multiplying the total vehicle miles traveled by the emission factor generated by EPA MOVES5. For reference, the MOVES5 outputs have been included in Appendix D.

EQUATION 10:

$$PM_{2.5} \text{ Emissions (tons)} = \frac{EF_{OR} * Total VMT}{907,185 \frac{gram}{ton}}$$

For Equation 10, EF_{OR} = On-Road Emission Factor generated using EPA MOVES5 and Total VMT = Total Vehicle Miles Traveled per vehicle type. Total vehicle miles traveled per day is calculated by taking the quantity of vehicle type estimated to be in use for the Project and multiplying it by the estimated round trip distance of that vehicle. To calculate total vehicle miles traveled by vehicle type for the Project, total vehicle miles traveled per day is multiplied by the anticipated length of time to complete the Project.

From Transco's Base Case Construction Emission Calculations in Appendix C; $PM_{2.5}$ emissions from worker commuter On-Road travel for the Quarryville Loop are estimated as follows:

EQUATION 10 APPLIED TO QUARRYVILLE LOOP:

$$PM_{2.5} \text{ Emissions} = \frac{0.003 \frac{gram}{mile} * 611,280 \text{ miles}}{907,185 \frac{gram}{ton}} = 0.002 \text{ tons}$$

For Equation 10, 0.003 gram/mile is the emission factor generated by EPA MOVES5 and 611,280 miles is the estimated total miles of worker commuter vehicle travel for the Quarryville Loop.

3.3 CONSTRUCTION EQUIPMENT EXHAUST EMISSIONS

Emissions associated with construction equipment exhaust are estimated as part of the calculation process. Construction Equipment Exhaust emissions are calculated by multiplying the total equipment work hours by a developed emission factor utilizing the EPA MOVES5 model. Emission factors for on-site construction equipment were calculated using the EPA MOVES5 nonroad model and selecting geographic boundaries for the Project. The equipment data applied included model year distribution, horsepower ratings, load factors, usage activity, and equipment specific emission rates taken from the model's database. For off-road equipment, SO_2 and particulate matter emission factors, a diesel sulfur content of 15 parts per million (ultra-low sulfur diesel fuel) is inherent in the model based on EPA regulations for sulfur-in-fuel effective 2014. For reference, the MOVES5 outputs have been included in Appendix D of the Air Quality Technical Report.

Construction equipment and vehicle usage was based on a work schedule of one 10 hour shift



per day, 6 days per week, unless otherwise noted in the tables. The construction activity tables contain the emission factors and emission rates used in the analysis. An example calculation for a Dozer is provided below in Section 3.3.3. It should be noted that the calculation process is identical for all emissions related to construction equipment exhaust.

3.3.1. ACTIVITY FACTORS

Non-road exhaust emissions are based on phasing and construction information provided by the Transco Project team, and where available, Transco's construction contractors. Based on the nature of the Project and timing of the FERC process, equipment listings and usage included in the original RR9 submittal and supplemental fillings are based on Transco's experience with similarly sized projects; updated to reflect current construction schedule and plan as applicable. Table 7 provides the non-road equipment listings from Appendix C for the Quarryville loop, and includes the information provided by Transco and updated by the construction contractor. The type of equipment included in the inventory and the number of each equipment anticipated in use on any given day are shown. Similar equipment listing information for the other aspects of the Project can be found in Appendix C.

TABLE 7 QUARRYVILLE CONSTRUCTION EQUIPMENT

Description	Quantity¹²	Average Hours Per Day	Days of Operation¹³	Total Work Hours for Project
Tractor W/Trailer	6	9	136	7,335
Air Compressor	6	8	136	6,520
Generator	5	4	136	2,717
RT Hoe	2	9	136	2,445
Welding Rigs	20	9	136	24,451
Front End Loader	2	9	136	2,445
Dozer	6	9	136	7,335
Excavator	8	9	136	9,780
Side Boom	10	9	136	12,226

¹² Please note the quantity of equipment is not necessarily a whole number as it's based on a calculated quantity of equipment anticipated onsite over the course of the construction period.

¹³ Total project length is estimated to be 136 days.

3.3.2. NON-ROAD EMISSION FACTORS

What was previously known as the NONROAD model has been incorporated into the MOVES emission factor model. The MOVES2014b (MOVES) emission model was originally used in early 2017, updated as appropriate, to develop the emission factors for the Project using the latest version of the model (MOVES5). The following summarizes the MOVES inputs used for developing the off-road/construction emission factor data sets provided in this technical report and its appendices:

- Description (optional): NESE Construction EF
- Scale:
 - Model: Nonroad
- Domain/Scale: National (only option available)
 - Calculation type: Inventory (only option available)
- Time Spans:
 - Time Aggregation Level: N/A (not an option for non-road)
 - Select year: 2026
 - Days: Workday and Weekday (both selected)
 - Months: January and July (winter and summer used to confirm most conservative emission factor, by pollutant, used for annual basis)
 - Hours: N/A (not an option for non-road)
- Geographic Boundaries:
 - Region: County
 - New York Queens County
- Vehicles/Equipment - Nonroad Vehicles:
 - 4 fuel/sector combinations selected:
 - Diesel Fuel Commercial
 - Diesel Fuel - Construction
 - Gasoline - Commercial
 - Gasoline - Construction
- Road Type: Nonroad (only option available)
- Pollutants and Processes:
 - All available pollutants and processes selected including:
 - Total Gaseous Hydrocarbons (all processes)
 - CO (only Running Exhaust available)

- NO_x (only Running Exhaust available)
- Primary Exhaust PM_{2.5} Total (only Running Exhaust available)
- Primary Exhaust PM₁₀ Total (only Running Exhaust available)
- SO₂ (only Running Exhaust available)
- Break Specific Fuel Consumption (only Running Exhaust available)
- Atmospheric CO₂
- Managed Input Data Sets: Not selected
- Strategies: Rate of Progress: Not selected
- Output
 - General Output:
 - Server none used
 - Database: NESE_nonroad
 - Units: Grams, MMBtu, Miles
 - Output Emissions: all defaults used.
- Advanced Performance: None appropriate, or selected.

Following the MOVES5 emission factor process, the system post-processing script was used to generate emission factors. Specifically, under "Post-Processing" the "Run MySQL Script on Nonroad Output Database" was selected. Additionally, the "EmissionFactors_per_hphr_by_Equipment_and_Horsepower.sql" script was selected. This script produced a comma separated values file for all results by MOVES equipment description (as opposed to SCC or other equipment code).

MOVES results include emission factors values for a range of time frames, both weekend and weekday values, in addition to summer and winter values. As noted, emission factors for mobile emission sources (on-road and off-road/non-road) vary based on temperature and external conditions, so seasonal variations (and temperature changes) will slightly impact resulting emission factors as provided by MOVES. For each piece of equipment, the most conservative emission factor modeled (winter versus summer and weekday versus weekend) was selected for use in the emission calculations on a pollutant-by-pollutant basis. While the variability within emission factors generally represented a less than 1% difference across all options, the additional level of conservatism was included to provide the maximum potential emissions in the inventory.

Table 8 below documents the Non-Road Emission Factors utilized in this analysis. "MOVES Eq Type" notes that selected MOVES equipment type to represent the specific equipment proposed for use by Transco's sub-contractor. "Assumed Capacity (hp)" is the size in horsepower as provided

by Transco's sub-contractor. Emission factors from MOVES are separated by "hp-bins" which note emission factors for a range of horsepower rates (e.g. given a listed assumed capacity of 202, the MOVES emission factor in the "100<hp<300" bin listing would be used).

TABLE 8 NON- ROAD MOVES5 EMISSION FACTORS

Equipment Type	MOVES Equip Type	Assumed Capacity (hp)	NONROAD Emission Factors (g/hp*hr)						
			HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
Tractor W/Trailer	Off-Highway Tractors	320	0.03	0.18	0.47	0.03	0.03	1.47E-03	536.75
Air Compressor	Air Compressors	85	0.04	0.39	1.34	0.07	0.07	1.63E-03	590.23
Generator	Generator Sets	13	4.83	271.43	2.60	0.11	0.10	7.60E-03	1046.90
RT hoe	Tractors/Loaders/Backhoes	330	0.18	0.78	1.33	0.16	0.15	1.83E-03	625.97
Crane	Cranes	185	0.02	0.07	0.26	0.02	0.01	1.43E-03	530.98
Welding Rigs	Welders	345	0.27	1.50	2.24	0.21	0.20	1.94E-03	625.70
Front End Loader	Tractors/Loaders/Backhoes	95	0.31	2.07	2.21	0.28	0.27	2.03E-03	695.02
Dozer	Crawler Tractor/Dozers	410	0.02	0.14	0.38	0.03	0.03	1.46E-03	536.76
Excavator	Excavators	350	0.02	0.10	0.26	0.02	0.02	1.44E-03	536.77
Side boom	Cranes	330	0.04	0.19	0.69	0.03	0.03	1.49E-03	530.92
HDD Rig	Bore/Drill Rigs	800	0.18	0.77	3.81	0.13	0.13	1.61E-03	530.46
RT Forklift	Rough Terrain Forklifts	185	0.02	0.11	0.33	0.02	0.02	1.45E-03	536.75
60 ft Man lift	Cranes	95	0.02	0.20	1.06	0.04	0.03	1.59E-03	590.30
Ramax Compactor	Rollers	22	5.13	274.04	2.68	0.12	0.11	7.59E-03	1045.87

3.3.3. EXAMPLE NON-ROAD EMISSION CALCULATION

Construction Equipment Exhaust emissions are calculated by multiplying the total equipment work hours by an EPA MOVES5 developed emission factor. For reference the MOVES5 output files have been included in the Air Quality Technical Report Appendix D.

EQUATION 11:

$$PM_{2.5} \text{ Emissions (tons)} = \frac{EF_{CE} * HP * \text{Total Work Hours}}{907,185 \frac{\text{gram}}{\text{ton}}}$$

For Equation 11, EF_{CE} = construction equipment exhaust emission factor generated using EPA MOVES5; HP = assumed equipment horse power; and Total Work Hours = Estimated Total Equipment Work Hours. An example calculation of $PM_{2.5}$ emissions from the operation of a Cat 6 Dozer is provided below. From Transco's Base Case Construction Emission Calculations in Appendix C; $PM_{2.5}$ emissions from Dozer Construction Equipment Operation for Quarryville Loop are estimated as follows:

EQUATION 11 APPLIED TO QUARRYVILLE LOOP:

$$PM_{2.5} \text{ Emissions} = \frac{0.03 \frac{\text{gram}}{\text{hp} * \text{hour}} * 410 \text{ hp} * 7,335 \text{ hours}}{907,185 \frac{\text{gram}}{\text{ton}}} = 0.1 \text{ tons}$$

Where 0.03 gram per horsepower-hour is the EPA MOVES5 generated emission rate; 410 is the rated equipment horsepower; and 7,335 hours is the estimated hours of operation for dozers as part of Quarryville Loop as shown in the Base Case Project Emissions table in the Quarryville Loop section of Appendix C.

3.4 MARINE VESSEL & MARINE EQUIPMENT EXHAUST EMISSIONS

Emissions associated with marine vessel exhaust and associated marine equipment exhaust is estimated as part of the calculation process. Marine vessel and marine equipment are used to lay the pipeline and bury it under the seafloor for the Raritan Bay Loop phase of the Project. Exhaust emissions are calculated by multiplying the total equipment work hours by a developed emission factor. Emission factors for the marine vessel engines were taken from *USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories (2009)*. The SO_2 and particulate matter emission factors were corrected accordingly for marine vessel engines to account for a diesel sulfur content of 15 parts per million (ultra-low sulfur diesel fuel). Emission factors for additional marine equipment that support marine activities, such as diesel fueled generator sets, are developed utilizing the nonroad model in the EPA MOVES5 model. Emission factors for this additional marine activity equipment are calculated using the nonroad model within the EPA MOVES5 model populated with regionally specific equipment data. The equipment data applied included model year distribution, horsepower ratings, load factors, usage activity, and

equipment-specific emission rates taken from the model's database. For off-road equipment supporting marine activities, SO₂ and particulate matter emission factors, a diesel sulfur content of 15 parts per million (ultra-low sulfur diesel fuel) is inherent in the model based on EPA regulations for sulfur-in-fuel effective 2014. For reference, the MOVES5 outputs have been included in Appendix D of the Air Quality Technical Report. Marine vessel equipment usage was estimated based on Transco and contractor experience with similar projects. The construction activity tables contain the emission factors and emission rates used in the analysis. An example calculation for a tug boat is provided below in Section 3.4.3. It should be noted that the calculation process is identical for all emissions related to marine equipment exhaust.

3.4.1. ACTIVITY FACTORS

Marine exhaust emissions are based on phasing and construction information provided by the Transco Project team, and where available, Transco's construction contractors. Based on the nature of the Project and timing of the FERC process, equipment listings and usage included in the original RR9 submittal are based on Transco's experience with similar sized projects. For a detailed equipment listing, including equipment type, purpose, and assumed hours of operation, please refer to Appendix C: Raritan Bay Loop Equipment.

3.4.2. MARINE VESSEL EMISSION FACTORS

Marine vessel emissions are associated with the operation of the vessels main and auxiliary engines. Emission factors for the marine vessel engines were taken from USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories (2009). The USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories (2009) does not include emission factors for craft engines rated tier 3 or higher. For those craft engines that Transco anticipates to operate tier 3 or higher engines, the tier 2 engine emission factors have been utilized for all pollutants except NO_x. A NO_x emission factor of 4.3 gram per horsepower-hour is being utilized for tier 3 or higher craft engines.¹⁴ auxiliary engine is to power the vessel during those times when the main engine is not required, i.e. the vessel is in idling mode. As part of the calculation process Transco has estimated auxiliary engine operation where a reasonable estimation could be made (see: Crew Boats). A similar estimation for Tug Boat auxiliary engines has not been made as Transco does not feel a reasonable estimation is possible at this time. As a result Transco has conservatively assumed that all hours of Tug Boat operation will involve the main engine, resulting in a conservative estimate of the emissions attributed to Tug Boat engine operation. As such, no hours of vessel idling have been assumed. Table 9 details the assumed total horsepower¹⁵ and the emission factors utilized for marine vessels.

¹⁴ 40 CFR 1042.101 Table 1: Tier 3 Standards for Category 1 Engines Below 3700 kW

¹⁵ For example, a 2,000 hp tug boat consists of two (2) 1,000 hp category 1, tier II engines.

3.4.3. MARINE NON-ROAD EMISSION FACTORS

Non-vessel marine equipment utilize emission factors developed utilizing the U.S. EPA MOVES5 model consistent with the process outlined in section 3.3.2. Table 10 details the emission factors utilized for non-vessel marine equipment.

TABLE 9 RARITAN BAY MARINE VESSEL EMISSION FACTORS

Equipment Type	Assumed Capacity (hp)	Emission Factors (g/hp-hr)						
		HC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
Tug Boat ¹⁶	660	0.2	3.7	4.3	0.2	0.2	4.9E-03	514.9
Tug Boat ¹⁷	Various	0.2	3.7	5.1	0.2	0.2	4.9E-03	514.9
Crew Boat	Various	0.2	1.9	9.7	0.2	0.2	4.9E-03	514.9
Anchor Barge	99	0.2	1.3	4.3	0.3	0.3	4.9E-03	514.9
W571 Clamshell Barge	1502	0.2	3.7	5.1	0.2	0.2	4.9E-03	514.9
W551 Clam Rig	2545	0.2	3.7	4.3	0.2	0.2	4.9E-03	514.9
Dump Scow	286	0.2	1.1	7.5	0.2	0.2	4.9E-03	514.9

¹⁶ Assumed to be Tier III.¹⁷ Assumed to be Category 1, Tier II

TABLE 10 NON-VESSEL RARITAN BAY MARINE EQUIPMENT EMISSION FACTORS

Equipment Type	MOVES Equipment Type	Assumed Capacity (hp)	Emission Factors (g/hp-hr)						
			HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
Kenworth	Off-highway Trucks	450	0.01	0.03	0.14	0.01	0.01	1.42E-03	536.80
Backhoe	Tractors/Loaders/Backhoes	300	0.18	0.78	1.33	0.16	0.15	1.83E-03	625.97
Drill Rig CAT Power Unit	Bore/Drill Rigs	1750	0.18	0.77	3.81	0.13	0.13	1.61E-03	530.46
Mud Rig Genset-MQ	Generator Sets	350	0.12	0.60	2.00	0.09	0.09	1.65E-03	530.66
Trackhoe - 240	Tractors/Loaders/Backhoes	177	0.18	0.78	1.33	0.16	0.15	1.83E-03	625.97
Forklift - 10,000# & Over	Rough Terrain Forklifts	130	0.02	0.11	0.33	0.02	0.02	1.45E-03	536.75
Forklift - 10,000# & Over	Rough Terrain Forklifts	22	0.32	1.49	3.76	0.17	0.17	2.19E-03	595.15
R.T. Crane 50-75 Ton	Cranes	275	0.02	0.07	0.26	0.02	0.01	1.43E-03	530.98
Triplex Pump	Pumps	540	0.12	0.61	2.00	0.10	0.09	1.65E-03	530.66
Generators	Generator Sets	250	0.15	0.55	2.01	0.11	0.11	1.64E-03	530.56
Drill Rig CAT Power Unit	Bore/Drill Rigs	202	0.12	0.51	1.68	0.10	0.10	1.60E-03	530.65
Mud Rig & Reclaimer Pumps	Pumps	25	0.34	1.58	3.84	0.18	0.18	2.17E-03	589.29
400 Amp Welder	Welders	32.7	0.31	1.36	3.21	0.22	0.21	2.03E-03	695.03
20kW Generator	Generator Sets	30	0.17	0.67	3.03	0.11	0.11	1.71E-03	589.81
Light Plant	Signal Boards/Light Plants	24.8	0.32	1.53	3.78	0.18	0.17	2.17E-03	589.34



Equipment Type	MOVES Equipment Type	Assumed Capacity (hp)	Emission Factors (g/hp-hr)						
			HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
250 cfm Aircompressor	Air Compressors	80	0.04	0.39	1.34	0.07	0.07	1.63E-03	590.23
Crawler Crane	Cranes	95	0.02	0.20	1.06	0.04	0.03	1.59E-03	590.30
W751 Generator	Generator Sets	425	0.12	0.60	2.00	0.09	0.09	1.65E-03	530.66
W751 Aux Generator	Generator Sets	160	0.17	0.63	2.28	0.14	0.14	1.65E-03	530.50
Jacking Compressors	Air Compressors	525	0.07	0.35	1.20	0.06	0.05	1.56E-03	530.83
50T Cherry picker	Other Construction Equipment	250	0.03	0.14	0.41	0.03	0.03	1.46E-03	536.74
W750 Generator	Generator Sets	325	0.12	0.60	2.00	0.09	0.09	1.65E-03	530.66
W541-Hoist Engine	Cranes	400	0.04	0.19	0.69	0.03	0.03	1.49E-03	530.92
W541-Swing Engine	Cranes	525	0.04	0.19	0.69	0.03	0.03	1.49E-03	530.92
W541-Auxiliary Generator	Generator Sets	85	0.22	1.35	2.85	0.22	0.22	1.84E-03	589.66
Deck Winch #1	Other Construction Equipment	238	0.03	0.14	0.41	0.03	0.03	1.46E-03	536.74
Deck Winch #2	Other Construction Equipment	160	0.03	0.17	0.51	0.04	0.04	1.46E-03	536.74
110kW Diesel Hydraulic Power Unit	Other Construction Equipment	147	0.03	0.17	0.51	0.04	0.04	1.46E-03	536.74
150 Tonne SWL Diesel Hydraulic Spooling Winch	Other Construction Equipment	248	0.03	0.14	0.41	0.03	0.03	1.46E-03	536.74
Manitowoc 1100	Cranes	332	0.04	0.19	0.69	0.03	0.03	1.49E-03	530.92
Deck Winches	Other Construction Equipment	300	0.03	0.14	0.41	0.03	0.03	1.46E-03	536.74

Equipment Type	MOVES Equipment Type	Assumed Capacity (hp)	Emission Factors (g/hp-hr)						
			HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
M4000 Crane	Cranes	400	0.04	0.19	0.69	0.03	0.03	1.49E-03	530.92
W263 Deck Winches	Other Construction Equipment	225	0.03	0.14	0.41	0.03	0.03	1.46E-03	536.74
W061 Deck Winches	Other Construction Equipment	300	0.03	0.14	0.41	0.03	0.03	1.46E-03	536.74
1250kw Generator	Generator Sets	1676	0.12	0.60	2.00	0.09	0.09	1.65E-03	530.66
Toyo Pump	Pumps	425	0.12	0.61	2.00	0.10	0.09	1.65E-03	530.66
Komatsu PC 1250 (Hyd Excavator)	Excavators	675	0.02	0.14	0.26	0.02	0.02	1.44E-03	536.77
Komatsu PC 360 (Hyd Excavator)	Excavators	270	0.01	0.03	0.14	0.01	0.01	1.42E-03	536.80
Komatsu WA 420 (Loader)	Tractors/Loaders/Backhoes	220	0.18	0.78	1.33	0.16	0.15	1.83E-03	625.97

3.4.4. EXAMPLE MARINE VESSEL EMISSION CALCULATION

Marine Vessel Exhaust emissions are calculated by multiplying the total vessel work hours by a developed emission factor. For reference the marine vessel emission factors are detailed in Table 9.

EQUATION 12:

$$PM_{2.5} \text{ Emissions (tons)} = \frac{EF_v * HP * \text{Total Work Hours} * LF}{907,185 \frac{\text{gram}}{\text{ton}}}$$

For Equation 12, EF_v = marine vessel exhaust emission factor *USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories (2009)*; HP = assumed total equipment horse power; Total Work Hours = Estimated Total Equipment Work Hours; and LF = EPA guidance load factor from *USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories (2009)*. An example calculation of $PM_{2.5}$ emissions from the operation of a 2000 hp Tug Boat is provided below. From Transco's Base Case Construction Emission Calculations in Appendix C; $PM_{2.5}$ emissions from Tug Boat Vessel Operation for Raritan Bay Loop are estimated as follows:

EQUATION 12 APPLIED TO RARITAN BAY LOOP:

$$PM_{2.5} \text{ Emissions} = \frac{0.19 \frac{\text{gram}}{\text{hp} * \text{hour}} * 2000 \text{ hp} * 33,362 \text{ hours} * 0.79}{907,185 \frac{\text{gram}}{\text{ton}}} = 11.2 \text{ tons}$$

Where 0.19 gram per horsepower-hour is the emission factor from *USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories (2009)*; 2000 is the vessel total horsepower; 33,362 hours is the estimated hours of operation for all 2000 hp Tug Boats as part of Raritan Bay Loop as shown in Appendix C; and 0.79 is the load factor from *USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories (2009)*.



APPENDIX B CONSTRUCTION EQUIPMENT SUMMARY

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1. INTRODUCTION

This appendix describes the equipment proposed to construct the Transcontinental Gas Pipe Line Company, LLC (Transco) Northeast Enhancement Supply Project (NESE or Project). Transco has estimated the various equipment types and hours of operation needed for construction to estimate potential air quality impacts. In order to estimate the needed equipment and usage, Transco relied upon its experience with similar projects, its engineering experience with construction needs, and consultation with its installation subcontractors where applicable. Transco's NESE Project features both onshore and offshore construction components which by their nature employ different equipment types. Consequently, and for purposes of this analysis, the equipment type and usage have been separated into onshore and offshore sections. More specifically, Sections 2 and 3 describe the proposed construction equipment types and primary usage for the onshore and offshore components, respectively.

2. ONSHORE CONSTRUCTION EQUIPMENT SUMMARY

Onshore construction activities associated with the Project involve components located in Pennsylvania, New Jersey, and New York including:

- 10.17 miles of new 42-inch-diameter pipeline co-located with the existing Transco Mainline in Drumore, East Drumore, and Eden Townships, Lancaster County, Pennsylvania (Quarryville Loop).
- Addition of one electric motor-driven compressor (21,902 horsepower) and related ancillary equipment to Transco's existing Compressor Station 200 in Chester County.
- 3.43 miles of new 26-inch-diameter pipeline co-located with the existing Transco Mainline in Old Bridge Township and Borough of Sayreville, Middlesex County, New Jersey (Madison Loop).
- 0.16 mile of new 26-inch-diameter pipeline co-located with the existing Transco Mainline in Sayreville, Middlesex County (onshore portion of Raritan Bay Loop, NJ).
- A new 32,000 ISO horsepower compressor station (Compressor Station 206) in Somerset County.

For a summary of onshore construction activities please refer to Section 1.1 of the Air Quality Technical Report. Table 1 provides a detailed list of the onshore construction equipment including the equipment class, type, and use. The list of onshore equipment properties including equipment type, MOVES Equipment Type for Emission Factor, fuel type, and assumed capacity (horsepower or hp) are provided in Appendix C, by project element (Quarryville Loop, Compressor Station 200, Compressor Station 206, and Madison Loop). Other key assumptions related to onshore construction, such as equipment hours of operation and vehicle miles traveled, can be found in the following sections of Appendix C: Quarryville Loop, Compressor Station 200, Compressor Station 206 and Madison Loop.

TABLE 1 **ONSHORE CONSTRUCTION EQUIPMENT**

Equipment Class/Type	Equipment Type	Equipment Use	
Tractors, Dozers, Excavators	Dozers	Primary	Clearing brush, grading, backfill pipeline trench, and restoring the right-of-way contours for final clean up.
		Secondary	Aid in winching equipment in steep hills.
	Backhoe	Primary	Trench pipeline ditch, excavate soil/fractured rock trenches across streams, excavate soil for boring pits, assist with lifting and positioning line pipe for tie-in.
		Secondary	Lift pipe from stringing trailers to side of pipeline trench, lowering in of line pipe into pipeline trench.
	Side Booms	Primary	Placing pipe to be bent in and out of bending machine, lift and position line pipe for welding, lower pipeline into trench after welding is completed.
	Tractor	Primary	Utility Use - material handling in yard, exposing foreign utility crossings, aid in placing silt sock (erosion control devices), loading construction debris into trucks.
	Loader	Primary	Loading/Unloading soil from pipeline right of way and loading crushed rock from access roads into trucks.
	Tractor	Primary	Initial tall grasses and brush clearing for storage yards, staging areas.
		Secondary	Maintaining sections of the ROW that has been restored before project closeout.
	Tractor	Primary	Utility tractor to pull a propane tank. The ends of the line pipe must be heated prior to welding to improve the integrity of the weld.
Air Compressor	Air Compressor	Primary	Sandblast the girth welds (i.e., joining the sections of pipe) in preparation of applying coating to the weld areas.
		Primary	Dewatering of the pipeline after hydrostatic testing is complete, displace a caliper tool within the pipeline after testing is complete , and

Equipment Class/Type	Equipment Type	Equipment Use	
			displacing foam 'pigs' to facilitate removing residual water from the hydrostatic test.
Fork Lift	Fork Lift	Primary	Used in pipe yards and mat yards to load/unload fittings and mats, set mats in wetland areas along the pipeline right of-way.
Graders	Graders	Primary	Stripping and replacing topsoil, snow removal, and maintenance of county and access roads.

Note:

^a Equipment uses identified in table are the normal utilization of stated equipment.

^b For clarity purposes, construction industry uses the terms "excavator" and "trackhoes" (a.k.a. hoes for short) interchangeably. Both terms relate to equipment with tracks, and large buckets at the end of booms used to remove(or place) fill material. Specifically rubber tired hoes (also referred to as backhoes) are tractors that have a scoop on the front and excavating appurtenances on the rear. They are used in light duty applications.

3. OFFSHORE CONSTRUCTION EQUIPMENT SUMMARY

Offshore construction activities associated with the Project involve components located in New Jersey and New York including:

- 5.96 miles of new 26-inch-diameter pipeline offshore in New Jersey waters (offshore portion of Raritan Bay Loop).
- 17.38 miles of new 26-inch-diameter pipeline offshore in New York waters (offshore portion of Raritan Bay Loop).

To complete the Project installation, Transco plans to use a combination of installation methods including the clamshell dredge, jet trencher, hand jets, and the horizontal directional drill (HDD). For a more detailed summary of the proposed offshore construction activities, please refer to Sections 1.3 and 1.4 of Resource Report 1, dated March 27, 2017, Transco's Supplemental Filing #3 dated September 7, 2017, and the responses to the Draft Environmental Impact Statements (Draft EIS), dated May 1, 2018 and November 29, 2018.

3.1 OFF-SHORE EQUIPMENT ASSUMPTIONS

The specific construction-related assumptions that inform the calculation of emissions from offshore construction are the same as the assumptions previously used for the emissions calculations that the GCD is based on, and include but are not limited to:

- The specific equipment and construction activities associated with the emission estimates, including dredging activities as outlined in Section 1.4 of Resource Report 1 (see Table 2).
- The disposition of the dredge material, including the volume assumed to go to the Historic Area Remediation Site (HARS) and the volume assumed brought onsite (see Table 2)
- Marine Vessel travels includes all operations within the Air Quality Region which extends 3 miles into the international waters of the Atlantic Ocean. (See Appendix C - Raritan Bay Loop Equipment Emissions).
- The travel hours required to transport equipment, which is based on a distance from shore for various activities to intermediate storage or staging areas (see Appendix C - Raritan Bay Loop Equipment Emissions). The travel hours to transport HDD equipment were specifically included in these calculations. A one hour one-way transit time was assumed for trucks mobilizing and then also de-mobilizing equipment to the onshore project worksites.
- The tier of the engine that forms the basis for the emission factor (see Appendix C - Raritan Bay Loop Emission Factors). The selection of tiers for specific engines was determined in consultation with the offshore installation contractor based off of known equipment types available for this project.
- The pipeline depth of cover used and associated volumes as presented in Table 2.

- Disposition of the dredged materials. The volumes of dredged material, as well as labels as to what is expected to go to upland processing facilities and what volume is expected to be transported to HARS, is included in Table 2 below.
- A clamshell rig will dredge the specified volume of material and place it on scow barges for tug transport to either an upland material processing site or the HARS. The emissions associated with dredging and transporting the material were calculated based on the operating hours of the clamshell, the engines to operate the split hull of the scow barge for HARS disposal (sealed barges used for upland disposal do not have emitting engines), and the tugs to transport the scow barges. Round trip distance was not calculated, as the operation is planned to be a 12 hour operation in the case of upland disposal and 24 hour operation in the case of HARS disposal.

For reinstatement activities, the same calculations apply to the Project as follows:

Clamshell dredger or suction hopper dredge will dredge the material from the borrow site, the material will be transported by scow barge via tug to the reinstatement site, and a clamshell will use material from the scow barge to backfill the site. The emissions of these clamshells and associated tugs have been accounted for on a 24 hour per day operating basis.

As requested by FERC, in Request No. 1 of the Information Request, proposed sites include:

- Proposed Borrow Sites
 - Jamaica Bay
 - Ambrose Channel
 - Navy Earle
- Proposed upland processing sites:
 - Clean Earth Dredging Technologies, LLC, Koppers DMRF - Kearny, NJ 07032
 - Clean Earth Dredging Technologies, LLC, Claremont DMRF, Jersey City, NJ 07305

After dockside processing and offload of upland designated dredged material, the material will be transported by truck to upland disposal sites. The emissions calculations assumed 18 cubic yards, with trucks travelling a round trip distance of 240 miles or less (6 hours) to the disposal site and back.

In addition, Table 2 provides a summary list of the proposed offshore construction equipment including the equipment class, type, and use. The list of a summary of the offshore equipment properties including equipment type, Emission Factor Source/MOVES Equipment Type, fuel type, and assumed equipment capacity (hp) are provided in Appendix C, by project element (Raritan Bay Loop and Raritan Bay Loop Equipment). In addition, Appendix C: Raritan Bay Loop and Raritan Bay Loop Equipment contains a comprehensive list of the proposed marine equipment and descriptions including construction phase, activity, equipment type, pieces of equipment, horsepower, fuel type, description of the equipment, and specific task being performed. Other assumptions are found in the footnotes to specific tables.

3.2 REQUESTED, ADDITIONAL SCENARIOS ASSUMPTIONS

In response to Item 2 from the FERC Data Request dated October 23, 2018, air emission calculations were provided for the three (3) additional scenarios described below, for a total of four (4) scenarios. Updated emission calculations for these three scenarios are also provided herein .

Additional Scenario #1: 15 foot depth of cover within navigational channels, 7 ft depth of cover in anchorage area 28, no disposal at HARS

- *Increased Total Dredging and Backfill Volumes*
- *Equipment and construction activity differences:* Additional upland processing, additional tug support required for transporting scows of upland designated material and upland processing logistics
- *Marine Vessel travels changes:* Offshore soil transport
- *Transport travel requirements*
- *Associated Dredging and reinstatement volumes of the following locations:*
 - Raritan Channel: 290,470 CuYd Upland
 - The volume of Raritan Channel has been revised due to an increase in channel controlling depth. This volume reflects an optimized dredge profile.
 - Chapel Hill Channel: 131,729 CuYd Upland
 - Anchorage Area: 55,379 CuYd Upland
 - The volume of the anchorage area has been adjusted to account for the larger neighboring dredge prism of Chapel Hill Channel
- *Upland processing and onshore transport of the dredged materials.*

Additional Scenario #2: 15 foot depth of cover within navigational channels, 7 ft depth of cover within anchorage area 28, use of HARS for all non-class C dredge prisms

- *Equipment and construction activity differences:* limited dredging rates for upland designated material
- *Marine Vessel travels changes, including offshore soil transport*
- *Transport travel requirements.*
- *Associated Dredging and reinstatement volumes of the following locations:*
 - Raritan Channel: 290,470 CuYd Upland
 - Chapel Hill Channel: 120,960 CuYd HARS, 10,769 CuYd Upland
 - Anchorage Area: 44,490 CuYd HARS and 10,889 CuYd Upland
- *HARS Disposition, upland processing and onshore transport of the dredged materials.*

Additional Scenario #3: 15 foot depth of cover within navigational channels, 7 ft depth of cover within anchorage area 28, use of HARS for all non-class C dredge prisms except Raritan, and sidecast of dredged material in anchorage 28 and eastward of the Rockaway Neptune crossing

- *Equipment and construction activity differences:* No scows required to transport dredged material. Dredging spreads for sidecasted areas do not require tug support for scows to transport dredger material. Backfill mining is not required for sidecast areas.
- *Volume of backfill material reduced*
- *Marine Vessel travels changes:* including offshore soil transport
- *Transport travel requirements.*
- *Associated Dredging and reinstatement volumes of the following locations:*
 - Raritan Channel: 317,531 CuYd HARS, 39,970 CuYd Upland
 - The volume of Raritan Channel dredged material is larger in the HARS acceptable case to match USACE submitted prisms. The dredge profile has since been optimized if material is required to be sent upland.
 - Chapel Hill Channel: 120,960 CuYd HARS, 10,769 CuYd Upland
 - Anchorage Area: 44,490 CuYd HARS and 10,889 CuYd Upland
- *HARS disposition, upland processing and onshore transport of the dredged material*

TABLE 2 ONSHORE CONSTRUCTION EQUIPMENT

Equipment Class	Equipment Type	List	Equipment Use	
Marine Vessels	Shallow Water Pipelay Barge	Caterpillar 3412 DITA, Volvo D12 MG-RC, GE6 for Pipelay	Primary	Generators provide power to pipelay barge for pipeline installation from MP12.5 to MP35.49. Activities include pipeline welding, NDE, FJC application, mooring winch operation, crane operation.
	Tug Boats	660 HP Tug 1500 HP Tug 2000 HP Tug	Primary	Anchor handling tugs and towing support for pipe delivery barges, material barge for concrete mattresses, jet trenching barge, diving barge, clamshell dredge, clamshell backfill, and dredge/backfill material scow barges.
			Secondary	Used as guard boats to monitor project area and prevent recreational marine users from interrupting pipelay operations
	Crew/Utility Boats	Crew Boats Samantha Miller LCV HDD Water Delivery OSV Guard Vessel	Primary	Transfer personnel and/or supplies from shorebase to offshore working sites
			Secondary	Used as guard boats to monitor project workspace, set workspace buoys, and prevent other vessels from interrupting pipelay or HDD operations
	Anchor Barge	Anchor Barge #37	Primary	Deck barge with A-frame to lift and deploy anchors in shallow water depth.
	Dive Barge	Crane Barges	Primary	Diving and installation operations such as pile installation, spool installation, cable crossing arrangements installation, and spool leak checks
			Secondary	Assist in pre-commissioning operations including flooding, cleaning, gauging and dewatering of pipeline.
	Crane Barge	W541 Crane Barge	Primary	Install fixed shallow water platform, goal posts for offshore HDDs, mooring piles, and shore pull guide piles.
			Secondary	Support offshore HDD operations.

Equipment Class	Equipment Type	List	Equipment Use	
	Clamshell Dredger	W551 Clam Rig	Primary	Dredging and reinstatement of the following locations: - Morgan Transition (MP12.5-MP16.6): 41,979 CuYd Upland; 133,694 CuYd HARS; 243,448 CuYd Reinstatement - Corrosion Protection Cable HDD Pit: 461 CuYd Upland; 615 CuYd Reinstatement - Raritan Channel: 39,970 CuYd Upland, 317,532 CuYd HARS; 476,670 CuYd Reinstatement - Chapel Hill Channel: 120,960 CuYd HARS, 10,789 CuYd Upland; 175,639 CuYd Reinstatement - Morgan HDD Pit: 9,931 CuYd Upland; 13,241 CuYd Reinstatement - Ambrose HDD West Pit: 14,050 CuYd HARS, 18,733 CuYd Reinstatement - Ambrose HDD East Pit: 32,450 CuYd HARS; 43,267 CuYd Reinstatement - Anchorage Area: 44,490 CuYd HARS, 10,889 CuYd Upland, 73,839 CuYd Reinstatement - Neptune to RDL Tie-in: 13,152 CuYd HARS; 17,536 CuYd Reinstatement - Additional Chapel Hill Transition (MPs 25.2 to 25.6): 14,778 CuYd Upland, 19,704 CuYd Reinstatement - VC64 Clamshell Segment (MPs 33.5 to MP 33.9): 16,790 CuYd Upland, 22,387 CuYd Reinstatement
			Secondary	Mining at borrow site locations
	Dump Scow	Scow Barges	Primary	Transit material to HARS or upland disposal processing facilities
			Secondary	Transport backfill material from borrow sites to reinstatement locations
Dozer/Excavator/Loader	Hoe	Backhoe, Trackhoe	Primary	Excavate and backfill soil for onshore HDD pit
			Secondary	Assist in performing loading and unloading operations and movement of smaller materials and tools
	Excavator	Komatsu PC 1250, Komatsu PCC 360	Primary	Soil loading and offloading at upland processing facilities
			Secondary	Soil handling - dredging and reinstatement operations
Winches	Deck Winches	Deck Winches, W263 Deck Winches, W061 Deck Winches	Primary	Ancillary tools for handling equipment on deck of barges
			Secondary	Utilized for mooring and anchoring jet trencher vessel.



APPENDIX C

CONSTRUCTION DATA AND DETAILED
RESULTS



Summary of 2026 Construction Emissions (tons)									
Location	Non-Attainment Designation*	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	HAPs
Lancaster County	NT - 8 hr Ozone (2008) MT - 24 hr PM2.5 (2006)	0		0		0	0		
So. NJ/Phil/Wilmington Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	0		0		0	0		
No. NJ/NY/CT Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	0.04		1.4		0.8	1.62E-03		

*Locations are designated as in attainment for all other pollutants.

Key:

NT = Nonattainment

MT = Maintenance

CO = Carbon monoxide

VOC = Volatile organica compounds

NO_x = Oxides of Nitrogen

PM_{xx} = Particulate Matter smaller than X.X micrometers

SO₂ = Sulfur Dioxide

Summary of 2027 Construction Emissions (tons)									
Location	Non-Attainment Designation*	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	HAPs
Lancaster County	NT - 8 hr Ozone (2008) MT - 24 hr PM2.5 (2006)	3.4		30.7		21.8	4.53E-02		
So. NJ/Phil/Wilmington Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	1.5		11.6		1.6	1.52E-02		
No. NJ/NY/CT Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	29.0		672.5		75.6	42.1		

*Locations are designated as in attainment for all other pollutants.

Key:

NT = Nonattainment

MT = Maintenance

CO = Carbon monoxide

VOC = Volatile organica compounds

NO_x = Oxides of Nitrogen

PM_{xx} = Particulate Matter smaller than X.X micrometers

SO₂ = Sulfur Dioxide



Quarryville Loop - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
Totals				1,358	136	22.6	

Hours per day = 10
Days per week = 6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO _x	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	6	324	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	6	288	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	5	120	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
RT hoe	Tractors/Loaders/Backhoes	2	108	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
Welding Rigs	Welders	20	1080	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
Front End Loader	Tractors/Loaders/Backhoes	2	108	Diesel	95	29.1	196.8	209.9	26.8	26.0	0.2	66,027.2
Dozer	Crawler Tractor/Dozers	6	324	Diesel	410	9.5	58.9	154.2	10.8	10.5	0.6	220,070.6
Excavator	Excavator	8	432	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	10	540	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.

* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors													
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE	
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	
Worker commute vehicles	Passenger Vehicle	90	50	611,280	0.1	3.3	0.2	0.003	2.64E-03	3.2E-03	435.0	1.6E-04	4.6E-04	2.8E-05	1.7E-03	6.3E-04	no longer available	
Company trucks	Light Commercial Truck	20	50	135,840	0.1	1.9	1.0	3.74E-02	3.44E-02	1.9E-03	567.6	3.8E-04	5.4E-03	9.4E-04	1.1E-03	1.1E-02	no longer available	
Delivery Trucks	Combination Short-haul Truck	1	50	6,792	0.1	2.3	4.1	3.08E-02	2.84E-02	5.6E-03	1668.9	6.1E-05	2.6E-03	3.0E-04	1.7E-04	3.0E-03	no longer available	
Water Delivery Trucks	Combination Short-haul Truck	1	7	650	0.1	2.3	4.1	3.08E-02	2.84E-02	5.6E-03	1668.9	6.1E-05	2.6E-03	3.0E-04	1.7E-04	3.0E-03	no longer available	
Contractor trucks	Light Commercial Truck	45	50	305,640	0.1	1.9	1.0	3.74E-02	3.44E-02	1.9E-03	567.6	3.8E-04	5.4E-03	9.4E-04	1.1E-03	1.1E-02	no longer available	

Total VMT = 1,060,202

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.12E-03	1.70E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

579,547 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	15.57	4.67

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMt	lb/VMt
Paved Roads	0.01	1.45E-03
Unpaved Roads	16.40	1.64

AP-42 Section 13.2.1.3 (1/2011)
AP-42 Section 13.2.2.1 (1/2011)

1,630 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

2.1 1,000 lbs of abrasive

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site grading, excavation, and filling	NA	NA	NA	NA	NA	NA	NA	57.4	17.2	NA	NA	NA
Paved Roads (commuter and delivery vehicles)	NA	NA	NA	NA	NA	NA	NA	3.1	0.8	NA	NA	NA
Unpaved Roads (construction equipment)	NA	NA	NA	NA	NA	NA	NA	13.4	1.3	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	0.0	0.0	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	90	NA	NA	NA	0.0	2.2	0.1	2.01E-03	1.78E-03	2.15E-03	293	2.03E-03
Company Trucks	20	NA	NA	NA	2.11E-02	0.3	0.2	5.59E-03	5.15E-03	2.87E-04	85	2.83E-03
Delivery Trucks	1	NA	NA	NA	6.09E-04	1.71E-02	3.06E-02	2.31E-04	2.12E-04	4.18E-05	12	4.58E-05
Water Delivery Trucks	1	NA	NA	NA	5.83E-05	1.64E-03	2.93E-03	2.21E-05	2.03E-05	4.00E-06	1	4.38E-06
Contractor trucks	45	NA	NA	NA	4.75E-02	0.6	0.4	1.26E-02	1.16E-02	6.46E-04	191	6.36E-03
Construction Equipment Exhaust												
Tractor W/Trailer	6	320	324	7335	0.1	0.5	1.2	0.1	0.1	3.81E-03	1,389	NA
Air Compressor	6	85	288	6520	2.63E-02	0.2	0.8	4.12E-02	3.99E-02	9.96E-04	361	NA
Generator	5	13	120	2717	0.2	10.6	0.1	4.41E-03	4.05E-03	2.96E-04	41	NA
RT hoe	2	330	108	2445	0.2	0.7	1.2	0.1	0.1	1.63E-03	557	NA
Welding Rigs	20	345	1080	24451	2.5	14.0	20.8	2.0	1.9	1.80E-02	5,818	NA
Front End Loader	2	95	108	2445	0.1	0.5	0.6	0.1	0.1	5.20E-04	178	NA
Dozer	6	410	324	7335	0.1	0.5	1.2	0.1	0.1	4.84E-03	1,779	NA
Excavator	8	350	432	9780	0.1	0.4	1.0	0.1	0.1	5.45E-03	2,025	NA
Side boom	10	330	540	12226	0.2	0.9	3.1	0.1	0.1	6.61E-03	2,361	NA
Total Project Emissions					3.4	31.4	30.7	76.6	21.8	4.53E-02	15092.2	1.13E-02



Compressor Station 200 - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
July	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
August	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
September	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
		Totals		1,838	184	31	

Hours per day =

10

Days per week =

6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVG Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	1	54	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	2	96	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	3	72	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
Ext-Boom RT Hoe	Tractors/Loaders/Backhoes	1	54	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
RT Forklift	Rough Terrain Forklifts	1	24	Diesel	185	4.6	20.8	61.3	4.6	4.4	0.3	99,299.3
Welding Rigs	Welders	6	324	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
60 ft Man lift	Cranes	1	48	Diesel	95	2.1	19.4	100.8	3.4	3.3	0.2	56,078.4
Ramax Compactor	Roller	1	24	Gasoline	22	112.8	6,029.0	59.0	2.7	2.5	0.2	23,009.0
Excavator	Excavator	2	108	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	0	0	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
Crane	Cranes	2	108	Diesel	175	28.0	65.5	230.6	15.6	15.2	0.5	92,843.2

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.

* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	19	50	174,648	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	7	50	64,344	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	1	50	9,192	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	8	50	73,536	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available

Total VMT = 321,720

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.12E-03	1.70E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

55,094 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	NA	NA

Fugitives from Dozer (AP-42

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Paved Roads	0.01	1.36E-03
Unpaved Roads	15.57	1.56

AP-42 Section 13.2.1.3 (1/2011)

AP-42 Section 13.2.2.1 (1/2011)

460 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	NA	NA

AP-42 Table 13.2.6

1,000 lbs of abrasive

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site Clearing, Excavation & Filling	NA	NA	NA	NA	NA	NA	NA	3.09E-02	4.67E-03	NA	NA	NA
Paved Roads	NA	NA	NA	NA	NA	NA	NA	0.9	0.2	NA	NA	NA
Unpaved Roads	NA	NA	NA	NA	NA	NA	NA	3.6	0.4	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	19	NA	NA	NA	1.01E-02	0.6	0.0	5.74E-04	5.08E-04	6.13E-04	83.8	5.79E-04
Company Trucks	7	NA	NA	NA	1.00E-02	0.1	0.1	2.65E-03	2.44E-03	1.36E-04	40.3	1.34E-03
Delivery Trucks	1	NA	NA	NA	8.24E-04	2.32E-02	4.15E-02	3.12E-04	2.87E-04	5.66E-05	16.9	6.20E-05
Contractor trucks	8	NA	NA	NA	1.14E-02	0.2	0.1	3.03E-03	2.79E-03	1.55E-04	46.0	1.53E-03
Construction Equipment Exhaust												
Tractor W/Trailer	1	320	54	1655	1.56E-02	0.1	0.3	1.84E-02	1.79E-02	8.59E-04	313.3	NA
Air Compressor	2	85	96	2941	1.19E-02	0.1	0.4	1.86E-02	1.80E-02	4.49E-04	162.7	NA
Generator	3	13	72	2206	0.2	8.6	0.1	3.58E-03	3.29E-03	2.40E-04	33.1	NA
Ext-Boom RT Hoe	1	330	54	1655	0.1	0.5	0.8	0.1	0.1	1.10E-03	376.7	NA
RT Forklift	1	185	24	735	3.69E-03	1.68E-02	4.97E-02	3.70E-03	3.59E-03	2.18E-04	80.5	NA
Welding Rigs	6	345	324	9927	1.0	5.7	8.5	0.8	0.8	7.32E-03	2,362.2	NA
60 ft Man lift	1	95	48	1471	3.41E-03	3.15E-02	0.2	5.44E-03	5.28E-03	2.45E-04	90.9	NA
Ramax Compactor	1	22	24	735	0.1	4.9	4.78E-02	2.17E-03	1.99E-03	1.35E-04	18.7	NA
Excavator	2	350	108	3309	2.31E-02	0.1	0.3	2.58E-02	2.50E-02	1.84E-03	685.3	NA
Crane	2	175	108	3309	0.1	0.2	0.8	0.1	0.1	1.84E-03	338.7	NA
Total Project Emissions					1.5	21.2	11.6	5.5	1.6	1.52E-02	4648.9	3.51E-03



Compressor Station 206 - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
July	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
August	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
September	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
October	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
Totals				2,078	208	35	

Hours per day = 10
Days per week = 6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	1	54	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	2	96	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	3	72	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
Ext-Boom RT Hoe	Tractors/Loaders/Backhoes	1	54	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
RT Forklift	Rough Terrain Forklifts	1	24	Diesel	185	4.6	20.8	61.3	4.6	4.4	0.3	99,299.3
Welding Rigs	Welders	10	540	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
60 ft Man lift	Cranes	2	96	Diesel	95	2.1	19.4	100.8	3.4	3.3	0.2	56,078.4
Rammax Compactor	Rollers	1	24	Gasoline	22	112.8	6,029.0	59.0	2.7	2.5	0.2	23,009.0
Excavator	Excavator	2	108	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	1	54	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
Crane	Cranes	2	108	Diesel	175	28.0	65.5	230.6	15.6	15.2	0.5	92,843.2

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.

* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	25	50	259,800	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	6	50	62,352	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	2	50	20,784	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	10	50	103,920	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available

Total VMT = 446,856

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

51,686 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	NA	NA

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMt	lb/VMt
Paved Roads	0.01	1.42E-03
Unpaved Roads	14.43	1.44

AP-42 Section 13.2.1.3 (1/2011)
AP-42 Section 13.2.2.1 (1/2011)

624 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	NA	NA

AP-42 Table 13.2.6

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

1,000 lbs of abrasive

Project Emissions

907.185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site Clearing, Excavation & Filling	NA	NA	NA	NA	NA	NA	NA	4.64E-02	7.03E-03	NA	NA	NA
Paved Roads	NA	NA	NA	NA	NA	NA	NA	1.3	0.3	NA	NA	NA
Unpaved Roads	NA	NA	NA	NA	NA	NA	NA	4.5	0.4	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	25	NA	NA	NA	0.0	0.9	0.0	8.54E-04	7.55E-04	9.12E-04	124.6	8.62E-04
Company Trucks	6	NA	NA	NA	9.70E-03	0.1	0.1	2.57E-03	2.36E-03	1.32E-04	39.0	1.30E-03
Delivery Trucks	2	NA	NA	NA	1.86E-03	0.1	0.1	7.06E-04	6.50E-04	1.28E-04	38.2	1.40E-04
Contractor trucks	10	NA	NA	NA	1.62E-02	0.2	0.1	4.28E-03	3.94E-03	2.20E-04	65.0	2.16E-03
Construction Equipment Exhaust												
Tractor W/Trailer	1	320	54	1871	1.77E-02	0.1	0.3	2.08E-02	2.02E-02	9.71E-04	354.2	NA
Air Compressor	2	85	96	3325	1.34E-02	0.1	0.4	2.10E-02	2.04E-02	5.08E-04	183.9	NA
Generator	3	13	72	2494	0.2	9.7	0.1	4.04E-03	3.72E-03	2.72E-04	37.4	NA
Ext-Boom RT Hoe	1	330	54	1871	0.1	0.5	0.9	0.1	0.1	1.25E-03	425.9	NA
RT Forklift	1	185	24	831	4.17E-03	1.90E-02	0.1	4.18E-03	4.05E-03	2.46E-04	91.0	NA
Welding Rigs	10	345	540	18706	1.9	10.7	15.9	1.5	1.5	1.38E-02	4,451.0	NA
60 ft Man lift	2	95	96	3325	7.72E-03	0.1	0.4	1.23E-02	1.19E-02	5.54E-04	205.6	NA
Ramax Compactor	1	22	24	831	0.1	5.5	0.1	2.45E-03	2.26E-03	1.53E-04	21.1	NA
Excavator	2	350	108	3741	2.61E-02	0.1	0.4	2.91E-02	2.83E-02	2.08E-03	774.8	NA
Side boom	1	330	54	1871	2.59E-02	0.1	0.5	2.22E-02	2.16E-02	1.01E-03	361.3	NA
Crane	2	175	108	3741	0.1	0.3	1.0	0.1	0.1	2.08E-03	382.9	NA
Total Project Emissions					2.5	28.7	20.3	7.6	2.5	2.43E-02	7555.8	4.46E-03



Madison Loop - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	12	120	33%	40	4	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	12	120	33%	40	4	1	10-hour work days and 6-day work weeks
		Totals		799	80	13	

Hours per day =
Days per week =

10
6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	6	324	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	6	288	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	5	120	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
RT hoe	Tractors/Loaders/Backhoes	2	108	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
Crane	Cranes	0	0	Diesel	185	3.6	12.1	48.3	2.8	2.7	0.3	96,231.6
Welding Rigs	Welders	14	756	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
Front End Loader	Tractors/Loaders/Backhoes	2	108	Diesel	95	29.1	196.8	209.9	26.8	26.0	0.2	66,027.2
Dozer	Tractors/Loaders/Backhoes	4	216	Diesel	410	9.5	58.9	154.2	10.8	10.5	0.6	220,070.6
Excavator	Excavator	6	324	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	8	432	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
HDD Rig	Bore/Drill Rigs	3	162	Diesel	175	48.8	157.5	574.8	34.6	33.6	0.6	92,776.9

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.
* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	38	50	151,848	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.80E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	15	50	59,940	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	1	50	3,996	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	45	50	179,820	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available

Total VMT = 395,604

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

203,257 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	15.57	4.67

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMt	lb/VMt
Paved Roads	0.01	1.69E-03
Unpaved Roads	19.87	1.99

AP-42 Section 13.2.1.3 (1/2011)
AP-42 Section 13.2.2.1 (1/2011)

839 VMt

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

0.7 1,000 lbs of abrasive

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site grading, excavation, and filling	NA	NA	NA	NA	NA	NA	NA	22.6	6.7	NA	NA	NA
Paved Roads (commuter and delivery vehicles)	NA	NA	NA	NA	NA	NA	NA	1.4	0.3	NA	NA	NA
Unpaved Roads (construction equipment)	NA	NA	NA	NA	NA	NA	NA	8.3	0.8	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	4.71E-03	4.71E-04	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	38	NA	NA	NA	8.80E-03	0.6	0.0	4.99E-04	4.41E-04	5.33E-04	72.8	5.04E-04
Company Trucks	15	NA	NA	NA	9.32E-03	0.1	0.1	2.47E-03	2.27E-03	1.27E-04	37.5	1.25E-03
Delivery Trucks	1	NA	NA	NA	3.58E-04	1.01E-02	1.80E-02	1.36E-04	1.25E-04	2.46E-05	7.4	2.70E-05
Contractor trucks	45	NA	NA	NA	2.90E-02	0.4	0.2	7.40E-03	6.81E-03	3.80E-04	112.5	3.74E-03
Construction Equipment Exhaust												
Tractor W/Trailer	6	320	324	4316	4.08E-02	0.3	0.7	4.81E-02	4.66E-02	2.24E-03	817.1	NA
Air Compressor	6	85	288	3836	1.55E-02	0.1	0.5	2.42E-02	2.35E-02	5.86E-04	212.2	NA
Generator	5	13	120	1598	0.1	6.2	0.1	2.59E-03	2.38E-03	1.74E-04	24.0	NA
RT hoe	2	330	108	1439	0.1	0.4	0.7	0.1	0.1	9.58E-04	327.6	NA
Welding Rigs	14	345	756	10070	1.0	5.8	8.6	0.8	0.8	7.43E-03	2,396.2	NA
Front End Loader	2	95	108	1439	4.61E-02	0.3	0.3	4.25E-02	4.12E-02	3.06E-04	104.7	NA
Dozer	4	410	216	2877	3.00E-02	0.2	0.5	3.44E-02	3.34E-02	1.90E-03	697.9	NA
Excavator	6	350	324	4316	3.01E-02	0.2	0.4	3.36E-02	3.26E-02	2.40E-03	893.7	NA
Side boom	8	330	432	5754	0.1	0.4	1.4	0.1	0.1	3.11E-03	1,111.3	NA
HDD Rig	3	175	162	2158	0.1	0.4	1.4	16.9	5.1	1.33E-03	220.7	NA
Total Project Emissions					1.6	15.3	14.9	50.3	14.2	2.15E-02	7035.5	5.52E-03



Raritan Bay Loop Equipment Emissions

HDD Equipment													
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor	
Morgan Onshore HDD -	MOB	Kenworth	450	16	8.32E-05	2.43E-04	1.08E-03	6.52E-05	6.33E-05	1.13E-05	4.3	-	
		Backhoe	300	48	2.87E-03	1.24E-02	2.10E-02	2.47E-03	2.39E-03	2.90E-05	9.9	-	
		Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-	
	HDD Pilot Hole	Drill Rig CAT Power Unit	1,750	228	0.1	0.3	1.7	0.1	0.1	7.08E-04	233.3	-	
	HDD Hole Opening	Drill Rig CAT Power Unit	1,750	144	0.1	0.2	1.1	3.72E-02	3.61E-02	4.47E-04	147.4	-	
	Pull-back String	Drill Rig CAT Power Unit	1,750	96	3.40E-02	0.1	0.7	2.48E-02	2.40E-02	2.98E-04	98.2	-	
	HDD Pilot Hole	Mud Rig Genset-MQ	350	228	1.06E-02	0.1	0.2	8.05E-03	7.81E-03	1.45E-04	46.7	-	
	HDD Hole Opening	Mud Rig Genset-MQ	350	144	6.69E-03	3.32E-02	0.1	5.08E-03	4.93E-03	9.14E-05	29.5	-	
	Pull-back String	Mud Rig Genset-MQ	350	96	4.46E-03	2.21E-02	0.1	3.39E-03	3.29E-03	6.09E-05	19.7	-	
	HDD Pilot Hole	Trackhoe - 240	177	228	8.04E-03	3.48E-02	0.1	6.91E-03	6.71E-03	8.14E-05	27.8	-	
	HDD Hole Opening	Trackhoe - 240	177	144	5.08E-03	2.20E-02	3.72E-02	4.37E-03	4.24E-03	5.14E-05	17.6	-	
	Pull-back String	Trackhoe - 240	177	96	3.39E-03	1.47E-02	2.48E-02	2.91E-03	2.82E-03	3.43E-05	11.7	-	
	HDD Pilot Hole	Forklift - 10,000# & Over	130	228	8.04E-04	3.67E-03	1.08E-02	8.06E-04	7.81E-04	4.75E-05	17.5	-	
	HDD Hole Opening	Forklift - 10,000# & Over	130	144	5.08E-04	2.32E-03	6.84E-03	5.09E-04	4.94E-04	3.00E-05	11.1	-	
	Pull-back String	Forklift - 10,000# & Over	22	96	7.36E-04	3.47E-03	8.76E-03	3.97E-04	3.85E-04	5.09E-06	1.4	-	
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	228	1.34E-03	4.52E-03	1.80E-02	1.06E-03	1.03E-03	9.87E-05	36.7	-	
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	144	8.46E-04	2.85E-03	1.14E-02	6.67E-04	6.47E-04	6.23E-05	23.2	-	
	Pull-back String	R.T. Crane 50-75 Ton	275	96	5.64E-04	1.90E-03	7.59E-03	4.45E-04	4.32E-04	4.16E-05	15.5	-	
	HDD Pilot Hole	Triplex Pump	540	228	1.64E-02	0.1	0.3	1.30E-02	1.26E-02	2.23E-04	72.0	-	
	HDD Hole Opening	Triplex Pump	540	144	1.04E-02	0.1	0.2	8.19E-03	7.94E-03	1.41E-04	45.5	-	
	Pull-back String	Triplex Pump	540	96	6.91E-03	3.46E-02	0.1	5.46E-03	5.30E-03	9.40E-05	30.3	-	
Morgan Offshore HDD -	MOB	Kenworth	450	10	5.20E-05	1.52E-04	6.76E-04	4.08E-05	3.96E-05	7.03E-06	2.7	-	
		Generators	250	240	1.01E-02	3.63E-02	0.1	7.25E-03	7.03E-03	1.09E-04	35.1	-	
		Kenworth	450	6	3.12E-05	9.10E-05	4.06E-04	2.45E-05	2.37E-05	4.22E-06	1.6	-	
	HDD Pilot Hole	Drill Rig CAT Power Unit	1,750	84	2.98E-02	0.1	0.6	2.17E-02	2.10E-02	2.61E-04	86.0	-	
	HDD Hole Opening	Drill Rig CAT Power Unit	1,750	120	4.25E-02	0.2	0.9	3.10E-02	3.01E-02	3.73E-04	122.8	-	
	Pull-back String	Drill Rig CAT Power Unit	1,750	96	3.40E-02	0.1	0.7	2.48E-02	2.40E-02	2.98E-04	98.2	-	
	HDD Pilot Hole	Mud Rig Genset-MQ	350	84	3.90E-03	1.94E-02	0.1	2.96E-03	2.88E-03	5.33E-05	17.2	-	
	HDD Hole Opening	Mud Rig Genset-MQ	350	120	5.58E-03	2.77E-02	0.1	4.24E-03	4.11E-03	7.62E-05	24.6	-	
	Pull-back String	Mud Rig Genset-MQ	350	96	4.46E-03	2.21E-02	0.1	3.39E-03	3.29E-03	6.09E-05	19.7	-	
	HDD Pilot Hole	Trackhoe - 240	177	84	2.96E-03	1.28E-02	2.17E-02	2.55E-03	2.47E-03	3.00E-05	10.3	-	
	HDD Hole Opening	Trackhoe - 240	177	120	4.23E-03	1.83E-02	3.10E-02	3.64E-03	3.53E-03	4.28E-05	14.7	-	
	Pull-back String	Trackhoe - 240	177	96	3.39E-03	1.47E-02	2.48E-02	2.91E-03	2.82E-03	3.43E-05	11.7	-	
	HDD Pilot Hole	Forklift - 10,000# & Over	130	84	2.96E-04	1.35E-03	3.99E-03	2.97E-04	2.88E-04	1.75E-05	6.5	-	
	HDD Hole Opening	Forklift - 10,000# & Over	130	120	4.23E-04	1.93E-03	5.70E-03	4.24E-04	4.11E-04	2.50E-05	9.2	-	
	Pull-back String	Forklift - 10,000# & Over	22	96	7.36E-04	3.47E-03	8.76E-03	3.97E-04	3.85E-04	5.09E-06	1.4	-	
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	84	4.94E-04	1.66E-03	6.64E-03	3.89E-04	3.78E-04	3.64E-05	13.5	-	
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	120	7.05E-04	2.38E-03	9.49E-03	5.56E-04	5.40E-04	5.19E-05	19.3	-	
	Pull-back String	R.T. Crane 50-75 Ton	275	96	5.64E-04	1.90E-03	7.59E-03	4.45E-04	4.32E-04	4.16E-05	15.5	-	
	HDD Pilot Hole	Triplex Pump	540	84	6.04E-03	3.03E-02	0.1	4.78E-03	4.63E-03	8.23E-05	26.5	-	
	HDD Hole Opening	Triplex Pump	540	120	8.63E-03	4.32E-02	0.1	6.82E-03	6.62E-03	1.18E-04	37.9	-	
	Pull-back String	Triplex Pump	540	96	6.91E-03	3.46E-02	0.1	5.46E-03	5.30E-03	9.40E-05	30.3	-	
CP Cable Drill - Onshore	MOB	Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-	
		DeMOB	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-	
		HDD Pilot Hole	Drill Rig CAT Power Unit	202	48	1.32E-03	5.42E-03	1.79E-02	1.10E-03	1.07E-03	1.70E-05	5.7	-
		Pull-back String	Drill Rig CAT Power Unit	202	36	9.93E-04	4.06E-03	1.34E-02	8.28E-04	8.03E-04	1.28E-05	4.3	-
		HDD Pilot Hole	Mud Rig & Reclaimer Pumps	25	48	4.49E-04	2.09E-03	5.08E-03	2.43E-04	2.36E-04	2.87E-06	0.8	-
		Pull-back String	Mud Rig & Reclaimer Pumps	25	36	3.37E-04	1.57E-03	3.81E-03	1.83E-04	1.77E-04	2.15E-06	0.6	-
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	400 Amp Welder	33	72	7.94E-04	3.52E-03	8.32E-03	5.73E-04	5.56E-04	5.28E-06	1.8	-	
		20kW Generator	30	72	4.15E-04	1.60E-03	7.22E-03	2.60E-04	2.52E-04	4.07E-06	1.4	-	
		Light Plant	25	72	6.35E-04	3.01E-03	7.44E-03	3.51E-04	3.41E-04	4.27E-06	1.2	-	
		250 cfm Aircompressor	80	72	2.73E-04	2.50E-03	8.48E-03	4.28E-04	4.15E-04	1.04E-05	3.7	-	
		Crawler Crane	95	72	1.67E-04	1.54E-03	8.00E-03	2.66E-04	2.58E-04	1.20E-05	4.5	-	
		Shallow Water Tug	660	24	1.58E-03	2.93E-02	3.40E-02	1.76E-03	1.76E-03	7.62E-03	4.0	0.45	

Pipelay Related Equipment													907.185	grams/ton	18.4
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor			
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	778	432	0.1	1.4	1.9	0.1	0.1	1.80E-03	190.8	-			
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-			
		Additional G66 for pipelay ops 800kW	1,073	144	3.43E-02	0.6	0.9	3.81E-02	3.81E-02	0.2	87.7	-			
Pipelay of Ambrose HDD String	Antares Anchor Handling >12ft WD	Tug Robert	2,000	84	2.95E-02	0.5	0.7	2.82E-02	2.82E-02	7.10E-04	75.3	0.79			
		Tug Elizabeth	2,000	84	2.95E-02	0.5	0.7	2.82E-02	2.82E-02	7.10E-04	75.3	0.79			
	Seven Antares	Caterpillar 3412 DITA 580kW	778	252	4.35E-02	0.8	1.1	4.16E-02	4.16E-02	1.05E-03	111.3	-			
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-			
		Additional G66 for pipelay ops 800kW	1,073	84	2.00E-02	0.4	0.5	2.22E-02	2.22E-02	0.1	51.2	-			

Pipelay of Morgan HDD String	Anchor Handling <12ft WD	Linda Miller	660	91	6.02E-03	0.1	0.1	6.68E-03	6.68E-03	2.90E-02	15.4	0.45	
		Anchor Barge #37 Barge	99	30	3.01E-04	0.0	0.0	4.46E-04	4.46E-04	1.45E-03	0.8	0.45	
	110kW Diesel Hydraulic Power Unit	147	91	4.40E-04	0.0	0.0	5.94E-04	5.76E-04	2.16E-05	7.9	-		
	150 Tonne SWL Diesel Hydraulic Spooling Winch	248	91	7.21E-04	0.0	0.0	7.14E-04	6.93E-04	3.65E-05	13.4	-		
	Tug Elizabeth	2,000	91	3.20E-02	0.6	0.8	3.06E-02	3.06E-02	7.70E-04	81.8	0.79		
	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-		
	Additional GE6 for pipelay ops 800kW	1,073	91	2.17E-02	0.4	0.5	2.41E-02	2.41E-02	0.1	55.5	-		
	Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Anchor Handling <12ft WD	Linda Miller	660	190	1.25E-02	0.2	0.3	1.39E-02	1.39E-02	0.1	32.0	0.45
			Anchor Barge #37 Barge	99	63	6.27E-04	0.0	0.0	9.29E-04	9.29E-04	3.02E-03	1.6	0.45
		110kW Diesel Hydraulic Power Unit	147	190	9.17E-04	0.0	0.0	1.24E-03	1.20E-03	4.50E-05	16.5	-	
150 Tonne SWL Diesel Hydraulic Spooling Winch		248	190	1.50E-03	0.0	0.0	1.49E-03	1.44E-03	7.60E-05	27.9	-		
Tug Elizabeth		2,000	190	0.1	1.2	1.7	0.1	0.1	1.61E-03	170.5	0.79		
Volvo D12 MG-RC 225kW		302	0	0	0	0	0	0	0	0	-		
Additional GE6 for pipelay ops 800kW		1,073	190	4.53E-02	0.8	1.1	0.1	0.1	0.2	115.8	-		
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)		Antares Anchor Handling <12ft WD	Linda Miller	660	82	5.43E-03	0.1	0.1	6.03E-03	6.03E-03	2.61E-02	13.9	0.45
			Anchor Barge #37 Barge	99	27	2.72E-04	1.71E-03	5.83E-03	4.02E-04	4.02E-04	1.31E-03	0.7	0.45
		110kW Diesel Hydraulic Power Unit	147	82	3.97E-04	2.29E-03	6.76E-03	5.36E-04	5.20E-04	1.95E-05	7.2	-	
	150 Tonne SWL Diesel Hydraulic Spooling Winch	248	82	6.51E-04	3.08E-03	9.30E-03	6.45E-04	6.25E-04	3.29E-05	12.1	-		
	Tug Elizabeth	2,000	82	2.89E-02	0.5	0.7	2.76E-02	2.76E-02	6.95E-04	73.8	0.79		
	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-		
	Additional GE6 for pipelay ops 800kW	1,073	82	1.96E-02	0.4	0.5	2.18E-02	2.18E-02	0.1	50.1	-		
	Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling <12ft WD	Linda Miller	660	72	4.75E-03	0.1	0.1	5.28E-03	5.28E-03	2.29E-02	12.1	0.45
			Anchor Barge #37 Barge	99	24	2.37E-04	1.50E-03	5.10E-03	3.52E-04	3.52E-04	1.14E-03	0.6	0.45
		Tug Elizabeth	2,000	184	0.1	1.2	1.6	0.1	0.1	1.55E-03	164.7	0.79	
Caterpillar 3412 DITA 580kW		778	767	0.1	2.5	3.3	0.1	0.1	3.19E-03	338.6	-		
Additional GE6 for pipelay ops 800kW		1,073	256	0.1	1.1	1.5	0.1	0.1	0.3	155.7	-		
Tug Elizabeth		2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79		
Volvo D12 MG-RC 225kW		302	0	0	0	0	0	0	0	0	-		
Additional GE6 for pipelay ops 800kW		1,073	175	4.18E-02	0.8	1.1	4.64E-02	4.64E-02	0.2	106.7	-		
Above Water Tie-in/ Spool @ MP16.6		Antares Anchor Handling >12ft WD	Tug Robert	2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79
			Tug Elizabeth	2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79
	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-		
	Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-		
	Pipe Delivery Spread	Dockside Crane	332	472	6.57E-03	3.32E-02	0.1	5.64E-03	5.47E-03	2.57E-04	91.7	-	
Pipeline Barge Tug		1,500	878	0.2	4.3	5.8	0.2	0.2	5.57E-03	590.8	0.79		
Diving/Construction Support Spread	Dive Barge	W571	1,502	1,638	0.4	8.0	10.9	0.5	0.5	2.1	1103.2	0.79	
		Deck Winches	300	546	5.22E-03	2.47E-02	0.1	5.17E-03	5.02E-03	2.64E-04	96.9	-	
		400 Amp Welder	33	273	3.01E-03	1.34E-02	3.16E-02	2.17E-03	2.11E-03	2.00E-05	6.8	-	
		20kW Generator	30	1,638	9.44E-03	3.63E-02	0.2	5.92E-03	5.74E-03	9.25E-05	31.9	-	
		Light Plant	25	3,276	2.89E-02	0.1	0.3	1.60E-02	1.55E-02	1.94E-04	52.8	-	
		250 cfm Aircompressor	80	273	1.04E-03	9.49E-03	3.22E-02	1.62E-03	1.57E-03	3.93E-05	14.2	-	
		Tug 2000 HP TBN	2,000	1,070	0.4	7.0	9.5	0.4	0.4	9.04E-03	959.7	0.79	
		Crew Boat (Main Eng)	980	535	0.1	0.9	4.4	0.1	0.1	0.4	235.1	0.79	
		--(Aux engine)	12	1,070	1.60E-03	2.96E-02	4.02E-02	2.37E-03	2.37E-03	7.69E-03	4.1	0.56	
		Tug 2000 HP TBN	2,000	216	0.1	1.4	1.9	0.1	0.1	1.82E-03	193.7	0.79	
Jet Trencher	Mob	M4000 Crane	400	173	2.90E-03	1.46E-02	0.1	2.49E-03	2.41E-03	1.13E-04	40.5	-	
		400 Amp Welder	33	29	3.17E-04	1.41E-03	3.33E-03	2.29E-04	2.22E-04	2.11E-06	0.7	-	
		20kW Generator	30	173	9.96E-04	3.83E-03	1.73E-02	6.24E-04	6.05E-04	9.76E-06	3.4	-	
		Light Plant	25	230	2.03E-03	9.62E-03	2.38E-02	1.12E-03	1.09E-03	1.36E-05	3.7	-	
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	250 cfm Aircompressor	80	29	1.09E-04	1.00E-03	3.39E-03	1.71E-04	1.66E-04	4.14E-06	1.5	-	
		W263 Deck Winches	225	39	2.81E-04	1.33E-03	4.02E-03	2.79E-04	2.70E-04	1.42E-05	5.2	-	
		W061 Deck Winches	300	39	3.75E-04	1.78E-03	5.36E-03	3.71E-04	3.60E-04	1.90E-05	7.0	-	
		M4000 Crane	400	118	1.97E-03	9.96E-03	3.58E-02	1.69E-03	1.64E-03	7.71E-05	27.5	-	
		400 Amp Welder	33	20	2.16E-04	9.59E-04	2.27E-03	1.56E-04	1.51E-04	1.44E-06	0.5	-	
		20kW Generator	30	118	6.78E-04	2.61E-03	1.18E-02	4.25E-04	4.12E-04	6.64E-06	2.3	-	
		Light Plant	25	470	4.15E-03	1.96E-02	4.86E-02	2.30E-03	2.23E-03	2.79E-05	7.6	-	
		250 cfm Aircompressor	80	20	7.44E-05	6.81E-04	2.31E-03	1.16E-04	1.13E-04	2.82E-06	1.0	-	
		2000 HP Tugboat	2,000	235	0.1	1.5	2.1	0.1	0.1	1.99E-03	210.9	0.79	
		Crew Boat (Main Eng)	980	59	1.01E-02	0.1	0.5	1.12E-02	1.12E-02	4.87E-02	25.8	0.79	
		--(Aux engine)	12	118	1.76E-04	3.25E-03	4.42E-03	2.60E-04	2.60E-04	8.45E-04	0.4	0.56	
		1250kw Generator	1,676	118	2.62E-02	0.1	0.4	1.99E-02	1.93E-02	3.57E-04	115.3	-	
		Jetter											

Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	W263 Deck Winches	225	35	2.53E-04	1.20E-03	3.61E-03	2.50E-04	2.43E-04	1.28E-05	4.7	-
		W061 Deck Winches	300	35	3.37E-04	1.59E-03	4.81E-03	3.34E-04	3.24E-04	1.70E-05	6.2	-
		M4000 Crane	400	106	1.77E-03	8.94E-03	3.22E-02	1.52E-03	1.48E-03	6.92E-05	24.7	-
		400 Amp Welder	33	18	1.94E-04	8.61E-04	2.03E-03	1.40E-04	1.36E-04	1.29E-06	0.4	-
		20kW Generator	30	106	6.08E-04	2.34E-03	1.06E-02	3.81E-04	3.70E-04	5.96E-06	2.1	-
		Light Plant	25	422	3.72E-03	1.76E-02	4.37E-02	2.06E-03	2.00E-03	2.50E-05	6.8	-
		250 cfm Aircompressor	80	18	6.68E-05	6.12E-04	2.07E-03	1.05E-04	1.01E-04	2.53E-06	0.9	-
		2000 HP Tugboat	2,000	211	0.1	1.4	1.9	0.1	0.1	1.78E-03	189.4	0.79
		Crew Boat (Main Eng)	980	53	9.08E-03	0.1	0.4	1.01E-02	1.01E-02	4.37E-02	23.2	0.79
		--(Aux engine)	12	106	1.58E-04	2.92E-03	3.97E-03	2.34E-04	2.34E-04	7.59E-04	0.4	0.56
		Jetter	1250kw Generator	1,676	106	2.35E-02	0.1	0.4	1.78E-02	1.73E-02	3.21E-04	103.5
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	Barge + Tug	W263 Deck Winches	225	46	3.33E-04	1.58E-03	4.76E-03	3.30E-04	3.20E-04	1.68E-05	6.2	-
		W061 Deck Winches	300	46	4.44E-04	2.10E-03	6.34E-03	4.40E-04	4.26E-04	2.24E-05	8.2	-
		M4000 Crane	400	139	2.33E-03	1.18E-02	4.24E-02	2.01E-03	1.95E-03	9.13E-05	32.6	-
		400 Amp Welder	33	23	2.56E-04	1.14E-03	2.68E-03	1.85E-04	1.79E-04	1.70E-06	0.6	-
		20kW Generator	30	139	8.02E-04	3.09E-03	1.40E-02	5.03E-04	4.88E-04	7.86E-06	2.7	-
		Light Plant	25	557	4.91E-03	2.33E-02	0.1	2.72E-03	2.64E-03	3.30E-05	9.0	-
		250 cfm Aircompressor	80	23	8.81E-05	8.06E-04	2.73E-03	1.38E-04	1.34E-04	3.34E-06	1.2	-
		2000 HP Tugboat	2,000	278	0.1	1.8	2.5	0.1	0.1	2.35E-03	249.7	0.79
		Crew Boat (Main Eng)	980	70	1.20E-02	0.1	0.6	1.33E-02	1.33E-02	0.1	30.6	0.79
		--(Aux engine)	12	139	2.08E-04	3.85E-03	5.23E-03	3.08E-04	3.08E-04	1.00E-03	0.5	0.56
		Jetter	1250kw Generator	1,676	139	3.10E-02	0.2	0.5	2.35E-02	2.28E-02	4.23E-04	136.5
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	W263 Deck Winches	225	16	1.15E-04	5.44E-04	1.64E-03	1.14E-04	1.10E-04	5.81E-06	2.1	-
		W061 Deck Winches	300	16	1.53E-04	7.25E-04	2.19E-03	1.52E-04	1.47E-04	7.74E-06	2.8	-
		M4000 Crane	400	48	8.05E-04	4.07E-03	1.46E-02	6.92E-04	6.71E-04	3.15E-05	11.2	-
		400 Amp Welder	33	8	8.82E-05	3.92E-04	9.25E-04	6.36E-05	6.17E-05	5.86E-07	0.2	-
		20kW Generator	30	48	2.77E-04	1.06E-03	4.82E-03	1.73E-04	1.68E-04	2.71E-06	0.9	-
		Light Plant	25	192	1.69E-03	8.02E-03	1.99E-02	9.37E-04	9.09E-04	1.14E-05	3.1	-
		250 cfm Aircompressor	80	8	3.04E-05	2.78E-04	9.43E-04	4.75E-05	4.61E-05	1.15E-06	0.4	-
		2000 HP Tugboat	2,000	96	3.37E-02	0.6	0.8	3.22E-02	3.22E-02	8.11E-04	86.1	0.79
		Crew Boat (Main Eng)	980	24	4.13E-03	3.82E-02	0.2	4.59E-03	4.59E-03	1.99E-02	10.5	0.79
		--(Aux engine)	12	48	7.16E-05	1.33E-03	1.80E-03	1.06E-04	1.06E-04	3.45E-04	0.2	0.56
		Jetter	1250kw Generator	1,676	48	1.07E-02	0.1	0.2	8.11E-03	7.87E-03	4.66E-04	47.1
Daily Crew/Utility	Morgan HDD Crew Boat	Crew Boat (Main Eng)	600	0	0	0	0	0	0	0	0	0.45
		--(Aux engine)	150	0	0	0	0	0	0	0	0	0.56
	Ambrose HDD Crew Boat	Crew Boat (Main Eng)	600	360	2.16E-02	0.1	0.8	2.40E-02	2.40E-02	0.1	55.2	0.45
		--(Aux engine)	150	720	1.34E-02	0.2	0.3	1.49E-02	1.49E-02	0.1	34.3	0.56
	Samantha Miller LCV	Boat (Main Eng)	600	1,464	0.1	0.5	3.3	0.1	0.1	0.4	224.4	0.45
		--(Aux engine)	150	1,464	2.73E-02	0.5	0.7	3.03E-02	3.03E-02	0.1	69.8	0.56
	Guard Vessel # 1	Boat (Main Eng)	600	3,192	0.2	1.1	7.1	0.2	0.2	0.9	489.2	0.45
		--(Aux engine)	150	3,192	0.1	1.1	1.5	0.1	0.1	0.3	152.2	0.56
	HDD Water Delivery OSV	Main Eng	850	916	0.1	0.4	2.9	0.1	0.1	0.4	198.9	0.45
		--(Aux engine)	150	916	1.71E-02	0.3	0.4	1.90E-02	1.90E-02	0.1	43.7	0.56
		--Bow Thruster	300	916	2.75E-02	0.2	1.0	3.05E-02	3.05E-02	0.1	70.2	0.45
		Boat (Main Eng)	850	286	2.43E-02	0.1	0.9	2.70E-02	2.70E-02	0.1	62.2	0.45
		--(Aux engine)	150	286	5.34E-03	0.1	0.1	5.94E-03	5.94E-03	2.57E-02	13.7	0.56
		--Bow Thruster	300	286	8.59E-03	0.0	0.3	9.54E-03	9.54E-03	4.13E-02	21.9	0.45

Dredging & Reinstatement Related Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	661	0.3	5.5	6.3	0.3	0.3	1.4	754.6	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	1,322	0.1	1.4	1.6	0.1	0.1	0.4	193.4	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	0	0	0	0	0	0	0	0	0.79
		HARS W551 Clam Rig (Aux Engine)	460	0	0	0	0	0	0	0	0	0.56
		Tug 2000 HP TBN	2,000	1,656	0.6	10.8	14.6	0.6	0.6	1.40E-02	1485.1	0.79
		Tug 2000 HP TBN	2,000	1,656	0.6	10.8	14.6	0.6	0.6	1.40E-02	1485.1	0.79
		Crew Boat (Main Eng)	980	828	0.1	1.3	6.9	0.2	0.2	0.7	363.9	0.79
		--(Aux engine)	12	1,656	2.47E-03	4.58E-02	0.1	3.66E-03	3.66E-03	1.19E-02	6.3	0.56
		UPLAND W551 Clam Rig (Main Engine)	2,545	1,745	0.8	14.4	16.7	0.9	0.9	3.8	1991.2	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	1,745	0.1	1.8	2.1	0.1	0.1	0.5	255.1	0.56
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- Upland) Crossings	Dredging	HARS W551 Clam Rig (Main Engine)	2,545	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.79
		HARS W551 Clam Rig (Aux Engine)	460	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.56
		Tug 2000 HP TBN	2,000	3,984	1.4	25.9	35.2	1.3	1.3	3.37E-02	3572.9	0.79
		Tug 2000 HP TBN	2,000	3,984	1.4	25.9	35.2	1.3	1.3	3.37E-02	3572.9	0.79
		Crew Boat (Main Eng)	980	996	0.2	1.6	8.2	0.2	0.2	0.8	437.7	0.79
		--(Aux engine)	12	1,992	2.97E-03	0.1	0.1	4.40E-03	4.40E-03	1.43E-02	7.6	0.56
		UPLAND W551 Clam Rig (Main Engine)	2,545	50	2.25E-02	0.4	0.5	2.50E-02	2.50E-02	0.1	57.5	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	101	5.77E-03	0.1	0.1	6.41E-03	4.91E-03	2.78E-02	14.7	0.56
		Tug 2000 HP TBN	2,000	168	0.1	1.1	1.5	0.1	0.1	1.42E-03	150.7	0.79
		Tug 2000 HP TBN	2,000	168	0.1	1.1	1.5	0.1	0.1	1.42E-03	150.7	0.79
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	Crew Boat (Main Eng)	980	84	1.44E-02	0.1	0.7	1.60E-02	1.60E-02	0.1	36.9	0.79
		--(Aux engine)	12	168	2.51E-04	4.64E-03	6.32E-03	3.71E-04	3.71E-04	1.21E-03	0.6	0.56
		Upland W551 Clam Rig (Main Engine)	2,545	403	0.2	3.3	3.9	0.2	0.2	0.9	460.1	0.79
		Upland W551 Clam Rig (Aux Engine)	460	403	2.31E-02	0.4	0.5	2.56E-02	1.97E-02	0.1	59.0	0.56
		Tug 2000 HP TBN	2,000	1,008	0.4	6.6	8.9	0.3	0.3	8.52E-03	904.0	0.79
		Tug 2000 HP TBN	2,000	1,008	0.4	6.6	8.9	0.3	0.3	8.52E-03	904.0	0.79
		Crew Boat (Main Eng)	980	252	4.33E-02	0.4	2.1	4.81E-02	4.81E-02	0.2	110.7	0.79
		--(Aux engine)	12	504	7.52E-04	1.39E-02	1.89E-02	1.11E-03	1.11E-03	3.62E-03	1.9	0.56

Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - Upland, 10,889 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	223	0.1	1.8	2.1	0.1	0.1	0.5	254.7	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	223	1.28E-02	0.2	0.3	1.42E-02	1.09E-02	0.1	32.6	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	0	0	0	0	0	0	0	0	0.79
		HARS W551 Clam Rig (Aux Engine)	460	0	0	0	0	0	0	0	0	0.56
		Tug 2000 HP TBN	2,000	629	0.2	4.1	5.6	0.2	0.2	5.31E-03	563.9	0.79
		Tug 2000 HP TBN	2,000	629	0.2	4.1	5.6	0.2	0.2	5.31E-03	563.9	0.79
		Crew Boat (Main Eng)	980	157	2.70E-02	0.3	1.3	3.00E-02	3.00E-02	0.1	69.1	0.79
		--(Aux engine)	12	314	4.69E-04	8.69E-03	1.18E-02	6.95E-04	6.95E-04	2.26E-03	1.2	0.56
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd Upland), VCG4 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Additi Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	143	0.1	1.2	1.4	0.1	0.1	0.3	163.0	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	143	8.17E-03	0.2	0.2	9.08E-03	6.96E-03	3.93E-02	20.9	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	0	0	0	0	0	0	0	0	0.79
		HARS W551 Clam Rig (Aux Engine)	460	0	0	0	0	0	0	0	0	0.56
		Tug 2000 HP TBN	2,000	408	0.1	2.7	3.6	0.1	0.1	3.45E-03	365.9	0.79
		Tug 2000 HP TBN	2,000	408	0.1	2.7	3.6	0.1	0.1	3.45E-03	365.9	0.79
		Crew Boat (Main Eng)	980	102	1.75E-02	0.2	0.8	1.95E-02	1.95E-02	0.1	44.8	0.79
		--(Aux engine)	12	204	3.04E-04	5.64E-03	7.67E-03	4.51E-04	4.51E-04	1.47E-03	0.8	0.56
Scow Barge Spread (one / 1 each)	Dredge Material Transportation	Dump Scow #1	286	0	0	0	0	0	0	0	0	0.56
		Dump Scow #2	286	0	0	0	0	0	0	0	0	0.56
		Dump Scow #3	286	0	0	0	0	0	0	0	0	0.56
		Dump Scow #4	286	0	0	0	0	0	0	0	0	0.56
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	Reinstatement	Clam Rig (Main Engine)	2,545	780	0.3	6.5	7.5	0.4	0.4	1.7	890.1	0.79
		Clam Rig (Aux Engine)	460	780	4.46E-02	0.8	1.0	4.96E-02	3.80E-02	0.2	114.0	0.56
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Crew Boat (Main Eng)	980	390	0.1	0.6	3.2	0.1	0.1	0.3	171.4	0.79
		--(Aux engine)	12	780	0.001164198	0.021559229	0.029320551	0.001724738	0.001724738	0.005605399	3.0	0.56
		W551 Clam Rig (Main Engine)	2,545	780	0.3	6.5	7.5	0.4	0.4	1.7	890.1	0.79
	Mining Sand	W551 Clam Rig (Aux Engine)	460	780	4.46E-02	0.8	1.0	4.96E-02	3.80E-02	0.2	114.0	0.56
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Crew Boat (Main Eng)	980	390	0.1	0.6	3.2	0.1	0.1	0.3	171.4	0.79
		--(Aux engine)	12	780	1.16E-03	2.16E-02	2.93E-02	1.72E-03	1.72E-03	5.61E-03	3.0	0.56
	Dredge Material Transportation	Dump Scow #1	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #2	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #3	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #4	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Reinstatement	Clam Rig (Main Engine)	2,545	2,496	1.1	20.6	23.9	1.2	1.2	5.4	2848.4	0.79
		Clam Rig (Aux Engine)	460	2,496	0.2	3.7	4.3	0.2	0.2	1.0	514.8	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Crew Boat (Main Eng)	980	1,248	0.2	2.0	10.3	0.2	0.2	1.0	548.4	0.79
		--(Aux engine)	12	2,496	3.73E-03	0.1	0.1	5.52E-03	5.52E-03	1.79E-02	9.5	0.56
		W551 Clam Rig (Main Engine)	2,545	2,496	1.1	20.6	23.9	1.2	1.2	5.4	2848.4	0.79
	Mining Sand	W551 Clam Rig (Aux Engine)	460	2,496	0.2	3.7	4.3	0.2	0.2	1.0	514.8	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Crew Boat (Main Eng)	980	1,248	0.2	2.0	10.3	0.2	0.2	1.0	548.4	0.79
		--(Aux engine)	12	2,496	3.73E-03	0.1	0.1	5.52E-03	5.52E-03	1.79E-02	9.5	0.56
	Dredge Material Transportation	Dump Scow #1	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
		Dump Scow #2	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
		Dump Scow #3	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
		Dump Scow #4	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
Reinstatement Spread for Morgan HDD Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	43	1.93E-02	0.4	0.4	2.14E-02	2.14E-02	0.1	49.3	0.79
		Clam Rig (Aux Engine)	460	43	3.49E-03	0.1	0.1	3.87E-03	2.97E-03	1.68E-02	8.9	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Crew Boat (Main Eng)	980	22	3.71E-03	3.44E-02	0.2	4.13E-03	4.13E-03	1.79E-02	9.5	0.79
		--(Aux engine)	12	43	9.10E-05	1.68E-03	2.29E-03	1.35E-04	1.35E-04	4.38E-04	0.2	0.79
		W551 Clam Rig (Main Engine)	2,545	43	1.93E-02	0.4	0.4	2.14E-02	2.14E-02	0.1	49.3	0.79
	Mining Sand	W551 Clam Rig (Aux Engine)	460	43	3.49E-03	0.1	0.1	3.87E-03	2.97E-03	1.68E-02	8.9	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Crew Boat (Main Eng)	980	22	3.71E-03	3.44E-02	0.2	4.13E-03	4.13E-03	1.79E-02	9.5	0.79
		--(Aux engine)	12	43	6.45E-05	1.19E-03	1.62E-03	9.55E-05	9.55E-05	3.10E-04	0.2	0.56
	Dredge Material Transportation	Dump Scow #1	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #2	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #3	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #4	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56

Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	199	0.1	1.6	1.9	0.1	0.1	0.4	227.3	0.79		
		Clam Rig (Aux Engine)	460	199	1.61E-02	0.3	0.3	1.79E-02	1.37E-02	0.1	41.1	0.79		
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79		
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79		
		Crew Boat (Main Eng)	980	100	1.71E-02	0.2	0.8	1.90E-02	1.90E-02	0.1	43.8	0.79		
		--(Aux engine)	12	199	2.97E-04	5.51E-03	7.49E-03	4.40E-04	4.40E-04	1.43E-03	0.8	0.56		
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	199	0.1	1.6	1.9	0.1	0.1	0.4	227.3	0.79		
		W551 Clam Rig (Aux Engine)	460	199	1.61E-02	0.3	0.3	1.79E-02	1.37E-02	0.1	41.1	0.79		
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79		
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79		
		Crew Boat (Main Eng)	980	100	1.71E-02	0.2	0.8	1.90E-02	1.90E-02	0.1	43.8	0.79		
		--(Aux engine)	12	199	2.97E-04	5.51E-03	7.49E-03	4.40E-04	4.40E-04	1.43E-03	0.8	0.56		
	Dredge Material Transportation	Dump Scow #1	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56		
		Dump Scow #2	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56		
		Dump Scow #3	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56		
		Dump Scow #4	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56		
		Clam Rig (Main Engine)	2,545	240	0.1	2.0	2.3	0.1	0.1	0.5	273.9	0.79		
		Clam Rig (Aux Engine)	460	240	1.94E-02	0.4	0.4	2.15E-02	1.65E-02	0.1	49.5	0.79		
Reinstatement Spread for Anchorage Area	Reinstatement	Tug 2000 HP TBN	2,000	240	0.1	1.6	2.1	0.1	0.1	2.03E-03	215.2	0.79		
		Tug 2000 HP TBN	2,000	240	0.1	1.6	2.1	0.1	0.1	2.03E-03	215.2	0.79		
		Crew Boat (Main Eng)	980	120	2.06E-02	0.2	1.0	2.29E-02	2.29E-02	0.1	52.7	0.79		
		--(Aux engine)	12	240	3.58E-04	6.63E-03	9.02E-03	5.31E-04	5.31E-04	1.72E-03	0.9	0.56		
		W551 Clam Rig (Main Engine)	2,545	240	0.1	2.0	2.3	0.1	0.1	0.5	273.9	0.79		
		W551 Clam Rig (Aux Engine)	460	240	1.94E-02	0.4	0.4	2.15E-02	1.65E-02	0.1	49.5	0.79		
	Mining Sand	Tug 2000 HP TBN	2,000	240	0.1	1.6	2.1	0.1	0.1	2.03E-03	215.2	0.79		
		Tug 2000 HP TBN	2,000	240	0.1	1.6	2.1	0.1	0.1	2.03E-03	215.2	0.79		
		Crew Boat (Main Eng)	980	120	2.06E-02	0.2	1.0	2.29E-02	2.29E-02	0.1	52.7	0.79		
		--(Aux engine)	12	240	3.58E-04	6.63E-03	9.02E-03	5.31E-04	5.31E-04	1.72E-03	0.9	0.56		
		Dump Scow #1	286	40	1.42E-03	7.91E-03	0.1	1.58E-03	1.58E-03	6.85E-03	3.6	0.56		
		Dump Scow #2	286	40	1.42E-03	7.91E-03	0.1	1.58E-03	1.58E-03	6.85E-03	3.6	0.56		
	Dredge Material Transportation	Dump Scow #3	286	40	1.42E-03	7.91E-03	0.1	1.58E-03	1.58E-03	6.85E-03	3.6	0.56		
		Dump Scow #4	286	40	1.42E-03	7.91E-03	0.1	1.58E-03	1.58E-03	6.85E-03	3.6	0.56		
		Clam Rig (Main Engine)	2,545	192	0.1	1.6	1.8	0.1	0.1	0.4	219.1	0.79		
		Clam Rig (Aux Engine)	460	192	1.55E-02	0.3	0.3	1.72E-02	1.32E-02	0.1	39.6	0.79		
		Tug 2000 HP TBN	2,000	192	0.1	1.2	1.7	0.1	0.1	1.62E-03	172.2	0.79		
		Tug 2000 HP TBN	2,000	192	0.1	1.2	1.7	0.1	0.1	1.62E-03	172.2	0.79		
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	Reinstatement	Crew Boat (Main Eng)	980	96	1.65E-02	0.2	0.8	1.83E-02	1.83E-02	0.1	42.2	0.79		
		--(Aux engine)	12	192	2.87E-04	5.31E-03	7.22E-03	4.25E-04	4.25E-04	1.38E-03	0.7	0.56		
		W551 Clam Rig (Main Engine)	2,545	192	0.1	1.6	1.8	0.1	0.1	0.4	219.1	0.79		
		W551 Clam Rig (Aux Engine)	460	192	1.55E-02	0.3	0.3	1.72E-02	1.32E-02	0.1	39.6	0.79		
		Tug 2000 HP TBN	2,000	192	0.1	1.2	1.7	0.1	0.1	1.62E-03	172.2	0.79		
		Tug 2000 HP TBN	2,000	192	0.1	1.2	1.7	0.1	0.1	1.62E-03	172.2	0.79		
	Mining Sand	Crew Boat (Main Eng)	980	96	1.65E-02	0.2	0.8	1.83E-02	1.83E-02	0.1	42.2	0.79		
		--(Aux engine)	12	192	2.87E-04	5.31E-03	7.22E-03	4.25E-04	4.25E-04	1.38E-03	0.7	0.56		
		Dump Scow #1	286	32	1.14E-03	6.32E-03	4.22E-02	1.26E-03	1.26E-03	5.48E-03	2.9	0.56		
		Dump Scow #2	286	32	1.14E-03	6.32E-03	4.22E-02	1.26E-03	1.26E-03	5.48E-03	2.9	0.56		
		Dump Scow #3	286	32	1.14E-03	6.32E-03	4.22E-02	1.26E-03	1.26E-03	5.48E-03	2.9	0.56		
		Dump Scow #4	286	32	1.14E-03	6.32E-03	4.22E-02	1.26E-03	1.26E-03	5.48E-03	2.9	0.56		
Reinstatement Spread for all other pipeline segments	Toyo Dredge Pump	W571	1,502	516	0.1	2.5	3.4	0.2	0.2	0.7	347.5	0.79		
		Deck Winches	300	172	1.65E-03	7.79E-03	2.35E-02	1.63E-03	1.58E-03	8.32E-05	30.5	-		
		Toyo Pump	425	516	2.92E-02	0.1	0.5	2.31E-02	2.24E-02	3.98E-04	128.3	-		
		400 Amp Welder	33	86	9.48E-04	4.21E-03	9.94E-03	6.84E-04	6.64E-04	6.30E-06	2.2	-		
		20kW Generator	30	516	2.97E-03	1.14E-02	0.1	1.86E-03	1.81E-03	2.91E-05	10.1	-		
		Light Plant	25	1,032	9.10E-03	4.31E-02	0.1	5.04E-03	4.88E-03	6.11E-05	16.6	-		
		250 cfm Aircompressor	80	86	3.26E-04	2.99E-03	1.01E-02	5.11E-04	4.96E-04	1.24E-05	4.5	-		
		Tug 2000 HP TBN	2,000	516	0.2	3.4	4.6	0.2	0.2	4.36E-03	462.8	0.79		
		Crew Boat (Main Eng)	980	258	4.44E-02	0.4	2.1	4.93E-02	4.93E-02	0.2	113.4	0.79		
		--(Aux engine)	12	516	7.70E-04	1.43E-02	1.94E-02	1.14E-03	1.14E-03	3.71E-03	2.0	0.56		
					907,185		grams/ton							
		Survey Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM10 (tons)	PM2.5 (tons)	SO2 (tons)	CO2 (tons)	Load Factor		
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	600	132	7.92E-03	4.40E-02	0.3	8.80E-03	8.80E-03	3.81E-02	20.2	0.45		
		--(Aux engine)	150	132	2.46E-03	4.56E-02	0.1	2.74E-03	2.74E-03	1.19E-02	6.3	0.56		
Post Jet Burial Survey Campaign	Post Pipeline Burial Survey	Crew Boat (Main Eng)	600	36	2.16E-03	1.20E-02	0.1	2.40E-03	2.40E-03	1.04E-02	5.5	0.45		
		--(Aux engine)	150	36	6.72E-04	1.24E-02	1.69E-02	7.46E-04	7.46E-04	3.23E-03	1.7	0.56		
			907,185		grams/ton									

HDD Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Morgan Onshore HDD	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	8	1	16
		Backhoe	CAT 315, 320, 330 or JD110, 310	Assist in performing loading and unloading operations and movement of smaller materials and tools		1	300	Diesel	4	12	48
	DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	2	1	4
	HDD Pilot Hole	Drill Rig CAT Power Unit		Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	19	12	228
	HDD Hole Opening	Drill Rig CAT Power Unit	HDD Rig Power Unit			1	1,750	Diesel	12	12	144
	Pull-back String	Drill Rig CAT Power Unit				1	1,750	Diesel	8	12	96
	HDD Pilot Hole	Mud Rig Genset-MQ		Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	19	12	228
	HDD Hole Opening	Mud Rig Genset-MQ	Cat Model Generator			1	350	Diesel	12	12	144
	Pull-back String	Mud Rig Genset-MQ				1	350	Diesel	8	12	96
	HDD Pilot Hole	Trackhoe - 240		Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	19	12	228
	HDD Hole Opening	Trackhoe - 240	Komatsu Trackhoe/Excavator			1	177	Diesel	12	12	144
	Pull-back String	Trackhoe - 240				1	177	Diesel	8	12	96
	HDD Pilot Hole	Forklift - 10,000W & Over		Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	19	12	228
	HDD Hole Opening	Forklift - 10,000W & Over	Forklift			1	130	Diesel	12	12	144
	Pull-back String	Forklift - 10,000W & Over				1	130	Diesel	8	12	96
	HDD Pilot Hole	R.T. Crane 50-75 Ton		Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation.		1	275	Diesel	19	12	228
	HDD Hole Opening	R.T. Crane 50-75 Ton	Rough Terrain Crane			1	275	Diesel	12	12	144
	Pull-back String	R.T. Crane 50-75 Ton				1	275	Diesel	8	12	96
	HDD Pilot Hole	Triplex Pump		Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	19	12	228
	HDD Hole Opening	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500			1	540	Diesel	12	12	144
	Pull-back String	Triplex Pump				1	540	Diesel	8	12	96
Morgan Offshore HDD	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	5	1	10
		Generators	Engines that power the auxiliary systems of the Lift Boat.			2	250	non-road Diesel	30	4	240
	DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	3	1	6
	HDD Pilot Hole	Drill Rig CAT Power Unit		Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	7	12	84
	HDD Hole Opening	Drill Rig CAT Power Unit	HDD Rig Power Unit			1	1,750	Diesel	10	12	120
	Pull-back String	Drill Rig CAT Power Unit				1	1,750	Diesel	8	12	96
	HDD Pilot Hole	Mud Rig Genset-MQ		Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	7	12	84
	HDD Hole Opening	Mud Rig Genset-MQ	Cat Model Generator			1	350	Diesel	10	12	120
	Pull-back String	Mud Rig Genset-MQ				1	350	Diesel	8	12	96
	HDD Pilot Hole	Trackhoe - 240		Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	7	12	84
	HDD Hole Opening	Trackhoe - 240	Komatsu Trackhoe/Excavator			1	177	Diesel	10	12	120
	Pull-back String	Trackhoe - 240				1	177	Diesel	8	12	96
	HDD Pilot Hole	Forklift - 10,000W & Over		Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	7	12	84
	HDD Hole Opening	Forklift - 10,000W & Over	Forklift			1	130	Diesel	10	12	120
	Pull-back String	Forklift - 10,000W & Over				1	130	Diesel	8	12	96
	HDD Pilot Hole	R.T. Crane 50-75 Ton		Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation.		1	275	Diesel	7	12	84
	HDD Hole Opening	R.T. Crane 50-75 Ton	Rough Terrain Crane			1	275	Diesel	10	12	120
	Pull-back String	R.T. Crane 50-75 Ton				1	275	Diesel	8	12	96
	HDD Pilot Hole	Triplex Pump		Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	7	12	84
	HDD Hole Opening	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500			1	540	Diesel	10	12	120
	Pull-back String	Triplex Pump				1	540	Diesel	8	12	96
CP Cable Drill - Onshore	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		1	450	Diesel	1	4	4
		Generators	Engines that power the auxiliary systems of the Lift Boat.			2	250	non-road Diesel	30	4	240
	DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment to drill site or dock location		1	450	Diesel	1	4	4
	HDD Pilot Hole	Drill Rig CAT Power Unit		Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	10	12	120
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	20kW Generator	Diesel powered welding machine			1	33	Diesel	6	12	72
		Light Plant	Diesel powered lighting tower.			1	30	Diesel	6	12	72
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor			1	80	Diesel	6	12	72
		Crawler Crane				1	95	Diesel	6	12	72
	HDD Operations - W571 Jack up	400 Amp Welder	Diesel powered welding machine			1	33	Diesel	3	12	36
		20kW Generator	Diesel powered generator			1	30	Diesel	3	12	36
		Light Plant	Diesel powered lighting tower.			1	30	Diesel	3	12	36
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor			1	80	Diesel	3	12	36
	HDD Operations - W750 Jack up	400 Amp Welder	Hydraulic Rough Terrain rubber tire crane			1	33	Diesel	3	12	36
		20kW Generator	Diesel powered generator			1	30	Diesel	3	12	36
		Light Plant	Diesel powered lighting tower.			1	30	Diesel	3	12	36
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor			1	80	Diesel	3	12	36
Ambrose East Offshore HDD	HDD Operations - W571 Jack up	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	11	1	21
		W751 Generator	Engine that powers the main jacking systems of the jack up barge.			1	425	non-road Diesel	38	24	900
		W751 Aux Generator	Engine that powers the auxiliary power systems of the jack up barge.			1	160	non-road Diesel	38	24	900
		Jacking Compressors	Large Air Compressors	Providing a stationary platform for the HDD drilling operations.		2	525	non-road Diesel	38	4	300
		60T Cherry picker	Hydraulic Rough Terrain rubber tire crane			1	250	non-road Diesel	38	24	900
		400 Amp Welder	Diesel powered welding machine	Support HDD operations		1	33	Diesel	38	4	150
		20kW Generator	Diesel powered generator	Support HDD operations		1	30	non-road Diesel	38	24	900
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		4	25	non-road Diesel	38	12	1,800
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Support HDD operations		1	80	non-road Diesel	38	4	150
		DeMOB	Kenworth	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	6	1	12
	HDD Operations - W750 Jack up	HDD Pilot Hole	Drill Rig CAT Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	10	12	120
		HDD Hole Opening	Drill Rig CAT Power Unit			1	1,750	Diesel	6	12	72
		Pull-back String	Drill Rig CAT Power Unit			1	1,750	Diesel	5	12	60
		HDD Pilot Hole	Mud Rig Genset-MQ	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	10	12	120
		HDD Hole Opening	Mud Rig Genset-MQ			1	350	Diesel	6	12	72
		Pull-back String	Mud Rig Genset-MQ			1	350	Diesel	5	12	60
		HDD Pilot Hole	Trackhoe - 240	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	10	12	120
		HDD Hole Opening	Trackhoe - 240	Komatsu Trackhoe/Excavator		1	177	Diesel	6	12	72
		Pull-back String	Trackhoe - 240			1	177	Diesel	5	12	60
		HDD Pilot Hole	Forklift - 10,000W & Over	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	10	12	120
		HDD Hole Opening	Forklift - 10,000W & Over	Forklift		1	130	Diesel	6	12	72
		Pull-back String	Forklift - 10,000W & Over			1	130	Diesel	5	12	60
		HDD Pilot Hole	R.T. Crane 50-75 Ton	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation.		1	275	Diesel	10	12	120
		HDD Hole Opening	R.T. Crane 50-75 Ton			1	275	Diesel	6	12	72
		Pull-back String	R.T. Crane 50-75 Ton			1	275	Diesel	5	12	60
		HDD Pilot Hole	Triplex Pump	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	10	12	120
		HDD Hole Opening	Triplex Pump			1	540	Diesel	6	12	72
		Pull-back String	Triplex Pump			1	540	Diesel	5	12	60
HDD Operations - W750 Jack up	HDD Operations - W750 Jack up	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	15	1	31
		W750 Generator	Engine that powers the main jacking systems of the jack up barge.			1	325	non-road Diesel	46	24	1,110
		Jacking Compressors	Engine that powers the auxiliary power systems of the jack up barge.			2	525	non-road Diesel	46	4	1,700
		60T Cherry picker	Large Air Compressors	Providing a stationary platform for the HDD drilling operations.		1	250	non-road Diesel	46	24	1,110
		400 Amp Welder	Hydraulic Rough Terrain rubber tire crane	Support HDD operations		1	33	non-road Diesel	46	4	185
		20kW Generator	Diesel powered welding machine	Support HDD operations		1	30	non-road Diesel	46	24	1,110
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		4	25	non-road Diesel	46	12	2,210
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Support HDD operations		1	80	non-road Diesel	46	4	185
		DeMOB	Kenworth	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	6	1	13
		HDD Pilot Hole	Drill Rig CAT Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	14	12	168
		HDD Hole Opening	Drill Rig CAT Power Unit			1	1,750	Diesel	6	12	72
		Pull-back String	Drill Rig CAT Power Unit			1	1,750	Diesel	5	12	60

Ambrose West Offshore HDD		HDD Pilot Hole	Mud Rig Genset-MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations	1	350	Diesel	14	12	168
		HDD Hole Opening	Mud Rig Genset-MQ			1	350	Diesel	6	12	72
		Pullback String	Mud Rig Genset-MQ	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary	1	350	Diesel	4	12	48
		HDD Pilot Hole	Trackhoe - 240			1	177	Diesel	14	12	168
		HDD Hole Opening	Trackhoe - 240			1	177	Diesel	6	12	72
		Pullback String	Trackhoe - 240			1	177	Diesel	4	12	48
		HDD Pilot Hole	Forklift - 10,000W & Over	Forklift	Moving and Delivering materials, skids, loading, staging pumps and equipment, moving storage tanks, moving drill stem	1	130	Diesel	14	12	168
		HDD Hole Opening	Forklift - 10,000W & Over			1	130	Diesel	6	12	72
		Pullback String	Forklift - 10,000W & Over			1	130	Diesel	4	12	48
		HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, loading and materials to sustain HDD operation, placing drill stem for HDD operation.	1	275	Diesel	14	12	168
		HDD Hole Opening	R.T. Crane 50-75 Ton			1	275	Diesel	6	12	72
		Pullback String	R.T. Crane 50-75 Ton			1	275	Diesel	4	12	48
		HDD Pilot Hole	Triflex Dams	CAT Engine Type OPI Mud Pump 350D, 500	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation.	1	540	Diesel	14	12	168
		HDD Hole Opening	Triflex Pump			1	540	Diesel	6	12	72
		Pullback String	Triflex Pump			1	540	Diesel	4	12	48
		W541 Head Engine	Engine that powers the crane hoist winches.	Providing Hook support along side the W750 Jack up barge during HDD operations.		1	400	non-road Diesel	60	24	1,428
		W541-Swing Engine	Engine that powers the crane swing gears.			1	525	non-road Diesel	60	24	1,428
		W541-Auxiliary Generator	Engine that powers the auxiliary power systems of the crane barge.			1	85	non-road Diesel	60	24	1,428
		Deck Winch #1	For mooring and anchoring vessel.			1	238	non-road Diesel	60	4	238
		Deck Winch #2	For mooring and anchoring vessel.			1	360	non-road Diesel	60	4	238
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	60	4	238
		20kW Generator	Diesel powered generator			1	30	non-road Diesel	60	24	1,428
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		4	25	non-road Diesel	60	12	2,856
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Providing Hook support along side the W750 Jack up barge during HDD operations.		1	80	non-road Diesel	60	4	238

Pipelay Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Places of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Pipelay Spread Mobil/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Mobilization/ Demobilization activities for the Pipelay vessel when it is alongside at the Quay/site		3	778	Low Sulfur Marine Diesel	6	24	432
		Volvo D12 MG-RC 225kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	6	24	0
		Additional GSE for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	6	24	144
Pipelay of Ambrose HDD String	Antares Anchor Handling >12Hr WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	4	24	84
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	4	24	84
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the Ambrose HDD String production.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	4	24	264
		Volvo D12 MG-RC 225kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	4	24	0
		Additional GSE for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	4	24	84
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	4	24	91
		Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Moving anchors in shallow water.		1	99	non-road Diesel	4	8	30
		Gabby Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	4	24	91
		110kW Diesel Hydraulic Power Unit				1	147	non-road Diesel	4	24	91
		150 Tonne SWL Diesel Hydraulic Spooling Winch				1	248	non-road Diesel	4	24	91
Pipelay of Morgan HDD String	Beach Pull	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	4	24	91
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	4	24	91
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the Morgan HDD String production.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	4	24	274
		Volvo D12 MG-RC 225kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	4	24	0
		Additional GSE for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	4	24	91
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	8	24	190
		Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Moving anchors in shallow water.		1	99	non-road Diesel	8	24	63
		Gabby Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	8	24	190
		110kW Diesel Hydraulic Power Unit				1	147	non-road Diesel	8	24	190
		150 Tonne SWL Diesel Hydraulic Spooling Winch				1	248	non-road Diesel	8	24	190
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Anchor Handling >12Hr WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	8	24	190
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	8	24	190
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP12.5 to MP14.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	8	24	270
		Volvo D12 MG-RC 225kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	8	24	0
		Additional GSE for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	8	24	91
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	8	24	190
		Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Moving anchors in shallow water.		1	99	non-road Diesel	3	8	27
		Gabby Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	3	24	82
		110kW Diesel Hydraulic Power Unit				1	147	non-road Diesel	3	24	82
		150 Tonne SWL Diesel Hydraulic Spooling Winch				1	248	non-road Diesel	3	24	82
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Antares Anchor Handling >12Hr WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	3	24	82
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	3	24	82
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP14.5 to MP16.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	3	24	247
		Volvo D12 MG-RC 225kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	3	24	0
		Additional GSE for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	3	24	82
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	3	24	82
		Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Moving anchors in shallow water.		1	99	non-road Diesel	3	8	24
		Gabby Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	8	24	184
		110kW Diesel Hydraulic Power Unit				1	147	non-road Diesel	8	24	184
		150 Tonne SWL Diesel Hydraulic Spooling Winch				1	248	non-road Diesel	8	24	184
Pipelay Spread from MP16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling >12Hr WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	11	24	767
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	11	24	0
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP16.5 to MP29.3.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	11	24	256
		Volvo D12 MG-RC 225kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	11	24	0
		Additional GSE for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	11	24	256
		Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	7	24	175
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	7	24	175
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP30.4 to MP35.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	7	24	526
		Volvo D12 MG-RC 225kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	7	24	0
		Additional GSE for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	7	24	175
		Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	5	24	120
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	5	24	120
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Above Water Tie in Activities at MP16.6	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	5	24	360
		Volvo D12 MG-RC 225kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	5	24	0
		Additional GSE for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	5	24	120
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	5	24	120
		Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Towing barges with pipe from load out area to pipelay vessel for installation.		1	1,500	Low Sulfur Marine Diesel	39	8	472
		Gabby Miller	660 HP shallow draft tug boat			1	1,500	Low Sulfur Marine Diesel	39	24	878
		1500 HP Tugboat				1	1,500	Low Sulfur Marine Diesel	68	24	1,638
		W571	Engine that powers W571 crane and main systems.	Provides staging deck and hook support for diving operations.		1	1,502	non-road Diesel	68	4	546
		Deck Winches	For mooring and anchoring vessel.			2	300	non-road Diesel	68	4	546
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	68	4	273
		20kW Generator	Diesel powered generator			1	30	non-road Diesel	68	24	1,638
Diving/Construction Support Spread	Dive Barge	Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.	Activities: Installation of Neptune cable crossing arrangements, installation of tie-in valve skid and tie-in spots at Rockaway manifold, installation of spoil piece at HDD, and precommissioning operations (flooding, cleaning, gauging and dewatering of pipeline)	4	25	non-road Diesel	68	12	3,276
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides staging deck and hook support for diving operations.		1	80	non-road Diesel	68	4	273
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to W571		1	2,000	Low Sulfur Marine Diesel	45	24	1,070
		Crew Boat (Man Eng)	Crew-transfer boat	Provides means to transport workers to/from the W571 during diving operations.		1	980	non-road Diesel	45	12	535
		—4500 engine				1	4512	non-road Diesel	45	12	1,070
		Tug 2000 HP TBN	2000 HP Tugboat			1	2,000	non-road Diesel	9	24	216
Jet Trencher	Mob	M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.		1	400	non-road Diesel	7	24	173
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.		1	33	non-road Diesel	7	4	29
		20kW Generator	Diesel powered generator			1	30	non-road Diesel	7	24	173
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	7	4	230
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jetting contractor.		1	80	non-road Diesel	7	4	29
		W203 Deck Winches	For mooring and anchoring vessel.			2	225	non-road Diesel	5	4	39
		W065 Deck Winches				2	300	non-road Diesel	5	4	39
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.		1	400	non-road Diesel	5	24	118

Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.	1	93	non-road Diesel	5	4	20
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.	1	30	non-road Diesel	5	24	118
		Light Plant	Diesel powered lighting tower.		8	25	non-road Diesel	5	12	470
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jetting contractor.	1	80	non-road Diesel	5	4	20
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.	2	2,000	Low Sulfur Marine Diesel	5	24	235
	Jettie	Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.	1	980	non-road Diesel	5	12	59
		-(Aux engine)			1	12	non-road Diesel	5	24	118
		1250kw Generator	Power Generation of the Jet/Trencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.	1	1,676	non-road Diesel	5	24	118
		W263 Deck Winches	For mooring and anchoring vessel.		2	225	non-road Diesel	4	4	35
		W561 Deck Winches		Provides support to the pipeline jetting contractor.	2	300	non-road Diesel	4	4	35
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.	1	400	non-road Diesel	4	24	106
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.	1	33	non-road Diesel	4	4	18
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.	1	30	non-road Diesel	4	24	106
		Light Plant	Diesel powered lighting tower.		8	25	non-road Diesel	4	12	422
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jetting contractor.	1	80	non-road Diesel	4	4	18
	Jettie	2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.	2	2,000	Low Sulfur Marine Diesel	4	24	211
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.	1	980	non-road Diesel	4	12	53
		-(Aux engine)			1	12	non-road Diesel	4	24	106
		1250kw Generator	Power Generation of the Jet/Trencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.	1	1,676	non-road Diesel	4	24	106
		W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.	2	225	non-road Diesel	6	4	46
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 - MP 17.5)	Barge + Tug	W561 Deck Winches			2	300	non-road Diesel	6	4	46
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.	1	400	non-road Diesel	6	24	139
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.	1	33	non-road Diesel	6	4	23
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.	1	30	non-road Diesel	6	24	139
		Light Plant	Diesel powered lighting tower.		8	25	non-road Diesel	6	12	557
	Jettie	250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jetting contractor.	1	80	non-road Diesel	6	4	23
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.	2	2,000	Low Sulfur Marine Diesel	6	24	278
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.	1	980	non-road Diesel	6	12	70
		-(Aux engine)			1	12	non-road Diesel	6	24	139
		1250kw Generator	Power Generation of the Jet/Trencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.	1	1,676	non-road Diesel	6	24	139
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.	2	225	non-road Diesel	2	4	16
		W561 Deck Winches			2	300	non-road Diesel	2	4	16
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.	1	400	non-road Diesel	2	24	48
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.	1	33	non-road Diesel	2	4	8
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.	1	30	non-road Diesel	2	24	48
	Jettie	Light Plant	Diesel powered lighting tower.		8	25	non-road Diesel	2	12	192
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jetting contractor.	1	80	non-road Diesel	2	4	8
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.	2	2,000	Low Sulfur Marine Diesel	2	24	96
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.	1	980	non-road Diesel	2	24	24
		-(Aux engine)			1	12	non-road Diesel	2	24	48
Daily Crew/Utility	Morgan HDD Crew Boat	1250kw Generator	Power Generation of the Jet/Trencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.	1	1,676	non-road Diesel	2	24	48
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the HDD operations.	1	600	non-road Diesel	0	12	0
		-(Aux engine)			1	150	non-road Diesel	0	24	0
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the HDD operations.	1	600	non-road Diesel	30	12	360
		-(Aux engine)			1	150	non-road Diesel	30	24	720
	Ambrose HDD Crew Boat	UPLAND W551 Claim Rig (Main Engine)			1	600	non-road Diesel	61	24	1,464
		UPLAND W551 Claim Rig (Aux Engine)			1	150	non-road Diesel	61	24	1,464
		Guard Vessel # 1	Guard Boat Vessel	For transiting site and keeping other vessels away from work site.	1	600	non-road Diesel	133	24	3,192
		-(Aux engine)			1	150	non-road Diesel	133	24	3,192
		HDD Water Delivery OSV	150FT offshore supply vessel	For transporting supplies and water for HDD operations.	1	600	non-road Diesel	38	24	916
Daily Crew/Utility	Pre-comm OSV	-(Aux engine)			1	150	non-road Diesel	38	24	916
		-(Bow Thruster)			1	300	non-road Diesel	38	24	916
		Boat (Main Eng)	150FT offshore supply vessel	For transporting supplies and acting as a staging area for precommissioning activities.	1	850	non-road Diesel	12	24	288
		-(Aux engine)			1	150	non-road Diesel	12	24	288
		-(Bow Thruster)			1	300	non-road Diesel	12	24	288
Daily Crew/Utility	Samantha Miller LCY	65FT Supply Vessel		For mic. supplies and placing marker buoys.	1	150	non-road Diesel	61	24	1,464
		Guard Vessel # 1	Guard Boat Vessel	For transiting site and keeping other vessels away from work site.	1	600	non-road Diesel	133	24	3,192
		-(Aux engine)			1	150	non-road Diesel	133	24	3,192
		HDD Water Delivery OSV	150FT offshore supply vessel	For transporting supplies and water for HDD operations.	1	600	non-road Diesel	38	24	916
		-(Aux engine)			1	150	non-road Diesel	38	24	916
Daily Crew/Utility	Pre-comm OSV	-(Bow Thruster)			1	300	non-road Diesel	38	24	916
		Boat (Main Eng)	150FT offshore supply vessel	For transporting supplies and acting as a staging area for precommissioning activities.	1	850	non-road Diesel	12	24	288
		-(Aux engine)			1	150	non-road Diesel	12	24	288
		-(Bow Thruster)			1	300	non-road Diesel	12	24	288
		Guard Vessel # 1	Guard Boat Vessel	For transiting site and keeping other vessels away from work site.	1	600	non-road Diesel	133	24	3,192

Dredging & Reinstatement Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Places of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Dredging Spread for Pre-trenching the Morgan HDD Sling & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Claim Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	55	12	661
		UPLAND W551 Claim Rig (Aux Engine)				1	460	non-road Diesel	55	24	1,320
		HARS W551 Claim Rig (Main Engine)				1	2,545	non-road Diesel	0	24	0
		HARS W551 Claim Rig (Aux Engine)				1	460	non-road Diesel	0	24	0
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	69	24	1,656
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	69	24	1,656
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W551 Dredge		1	980	non-road Diesel	69	12	828
		-(Aux engine)				1	12	non-road Diesel	69	24	1,656
		UPLAND W551 Claim Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	73	24	1,745
		UPLAND W551 Claim Rig (Aux Engine)				1	460	non-road Diesel	73	24	1,745
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- Upland) Crossings	Dredging	HARS W551 Claim Rig (Aux Engine)				1	2,545	non-road Diesel	0	24	0
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		2	2,000	Low Sulfur Marine Diesel	83	24	3,984
		Tug 2000 HP TBN				1	980	non-road Diesel	83	12	796
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W551 Dredge		1	12	non-road Diesel	83	24	1,992
		-(Aux engine)				1	2,545	non-road Diesel	4	12	50
		UPLAND W551 Claim Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging HDD pit.		1	460	non-road Diesel	4	24	101
		UPLAND W551 Claim Rig (Aux Engine)				1	2,000	Low Sulfur Marine Diesel	7	24	168
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	7	24	168
		Tug 2000 HP TBN				1	980	non-road Diesel	7	12	84
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W551 Dredge		1	12	non-road Diesel	7	24	168
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (8,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	UPLAND W551 Claim Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging HDD pit.		1	2,545	non-road Diesel	17	24	403
		UPLAND W551 Claim Rig (Aux Engine)				1	460	non-road Diesel	17	24	403
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		2	2,000	Low Sulfur Marine Diesel	21	24	1,008
		Tug 2000 HP TBN				2	2,000	Low Sulfur Marine Diesel	21	24	1,008
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W551 Dredge		1	980	non-road Diesel	21	12	252
		-(Aux engine)				1	12	non-road Diesel	21	24	504
		UPLAND W551 Claim Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	9	24	223
		UPLAND W551 Claim Rig (Aux Engine)				1	460	non-road Diesel	0	24	0
		HARS W551 Claim Rig (Main Engine)				1	460	non-road Diesel	0	24	0
		HARS W551 Claim Rig (Aux Engine)				1	2,000	Low Sulfur Marine Diesel	13	24	629
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - Upland, 10,889 CuYd - Upland)	Dredging	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		2	2,000	Low Sulfur Marine Diesel	13	24	629
		Tug 2000 HP TBN				2	2,000	Low Sulfur Marine Diesel	13	24	629
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W551 Dredge		1	980	non-road Diesel	13	12	157
		-(Aux engine)				1	12	non-road Diesel	13	24	314
		UPLAND W551 Claim Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	6	24	143
		UPLAND W551 Claim Rig (Aux Engine)				1	460	non-road Diesel	6	24	143
		HARS W551 Claim Rig (Main Engine)				1	2,545	non-road Diesel	0	24	0
		HARS W551 Claim Rig (Aux Engine)				1	460	non-road Diesel	0	24	0
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		2	2,000	Low Sulfur Marine Diesel	9	24	408
		Tug 2000 HP TBN				2	2,000	Low Sulfur Marine Diesel	9	24	408
Dredging Spread for RDL Neptune Crossing to RDL Tie-In Location MP 35.2 to MP36.5 (13,152 CuYd Upland), V064 Ozamhet Segment MP23.54 to 33.93 (16,790 CuYd Upland), & Admit Chapel Segment MP 25.30 to 25.61 (14,779 CuYd Upland)	Dredging	Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W551 Dredge		1	980	non-road Diesel	9	12	102
		-(Aux engine)				1	12	non-road Diesel	9	24	204
		UPLAND W551 Claim Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	6	24	143
		UPLAND W551 Claim Rig (Aux Engine)				1	460	non-road Diesel	6	24	143
		HARS W551 Claim Rig (Main Engine)				1	2,545	non-road Diesel	0	24	0
		HARS W551 Claim Rig (Aux Engine)				1	460	non-road Diesel	0	24	0
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		2	2,000	Low Sulfur Marine Diesel	9	24	408
		Tug 2000 HP TBN				2	2,000	Low Sulfur Marine Diesel	9	24	408
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W551 Dredge		1	980	non-road Diesel	9	12	102
		-(Aux engine)				1	12	non-road Diesel	9	24	204

Survey Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing a prelay survey of the offshore workplace.	Used to power all systems on the boat.	1	600	non-road Diesel	11	12	132
		-(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	11	12	132
Post Jet Buntal Survey Campaign	Post Pipeline Buntal Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing a post buntal survey of the pipeline to ensure adequate depth of cover.	Used to power all systems on the boat.	1	600	non-road Diesel	3	12	36
		-(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	3	12	36
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing an as-built survey of the pipeline.	Used to power all systems on the boat.	1	600	non-road Diesel	4	12	48
		-(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	4	12	48
Quayside Disposal Processing Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	Hydraulic excavator with clam bucket	For unloaded dredged material from barges at the processing facility.		2	675	Diesel	151	12	1,812
Soil Processing	Screening, conveying and processing of Sediment	Papemill Processing System	Screw conveyor with dry cement addition with mixing.	To mix/blent cement product with raw dredged material.		2	350	Electric	151	12	1,812
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	Hydraulic excavator with clam bucket	For unloaded dredged material from barges at the processing facility.		2	270	Diesel	151	12	1,812
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)				2	220	Diesel	151	12	1,812
Soil Transport	Post Processing Trucking to Upland Site	Dump Truck	On-Road dump truck	Hauling processed dredged material from the processor facility to final resting place.		278	450	Diesel	151	6	251,622
Pipe Transport Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Procurement	Trucking of Pipe to Storage Yard	Kenworth				60	450	Diesel	35	4	139



Raritan Bay Loop Vehicle Emissions

On Road Emission Factors

Equipment Type	Emission Factors												
	HC	CO	NOx	PM ₁₀	PM _{2.5}	SO _x	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Commuter Vehicles	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Dump Truck	0.1	2.3	4.7	0.1	0.1	5.58E-03	1660.5	2.52E-04	4.64E-03	7.24E-04	7.36E-04	8.62E-03	no longer available
Pipe Delivery Truck	0.1	2.5	5.2	0.1	0.1	5.87E-03	1747.0	2.21E-04	4.93E-03	7.09E-04	6.43E-04	8.09E-03	no longer available

Paved Road Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	Ib/VMt	Ib/VMt
Commuter Vehicles	0.00	0.001
Dump Truck	0.03	0.008
Pipe Delivery Truck	0.03	0.006

AP-42 Section 13.2.1.3 (1/2011)

Miles Traveled by Spread/Phase

Construction Phase	POB PER 24 hr shift	Average Daily Round Trip	Construction Days		Vehicle Miles Traveled	
			2026	2027	2026	2027
Morgan Onshore HDD -	20	50	0	19	0	19,000
Morgan Offshore HDD -	23	50	0	30	0	34,500
CP Cable Drill - Onshore	12	50	0	4	0	2,400
CP Cable Drill - Offshore	12	50	0	6	0	3,600
Ambrose East Offshore HDD	52	50	0	38	0	97,500
Ambrose West Offshore HDD	46	50	0	46	0	106,375
W541 - Crane Barge	34	50	0	60	0	101,150
Pipelay Spread	250	50	0	6	0	75,000
Moby/Demob	258	50	0	4	0	45,150
Pipelay of Ambrose HDD String	272	50	0	4	0	51,680
Pipelay of Morgan HDD String	272	50	0	8	0	107,712
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	272	50	0	3	0	46,648
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	266	50	0	11	0	141,645
Pipelay Spread from MP16.5 - MP 29.3 (West of Ambrose)	258	50	0	7	0	94,170
Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	258	50	0	5	0	64,500
Above Water Tie-in/ Spool @ MP16.6	6	50	0	59	0	17,700
Pipe Delivery Spread	54	50	0	68	0	184,275
Diving/Construction Support Spread	20	50	0	7	0	7,200
Jet Trencher	30	50	0	5	0	7,350
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	30	50	0	4	0	6,600
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	30	50	0	6	0	8,700
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	30	50	0	2	0	3,000
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	32	50	0	133	0	212,800
Daily Crew/Utility	26	50	0	69	0	89,700
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	26	50	0	83	0	107,900
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- Upland) Crossings	26	50	0	7	0	9,100
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	26	50	0	21	0	27,300
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - Upland, 32,450 CuYd - Upland)	26	50	0	13.1	0	17,030
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - Upland, 10,889 CuYd - Upland)	26	50	0	9	0	11,050
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd Upland), VCG4 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	8	50	0	202	0	80,640
Scow Barge Spread (one / each)	62	50	0	33	0	100,750
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	62	50	0	104	0	322,400
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	62	50	0	2	0	5,580
Reinstatement Spread for Morgan HDD Pit Excavation	62	50	0	8	0	25,730
Reinstatement Spread for Ambrose HDD East & West Pit Excavation						

Reinstatement Spread for Anchorage Area	62	50	0	10	0	31,000
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	62	50	0	8	0	24,800
Reinstatement Spread for all other pipeline segments	26	50	0	22	0	27,950
Pre Lay Survey Campaign	6	50	0	11	0	3,300
Post Jet Burial Survey Campaign	6	50	0	3	0	900
As Built Survey Campaign	6	50	0	4	0	1,200
Soil Transport	278	200	0	151	0	8,387,389
Trucking of Pipe to Storage Yard	60	120	35	0	250,320	0

Worker Commuter Vehicle OnRoad Emissions by Spread/Phase 907,185 grams/ton 2000 lbs/ton

Construction Phase	Emission (tons)															
	VOC		CO		NO _x		PM ₁₀		PM _{2.5}		SO _x		CO ₂		HAPs	
	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027
Morgan Onshore HDD -	0	1.10E-03	0	0.07	0	3.33E-03	0	4.03E-02	0	9.94E-03	0	6.67E-05	0	9.11	0	6.30E-05
Morgan Offshore HDD -	0	2.00E-03	0	0.13	0	0.01	0	0.07	0	1.80E-02	0	1.21E-04	0	16.54	0	1.14E-04
CP Cable Drill - Onshore	0	1.39E-04	0	8.76E-03	0	4.21E-04	0	5.09E-03	0	1.26E-03	0	8.43E-06	0	1.15	0	7.96E-06
CP Cable Drill - Offshore	0	2.09E-04	0	1.31E-02	0	6.32E-04	0	7.64E-03	0	1.88E-03	0	1.26E-05	0	1.73	0	1.19E-05
Ambrose East Offshore HDD	0	5.65E-03	0	0.36	0	0.02	0	0.21	0	0.05	0	3.42E-04	0	46.76	0	3.24E-04
Ambrose West Offshore HDD	0	6.17E-03	0	0.39	0	0.02	0	0.23	0	0.06	0	3.74E-04	0	51.01	0	3.53E-04
W541 - Crane Barge	0	5.87E-03	0	0.37	0	0.02	0	0.21	0	0.05	0	3.55E-04	0	48.51	0	3.36E-04
Pipeline Spread	0	4.35E-03	0	0.27	0	0.01	0	0.16	0	3.92E-02	0	2.63E-04	0	35.97	0	2.49E-04
Moby/Demob	0	2.62E-03	0	0.16	0	0.01	0	0.10	0	2.36E-02	0	1.59E-04	0	21.65	0	1.50E-04
Pipeline of Ambrose HDD String	0	3.00E-03	0	0.19	0	0.01	0	0.11	0	2.70E-02	0	1.81E-04	0	24.78	0	1.71E-04
Pipeline Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	0	6.25E-03	0	0.39	0	0.02	0	0.23	0	0.06	0	3.78E-04	0	51.65	0	3.57E-04
Pipeline Spread from MP14.5 - MP16.5 (Shallow Water)	0	2.70E-03	0	0.17	0	0.01	0	0.10	0	2.44E-02	0	1.64E-04	0	22.37	0	1.55E-04
Pipeline Spread from M16.5 - MP 29.3 (West of Ambrose)	0	8.21E-03	0	0.52	0	0.02	0	0.30	0	0.07	0	4.97E-04	0	67.92	0	4.70E-04
Pipeline Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	0	5.46E-03	0	0.34	0	0.02	0	0.20	0	0.05	0	3.31E-04	0	45.16	0	3.12E-04
Above Water Tie-in/ Spool @ MP16.6	0	3.74E-03	0	0.24	0	0.01	0	0.14	0	3.37E-02	0	2.26E-04	0	30.93	0	2.14E-04
Pipe Delivery Spread	0	1.03E-03	0	0.06	0	3.11E-03	0	3.76E-02	0	9.26E-03	0	6.22E-05	0	8.49	0	5.87E-05
Diving/Construction Support Spread	0	1.07E-02	0	0.67	0	0.03	0	0.39	0	0.10	0	6.47E-04	0	88.37	0	6.11E-04
Jet Trencher	0	4.17E-04	0	2.63E-02	0	1.26E-03	0	1.53E-02	0	3.77E-03	0	2.53E-05	0	3.45	0	2.39E-05
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	0	4.26E-04	0	2.68E-02	0	1.29E-03	0	1.56E-02	0	3.84E-03	0	2.58E-05	0	3.52	0	2.44E-05
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	0	3.83E-04	0	2.41E-02	0	1.16E-03	0	1.40E-02	0	3.45E-03	0	2.32E-05	0	3.16	0	2.19E-05
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	0	5.04E-04	0	3.18E-02	0	1.53E-03	0	1.85E-02	0	4.55E-03	0	3.06E-05	0	4.17	0	2.89E-05
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	0	1.74E-04	0	1.10E-02	0	5.26E-04	0	6.37E-03	0	1.57E-03	0	1.05E-05	0	1.44	0	9.95E-06
Daily Crew/Utility	0	0.01	0	0.78	0	0.04	0	0.45	0	0.11	0	7.47E-04	0	102.05	0	7.06E-04
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipeline Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	0	5.20E-03	0	0.33	0	0.02	0	0.19	0	0.05	0	3.15E-04	0	43.01	0	2.98E-04
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- Upland) Crossings	0	6.26E-03	0	0.39	0	0.02	0	0.23	0	0.06	0	3.79E-04	0	51.74	0	3.58E-04
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	0	5.28E-04	0	3.32E-02	0	1.60E-03	0	1.93E-02	0	4.76E-03	0	3.20E-05	0	4.36	0	3.02E-05
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - Upland, 32,450 CuYd - Upland)	0	1.58E-03	0	0.10	0	4.79E-03	0	0.06	0	1.43E-02	0	9.59E-05	0	13.09	0	9.06E-05
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - Upland, 10,889 CuYd - Upland)	0	9.87E-04	0	6.22E-02	0	2.99E-03	0	3.61E-02	0	8.91E-03	0	5.98E-05	0	8.17	0	5.65E-05
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd Upland), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	0	6.41E-04	0	4.03E-02	0	1.94E-03	0	2.35E-02	0	5.78E-03	0	3.88E-05	0	5.30	0	3.67E-05
Scow Barge Spread (one / teach)	0	4.68E-03	0	0.29	0	0.01	0	0.17	0	4.22E-02	0	2.83E-04	0	38.67	0	2.68E-04
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipeline Transition (MP12.5-MP16.6)	0	5.84E-03	0	0.37	0	0.02	0	0.21	0	0.05	0	3.54E-04	0	48.31	0	3.34E-04
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	0	0.02	0	1.18	0	0.06	0	0.68	0	0.17	0	1.13E-03	0	154.60	0	1.07E-03
Reinstatement Spread for Morgan HDD Pit Excavation	0	3.24E-04	0	2.04E-02	0	9.79E-04	0	1.18E-02	0	2.92E-03	0	1.96E-05	0	2.68	0	1.85E-05
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	0	1.49E-03	0	0.09	0	4.52E-03	0	0.05	0	1.35E-02	0	9.04E-05	0	12.34	0	8.54E-05
Reinstatement Spread for Anchorage Area	0	1.80E-03	0	0.11	0	5.44E-03	0	0.07	0	1.62E-02	0	1.09E-04	0	14.87	0	1.03E-04
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	0	1.44E-03	0	0.09	0	4.35E-03	0	0.05	0	1.30E-02	0	8.71E-05	0	11.89	0	8.23E-05
Reinstatement Spread for all other pipeline segments	0	1.62E-03	0	0.10	0	4.90E-03	0	0.06	0	1.46E-02	0	9.81E-05	0	13.40	0	9.27E-05
Pre Lay Survey Campaign	0	1.91E-04	0	1.21E-02	0	5.79E-04	0	7.00E-03	0	1.73E-03	0	1.16E-05	0	1.58	0	1.09E-05
Post Jet Burial Survey Campaign	0	5.22E-05	0	3.29E-03	0	1.58E-04	0	1.91E-03	0	4.71E-04	0	3.16E-06	0	0.43	0	2.99E-06
As Built Survey Campaign	0	6.96E-05	0	4.38E-03	0	2.11E-04	0	2.55E-03	0	6.28E-04	0	4.21E-06	0	0.58	0	3.98E-06
Soil Transport	0	1.24	0	21.05	0	43.53	0	138.74	0	34.45	0	0.05	0	15352.38	0	0.14
Trucking of Pipe to Storage Yard	3.81E-02	0	0.69	0	1.45	0	3.25	0	0.81	0	1.62E-03	0	482.06	0	4.03E-03	0
Total	3.81E-02	1.38	0.69	29.54	1.45	43.94	3.25	143.68	0.81	35.66	1.62E-03	0.06	482.06	16467.31	4.03E-03	0.15



Raritan Bay Loop Fugitive Dust Emissions

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

29,630 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

0.03

1,000 lbs of abrasive

Project Emissions

Equipment	Emission (tons)							
	VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Site grading, excavation, and filling	NA	NA	NA	2.66E-02	4.03E-03	NA	NA	NA
Sandblasting	NA	NA	NA	2.20E-04	2.20E-05	NA	NA	NA
Total Project Emissions	0	0	0	2.68E-02	4.05E-03	0	0	0



Raritan Bay Loop Equipment Emission Factors

HDD Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Morgan Onshore HDD -	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
		Backhoe	300	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
Morgan Offshore HDD -	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
		Generators	250	0.2	0.5	2.0	0.1	0.1	1.64E-03	530.6
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
CP Cable Drill - Onshore	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	202	0.1	0.5	1.7	0.1	0.1	1.60E-03	530.6
	Pull-back String	Drill Rig CAT Power Unit	202	0.1	0.5	1.7	0.1	0.1	1.60E-03	530.6
	HDD Pilot Hole	Mud Rig & Reclaimer Pumps	25	0.3	1.6	3.8	0.2	0.2	2.17E-03	589.3
	Pull-back String	Mud Rig & Reclaimer Pumps	25	0.3	1.6	3.8	0.2	0.2	2.17E-03	589.3
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		Crawler Crane	95	2.22E-02	0.2	1.1	3.53E-02	3.43E-02	1.59E-03	590.3
		Shallow Water Tug	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9

Ambrose East Offshore HDD	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Operations - W571 Jack up	W751 Generator	425	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		W751 Aux Generator	160	0.2	0.6	2.3	0.1	0.1	1.65E-03	530.5
		Jacking Compressors	525	0.1	0.3	1.2	0.1	0.1	1.56E-03	530.8
		50T Cherry picker	250	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
Ambrose West Offshore HDD	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Operations - W750 Jack up	W750 Generator	325	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		Jacking Compressors	525	0.1	0.3	1.2	0.1	0.1	1.56E-03	530.8
		50T Cherry picker	250	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
W541 - Crane Barge	W541 - Crane Barge	W541-Hoist Engine	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		W541-Swing Engine	525	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		W541-Auxiliary Generator	85	0.2	1.3	2.8	0.2	0.2	1.84E-03	589.7
		Deck Winch #1	238	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Deck Winch #2	160	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2

Pipelay Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)	
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Pipelay of Ambrose HDD String	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Pipelay of Morgan HDD String	Anchor Handling <12ft WD	Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9	
		Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9	
	Beach Pull	Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9	
		110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
	Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Anchor Handling <12ft WD	Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9	
		Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9	
	Beach Pull	Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9	
		110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
	Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Antares Anchor Handling <12ft WD	Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9	
		Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9	
	Beach Pull	Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9	
		110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling <12ft WD	Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9	
		Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9	
	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	Antares Anchor Handling >12ft WD	Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
		Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Seven Antares	Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Above Water Tie-in/ Spool @ MP16.6	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Pipe Delivery Spread	Dockside Crane	Manitowoc 1100	332	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9	
	Pipeline Barge Tug	Tug Trevor	1500	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	

Diving/Construction Support Spread	Dive Barge	W571	1502	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		Tug 2000 HP TBN	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		Tug 2000 HP TBN	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Material Barge Tug	M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
Jet Trencher	Mob	400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	1.65E-03	530.7
		W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	1.65E-03	530.7
		W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	Barge + Tug	400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	1.65E-03	530.7
		W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	1.65E-03	530.7
		W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8

Daily Crew/Utility	Morgan HDD Crew Boat	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
	Ambrose HDD Crew Boat	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
	Samantha Miller LCV	Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
	Guard Vessel # 1	Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
	HDD Water Delivery OSV	Main Eng	850	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		--Bow Thruster	300	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Pre-comm OSV	Boat (Main Eng)	850	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		--Bow Thruster	300	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Dredging & Reinstatement Related Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- Upland) Crossings	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		Upland W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - Upland, 32,450 CuYd - Upland)	Dredging	Upland W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd Upland, 10,889 CuYd - Upland)	Dredging	HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd Upland), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9

Scow Barge Spread (one / 1each)	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for Morgan HDD Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Reinstatement Spread for Anchorage Area	Reinstatement	Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for all other pipeline segments	Toyo Dredge Pump	W571	1,502	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Toyo Pump	425	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		400 Amp Welder	33	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	25	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9

Survey Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Post Jet Burial Survey Campaign	Post Pipeline Burial Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9

Quayside Disposal Processing Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	675	1.80E-02	0.1	0.3	2.03E-02	1.96E-02	1.44E-03	536.8
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	350	0	0	0	0	0	0	0
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	270	1.06E-02	2.94E-02	0.1	8.24E-03	7.99E-03	1.42E-03	536.8
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)	220	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0

Summary of 2026 Construction Emissions (tons)									
Location	Non-Attainment Designation*	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	HAPs
Lancaster County	NT - 8 hr Ozone (2008) MT - 24 hr PM2.5 (2006)	0		0		0	0		
So. NJ/Phil/Wilmington Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	0		0		0	0		
No. NJ/NY/CT Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	0.04		1.4		0.8	1.62E-03		

*Locations are designated as in attainment for all other pollutants.

Key:

NT = Nonattainment

MT = Maintenance

CO = Carbon monoxide

VOC = Volatile organica compounds

NO_x = Oxides of Nitrogen

PM_{xx} = Particulate Matter smaller than X.X micrometers

SO₂ = Sulfur Dioxide

Summary of 2027 Construction Emissions (tons)									
Location	Non-Attainment Designation*	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	HAPs
Lancaster County	NT - 8 hr Ozone (2008) MT - 24 hr PM2.5 (2006)	3.4		30.7		21.8	4.53E-02		
So. NJ/Phil/Wilmington Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	1.5		11.6		1.6	1.52E-02		
No. NJ/NY/CT Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	28.1		642.1		48.7	47.5		

*Locations are designated as in attainment for all other pollutants.

Key:

NT = Nonattainment

MT = Maintenance

CO = Carbon monoxide

VOC = Volatile organica compounds

NO_x = Oxides of Nitrogen

PM_{xx} = Particulate Matter smaller than X.X micrometers

SO₂ = Sulfur Dioxide

Quarryville Loop - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	33%	79	8	1	10-hour work days and 6-day work weeks

Hours per day = 10
Days per week = 6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	6	324	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	6	288	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	5	120	Gasoline	13	62.8	3,528.6	33.8	1.6	1.5	0.4	13,690.7
RT hoe	Tractors/Loaders/Backhoes	2	108	Diesel	330	2	288.1	437.4	51.3	49.8	0.8	206,569.2
Welding Rigs	Welders	20	108	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,886.0
Front End Loader	Tractors/Loaders/Backhoes	2	108	Diesel	95	29.1	196.8	208.9	28.8	26.0	0.2	66,027.2
Dozer	Crawler Tractor/Dozers	6	324	Diesel	410	9.5	58.9	154.2	10.8	10.5	0.6	220,070.6
Excavator	Excavator	8	432	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	10	540	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.

* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

[illegible]

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.12E-03	1.70E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

579,547 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	15.57	4.67

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Paved Roads	0.01	1.45E-03
Unpaved Roads	16.40	1.64

AP-42 Section 13.2.1.3 (1/2011)

1,630 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

2.1 1,000 lbs of abrasive

Process Type	Emission Factors
	PM ₁₀
Welding	NA

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site grading, excavation, and filling	NA	NA	NA	NA	NA	NA	NA	57.4	17.2	NA	NA	NA
Paved Roads (commuter and delivery vehicles)	NA	NA	NA	NA	NA	NA	NA	3.1	0.8	NA	NA	NA
Unpaved Roads (construction equipment)	NA	NA	NA	NA	NA	NA	NA	13.4	1.3	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	0.0	0.0	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	90	NA	NA	NA	0.0	2.2	0.1	2.01E-03	1.78E-03	2.15E-03	293	2.03E-03
Company Trucks	20	NA	NA	NA	2.11E-02	0.3	0.2	5.59E-03	5.15E-03	2.87E-04	85	2.83E-03
Delivery Trucks	1	NA	NA	NA	6.09E-04	1.71E-02	3.06E-02	2.31E-04	2.12E-04	4.18E-05	12	4.58E-05
Water Delivery Trucks	1	NA	NA	NA	5.83E-05	1.64E-03	2.93E-03	2.21E-05	2.03E-05	4.00E-06	1	4.38E-06
Contractor trucks	45	NA	NA	NA	4.75E-02	0.6	0.4	1.26E-02	1.16E-02	6.46E-04	191	6.36E-03
Construction Equipment Exhaust												
Tractor W/Trailer	6	320	324	7335	0.1	0.5	1.2	0.1	0.1	3.81E-03	1,389	NA
Air Compressor	6	85	288	6520	2.63E-02	0.2	0.8	4.12E-02	3.99E-02	9.96E-04	361	NA
Generator	5	13	120	2717	0.2	10.6	0.1	4.41E-03	4.05E-03	2.96E-04	41	NA
RT hoe	2	330	108	2445	0.2	0.7	1.2	0.1	0.1	1.63E-03	557	NA
Welding Rigs	20	345	1080	24451	2.5	14.0	20.8	2.0	1.9	1.80E-02	5,818	NA
Front End Loader	2	95	108	2445	0.1	0.5	0.6	0.1	0.1	5.20E-04	178	NA
Dozer	6	410	324	7335	0.1	0.5	1.2	0.1	0.1	4.84E-03	1,779	NA
Excavator	8	350	432	9780	0.1	0.4	1.0	0.1	0.1	5.45E-03	2,025	NA
Side boom	10	330	540	12226	0.2	0.9	3.1	0.1	0.1	6.61E-03	2,361	NA
Total Project Emissions					3.4	31.4	30.7	76.6	21.8	4.53E-02	15092.2	1.13E-02



Compressor Station 200 - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
July	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
August	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
September	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
Totals				1,838	184	31	

Hours per day =

10

Days per week =

6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVG Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	1	54	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	2	96	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	3	72	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
Ext-Boom RT Hoe	Tractors/Loaders/Backhoes	1	54	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
RT Forklift	Rough Terrain Forklifts	1	24	Diesel	185	4.6	20.8	61.3	4.6	4.4	0.3	99,299.3
Welding Rigs	Welders	6	324	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
60 ft Man lift	Cranes	1	48	Diesel	95	2.1	19.4	100.8	3.4	3.3	0.2	56,078.4
Ramox Compactor	Roller	1	24	Gasoline	22	112.8	6,029.0	59.0	2.7	2.5	0.2	23,009.0
Excavator	Excavator	2	108	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	0	0	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
Crane	Cranes	2	108	Diesel	175	28.0	65.5	230.6	15.6	15.2	0.5	92,843.2

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.

* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	19	50	174,648	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	7	50	64,344	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	1	50	9,192	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	8	50	73,536	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available

Total VMT = 321,720

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.12E-03	1.70E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

55,094 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	NA	NA

Fugitives from Dozer (AP-42

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Paved Roads	0.01	1.36E-03
Unpaved Roads	15.57	1.56

AP-42 Section 13.2.1.3 (1/2011)
AP-42 Section 13.2.2.1 (1/2011)

460 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	NA	NA

AP-42 Table 13.2.6

1,000 lbs of abrasive

Process Type	Emission Factors
	PM ₁₀
Welding	NA

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site Clearing, Excavation & Filling	NA	NA	NA	NA	NA	NA	NA	3.09E-02	4.67E-03	NA	NA	NA
Paved Roads	NA	NA	NA	NA	NA	NA	NA	0.9	0.2	NA	NA	NA
Unpaved Roads	NA	NA	NA	NA	NA	NA	NA	3.6	0.4	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	19	NA	NA	NA	1.01E-02	0.6	0.0	5.74E-04	5.08E-04	6.13E-04	83.8	5.79E-04
Company Trucks	7	NA	NA	NA	1.00E-02	0.1	0.1	2.65E-03	2.44E-03	1.36E-04	40.3	1.34E-03
Delivery Trucks	1	NA	NA	NA	8.24E-04	2.32E-02	4.15E-02	3.12E-04	2.87E-04	5.66E-05	16.9	6.20E-05
Contractor trucks	8	NA	NA	NA	1.14E-02	0.2	0.1	3.03E-03	2.79E-03	1.55E-04	46.0	1.53E-03
Construction Equipment Exhaust												
Tractor W/Trailer	1	320	54	1655	1.56E-02	0.1	0.3	1.84E-02	1.79E-02	8.59E-04	313.3	NA
Air Compressor	2	85	96	2941	1.19E-02	0.1	0.4	1.86E-02	1.80E-02	4.49E-04	162.7	NA
Generator	3	13	72	2206	0.2	8.6	0.1	3.58E-03	3.29E-03	2.40E-04	33.1	NA
Ext-Boom RT Hoe	1	330	54	1655	0.1	0.5	0.8	0.1	0.1	1.10E-03	376.7	NA
RT Forklift	1	185	24	735	3.69E-03	1.68E-02	4.97E-02	3.70E-03	3.59E-03	2.18E-04	80.5	NA
Welding Rigs	6	345	324	9927	1.0	5.7	8.5	0.8	0.8	7.32E-03	2,362.2	NA
60 ft Man lift	1	95	48	1471	3.41E-03	3.15E-02	0.2	5.44E-03	5.28E-03	2.45E-04	90.9	NA
Rammax Compactor	1	22	24	735	0.1	4.9	4.78E-02	2.17E-03	1.99E-03	1.35E-04	18.7	NA
Excavator	2	350	108	3309	2.31E-02	0.1	0.3	2.58E-02	2.50E-02	1.84E-03	685.3	NA
Crane	2	175	108	3309	0.1	0.2	0.8	0.1	0.1	1.84E-03	338.7	NA
Total Project Emissions					1.5	21.2	11.6	5.5	1.6	1.52E-02	4648.9	3.51E-03



Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
July	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
August	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
September	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
October	24	240	33%	79	8	1	10-hour work days and 6-day work weeks

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (bpi)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO _x	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	1	54	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	2	96	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	3	72	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
Ext-Boom RT Hoe	Tractors/Loaders/Bachhoes	1	54	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
RT Forklift	Rough Terrain Forklifts	1	24	Diesel	185	4.6	20.8	61.3	4.6	4.4	0.3	99,299.3
Welding Rigs	Welders	10	540	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
60 ft Man lift	Cranes	2	96	Diesel	95	2.1	19.4	100.8	3.4	3.3	0.2	56,078.4
Ramax Compactor	Rollers	1	24	Gasoline	22	112.8	6,029.0	59.0	2.7	2.5	0.2	23,009.0
Excavator	Excavator	2	108	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	1	54	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
Crane	Cranes	2	108	Diesel	175	28.0	65.5	230.6	15.6	15.2	0.5	92,843.2

Equipment Type	MOVES Equip Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	25	50	259,800	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	6	50	62,352	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	2	50	20,784	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	10	50	103,920	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Total VMT =				446,856													

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

51,686 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	NA	NA

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Paved Roads	0.01	1.42E-03
Unpaved Roads	14.43	1.44

AP-42 Section 13.2.1.3 (1/2011)

AP-42 Section 13.2.2.1 (1/2011)

624 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	NA	NA

AP-42 Table 13.2.6

1,000 lbs of abrasive

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site Clearing, Excavation & Filling	NA	NA	NA	NA	NA	NA	NA	4.64E-02	7.03E-03	NA	NA	NA
Paved Roads	NA	NA	NA	NA	NA	NA	NA	1.3	0.3	NA	NA	NA
Unpaved Roads	NA	NA	NA	NA	NA	NA	NA	4.5	0.4	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	25	NA	NA	NA	0.0	0.9	0.0	8.54E-04	7.55E-04	9.12E-04	124.6	8.62E-04
Company Trucks	6	NA	NA	NA	9.70E-03	0.1	0.1	2.57E-03	2.36E-03	1.32E-04	39.0	1.30E-03
Delivery Trucks	2	NA	NA	NA	1.86E-03	0.1	0.1	7.06E-04	6.50E-04	1.28E-04	38.2	1.40E-04
Contractor trucks	10	NA	NA	NA	1.62E-02	0.2	0.1	4.28E-03	3.94E-03	2.20E-04	65.0	2.16E-03
Construction Equipment Exhaust												
Tractor W/Trailer	1	320	54	1871	1.77E-02	0.1	0.3	2.08E-02	2.02E-02	9.71E-04	354.2	NA
Air Compressor	2	85	96	3325	1.34E-02	0.1	0.4	2.10E-02	2.04E-02	5.08E-04	183.9	NA
Generator	3	13	72	2494	0.2	9.7	0.1	4.04E-03	3.72E-03	2.72E-04	37.4	NA
Exit-Boom RT Hoe	1	330	54	1871	0.1	0.5	0.9	0.1	1.25E-03	4.25E-04	425.9	NA
RT Forklift	1	185	24	831	4.17E-03	1.90E-02	0.1	4.18E-03	4.05E-03	2.46E-04	91.0	NA
Welding Rigs	10	345	540	18706	1.9	10.7	15.9	1.5	1.5	1.38E-02	4,451.0	NA
60 ft Man lift	2	95	96	3325	7.72E-03	0.1	0.4	1.23E-02	1.19E-02	5.54E-04	205.6	NA
Rammax Compactor	1	22	24	831	0.1	5.5	0.1	2.45E-03	2.26E-03	1.53E-04	21.1	NA
Excavator	2	350	108	3741	2.61E-02	0.1	0.4	2.91E-02	2.83E-02	2.08E-03	774.8	NA
Side boom	1	330	54	1871	2.59E-02	0.1	0.5	2.22E-02	2.16E-02	1.01E-03	361.3	NA
Crane	2	175	108	3741	0.1	0.3	1.0	0.1	2.08E-03	382.9	NA	NA
Total Project Emissions					2.5	28.7	20.3	7.6	2.5	2.43E-02	7555.8	4.46E-03



Madison Loop - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	12	120	33%	40	4	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	12	120	33%	40	4	1	10-hour work days and 6-day work weeks
Totals				799	80	13	

Hours per day = 10
Days per week = 6

Exhaust Emission Factors

Equipment Type	MOVES Type Equip	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	6	324	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	6	288	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	5	120	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
RT hoe	Tractors/Loaders/Backhoes	2	108	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,969.2
Crane	Cranes	0	0	Diesel	185	3.6	12.1	48.3	2.7	2.7	0.3	98,231.6
Welding Rigs	Welders	14	756	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
Front End Loader	Tractors/Loaders/Backhoes	2	108	Diesel	95	29.1	196.8	209.9	26.8	26.0	0.2	66,027.2
Dozer	Tractors/Loaders/Backhoes	4	216	Diesel	410	9.5	58.9	154.2	10.8	10.5	0.6	220,070.6
Excavator	Excavator	6	324	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	8	432	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
HDD Rig	Bore/Drill Rigs	3	162	Diesel	175	48.8	157.5	574.8	34.6	33.6	0.6	92,776.9

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.

* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip. Typ.	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	38	50	151,848	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	15	50	59,940	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	1	50	3,996	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	45	50	179,820	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available

Total VMT = 395,604

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

203,257 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	15.57	4.67

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Paved Roads	0.01	1.69E-03
Unpaved Roads	19.87	1.99

 AP-42 Section 13.2.1.3 (1/2011)
 AP-42 Section 13.2.2.1 (1/2011)

839 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

0.7 1,000 lbs of abrasive

Process Type	Emission Factors
	PM ₁₀
Welding	NA

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	VOC	CO	NOx	Emission (tons)		SOx	CO ₂	HAPs
								PM ₁₀	PM _{2.5}			
Fugitive Dust												
Site grading, excavation, and filling	NA	NA	NA	NA	NA	NA	NA	22.6	6.7	NA	NA	NA
Paved Roads (commuter and delivery vehicles)	NA	NA	NA	NA	NA	NA	NA	1.4	0.3	NA	NA	NA
Unpaved Roads (construction equipment)	NA	NA	NA	NA	NA	NA	NA	8.3	0.8	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	4.71E-03	4.71E-04	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	38	NA	NA	NA	8.80E-03	0.6	0.0	4.99E-04	4.41E-04	5.33E-04	72.8	5.04E-04
Company Trucks	15	NA	NA	NA	9.32E-03	0.1	0.1	2.47E-03	2.27E-03	1.27E-04	37.5	1.25E-03
Delivery Trucks	1	NA	NA	NA	3.58E-04	1.01E-02	1.80E-02	1.36E-04	1.25E-04	2.46E-05	7.4	2.70E-05
Contractor trucks	45	NA	NA	NA	2.80E-02	0.4	0.2	7.40E-03	6.81E-03	3.80E-04	112.5	3.74E-03
Construction Equipment Exhaust												
Tractor W/Trailer	6	320	324	4316	4.08E-02	0.3	0.7	4.81E-02	4.66E-02	2.24E-03	817.1	NA
Air Compressor	6	85	288	3836	1.55E-02	0.1	0.5	2.42E-02	2.35E-02	5.86E-04	212.2	NA
Generator	5	13	120	1598	0.1	6.2	0.1	2.59E-03	2.38E-03	1.74E-04	24.0	NA
RT hoe	2	330	108	1439	0.1	0.4	0.7	0.1	0.1	9.58E-04	327.6	NA
Welding Rigs	14	345	756	10070	1.0	5.8	8.6	0.8	0.8	7.43E-03	2,396.2	NA
Front End Loader	2	95	108	1439	4.61E-02	0.3	0.3	4.25E-02	4.12E-02	3.06E-04	104.7	NA
Dozer	4	410	216	2877	3.00E-02	0.2	0.5	3.44E-02	3.34E-02	1.90E-03	697.9	NA
Excavator	6	350	324	4316	3.01E-02	0.2	0.4	3.36E-02	3.26E-02	2.40E-03	893.7	NA
Side boom	8	330	432	5754	0.1	0.4	1.4	0.1	0.1	3.11E-03	1,111.3	NA
HDD Rig	3	175	162	2158	0.1	0.4	1.4	16.9	5.1	1.33E-03	220.7	NA
Total Project Emissions					1.6	15.3	14.9	50.3	14.2	2.15E-02	7035.5	5.52E-03



Raritan Bay Loop Equipment Emissions

HDD Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Morgan Onshore HDD -	MOB	Kenworth	450	16	8.32E-05	2.43E-04	1.08E-03	6.52E-05	6.33E-05	1.13E-05	4.3	-
		Backhoe	300	48	2.87E-03	1.24E-02	2.10E-02	2.47E-03	2.39E-03	2.90E-05	9.9	-
		Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-
	HDD Pilot Hole	Drill Rig CAT Power Unit	1,750	228	0.1	0.3	1.7	0.1	0.1	7.08E-04	233.3	-
	HDD Hole Opening	Drill Rig CAT Power Unit	1,750	144	0.1	0.2	1.1	3.72E-02	3.61E-02	4.47E-04	147.4	-
	Pull-back String	Drill Rig CAT Power Unit	1,750	96	3.40E-02	0.1	0.7	2.48E-02	2.40E-02	2.98E-04	98.2	-
	HDD Pilot Hole	Mud Rig Genset-MQ	350	228	1.05E-02	0.1	0.2	8.05E-03	7.81E-03	1.45E-04	46.7	-
	HDD Hole Opening	Mud Rig Genset-MQ	350	144	6.69E-03	3.32E-02	0.1	5.08E-03	4.93E-03	9.14E-05	29.5	-
	Pull-back String	Mud Rig Genset-MQ	350	96	4.45E-03	2.21E-02	0.1	3.39E-03	3.29E-03	6.09E-05	19.7	-
	HDD Pilot Hole	Trackhoe - 240	177	228	8.04E-03	3.48E-02	0.1	6.91E-03	6.71E-03	8.14E-05	27.8	-
	HDD Hole Opening	Trackhoe - 240	177	144	5.08E-03	2.20E-02	3.72E-02	4.37E-03	4.24E-03	5.14E-05	17.6	-
	Pull-back String	Trackhoe - 240	177	96	3.39E-03	1.47E-02	2.48E-02	2.91E-03	2.82E-03	3.43E-05	11.7	-
	HDD Pilot Hole	Forklift - 10,000# & Over	130	228	8.04E-04	3.67E-03	1.08E-02	8.06E-04	7.81E-04	4.75E-05	17.5	-
	HDD Hole Opening	Forklift - 10,000# & Over	130	144	5.08E-04	2.32E-03	6.84E-03	5.09E-04	4.94E-04	3.00E-05	11.1	-
	Pull-back String	Forklift - 10,000# & Over	22	96	7.36E-04	3.47E-03	8.76E-03	3.97E-04	3.85E-04	5.09E-06	1.4	-
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	228	1.34E-03	4.52E-03	1.80E-02	1.06E-03	1.03E-03	9.87E-05	36.7	-
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	144	8.46E-04	2.85E-03	1.14E-02	6.67E-04	6.47E-04	6.23E-05	23.2	-
	Pull-back String	R.T. Crane 50-75 Ton	275	96	5.64E-04	1.90E-03	7.59E-03	4.45E-04	4.32E-04	4.16E-05	15.5	-
	HDD Pilot Hole	Triplex Pump	540	228	1.64E-02	0.1	0.3	1.30E-02	1.26E-02	2.23E-04	72.0	-
	HDD Hole Opening	Triplex Pump	540	144	1.04E-02	0.1	0.2	8.19E-03	7.94E-03	1.41E-04	45.5	-
	Pull-back String	Triplex Pump	540	96	6.91E-03	3.46E-02	0.1	5.46E-03	5.30E-03	9.40E-05	30.3	-
Morgan Offshore HDD -	MOB	Kenworth	450	10	5.20E-05	1.52E-04	6.76E-04	4.08E-05	3.96E-05	7.03E-06	2.7	-
		Generators	250	240	1.01E-02	3.63E-02	0.1	7.25E-03	7.03E-03	1.09E-04	35.1	-
		Kenworth	450	6	3.12E-05	9.10E-05	4.06E-04	2.45E-05	2.37E-05	4.22E-06	1.6	-
	HDD Pilot Hole	Drill Rig CAT Power Unit	1,750	84	2.98E-02	0.1	0.6	2.17E-02	2.10E-02	2.61E-04	86.0	-
	HDD Hole Opening	Drill Rig CAT Power Unit	1,750	120	4.25E-02	0.2	0.9	3.10E-02	3.01E-02	3.73E-04	122.8	-
	Pull-back String	Drill Rig CAT Power Unit	1,750	96	3.40E-02	0.1	0.7	2.48E-02	2.40E-02	2.98E-04	98.2	-
	HDD Pilot Hole	Mud Rig Genset-MQ	350	84	3.90E-03	1.94E-02	0.1	2.96E-03	2.88E-03	5.33E-05	17.2	-
	HDD Hole Opening	Mud Rig Genset-MQ	350	120	5.58E-03	2.77E-02	0.1	4.24E-03	4.11E-03	7.62E-05	24.6	-
	Pull-back String	Mud Rig Genset-MQ	350	96	4.46E-03	2.21E-02	0.1	3.39E-03	3.29E-03	6.09E-05	19.7	-
	HDD Pilot Hole	Trackhoe - 240	177	84	2.96E-03	1.28E-02	2.17E-02	2.55E-03	2.47E-03	3.00E-05	10.3	-
	HDD Hole Opening	Trackhoe - 240	177	120	4.23E-03	1.83E-02	3.10E-02	3.64E-03	3.53E-03	4.28E-05	14.7	-
	Pull-back String	Trackhoe - 240	177	96	3.39E-03	1.47E-02	2.48E-02	2.91E-03	2.82E-03	3.43E-05	11.7	-
	HDD Pilot Hole	Forklift - 10,000# & Over	130	84	2.96E-04	1.35E-03	3.99E-03	2.97E-04	2.88E-04	1.75E-05	6.5	-
	HDD Hole Opening	Forklift - 10,000# & Over	130	120	4.23E-04	1.93E-03	5.70E-03	4.24E-04	4.11E-04	2.50E-05	9.2	-
	Pull-back String	Forklift - 10,000# & Over	22	96	7.36E-04	3.47E-03	8.76E-03	3.97E-04	3.85E-04	5.09E-06	1.4	-
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	84	4.94E-04	1.66E-03	6.64E-03	3.89E-04	3.78E-04	3.64E-05	13.5	-
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	120	7.05E-04	2.38E-03	9.49E-03	5.56E-04	5.40E-04	5.19E-05	19.3	-
	Pull-back String	R.T. Crane 50-75 Ton	275	96	5.64E-04	1.90E-03	7.59E-03	4.45E-04	4.32E-04	4.16E-05	15.5	-
	HDD Pilot Hole	Triplex Pump	540	84	6.04E-03	3.03E-02	0.1	4.78E-03	4.63E-03	8.23E-05	26.5	-
	HDD Hole Opening	Triplex Pump	540	120	8.63E-03	4.32E-02	0.1	6.82E-03	6.62E-03	1.18E-04	37.9	-
	Pull-back String	Triplex Pump	540	96	6.91E-03	3.46E-02	0.1	5.46E-03	5.30E-03	9.40E-05	30.3	-
CP Cable Drill - Onshore	MOB	Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-
		Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-
		Drill Rig CAT Power Unit	202	48	1.32E-03	5.42E-03	1.79E-02	1.10E-03	1.07E-03	1.70E-05	5.7	-
	Pull-back String	Drill Rig CAT Power Unit	202	36	9.93E-04	4.06E-03	1.34E-02	8.28E-04	8.03E-04	1.28E-05	4.3	-
	HDD Pilot Hole	Mud Rig & Reclaimer Pumps	25	48	4.49E-04	2.09E-03	5.08E-03	2.43E-04	2.36E-04	2.87E-06	0.8	-
	Pull-back String	Mud Rig & Reclaimer Pumps	25	36	3.37E-04	1.57E-03	3.81E-03	1.83E-04	1.77E-04	2.15E-06	0.6	-
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	400 Amp Welder	33	72	7.94E-04	3.52E-03	8.32E-03	5.73E-04	5.56E-04	5.28E-06	1.8	-
		20kW Generator	30	72	4.15E-04	1.60E-03	7.22E-03	2.60E-04	2.52E-04	4.07E-06	1.4	-
		Light Plant	25	72	6.35E-04	3.01E-03	7.44E-03	3.51E-04	3.41E-04	4.27E-06	1.2	-
		250 cfm Aircompressor	80	72	2.73E-04	2.50E-03	8.48E-03	4.28E-04	4.15E-04	1.04E-05	3.7	-
		Crawler Crane	95	72	1.67E-04	1.54E-03	8.00E-03	2.66E-04	2.58E-04	1.20E-05	4.5	-
		Shallow Water Tug	660	24	1.58E-03	2.93E-02	3.40E-02	1.76E-03	1.76E-03	7.62E-03	4.0	0.45

Pipelay Related Equipment													907.185	grams/ton	18.4
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor			
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	778	432	0.1	1.4	1.9	0.1	0.1	1.80E-03	190.8	-			
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-			
		Additional G66 for pipelay ops 800kW	1,073	144	3.43E-02	0.6	0.9	3.81E-02	3.81E-02	0.2	87.7	-			
Pipelay of Ambrose HDD String	Antares Anchor Handling >12ft WD	Tug Robert	2,000	84	2.95E-02	0.5	0.7	2.82E-02	2.82E-02	7.10E-04	75.3	0.79			
		Tug Elizabeth	2,000	84	2.95E-02	0.5	0.7	2.82E-02	2.82E-02	7.10E-04	75.3	0.79			
	Seven Antares	Caterpillar 3412 DITA 580kW	778	252	4.35E-02	0.8	1.1	4.16E-02	4.16E-02	1.05E-03	111.3	-			
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-			
		Additional G66 for pipelay ops 800kW	1,073	84	2.00E-02	0.4	0.5	2.22E-02	2.22E-02	0.1	51.2	-			

Pipelay of Morgan HDD String	Anchor Handling <12ft WD	Linda Miller	660	91	6.02E-03	0.1	0.1	6.68E-03	6.68E-03	2.90E-02	15.4	0.45	
		Anchor Barge #37 Barge	99	30	3.01E-04	0.0	0.0	4.46E-04	4.46E-04	1.45E-03	0.8	0.45	
	Beach Pull	Gabby Miller	660	91	6.02E-03	0.1	0.1	6.68E-03	6.68E-03	2.90E-02	15.4	0.45	
		110kW Diesel Hydraulic Power Unit	147	91	4.40E-04	0.0	0.0	5.94E-04	5.76E-04	2.16E-05	7.9	-	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	91	7.21E-04	0.0	0.0	7.14E-04	6.93E-04	3.65E-05	13.4	-	
	Anchor Handling >12ft WD	Tug Robert	2,000	91	3.20E-02	0.6	0.8	3.06E-02	3.06E-02	7.70E-04	81.8	0.79	
		Tug Elizabeth	2,000	91	3.20E-02	0.6	0.8	3.06E-02	3.06E-02	7.70E-04	81.8	0.79	
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	778	274	4.73E-02	0.9	1.2	4.52E-02	4.52E-02	1.14E-03	120.8	-	
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-	
		Additional GE6 for pipelay ops 800kW	1,073	91	2.17E-02	0.4	0.5	2.41E-02	2.41E-02	0.1	55.5	-	
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Anchor Handling <12ft WD	Linda Miller	660	190	1.25E-02	0.2	0.3	1.39E-02	1.39E-02	0.1	32.0	0.45	
		Anchor Barge #37 Barge	99	63	6.27E-04	0.0	0.0	9.29E-04	9.29E-04	3.02E-03	1.6	0.45	
	Beach Pull	Gabby Miller	660	190	1.25E-02	0.2	0.3	1.39E-02	1.39E-02	0.1	32.0	0.45	
		110kW Diesel Hydraulic Power Unit	147	190	9.17E-04	0.0	0.0	1.24E-03	1.20E-03	4.50E-05	16.5	-	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	190	1.50E-03	0.0	0.0	1.49E-03	1.44E-03	7.60E-05	27.9	-	
	Anchor Handling >12ft WD	Tug Robert	2,000	190	0.1	1.2	1.7	0.1	0.1	1.61E-03	170.5	0.79	
		Tug Elizabeth	2,000	190	0.1	1.2	1.7	0.1	0.1	1.61E-03	170.5	0.79	
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	778	570	0.1	1.8	2.5	0.1	0.1	2.37E-03	251.8	-	
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-	
		Additional GE6 for pipelay ops 800kW	1,073	190	4.53E-02	0.8	1.1	0.1	0.1	0.2	115.8	-	
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Antares Anchor Handling <12ft WD	Linda Miller	660	82	5.43E-03	0.1	0.1	6.03E-03	6.03E-03	2.61E-02	13.9	0.45	
		Anchor Barge #37 Barge	99	27	2.72E-04	1.71E-03	5.83E-03	4.02E-04	4.02E-04	1.31E-03	0.7	0.45	
	Beach Pull	Gabby Miller	660	82	5.43E-03	0.1	0.1	6.03E-03	6.03E-03	2.61E-02	13.9	0.45	
		110kW Diesel Hydraulic Power Unit	147	82	3.97E-04	2.29E-03	6.76E-03	5.36E-04	5.20E-04	1.95E-05	7.2	-	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	82	6.51E-04	3.08E-03	9.30E-03	6.45E-04	6.25E-04	3.29E-05	12.1	-	
	Antares Anchor Handling >12ft WD	Tug Robert	2,000	82	2.89E-02	0.5	0.7	2.76E-02	2.76E-02	6.95E-04	73.8	0.79	
		Tug Elizabeth	2,000	82	2.89E-02	0.5	0.7	2.76E-02	2.76E-02	6.95E-04	73.8	0.79	
	Seven Antares	Caterpillar 3412 DITA 580kW	778	247	4.27E-02	0.8	1.1	4.08E-02	4.08E-02	1.03E-03	109.1	-	
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-	
		Additional GE6 for pipelay ops 800kW	1,073	82	1.96E-02	0.4	0.5	2.18E-02	2.18E-02	0.1	50.1	-	
Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling <12ft WD	Linda Miller	660	72	4.75E-03	0.1	0.1	5.28E-03	5.28E-03	2.29E-02	12.1	0.45	
		Anchor Barge #37 Barge	99	24	2.37E-04	1.50E-03	5.10E-03	3.52E-04	3.52E-04	1.14E-03	0.6	0.45	
	Antares Anchor Handling >12ft WD	Tug Robert	2,000	184	0.1	1.2	1.6	0.1	0.1	1.55E-03	164.7	0.79	
		Tug Elizabeth	2,000	184	0.1	1.2	1.6	0.1	0.1	1.55E-03	164.7	0.79	
		Caterpillar 3412 DITA 580kW	778	767	0.1	2.5	3.3	0.1	0.1	3.19E-03	338.6	-	
	Seven Antares	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-	
		Additional GE6 for pipelay ops 800kW	1,073	256	0.1	1.1	1.5	0.1	0.1	0.3	155.7	-	
		Antares Anchor Handling >12ft WD	Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
			Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
	Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	Seven Antares	Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
Volvo D12 MG-RC 225kW			302	0	0	0	0	0	0	0	0	-	
Additional GE6 for pipelay ops 800kW			1,073	175	4.18E-02	0.8	1.1	4.64E-02	4.64E-02	0.2	106.7	-	
Antares Anchor Handling >12ft WD		Tug Robert	2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79	
		Tug Elizabeth	2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79	
Seven Antares		Caterpillar 3412 DITA 580kW	778	360	0.1	1.2	1.6	0.1	0.1	1.50E-03	159.0	-	
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-	
		Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-	
Pipe Delivery Spread	Dockside Crane	332	472	6.57E-03	3.32E-02	0.1	5.64E-03	5.47E-03	2.57E-04	91.7	-		
	Pipeline Barge Tug	1,500	878	0.2	4.3	5.8	0.2	0.2	5.57E-03	590.8	0.79		
Diving/Construction Support Spread	Dive Barge	W571	1,502	1,638	0.4	8.0	10.9	0.5	0.5	2.1	1103.2	0.79	
		Deck Winches	300	546	5.22E-03	2.47E-02	0.1	5.17E-03	5.02E-03	2.64E-04	96.9	-	
		400 Amp Welder	33	273	3.01E-03	1.34E-02	3.16E-02	2.17E-03	2.11E-03	2.00E-05	6.8	-	
		20kW Generator	30	1,638	9.44E-03	3.63E-02	0.2	5.92E-03	5.74E-03	9.25E-05	31.9	-	
		Light Plant	25	3,276	2.89E-02	0.1	0.3	1.60E-02	1.55E-02	1.94E-04	52.8	-	
		250 cfm Aircompressor	80	273	1.04E-03	9.49E-03	3.22E-02	1.62E-03	1.57E-03	3.93E-05	14.2	-	
		Tug 2000 HP TBN	2,000	1,070	0.4	7.0	9.5	0.4	0.4	9.04E-03	959.7	0.79	
		Crew Boat (Main Eng)	980	535	0.1	0.9	4.4	0.1	0.1	0.4	235.1	0.79	
		--(Aux engine)	12	1,070	1.60E-03	2.96E-02	4.02E-02	2.37E-03	2.37E-03	7.69E-03	4.1	0.56	
		Tug 2000 HP TBN	2,000	216	0.1	1.4	1.9	0.1	0.1	1.82E-03	193.7	0.79	
Jet Trencher	Mob	M4000 Crane	400	173	2.90E-03	1.46E-02	0.1	2.49E-03	2.41E-03	1.13E-04	40.5	-	
		400 Amp Welder	33	29	3.17E-04	1.41E-03	3.33E-03	2.29E-04	2.22E-04	2.11E-06	0.7	-	
		20kW Generator	30	173	9.96E-04	3.83E-03	1.73E-02	6.24E-04	6.05E-04	9.76E-06	3.4	-	
		Light Plant	25	230	2.03E-03	9.62E-03	2.38E-02	1.12E-03	1.09E-03	1.36E-05	3.7	-	
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	250 cfm Aircompressor	80	29	1.09E-04	1.00E-03	3.39E-03	1.71E-04	1.66E-04	4.14E-06	1.5	-	
		W263 Deck Winches	225	39	2.81E-04	1.33E-03	4.02E-03	2.79E-04	2.70E-04	1.42E-05	5.2	-	
		W061 Deck Winches	300	39	3.75E-04	1.78E-03	5.36E-03	3.71E-04	3.60E-04	1.90E-05	7.0	-	
		M4000 Crane	400	118	1.97E-03	9.96E-03	3.58E-02	1.69E-03	1.64E-03	7.71E-05	27.5	-	
		400 Amp Welder	33	20	2.16E-04	9.59E-04	2.27E-03	1.56E-04	1.51E-04	1.44E-06	0.5	-	
		20kW Generator	30	118	6.78E-04	2.61E-03	1.18E-02	4.25E-04	4.12E-04	6.64E-06	2.3	-	
		Light Plant	25	470	4.15E-03	1.96E-02	4.86E-02	2.30E-03	2.23E-03	2.79E-05	7.6	-	
		250 cfm Aircompressor	80	20	7.44E-05	6.81E-04	2.31E-03	1.16E-04	1.13E-04	2.82E-06	1.0	-	
		2000 HP Tugboat	2,000	235	0.1	1.5	2.1	0.1	0.1	1.99E-03	210.9	0.79	
		Crew Boat (Main Eng)	980	59	1.01E-02	0.1	0.5	1.12E-02	1.12E-02	4.87E-02	25.8	0.79	
		--(Aux engine)	12	118	1.76E-04	3.25E-03	4.42E-03	2.60E-04	2.60E-04	8.45E-04	0.4	0.56	
		1250kw Generator	1,676	118	2.62E-02	0.1	0.4	1.99E-02	1.93E-02	3.57E-04	115.3	-	
		Jetter											

Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	W263 Deck Winches	225	35	2.53E-04	1.20E-03	3.61E-03	2.50E-04	2.43E-04	1.28E-05	4.7	-
		W061 Deck Winches	300	35	3.37E-04	1.59E-03	4.81E-03	3.34E-04	3.24E-04	1.70E-05	6.2	-
		M4000 Crane	400	106	1.77E-03	8.94E-03	3.22E-02	1.52E-03	1.48E-03	6.92E-05	24.7	-
		400 Amp Welder	33	18	1.94E-04	8.61E-04	2.03E-03	1.40E-04	1.36E-04	1.29E-06	0.4	-
		20kW Generator	30	106	6.08E-04	2.34E-03	1.06E-02	3.81E-04	3.70E-04	5.96E-06	2.1	-
		Light Plant	25	422	3.72E-03	1.76E-02	4.37E-02	2.06E-03	2.00E-03	2.50E-05	6.8	-
		250 cfm Aircompressor	80	18	6.68E-05	6.12E-04	2.07E-03	1.05E-04	1.01E-04	2.53E-06	0.9	-
		2000 HP Tugboat	2,000	211	0.1	1.4	1.9	0.1	0.1	1.78E-03	189.4	0.79
		Crew Boat (Main Eng)	980	53	9.08E-03	0.1	0.4	1.01E-02	1.01E-02	4.37E-02	23.2	0.79
		--(Aux engine)	12	106	1.58E-04	2.92E-03	3.97E-03	2.34E-04	2.34E-04	7.59E-04	0.4	0.56
		Jetter	1250kw Generator	1,676	106	2.35E-02	0.1	0.4	1.78E-02	1.73E-02	3.21E-04	103.5
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	Barge + Tug	W263 Deck Winches	225	46	3.33E-04	1.58E-03	4.76E-03	3.30E-04	3.20E-04	1.68E-05	6.2	-
		W061 Deck Winches	300	46	4.44E-04	2.10E-03	6.34E-03	4.40E-04	4.26E-04	2.24E-05	8.2	-
		M4000 Crane	400	139	2.33E-03	1.18E-02	4.24E-02	2.01E-03	1.95E-03	9.13E-05	32.6	-
		400 Amp Welder	33	23	2.56E-04	1.14E-03	2.68E-03	1.85E-04	1.79E-04	1.70E-06	0.6	-
		20kW Generator	30	139	8.02E-04	3.09E-03	1.40E-02	5.03E-04	4.88E-04	7.86E-06	2.7	-
		Light Plant	25	557	4.91E-03	2.33E-02	0.1	2.72E-03	2.64E-03	3.30E-05	9.0	-
		250 cfm Aircompressor	80	23	8.81E-05	8.06E-04	2.73E-03	1.38E-04	1.34E-04	3.34E-06	1.2	-
		2000 HP Tugboat	2,000	278	0.1	1.8	2.5	0.1	0.1	2.35E-03	249.7	0.79
		Crew Boat (Main Eng)	980	70	1.20E-02	0.1	0.6	1.33E-02	1.33E-02	0.1	30.6	0.79
		--(Aux engine)	12	139	2.08E-04	3.85E-03	5.23E-03	3.08E-04	3.08E-04	1.00E-03	0.5	0.56
		Jetter	1250kw Generator	1,676	139	3.10E-02	0.2	0.5	2.35E-02	2.28E-02	4.23E-04	136.5
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	W263 Deck Winches	225	16	1.15E-04	5.44E-04	1.64E-03	1.14E-04	1.10E-04	5.81E-06	2.1	-
		W061 Deck Winches	300	16	1.53E-04	7.25E-04	2.19E-03	1.52E-04	1.47E-04	7.74E-06	2.8	-
		M4000 Crane	400	48	8.05E-04	4.07E-03	1.46E-02	6.92E-04	6.71E-04	3.15E-05	11.2	-
		400 Amp Welder	33	8	8.82E-05	3.92E-04	9.25E-04	6.36E-05	6.17E-05	5.86E-07	0.2	-
		20kW Generator	30	48	2.77E-04	1.06E-03	4.82E-03	1.73E-04	1.68E-04	2.71E-06	0.9	-
		Light Plant	25	192	1.69E-03	8.02E-03	1.99E-02	9.37E-04	9.09E-04	1.14E-05	3.1	-
		250 cfm Aircompressor	80	8	3.04E-05	2.78E-04	9.43E-04	4.75E-05	4.61E-05	1.15E-06	0.4	-
		2000 HP Tugboat	2,000	96	3.37E-02	0.6	0.8	3.22E-02	3.22E-02	8.11E-04	86.1	0.79
		Crew Boat (Main Eng)	980	24	4.13E-03	3.82E-02	0.2	4.59E-03	4.59E-03	1.99E-02	10.5	0.79
		--(Aux engine)	12	48	7.16E-05	1.33E-03	1.80E-03	1.06E-04	1.06E-04	3.45E-04	0.2	0.56
		Jetter	1250kw Generator	1,676	48	1.07E-02	0.1	0.2	8.11E-03	7.87E-03	1.46E-04	47.1
Daily Crew/Utility	Morgan HDD Crew Boat	Crew Boat (Main Eng)	600	0	0	0	0	0	0	0	0	0.45
		--(Aux engine)	150	0	0	0	0	0	0	0	0	0.56
	Ambrose HDD Crew Boat	Crew Boat (Main Eng)	600	360	2.16E-02	0.1	0.8	2.40E-02	2.40E-02	0.1	55.2	0.45
		--(Aux engine)	150	720	1.34E-02	0.2	0.3	1.49E-02	1.49E-02	0.1	34.3	0.56
	Samantha Miller LCV	Boat (Main Eng)	600	1,464	0.1	0.5	3.3	0.1	0.1	0.4	224.4	0.45
		--(Aux engine)	150	1,464	2.73E-02	0.5	0.7	3.03E-02	3.03E-02	0.1	69.8	0.56
	Guard Vessel # 1	Boat (Main Eng)	600	3,192	0.2	1.1	7.1	0.2	0.2	0.9	489.2	0.45
		--(Aux engine)	150	3,192	0.1	1.1	1.5	0.1	0.1	0.3	152.2	0.56
	HDD Water Delivery OSV	Main Eng	850	916	0.1	0.4	2.9	0.1	0.1	0.4	198.9	0.45
		--(Aux engine)	150	916	1.71E-02	0.3	0.4	1.90E-02	1.90E-02	0.1	43.7	0.56
		--Bow Thruster	300	916	2.75E-02	0.2	1.0	3.05E-02	3.05E-02	0.1	70.2	0.45
		Boat (Main Eng)	850	286	2.43E-02	0.1	0.9	2.70E-02	2.70E-02	0.1	62.2	0.45
		--(Aux engine)	150	286	5.34E-03	0.1	0.1	5.94E-03	5.94E-03	2.57E-02	13.7	0.56
		--Bow Thruster	300	286	8.59E-03	0.0	0.3	9.54E-03	9.54E-03	4.13E-02	21.9	0.45

Dredging & Reinstatement Related Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	234	0.1	1.9	2.2	0.1	0.1	0.5	267.0	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	468	0.0	0.5	0.6	0.0	0.0	0.1	68.4	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	916.8	0.40940477	7.581564392	8.794614694	0.454893863	0.454893863	1.971206742	1046.255886	0.79
		HARS W551 Clam Rig (Aux Engine)	460	916.8	0.052454599	0.971381456	1.126802489	0.058238287	0.044683547	0.252559179	134.050641	0.56
		Tug 2000 HP TBN	2,000	1,656	0.6	10.8	14.6	0.6	0.6	1.40E-02	1485.1	0.79
		Tug 2000 HP TBN	2,000	1,656	0.6	10.8	14.6	0.6	0.6	1.40E-02	1485.1	0.79
		Crew Boat (Main Eng)	980	828	0.1	1.3	6.9	0.2	0.2	0.7	363.9	0.79
		--(Aux engine)	12	1,656	2.47E-03	4.58E-02	0.1	3.66E-03	3.66E-03	1.19E-02	6.3	0.56
		UPLAND W551 Clam Rig (Main Engine)	2,545	305	0.1	2.5	2.9	0.2	0.2	0.7	347.8	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	610	0.0	0.6	0.7	0.0	0.0	0.2	89.1	0.56
Dredging Spread for Pre-trenching the Raritan (317,532CuYd HARS, 35,580 Upland) & Chapel Hill Channel (131,729- HARS) Crossings	Dredging	HARS W551 Clam Rig (Main Engine)	2,545	1,793	0.8	14.8	17.2	0.9	0.9	3.9	2046.0	0.79
		HARS W551 Clam Rig (Aux Engine)	460	1,793	0.1	1.9	2.2	0.1	0.1	0.5	262.1	0.56
		Tug 2000 HP TBN	2,000	2,652	0.9	17.2	23.4	0.9	0.9	2.24E-02	2378.4	0.79
		Tug 2000 HP TBN	2,000	2,652	0.9	17.2	23.4	0.9	0.9	2.24E-02	2378.4	0.79
		Crew Boat (Main Eng)	980	1,326	0.2	2.1	11.0	0.3	0.3	1.1	582.7	0.79
		--(Aux engine)	12	2,652	3.96E-03	0.1	0.1	5.86E-03	5.86E-03	1.91E-02	10.1	0.56
		UPLAND W551 Clam Rig (Main Engine)	2,545	50	2.25E-02	0.4	0.5	2.50E-02	2.50E-02	0.1	57.5	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	101	5.77E-03	0.1	0.1	6.41E-03	4.91E-03	2.78E-02	14.7	0.56
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	Tug 2000 HP TBN	2,000	168	0.1	1.1	1.5	0.1	0.1	1.42E-03	150.7	0.79
		Tug 2000 HP TBN	2,000	168	0.1	1.1	1.5	0.1	0.1	1.42E-03	150.7	0.79
		Crew Boat (Main Eng)	980	84	1.44E-02	0.1	0.7	1.60E-02	1.60E-02	0.1	36.9	0.79
		--(Aux engine)	12	168	2.51E-04	4.64E-03	6.32E-03	3.71E-04	3.71E-04	1.21E-03	0.6	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	403	0.2	3.3	3.9	0.2	0.2	0.9	460.1	0.79
		HARS W551 Clam Rig (Aux Engine)	460	403	2.31E-02	0.4	0.5	2.56E-02	1.97E-02	0.1	59.0	0.56
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	Dredging	Tug 2000 HP TBN	2,000	504	0.2	3.3	4.5	0.2	0.2	4.26E-03	452.0	0.79
		Tug 2000 HP TBN	2,000	504	0.2	3.3	4.5	0.2	0.2	4.26E-03	452.0	0.79
		Crew Boat (Main Eng)	980	252	4.33E-02	0.4	2.1	4.81E-02	4.81E-02	0.2	110.7	0.79
		--(Aux engine)	12	504	7.52E-04	1.39E-02	1.89E-02	1.11E-03	1.11E-03	3.62E-03	1.9	0.56

Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	53	0.0	0.4	0.5	0.0	0.0	0.1	60.3	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	106	6.04E-03	0.1	0.1	6.71E-03	5.15E-03	0.0	15.4	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	117.6	0.052515234	0.972504333	1.128105026	0.05835026	0.05835026	0.252851127	134.2055979	0.79
		HARS W551 Clam Rig (Aux Engine)	460	117.6	0.006728469	0.124601286	0.144537492	0.007476077	0.005731659	0.032396334	17.19497751	0.56
		Tug 2000 HP TBN	2,000	314	0.1	2.0	2.8	0.1	0.1	2.66E-03	282.0	0.79
		Tug 2000 HP TBN	2,000	314	0.1	2.0	2.8	0.1	0.1	2.66E-03	282.0	0.79
		Crew Boat (Main Eng)	980	157	2.70E-02	0.3	1.3	3.00E-02	3.00E-02	0.1	69.1	0.79
		--(Aux engine)	12	314	4.69E-04	8.69E-03	1.18E-02	6.95E-04	6.95E-04	2.26E-03	1.2	0.56
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addit Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	50	0.0	0.4	0.5	0.0	0.0	0.1	57.5	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	101	5.77E-03	0.1	0.1	6.41E-03	4.91E-03	2.78E-02	14.7	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	42	0.018755441	0.347322976	0.402894652	0.020839379	0.020839379	0.090303974	47.9305707	0.79
		HARS W551 Clam Rig (Aux Engine)	460	42	0.002403025	0.044500459	0.051620533	0.002670028	0.002047021	0.011570119	6.141063396	0.56
		Tug 2000 HP TBN	2,000	204	0.1	1.3	1.8	0.1	0.1	1.72E-03	183.0	0.79
		Tug 2000 HP TBN	2,000	204	0.1	1.3	1.8	0.1	0.1	1.72E-03	183.0	0.79
		Crew Boat (Main Eng)	980	102	1.75E-02	0.2	0.8	1.95E-02	1.95E-02	0.1	44.8	0.79
		--(Aux engine)	12	204	3.04E-04	5.64E-03	7.67E-03	4.51E-04	4.51E-04	1.47E-03	0.8	0.56
Scow Barge Spread (one / 1each)	Dredge Material Transportation	Dump Scow #1	286	916.4	0.032598847	0.181104708	1.207364721	0.036220942	0.036220942	0.156957414	83.30816573	0.56
		Dump Scow #2	286	916.4	0.032598847	0.181104708	1.207364721	0.036220942	0.036220942	0.156957414	83.30816573	0.56
		Dump Scow #3	286	916.4	0.032598847	0.181104708	1.207364721	0.036220942	0.036220942	0.156957414	83.30816573	0.56
		Dump Scow #4	286	916.4	0.032598847	0.181104708	1.207364721	0.036220942	0.036220942	0.156957414	83.30816573	0.56
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipeline Transition (MP12.5-MP16.6)	Reinstatement	Clam Rig (Main Engine)	2,545	780	0.3	6.5	7.5	0.4	0.4	1.7	890.1	0.79
		Clam Rig (Aux Engine)	460	780	4.46E-02	0.8	1.0	4.96E-02	3.80E-02	0.2	114.0	0.56
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Crew Boat (Main Eng)	980	390	0.1	0.6	3.2	0.1	0.1	0.3	171.4	0.79
		--(Aux engine)	12	780	0.001164198	0.021559229	0.029320551	0.001724738	0.001724738	0.005605399	3.0	0.56
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	780	0.3	6.5	7.5	0.4	0.4	1.7	890.1	0.79
		W551 Clam Rig (Aux Engine)	460	780	4.46E-02	0.8	1.0	4.96E-02	3.80E-02	0.2	114.0	0.56
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Crew Boat (Main Eng)	980	390	0.1	0.6	3.2	0.1	0.1	0.3	171.4	0.79
		--(Aux engine)	12	780	1.16E-03	2.16E-02	2.93E-02	1.72E-03	1.72E-03	5.61E-03	3.0	0.56
	Dredge Material Transportation	Dump Scow #1	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #2	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #3	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #4	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Reinstatement	Clam Rig (Main Engine)	2,545	2,952	1.3	24.4	28.3	1.5	1.5	6.3	3368.8	0.79
		Clam Rig (Aux Engine)	460	2,952	0.2	4.4	5.1	0.3	0.2	1.1	608.9	0.79
		Tug 2000 HP TBN	2,000	2,952	1.0	19.2	26.1	1.0	1.0	2.49E-02	2647.4	0.79
		Tug 2000 HP TBN	2,000	2,952	1.0	19.2	26.1	1.0	1.0	2.49E-02	2647.4	0.79
		Crew Boat (Main Eng)	980	1,476	0.3	2.4	12.2	0.3	0.3	1.2	648.6	0.79
		--(Aux engine)	12	2,952	4.41E-03	0.1	0.1	6.53E-03	6.53E-03	2.12E-02	11.3	0.56
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	2,952	1.3	24.4	28.3	1.5	1.5	6.3	3368.8	0.79
		W551 Clam Rig (Aux Engine)	460	2,952	0.2	4.4	5.1	0.3	0.2	1.1	608.9	0.79
		Tug 2000 HP TBN	2,000	2,952	1.0	19.2	26.1	1.0	1.0	2.49E-02	2647.4	0.79
		Tug 2000 HP TBN	2,000	2,952	1.0	19.2	26.1	1.0	1.0	2.49E-02	2647.4	0.79
		Crew Boat (Main Eng)	980	1,476	0.3	2.4	12.2	0.3	0.3	1.2	648.6	0.79
		--(Aux engine)	12	2,952	4.41E-03	0.1	0.1	6.53E-03	6.53E-03	2.12E-02	11.3	0.56
	Dredge Material Transportation	Dump Scow #1	286	492	1.75E-02	0.1	0.6	1.94E-02	1.94E-02	0.1	44.7	0.56
		Dump Scow #2	286	492	1.75E-02	0.1	0.6	1.94E-02	1.94E-02	0.1	44.7	0.56
		Dump Scow #3	286	492	1.75E-02	0.1	0.6	1.94E-02	1.94E-02	0.1	44.7	0.56
		Dump Scow #4	286	492	1.75E-02	0.1	0.6	1.94E-02	1.94E-02	0.1	44.7	0.56
Reinstatement Spread for Morgan HDD Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	43	1.93E-02	0.4	0.4	2.14E-02	2.14E-02	0.1	49.3	0.79
		Clam Rig (Aux Engine)	460	43	3.49E-03	0.1	0.1	3.87E-03	2.97E-03	1.68E-02	8.9	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Crew Boat (Main Eng)	980	22	3.71E-03	3.44E-02	0.2	4.13E-03	4.13E-03	1.79E-02	9.5	0.79
		--(Aux engine)	12	43	9.10E-05	1.68E-03	2.29E-03	1.35E-04	1.35E-04	4.38E-04	0.2	0.79
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	43	1.93E-02	0.4	0.4	2.14E-02	2.14E-02	0.1	49.3	0.79
		W551 Clam Rig (Aux Engine)	460	43	3.49E-03	0.1	0.1	3.87E-03	2.97E-03	1.68E-02	8.9	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Crew Boat (Main Eng)	980	22	3.71E-03	3.44E-02	0.2	4.13E-03	4.13E-03	1.79E-02	9.5	0.79
		--(Aux engine)	12	43	6.45E-05	1.19E-03	1.62E-03	9.55E-05	9.55E-05	3.10E-04	0.2	0.56
	Dredge Material Transportation	Dump Scow #1	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #2	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #3	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #4	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56

Quayside Disposal Processing Equipment														907,185	grams/ton
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor			
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	675	385	5.16E-03	0.0	0.1	5.80E-03	5.63E-03	4.13E-04	153.8	-			
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	350	385	0	0	0	0	0	0	0	-			
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	270	385	1.22E-03	3.37E-03	0.0	9.44E-04	9.16E-04	1.62E-04	61.5	-			
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)	220	385	0.0	0.1	0.0	0.0	0.0	1.71E-04	58.4	-			



Baritan Bay Loop Equipment

HDD Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation	
Morgan Onshore HDD -	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	8	1	8	16
		Backhoe	CAT 315, 320, 330 or JD110, 310	Assist in performing loading and unloading operations and movement of smaller materials and tools		1	300	Diesel	4	12	48	
	DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	2	1	4	
	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	19	12	228	
	HDD Hole Opening	Drill Rig CAT Power Unit				1	1,750	Diesel	12	12	144	
	Pull-back String	Drill Rig CAT Power Unit				1	1,750	Diesel	8	12	96	
	HDD Pilot Hole	Mud Rig GenSet-MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	19	12	228	
	HDD Hole Opening	Mud Rig GenSet-MQ				1	350	Diesel	12	12	144	
	Pull-back String	Mud Rig GenSet-MQ				1	350	Diesel	8	12	96	
	HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	19	12	228	
	HDD Hole Opening	Trackhoe - 240				1	177	Diesel	12	12	144	
	Pull-back String	Trackhoe - 240				1	177	Diesel	8	12	96	
	HDD Pilot Hole	Forklift - 10,000# & Over	Forklift	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	19	12	228	
	HDD Hole Opening	Forklift - 10,000# & Over				1	130	Diesel	12	12	144	
	Pull-back String	Forklift - 10,000# & Over				1	22	Diesel	8	12	96	
	HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation,		1	275	Diesel	19	12	228	
	HDD Hole Opening	R.T. Crane 50-75 Ton				1	275	Diesel	12	12	144	
	Pull-back String	R.T. Crane 50-75 Ton				1	275	Diesel	8	12	96	
	HDD Pilot Hole	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	19	12	228	
	HDD Hole Opening	Triplex Pump				1	540	Diesel	12	12	144	
	Pull-back String	Triplex Pump				1	540	Diesel	8	12	96	
Morgan Offshore HDD -	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	5	1	10	
		Generators	Engines that power the auxiliary systems of the Lift Boat.			2	250	non-road Diesel	30	4	240	
	DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	3	1	6	
	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	7	12	84	
	HDD Hole Opening	Drill Rig CAT Power Unit				1	1,750	Diesel	10	12	120	
	Pull-back String	Drill Rig CAT Power Unit				1	1,750	Diesel	8	12	96	
	HDD Pilot Hole	Mud Rig GenSet-MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	7	12	84	
	HDD Hole Opening	Mud Rig GenSet-MQ				1	350	Diesel	10	12	120	
	Pull-back String	Mud Rig GenSet-MQ				1	350	Diesel	8	12	96	
	HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	7	12	84	
	HDD Hole Opening	Trackhoe - 240				1	177	Diesel	10	12	120	
	Pull-back String	Trackhoe - 240				1	177	Diesel	8	12	96	
	HDD Pilot Hole	Forklift - 10,000# & Over	Forklift	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	7	12	84	
	HDD Hole Opening	Forklift - 10,000# & Over				1	130	Diesel	10	12	120	
	Pull-back String	Forklift - 10,000# & Over				1	22	Diesel	8	12	96	
	HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation,		1	275	Diesel	7	12	84	
	HDD Hole Opening	R.T. Crane 50-75 Ton				1	275	Diesel	10	12	120	
	Pull-back String	R.T. Crane 50-75 Ton				1	275	Diesel	8	12	96	
	HDD Pilot Hole	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	7	12	84	
	HDD Hole Opening	Triplex Pump				1	540	Diesel	10	12	120	
	Pull-back String	Triplex Pump				1	540	Diesel	8	12	96	
CP Cable Drill - Onshore	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		1	450	Diesel	1	4	4	
		Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		1	450	Diesel	1	4	4	
	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	202	Diesel	4	12	48	
	HDD Hole Opening	Drill Rig CAT Power Unit				1	202	Diesel	3	12	36	
	Pull-back String	Mud Rig & Reclaimer Pumps				3	25	Diesel	4	12	48	
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	Mud Rig & Reclaimer Pumps	Diesel powered welding machine Diesel powered generator Light Plant 250 cfm Aircompressor Crawler Crane Shallow Water Tug	Smaller, diesel powered tool grade, air compressor.		3	25	Diesel	3	12	36	
		400 Amp Welder				1	33	Diesel	6	12	72	
		20kW Generator				1	30	Diesel	6	12	72	
		Light Plant				4	25	Diesel	6	12	72	
		250 cfm Aircompressor				1	80	Diesel	6	12	72	
		Crawler Crane				1	95	Diesel	6	12	72	
		Shallow Water Tug				1	660	Diesel	2	12	24	
		W751 Generator				1	425	non-road Diesel	38	24	900	
		W751 Aux Generator				1	160	non-road Diesel	38	24	900	
		Jacking Compressors				2	525	non-road Diesel	38	4	300	
Ambrose East Offshore HDD	HDD Operations - W571 Jack up	50T Cherry picker	Hydraulic Rough Terrain rubber tire crane.	Support HDD operations		1	250	non-road Diesel	38	24	900	
		400 Amp Welder				1	33	non-road Diesel	38	4	150	
		20kW Generator				1	30	non-road Diesel	38	24	900	
		Light Plant				1	25	non-road Diesel	38	12	1,800	
		250 cfm Aircompressor				1	80	non-road Diesel	38	4	150	
		Smaller, diesel powered tool grade, air compressor.				1	80	non-road Diesel	38	4	150	
		DemOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location	2	450	Diesel	6	1	12	
		HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig	1	1,750	Diesel	10	12	120	
		HDD Hole Opening	Drill Rig CAT Power Unit			1	1,750	Diesel	6	12	72	
		Pull-back String	Drill Rig CAT Power Unit			1	1,750	Diesel	5	12	60	
	HDD Operations - W750 Jack up	HDD Pilot Hole	Mud Rig GenSet-MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations	1	350	Diesel	10	12	120	
		HDD Hole Opening	Mud Rig GenSet-MQ			1	350	Diesel	6	12	72	
		Pull-back String	Mud Rig GenSet-MQ			1	350	Diesel	5	12	60	
		HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary	1	177	Diesel	10	12	120	
		HDD Hole Opening	Trackhoe - 240			1	177	Diesel	6	12	72	
		Pull-back String	Trackhoe - 240			1	177	Diesel	5	12	60	
		HDD Pilot Hole	Forklift - 10,000# & Over	Forklift	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem	1	130	Diesel	10	12	120	
		HDD Hole Opening	Forklift - 10,000# & Over			1	130	Diesel	6	12	72	
		Pull-back String	Forklift - 10,000# & Over			1	22	Diesel	5	12	60	
		HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation,	1	275	Diesel	10	12	120	
		HDD Hole Opening	R.T. Crane 50-75 Ton			1	275	Diesel	6	12	72	
		Pull-back String	R.T. Crane 50-75 Ton			1	275	Diesel	5	12	60	
		HDD Pilot Hole	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation	1	540	Diesel	10	12	120	
		HDD Hole Opening	Triplex Pump			1	540	Diesel	6	12	72	
		Pull-back String	Triplex Pump			1	540	Diesel	5	12	60	
Ambrose West Offshore HDD	HDD Operations - W750 Jack up	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location	2	450	Diesel	15	1	31	
		W750 Generator	Engine that powers the main jacking systems of the jack up barge. Engine that powers the auxiliary power systems of the jack up barge. Large Air Compressors Hydraulic Rough Terrain rubber tire crane. Diesel powered welding machine Support HDD operations General Use. Provide illumination to workers when construction activity warrants evening/night work.	Providing a stationary platform for the HDD drilling operations.		1	325	non-road Diesel	46	24	1,110	
		Jacking Compressors				2	525	non-road Diesel	46	4	370	
		50T Cherry picker				1	250	non-road Diesel	46	24	1,110	
		400 Amp Welder				1	33	non-road Diesel	46	4	185	
		20kW Generator				1	30	non-road Diesel	46	24	1,110	
		Light Plant				4	25	non-road Diesel	46	12	2,220	
		250 cfm Aircompressor				1	80	non-road Diesel	46	4	185	
		Smaller, diesel powered tool grade, air compressor.				1	80	non-road Diesel	46	4	185	
		DemOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location	2	450	Diesel	6	1	13	
		HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig	1	1,750	Diesel	14	12	168	
		HDD Hole Opening	Drill Rig CAT Power Unit			1	1,750	Diesel	6	12	72	
		Pull-back String	Drill Rig CAT Power Unit			1	1,750	Diesel	5	12	60	
	HDD Operations - W750 Jack up	HDD Pilot Hole	Mud Rig GenSet-MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations	1	350	Diesel	14	12	168	
		HDD Hole Opening	Mud Rig GenSet-MQ			1	350	Diesel	6	12	72	
		Pull-back String	Mud Rig GenSet-MQ			1	350	Diesel	4	12	48	

W541 - Crane Barge	HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entrylevel pit when necessary	1	177	Diesel	14	12	168
	HDD Hole Opening	Trackhoe - 240			1	177	Diesel	6	12	72
	Pullback String	Trackhoe - 240			1	177	Diesel	4	12	48
	HDD Pilot Hole	Forklift - 10,000# & Over			1	130	Diesel	14	12	168
	HDD Hole Opening	Forklift - 10,000# & Over			1	130	Diesel	6	12	72
	Pullback String	Forklift - 10,000# & Over			1	130	Diesel	4	12	48
	HDD Pilot Hole	R.T. Crane 50-75 Ton			1	275	Diesel	14	12	168
	HDD Hole Opening	R.T. Crane 50-75 Ton			1	275	Diesel	6	12	72
	Pullback String	R.T. Crane 50-75 Ton			1	275	Diesel	4	12	48
	HDD Pilot Hole	Triplex Pump			1	540	Diesel	14	12	168
	HDD Hole Opening	Triplex Pump			1	540	Diesel	6	12	72
	Pullback String	Triplex Pump			1	540	Diesel	4	12	48
	W541-Hoist Engine	Engine that powers the crane hoist winches			1	400	non-road Diesel	60	24	1,428
	W541-Swing Engine	Engine that powers the crane swing gears			1	325	non-road Diesel	60	24	1,428
	W541-Auxiliary Generator	Engine that powers the auxiliary power systems of the crane barge			1	85	non-road Diesel	60	24	1,428
	Deck Winch #1	For mooring and anchoring vessel			1	238	non-road Diesel	60	4	238
	Deck Winch #2	For mooring and anchoring vessel			1	238	non-road Diesel	60	4	238
W541 - Crane Barge	400 Amp Welder	Diesel powered welding machine	Rough Terrain Crane	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem	1	33	non-road Diesel	60	4	238
	20kW Generator	Diesel powered generator			1	30	non-road Diesel	60	24	1,428
	Light Plant	Diesel powered lighting tower			4	25	non-road Diesel	60	12	2,856
	250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor			1	80	non-road Diesel	60	4	238

Pipelay Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Pipelay Spread Main/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Mobilization/ Demobilization activities for the Pipelay vessel when it is alongside at the Quayside		3	778	Low Sulfur Marine Diesel	6	24	432
		Volvo D12 MG-RC 229kW	Emergency Generator for Pipelay Vessel			0	302	Low Sulfur Marine Diesel	6	24	0
		Additional GED for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	6	24	144
		Tug Robert	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	4	24	96
Pipelay of Ambrose HDD String	Seven Antares	Tug Elizabeth	2000 HP Tugboat	Moving anchors	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	1	2,000	Low Sulfur Marine Diesel	4	24	96
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	4	24	252
		Volvo D12 MG-RC 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	4	24	0
		Additional GED for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	4	24	96
Pipelay of Morgan HDD String	Anchor Handling <12H WD	Linda Miller	660 HP shallow draft tug boat	Moving anchors in shallow water		1	660	non-road Diesel	4	24	91
		Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors			1	99	non-road Diesel	4	8	30
	Beach Pull	Gabby Miller	110kW Diesel Hydraulic Power Unit			1	660	non-road Diesel	4	24	91
		150 Tonne SWL Diesel Hydraulic Spooling Winch				1	147	non-road Diesel	4	24	91
	Anchor Handling <12H WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	4	24	91
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	4	24	91
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the Morgan HDD String production.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	4	24	274
		Volvo D12 MG-RC 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	4	24	0
	Anchor Handling <12H WD	Additional GED for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	4	24	91
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	8	24	190
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Beach Pull	Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Moving anchors in shallow water		1	99	non-road Diesel	8	8	63
		Gabby Miller	110kW Diesel Hydraulic Power Unit			1	660	non-road Diesel	8	24	190
	Anchor Handling <12H WD	150 Tonne SWL Diesel Hydraulic Spooling Winch				1	147	non-road Diesel	8	24	190
		Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	8	24	190
	Tug Elizabeth	2000 HP Tugboat	1			2,000	Low Sulfur Marine Diesel	8	24	190	
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP12.5 to MP14.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	8	24	570
		Volvo D12 MG-RC 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	8	24	0
	Antares Anchor Handling <12H WD	Additional GED for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	8	24	190
		Linda Miller	660 HP shallow draft tug boat	Moving anchors in shallow water		1	660	non-road Diesel	3	8	27
	Beach Pull	Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors			1	99	non-road Diesel	3	8	27
Gabby Miller		110kW Diesel Hydraulic Power Unit	Moving anchors		1	660	non-road Diesel	3	24	82	
150 Tonne SWL Diesel Hydraulic Spooling Winch		1			147	non-road Diesel	3	24	82		
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Antares Anchor Handling <12H WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	3	24	82
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	3	24	82
	Seven Antares	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP14.5 to MP16.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	3	24	247
		Volvo D12 MG-RC 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	3	24	0
	Antares Anchor Handling <12H WD	Additional GED for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	3	24	82
		Linda Miller	660 HP shallow draft tug boat	Moving anchors in shallow water		1	660	non-road Diesel	3	24	72
	Beach Pull	Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors			1	99	non-road Diesel	3	8	24
		Gabby Miller	110kW Diesel Hydraulic Power Unit	Moving anchors		1	660	non-road Diesel	3	24	82
	150 Tonne SWL Diesel Hydraulic Spooling Winch		1			147	non-road Diesel	3	24	82	
	Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling <12H WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	8	24
Tug Elizabeth			2000 HP Tugboat	1			2,000	Low Sulfur Marine Diesel	8	24	184
Seven Antares		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP16.5 to MP29.3.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	11	24	757
		Volvo D12 MG-RC 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	11	24	0
Antares Anchor Handling <12H WD		Additional GED for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	11	24	256
		Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	7	24	175
Beach Pull		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	7	24	175
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP30.4 to MP35.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	7	24	526
Seven Antares		Volvo D12 MG-RC 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	7	24	0
		Additional GED for pipelay ops 800kW	Diesel Generator for power on the pipelay barge	Moving anchors		1	1,073	non-road Diesel	7	24	175
Antares Anchor Handling <12H WD	Tug Robert	2000 HP Tugboat	1			2,000	Low Sulfur Marine Diesel	5	24	120	
Above Water Tie-in Spool @ MP16.6	Seven Antares	Tug Elizabeth	2000 HP Tugboat	Moving anchors	Above Water Tie in Activities at MP16.6	1	2,000	Low Sulfur Marine Diesel	5	24	120
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	5	24	360
	Beach Pull	Volvo D12 MG-RC 229kW	Emergency Generator for vessel	Provides staging deck and hook support for diving operations.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	0	302	Low Sulfur Marine Diesel	5	24	0
		Additional GED for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	5	24	120
	Dockside Crane	Manitowoc 1100		Towing barges with pipe from tow out area to pipelay vessel for installation		1	332	Diesel	59	8	472
		Pipeline Barge Tug	Tug Trevor			1	1,500	Low Sulfur Marine Diesel	37	24	878
	Diving/Construction Support Spread	W571	Engine that powers W571 crane and main systems	General Use. Provide illumination to workers when construction activity warrants essential/light work.	Activities: Installation of Neptune cable crossing arrangements, installation of tie-in valve skid and tie-in spools at Rockaway manifold, installation of spool piece at HDD, and precommissioning operations (flexing, cleaning, gauging and dewatering of pipeline)	1	1,502	non-road Diesel	68	24	1,638
		Deck Winches	For mooring and anchoring vessel			2	300	non-road Diesel	68	4	546
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	68	4	273
		20kW Generator	Diesel powered generator			1	30	non-road Diesel	68	24	1,638
		Light Plant	Diesel powered lighting tower			4	25	non-road Diesel	68	12	3,276
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor			1	80	non-road Diesel	68	4	273
		Tug 2000 HP TBN	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	45	24	1,070
		Crew Boat (Main Eng)	Crew-transfer boat			1	980	non-road Diesel	45	12	535
		(Aux engine)				1	12	non-road Diesel	45	24	1,070
		Material Barge Tug	Tug 2000 HP TBN			1	2,000	non-road Diesel	9	24	216
Jet Trencher	Mob	M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	7	24	173
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	7	4	29
		20kW Generator	Diesel powered generator			1	30	non-road Diesel	7	24	173
		Light Plant	Diesel powered lighting tower			8	25	non-road Diesel	7	4	230
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor			1	80	non-road Diesel	7	4	29

Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.		2	225	non-road Diesel	5	4	39
		W061 Deck Winches	For mooring and anchoring vessel.			2	300	non-road Diesel	5	4	39
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	5	24	118
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.		1	33	non-road Diesel	5	4	20
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	30	non-road Diesel	5	24	118
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	5	12	470
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Provides support to the pipeline jetting contractor.		1	80	non-road Diesel	5	4	30
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.		2	2,000	Low Sulfur Marine Diesel	5	24	235
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	5	12	59
		--(Aux engine)				1	12	non-road Diesel	5	24	118
		1250kw Generator	Power Generation of the Jet/Trencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	5	24	118
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.		2	225	non-road Diesel	4	4	35
		W061 Deck Winches	For mooring and anchoring vessel.			2	300	non-road Diesel	4	4	35
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	4	24	106
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.		1	33	non-road Diesel	4	4	18
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	30	non-road Diesel	4	24	106
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	4	12	422
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Provides support to the pipeline jetting contractor.		1	80	non-road Diesel	4	4	18
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.		2	2,000	Low Sulfur Marine Diesel	4	24	211
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	4	12	53
		--(Aux engine)				1	12	non-road Diesel	4	24	106
		1250kw Generator	Power Generation of the Jet/Trencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	4	24	106
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 - MP 17.5)	Barge + Tug	W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.		2	225	non-road Diesel	6	4	46
		W061 Deck Winches	For mooring and anchoring vessel.			2	300	non-road Diesel	6	4	46
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	6	24	139
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.		1	33	non-road Diesel	6	4	23
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	30	non-road Diesel	6	24	139
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	6	12	557
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Provides support to the pipeline jetting contractor.		1	80	non-road Diesel	6	4	23
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.		2	2,000	Low Sulfur Marine Diesel	6	24	278
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	6	12	70
		--(Aux engine)				1	12	non-road Diesel	6	24	139
		1250kw Generator	Power Generation of the Jet/Trencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	6	24	139
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.		2	225	non-road Diesel	2	4	16
		W061 Deck Winches	For mooring and anchoring vessel.			2	300	non-road Diesel	2	4	16
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	2	24	48
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.		1	33	non-road Diesel	2	4	8
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	30	non-road Diesel	2	24	48
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	2	12	192
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Provides support to the pipeline jetting contractor.		1	80	non-road Diesel	2	4	8
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.		2	2,000	Low Sulfur Marine Diesel	2	24	96
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	2	12	24
		--(Aux engine)				1	12	non-road Diesel	2	24	48
		1250kw Generator	Power Generation of the Jet/Trencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	2	24	48
Daily Crew/Utility	Jetter	Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the HDD operations		1	600	non-road Diesel	0	12	0
		--(Aux engine)				1	150	non-road Diesel	0	24	0
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the HDD operations		1	600	non-road Diesel	30	12	360
		--(Aux engine)				1	150	non-road Diesel	30	24	720
		Samantha Miller LCV	Boat (Main Eng)	60FT Supply Vessel	For misc. supplies and placing marker buoys.	1	600	non-road Diesel	61	24	1,464
		--(Aux engine)				1	150	non-road Diesel	61	24	1,464
		Guard Vessel # 1	Boat (Main Eng)	Guard Boat Vessel	For transiting site and keeping other vessels away from work site.	1	600	non-road Diesel	133	24	3,192
		--(Aux engine)				1	150	non-road Diesel	133	24	3,192
		HDD Water Delivery OSV	Main Eng	150FT offshore supply vessel	For transporting supplies and water for HDD operations.	1	850	non-road Diesel	38	24	916
		--(Aux engine)				1	150	non-road Diesel	38	24	916
		--Bow Thruster				1	300	non-road Diesel	38	24	916
		Pre-comm OSV	Boat (Main Eng)	150FT offshore supply vessel	For transporting supplies and acting as a staging area for precommissioning activities.	1	850	non-road Diesel	12	24	286
		--(Aux engine)				1	150	non-road Diesel	12	24	286
		--Bow Thruster				1	300	non-road Diesel	12	24	286

Dredging & Reinstatement Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipeline Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	20	12	234
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	20	24	468
		HARS W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	38	24	917
		HARS W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	38	24	917
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	69	24	1,656
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	69	24	1,656
		Crew Boat (Main Eng)				1	980	non-road Diesel	69	12	828
		--(Aux engine)				1	12	non-road Diesel	69	24	1,656
		UPLAND W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging HDD pit.		1	2,545	non-road Diesel	25	12	305
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	25	24	610
		HARS W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	75	24	1,793
		HARS W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	75	24	1,793
Dredging Spread for Pre-trenching the Raritan (317.233CuYd HARS, 35,580 Upland & Chapel Hill Channel (131.728 HARS) Crossings)	Dredging	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	111	24	2,652
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	111	24	2,652
		Crew Boat (Main Eng)				1	980	non-road Diesel	111	12	1,326
		--(Aux engine)				1	12	non-road Diesel	111	24	2,652
		UPLAND W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging HDD pit.		1	2,545	non-road Diesel	11	12	132
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	4	24	101
		HARS W551 Clam Rig (Main Engine)				1	2,000	Low Sulfur Marine Diesel	7	24	168
		HARS W551 Clam Rig (Aux Engine)				1	2,000	Low Sulfur Marine Diesel	7	24	168
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	980	non-road Diesel	7	12	84
		Tug 2000 HP TBN				1	980	non-road Diesel	7	12	84
		Crew Boat (Main Eng)				1	12	non-road Diesel	7	24	168
		--(Aux engine)				1	12	non-road Diesel	7	24	168
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (8,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging HDD pit.		1	2,545	non-road Diesel	17	24	403
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	17	24	403
		HARS W551 Clam Rig (Main Engine)				1	2,000	Low Sulfur Marine Diesel	21	24	504
		HARS W551 Clam Rig (Aux Engine)				1	2,000	Low Sulfur Marine Diesel	21	24	504
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	980	non-road Diesel	21	12	252
		Tug 2000 HP TBN				1	980	non-road Diesel	21	12	252
		Crew Boat (Main Eng)				1	12	non-road Diesel	21	24	504
		--(Aux engine)				1	12	non-road Diesel	21	24	504
		UPLAND W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	4	12	53
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	4	24	106
		HARS W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	5	24	118
		HARS W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	5	24	118
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	Dredging	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	13	24	314
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	13	24	314
		Crew Boat (Main Eng)				1	980	non-road Diesel	13	12	157
		--(Aux engine)				1	12	non-road Diesel	13	24	314

Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (1, 152 CuYd HARS), V084 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (4,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.	1	2,545	non-road Diesel	4	12	50
		UPLAND W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	4	24	101
		HARS W551 Clam Rig (Main Engine)			1	2,545	non-road Diesel	2	24	47
		HARS W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	2	24	42
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.	1	2,000	Low Sulfur Marine Diesel	9	24	204
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	9	24	204
		Crew Boat (Main Eng)			1	980	non-road Diesel	9	12	102
		—(Aux engine)			1	12	non-road Diesel	9	24	204
Scow Barge Spread (one / reach)	Dredge Material Transportation	Dump Scow #1	Hopper barge	For transporting dredged material to Upland processing and the HARS site.	1	286	non-road Diesel	229	4	916
		Dump Scow #2			1	286	non-road Diesel	229	4	916
		Dump Scow #3			1	286	non-road Diesel	229	4	916
		Dump Scow #4			1	286	non-road Diesel	229	4	916
	Reinstatement	Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	13	24	780
		Clam Rig (Aux Engine)			1	460	non-road Diesel	13	24	780
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	33	24	780
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	33	24	780
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	33	12	390
		—(Aux engine)			1	12	non-road Diesel	33	24	780
		W551 Clam Rig (Main Engine)			1	2,545	non-road Diesel	33	24	780
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	33	24	780
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipeline Transition (MP12.5-MP16.6)	Mining Sand	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	33	24	780
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	33	24	780
		Crew Boat (Main Eng)			1	980	non-road Diesel	33	12	390
		—(Aux engine)			1	12	non-road Diesel	33	24	780
	Dredge Material Transportation	Dump Scow #1	Split hull hopper barge	Provides means to transport workers to/from the mining spread.	1	286	non-road Diesel	33	4	130
		Dump Scow #2			1	286	non-road Diesel	33	4	130
		Dump Scow #3			1	286	non-road Diesel	33	4	130
		Dump Scow #4			1	286	non-road Diesel	33	4	130
	Reinstatement	Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	123	24	2,952
		Clam Rig (Aux Engine)			1	460	non-road Diesel	123	24	2,952
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	123	24	2,952
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	123	24	2,952
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	123	12	1,476
		—(Aux engine)			1	12	non-road Diesel	123	24	2,952
		W551 Clam Rig (Main Engine)			1	2,545	non-road Diesel	123	24	2,952
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	123	24	2,952
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Mining Sand	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	123	24	2,952
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	123	24	2,952
		Crew Boat (Main Eng)			1	980	non-road Diesel	123	12	1,476
		—(Aux engine)			1	12	non-road Diesel	123	24	2,952
	Dredge Material Transportation	Dump Scow #1	Split hull hopper barge	Provides means to transport workers to/from the mining spread.	1	286	non-road Diesel	123	4	492
		Dump Scow #2			1	286	non-road Diesel	123	4	492
		Dump Scow #3			1	286	non-road Diesel	123	4	492
		Dump Scow #4			1	286	non-road Diesel	123	4	492
	Reinstatement	Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	2	24	43
		Clam Rig (Aux Engine)			1	460	non-road Diesel	2	24	43
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	2	24	43
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	2	24	43
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	2	12	22
		—(Aux engine)			1	12	non-road Diesel	2	24	43
		W551 Clam Rig (Main Engine)			1	2,545	non-road Diesel	2	24	43
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	2	24	43
Reinstatement Spread for Morgan HDD Pit Excavation	Mining Sand	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	2	24	43
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	2	24	43
		Crew Boat (Main Eng)			1	980	non-road Diesel	2	12	22
		—(Aux engine)			1	12	non-road Diesel	2	24	43
	Dredge Material Transportation	Dump Scow #1	Split hull hopper barge	Provides means to transport workers to/from the mining spread.	1	286	non-road Diesel	2	4	7
		Dump Scow #2			1	286	non-road Diesel	2	4	7
		Dump Scow #3			1	286	non-road Diesel	2	4	7
		Dump Scow #4			1	286	non-road Diesel	2	4	7
	Reinstatement	Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	8	24	199
		Clam Rig (Aux Engine)			1	460	non-road Diesel	8	24	199
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	8	24	199
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	8	24	199
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	8	12	100
		—(Aux engine)			1	12	non-road Diesel	8	24	199
		W551 Clam Rig (Main Engine)			1	2,545	non-road Diesel	8	24	199
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	8	24	199
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Mining Sand	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	8	24	199
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	8	24	199
		Crew Boat (Main Eng)			1	980	non-road Diesel	8	12	100
		—(Aux engine)			1	12	non-road Diesel	8	24	199
	Dredge Material Transportation	Dump Scow #1	Split hull hopper barge	Provides means to transport workers to/from the mining spread.	1	286	non-road Diesel	8	4	33
		Dump Scow #2			1	286	non-road Diesel	8	4	33
		Dump Scow #3			1	286	non-road Diesel	8	4	33
		Dump Scow #4			1	286	non-road Diesel	8	4	33
	Reinstatement	Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	10	24	240
		Clam Rig (Aux Engine)			1	460	non-road Diesel	10	24	240
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	10	24	240
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	10	24	240
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	10	12	120
		—(Aux engine)			1	12	non-road Diesel	10	24	240
		W551 Clam Rig (Main Engine)			1	2,545	non-road Diesel	10	24	240
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	10	24	240
Reinstatement Spread for Anchorage Area	Mining Sand	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	10	24	240
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	10	24	240
		Crew Boat (Main Eng)			1	980	non-road Diesel	10	12	120
		—(Aux engine)			1	12	non-road Diesel	10	24	240
	Dredge Material Transportation	Dump Scow #1	Split hull hopper barge	Provides means to transport workers to/from the mining spread.	1	286	non-road Diesel	10	4	40
		Dump Scow #2			1	286	non-road Diesel	10	4	40
		Dump Scow #3			1	286	non-road Diesel	10	4	40
		Dump Scow #4			1	286	non-road Diesel	10	4	40
	Reinstatement	Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	8	24	192
		Clam Rig (Aux Engine)			1	460	non-road Diesel	8	24	192
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	8	24	192
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	8	24	192
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	8	12	96
		—(Aux engine)			1	12	non-road Diesel	8	24	192
		W551 Clam Rig (Main Engine)			1	2,545	non-road Diesel	8	24	192
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	8	24	192
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), V084 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	Mining Sand	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	8	24	192
		Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	8	24	192
		Crew Boat (Main Eng)			1	980	non-road Diesel	8	12	96
		—(Aux engine)			1	12	non-road Diesel	8	24	192
	Dredge Material Transportation	Dump Scow #1	Split hull hopper barge	Provides means to transport workers to/from the mining spread.	1	286	non-road Diesel	8	4	32
		Dump Scow #2			1	286	non-road Diesel	8	4	32
		Dump Scow #3			1	286	non-road Diesel	8	4	32
		Dump Scow #4			1	286	non-road Diesel	8	4	32

Reinstatement Spread for all other pipeline segments	Toyo Dredge Pump	W571	Engine that powers W571 crane and main systems.	Provides staging deck and hook support for diving operations.		1	1,502	non-road Diesel	22	24	516
		Deck Winches	For mooring and anchoring vessel.			2	300	non-road Diesel	22	4	172
		Toyo Pump	DP150 dredge pump	For sucking and pumping sand in critical areas near existing assets.		1	425	non-road Diesel	22	24	516
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	22	4	86
		20kW Generator	Diesel powered generator	Provides staging deck and hook support for diving operations.		1	30	non-road Diesel	22	24	516
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		4	25	non-road Diesel	22	12	1,032
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Provides staging deck and hook support for diving operations.		1	80	non-road Diesel	22	4	86
		Top 2000 HP TBN	2000 HP Tugboat	Provides towline and anchor support to W571		1	2,000	Low Sulfur Marine Diesel	22	24	516
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W571 during diving operations.		1	980	non-road Diesel	22	12	258
		—(Aux engine)	Crew-transfer boat			1	12	non-road Diesel	22	24	516

Survey Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing a prelay survey of the offshore workplace.	Used to power all systems on the boat.	1	600	non-road Diesel	11	12	132
		—(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	11	12	132
Post Jet Burial Survey Campaign	Post Pipeline Burial Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing a post burial survey of the pipeline to ensure adequate depth of cover.	Used to power all systems on the boat.	1	600	non-road Diesel	3	12	36
		—(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	3	12	36
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing an as-built survey of the pipeline.	Used to power all systems on the boat.	1	600	non-road Diesel	4	12	48
		—(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	4	12	48

Quayside Disposal Processing Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	Hydraulic excavator with clam bucket	For unloaded dredged material from barges at the processing facility.		1	675	Diesel	32	12	385
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	Screw conveyor with dry cement addition with mixing.	To mix/blend cement product with raw dredged material.		1	350	Electric	32	12	385
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	Hydraulic excavator with clam bucket	For unloaded dredged material from barges at the processing facility.		1	270	Diesel	32	12	385
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)				1	220	Diesel	32	12	385
Soil Transport	Post Processing Trucking to Upland Site	Dump Truck	On-Road dump truck	Hauling processed dredged material from the processor facility to final resting place.		278	450	Diesel	32	6	53,473

Pipe Transport Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Procurement	Trucking of Pipe to Storage Yard	Kenworth				60	450	Diesel	35	4	139



Raritan Bay Loop Vehicle Emissions

On Road Emission Factors

Equipment Type	Emission Factors										
	HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene
	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Commuter Vehicles	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03
Dump Truck	0.1	2.3	4.7	0.1	0.1	5.58E-03	1660.5	2.52E-04	4.64E-03	7.24E-04	7.36E-04
Pipe Delivery Truck	0.1	2.5	5.2	0.1	0.1	5.87E-03	1747.0	2.21E-04	4.93E-03	7.09E-04	6.43E-04

Paved Road Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Commuter Vehicles	0.00	0.001
Dump Truck	0.03	0.008
Pipe Delivery Truck	0.03	0.006

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Miles Traveled by Spread/Phase

Construction Phase	POB PER 24 hr shift	Average Daily Round Trip	Construction Days		Vehicle Miles Traveled	
			2026	2027	2026	2027
Morgan Onshore HDD -	20	50	0	19	0	19,000
Morgan Offshore HDD -	23	50	0	30	0	34,500
CP Cable Drill - Onshore	12	50	0	4	0	2,400
CP Cable Drill - Offshore	12	50	0	6	0	3,600
Ambrose East Offshore HDD	52	50	0	38	0	97,500
Ambrose West Offshore HDD	46	50	0	46	0	106,375
W541 - Crane Barge	34	50	0	60	0	101,150
Pipelay Spread	250	50	0	6	0	75,000
Mob/Demob	258	50	0	4	0	45,150
Pipelay of Ambrose HDD String	272	50	0	4	0	51,680
Pipelay of Morgan HDD String	272	50	0	8	0	107,712
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	272	50	0	3	0	46,648
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	266	50	0	11	0	141,645
Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	258	50	0	7	0	94,170
Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	258	50	0	5	0	64,500
Above Water Tie-in/ Spool @ MP16.6	6	50	0	59	0	17,700
Pipe Delivery Spread	54	50	0	68	0	184,275
Diving/Construction Support Spread	20	50	0	7	0	7,200
Jet Trencher	30	50	0	5	0	7,350
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	30	50	0	4	0	6,600
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	30	50	0	6	0	8,700
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	30	50	0	2	0	3,000
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	32	50	0	133	0	212,800
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	26	50	0	69	0	89,700
Dredging Spread for Pre-trenching the Raritan (317,532CuYd HARS, 35,580 Upland) & Chapel Hill Channel (131,729- HARS) Crossings	26	50	0	111	0	143,650
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	26	50	0	7	0	9,100
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	26	50	0	21	0	27,300
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	26	50	0	13.1	0	17,030
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	8	50	0	229	0	91,640
Scow Barge Spread (one / 1each)	62	50	0	33	0	100,750
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	62	50	0	123	0	381,300
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	62	50	0	2	0	5,580
Reinstatement Spread for Morgan HDD Pit Excavation	62	50	0	8	0	25,730
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	62	50	0	10	0	31,000
Reinstatement Spread for Anchorage Area						

Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	62	50	0	8	0	24,800
Reinstatement Spread for all other pipeline segments	26	50	0	22	0	27,950
Pre Lay Survey Campaign	6	50	0	11	0	3,300
Post Jet Burial Survey Campaign	6	50	0	3	0	900
As Built Survey Campaign	6	50	0	4	0	1,200
Soil Transport	278	200	0	32	0	1,782,433
Trucking of Pipe to Storage Yard	60	120	35	0	250,320	0

Worker Commuter Vehicle OnRoad Emissions by Spread/Phase		907,185		grams/ton		2000		lbs/ton		Emission (tons)									
Construction Phase	VOC		CO		NOx		PM ₁₀		PM _{2.5}		SOx		CO ₂		HAPs				
	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027			
Morgan Onshore HDD -	0	1.10E-03	0	0.07	0	3.33E-03	0	4.03E-02	0	9.94E-03	0	6.67E-05	0	9.11	0	6.30E-05			
Morgan Offshore HDD -	0	2.00E-03	0	0.13	0	0.01	0	0.07	0	1.80E-02	0	1.21E-04	0	16.54	0	1.14E-04			
CP Cable Drill - Onshore	0	1.39E-04	0	8.76E-03	0	4.21E-04	0	5.09E-03	0	1.26E-03	0	8.43E-06	0	1.15	0	7.96E-06			
CP Cable Drill - Offshore	0	2.09E-04	0	1.31E-02	0	6.32E-04	0	7.64E-03	0	1.88E-03	0	1.26E-05	0	1.73	0	1.19E-05			
Ambrose East Offshore HDD	0	5.65E-03	0	0.36	0	0.02	0	0.21	0	0.05	0	3.42E-04	0	46.76	0	3.24E-04			
Ambrose West Offshore HDD	0	6.17E-03	0	0.39	0	0.02	0	0.23	0	0.06	0	3.74E-04	0	51.01	0	3.53E-04			
W541 - Crane Barge	0	5.87E-03	0	0.37	0	0.02	0	0.21	0	0.05	0	3.55E-04	0	48.51	0	3.36E-04			
Pipeline Spread	0	4.35E-03	0	0.27	0	0.01	0	0.16	0	3.92E-02	0	2.63E-04	0	35.97	0	2.49E-04			
Mob/Demob	0	2.62E-03	0	0.16	0	0.01	0	0.10	0	2.36E-02	0	1.59E-04	0	21.65	0	1.50E-04			
Pipeline of Morgan HDD String	0	3.00E-03	0	0.19	0	0.01	0	0.11	0	2.70E-02	0	1.81E-04	0	24.78	0	1.71E-04			
Pipeline Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	0	6.25E-03	0	0.39	0	0.02	0	0.23	0	0.06	0	3.78E-04	0	51.65	0	3.57E-04			
Pipeline Spread from MP14.5 - MP16.5 (Shallow Water)	0	2.70E-03	0	0.17	0	0.01	0	0.10	0	2.44E-02	0	1.64E-04	0	22.37	0	1.55E-04			
Pipeline Spread from M16.5 - MP 29.3 (West of Ambrose)	0	8.21E-03	0	0.52	0	0.02	0	0.30	0	0.07	0	4.97E-04	0	67.92	0	4.70E-04			
Pipeline Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	0	5.46E-03	0	0.34	0	0.02	0	0.20	0	0.05	0	3.31E-04	0	45.16	0	3.12E-04			
Above Water Tie-in/ Spool @ MP16.6	0	3.74E-03	0	0.24	0	0.01	0	0.14	0	3.37E-02	0	2.26E-04	0	30.93	0	2.14E-04			
Pipe Delivery Spread	0	1.03E-03	0	0.06	0	3.11E-03	0	3.76E-02	0	9.26E-03	0	6.22E-05	0	8.49	0	5.87E-05			
Diving/Construction Support Spread	0	1.07E-02	0	0.67	0	0.03	0	0.39	0	0.10	0	6.47E-04	0	88.37	0	6.11E-04			
Jet Trencher	0	4.17E-04	0	2.63E-02	0	1.26E-03	0	1.53E-02	0	3.77E-03	0	2.53E-05	0	3.45	0	2.39E-05			
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	0	4.26E-04	0	2.68E-02	0	1.29E-03	0	1.56E-02	0	3.84E-03	0	2.58E-05	0	3.52	0	2.44E-05			
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	0	3.83E-04	0	2.41E-02	0	1.16E-03	0	1.40E-02	0	3.45E-03	0	2.32E-05	0	3.16	0	2.19E-05			
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	0	5.04E-04	0	3.18E-02	0	1.53E-03	0	1.85E-02	0	4.55E-03	0	3.06E-05	0	4.17	0	2.89E-05			
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	0	1.74E-04	0	1.10E-02	0	5.26E-04	0	6.37E-03	0	1.57E-03	0	1.05E-05	0	1.44	0	9.95E-06			
Daily Crew/Utility	0	0.01	0	0.78	0	0.04	0	0.45	0	0.11	0	7.47E-04	0	102.05	0	7.06E-04			
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipeline Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	0	5.20E-03	0	0.33	0	0.02	0	0.19	0	0.05	0	3.15E-04	0	43.01	0	2.98E-04			
Dredging Spread for Pre-trenching the Raritan (317,532CuYd HARS, 35,580 Upland) & Chapel Hill Channel (131,729- HARS) Crossings	0	8.33E-03	0	0.52	0	0.03	0	0.30	0	0.08	0	5.04E-04	0	68.89	0	4.77E-04			
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	0	5.28E-04	0	3.32E-02	0	1.60E-03	0	1.93E-02	0	4.76E-03	0	3.20E-05	0	4.36	0	3.02E-05			
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	0	1.58E-03	0	0.10	0	4.79E-03	0	0.06	0	1.43E-02	0	9.59E-05	0	13.09	0	9.06E-05			
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	0	9.87E-04	0	6.22E-02	0	2.99E-03	0	3.61E-02	0	8.91E-03	0	5.98E-05	0	8.17	0	5.65E-05			
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	0	6.41E-04	0	4.03E-02	0	1.94E-03	0	2.35E-02	0	5.78E-03	0	3.88E-05	0	5.30	0	3.67E-05			
Scow Barge Spread (one / 1each)	0	5.31E-03	0	0.33	0	0.02	0	0.19	0	4.79E-02	0	3.22E-04	0	43.95	0	3.04E-04			
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipeline Transition (MP12.5-MP16.6)	0	5.84E-03	0	0.37	0	0.02	0	0.21	0	0.05	0	3.54E-04	0	48.31	0	3.34E-04			
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	0	0.02	0	1.39	0	0.07	0	0.81	0	0.20	0	1.34E-03	0	182.85	0	1.27E-03			
Reinstatement Spread for Morgan HDD Pit Excavation	0	3.24E-04	0	2.04E-02	0	9.79E-04	0	1.18E-02	0	2.92E-03	0	1.96E-05	0	2.68	0	1.85E-05			
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	0	1.49E-03	0	0.09	0	4.52E-03	0	0.05	0	1.35E-02	0	9.04E-05	0	12.34	0	8.54E-05			
Reinstatement Spread for Anchorage Area	0	1.80E-03	0	0.11	0	5.44E-03	0	0.07	0	1.62E-02	0	1.09E-04	0	14.87	0	1.03E-04			
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	0	1.44E-03	0	0.09	0	4.35E-03	0	0.05	0	1.30E-02	0	8.71E-05	0	11.89	0	8.23E-05			
Reinstatement Spread for all other pipeline segments	0	1.62E-03	0	0.10	0	4.90E-03	0	0.06	0	1.46E-02	0	9.81E-05	0	13.40	0	9.27E-05			
Pre Lay Survey Campaign	0	1.91E-04	0	1.21E-02	0	5.79E-04	0	7.00E-03	0	1.73E-03	0	1.16E-05	0	1.58	0	1.09E-05			
Post Jet Burial Survey Campaign	0	5.22E-05	0	3.29E-03	0	1.58E-04	0	1.91E-03	0	4.71E-04	0	3.16E-06	0	0.43	0	2.99E-06			
As Built Survey Campaign	0	6.96E-05	0	4.38E-03	0	2.11E-04	0	2.55E-03	0	6.28E-04	0	4.21E-06	0	0.58	0	3.98E-06			
Soil Transport	0	0.26	0	4.47	0	9.25	0	29.48	0	7.32	0	0.01	0	3262.59	0	0.03			
Trucking of Pipe to Storage Yard	3.81E-02	0	0.69	0	1.45	0	3.25	0	0.81	0	1.62E-03	0	482.06	0	4.03E-03	0			
Total	3.81E-02	0.40	0.69	13.35	1.45	9.68	3.25	34.64	0.81	8.59	1.62E-03	0.02	482.06	4428.18	4.03E-03	0.04			



Raritan Bay Loop Fugitive Dust Emissions

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

29,630 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

0.03 1,000 lbs of abrasive

Project Emissions

Equipment	Emission (tons)							
	VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Site grading, excavation, and filling	NA	NA	NA	2.66E-02	4.03E-03	NA	NA	NA
Sandblasting	NA	NA	NA	2.20E-04	2.20E-05	NA	NA	NA
Total Project Emissions	0	0	0	2.68E-02	4.05E-03	0	0	0



Raritan Bay Loop Equipment Emission Factors

HDD Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Morgan Onshore HDD -	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
		Backhoe	300	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
Morgan Offshore HDD -	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
		Generators	250	0.2	0.5	2.0	0.1	0.1	1.64E-03	530.6
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
CP Cable Drill - Onshore	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	202	0.1	0.5	1.7	0.1	0.1	1.60E-03	530.6
	Pull-back String	Drill Rig CAT Power Unit	202	0.1	0.5	1.7	0.1	0.1	1.60E-03	530.6
	HDD Pilot Hole	Mud Rig & Reclaimer Pumps	25	0.3	1.6	3.8	0.2	0.2	2.17E-03	589.3
	Pull-back String	Mud Rig & Reclaimer Pumps	25	0.3	1.6	3.8	0.2	0.2	2.17E-03	589.3
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		Crawler Crane	95	2.22E-02	0.2	1.1	3.53E-02	3.43E-02	1.59E-03	590.3
		Shallow Water Tug	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9

Ambrose East Offshore HDD	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Operations - W571 Jack up	W751 Generator	425	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		W751 Aux Generator	160	0.2	0.6	2.3	0.1	0.1	1.65E-03	530.5
		Jacking Compressors	525	0.1	0.3	1.2	0.1	0.1	1.56E-03	530.8
		50T Cherry picker	250	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
Ambrose West Offshore HDD	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Operations - W750 Jack up	W750 Generator	325	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		Jacking Compressors	525	0.1	0.3	1.2	0.1	0.1	1.56E-03	530.8
		50T Cherry picker	250	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7

W541 - Crane Barge	W541 - Crane Barge	W541-Hoist Engine	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		W541-Swing Engine	525	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		W541-Auxiliary Generator	85	0.2	1.3	2.8	0.2	0.2	1.84E-03	589.7
		Deck Winch #1	238	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Deck Winch #2	160	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2

Pipelay Related Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Pipelay of Ambrose HDD String	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Pipelay of Morgan HDD String	Anchor Handling <12ft WD	Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
		Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
	Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Anchor Handling <12ft WD	Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
		Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
	Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Antares Anchor Handling <12ft WD	Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
		Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling <12ft WD	Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
		Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9

Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Above Water Tie-in/ Spool @ MP16.6	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Pipe Delivery Spread	Dockside Crane	Manitowoc 1100	332	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9	
	Pipeline Barge Tug	Tug Trevor	1500	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
Diving/Construction Support Spread	Dive Barge	W571	1502	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
		Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0	
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8	
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
		Tug 2000 HP TBN	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9	
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9	
		Material Barge Tug	Tug 2000 HP TBN	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Jet Trencher	Mob	M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
			400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
20kW Generator			30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8	
Light Plant			24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
250 cfm Aircompressor			80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9	
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0	
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8	
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9	
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9	
	Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7	
	Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
W061 Deck Winches			300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
M4000 Crane			400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9	
400 Amp Welder			32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0	
20kW Generator			30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8	
Light Plant			24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
250 cfm Aircompressor			80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
2000 HP Tugboat			2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
Crew Boat (Main Eng)			980	0.2	1.9	9.7	0.2	0.2	1.0	514.9	
--(Aux engine)			12	0.2	3.7	5.1	0.3	0.3	1.0	514.9	
Jetter		1250kw Generator	1676	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7	
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)		Barge + Tug	W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
	W061 Deck Winches		300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
	M4000 Crane		400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9	
	400 Amp Welder		32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0	
	20kW Generator		30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8	
	Light Plant		24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
	250 cfm Aircompressor		80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
	2000 HP Tugboat		2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Crew Boat (Main Eng)		980	0.2	1.9	9.7	0.2	0.2	1.0	514.9	
	--(Aux engine)		12	0.2	3.7	5.1	0.3	0.3	1.0	514.9	
	Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7	

Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Daily Crew/Utility	Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Morgan HDD Crew Boat	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Ambrose HDD Crew Boat	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Samantha Miller LCV	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Guard Vessel # 1	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Main Eng	850	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	HDD Water Delivery OSV	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		--Bow Thruster	300	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Pre-comm OSV	Boat (Main Eng)	850	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		--Bow Thruster	300	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Dredging & Reinstatement Related Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Pre-trenching the Raritan (317,532CuYd HARS, 35,580 Upland) & Chapel Hill Channel (131,729- HARS) Crossings	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	Dredging	HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9

Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Scow Barge Spread (one / 1 each)	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Reinstatement Spread for Morgan HDD Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for Anchorage Area	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for all other pipeline segments	Toyo Dredge Pump	W571	1,502	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Toyo Pump	425	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		400 Amp Welder	33	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	25	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9

Survey Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Post Jet Burial Survey Campaign	Post Pipeline Burial Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9

Quayside Disposal Processing Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	675	1.80E-02	0.1	0.3	2.03E-02	1.96E-02	1.44E-03	536.8
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	350	0	0	0	0	0	0	0
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	270	1.06E-02	2.94E-02	0.1	8.24E-03	7.99E-03	1.42E-03	536.8
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)	220	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0



Summary of 2026 Construction Emissions (tons)									
Location	Non-Attainment Designation*	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	HAPs
Lancaster County	NT - 8 hr Ozone (2008) MT - 24 hr PM2.5 (2006)	0		0		0	0		
So. NJ/Phil/Wilmington Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	0		0		0	0		
No. NJ/NY/CT Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	0.04		1.4		0.8	1.62E-03		

*Locations are designated as in attainment for all other pollutants.

Key:

NT = Nonattainment

MT = Maintenance

CO = Carbon monoxide

VOC = Volatile organica compounds

NO_x = Oxides of Nitrogen

PM_{xx} = Particulate Matter smaller than X.X micrometers

SO₂ = Sulfur Dioxide

Summary of 2027 Construction Emissions (tons)									
Location	Non-Attainment Designation*	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	HAPs
Lancaster County	NT - 8 hr Ozone (2008) MT - 24 hr PM2.5 (2006)	3.4		30.7		21.8	4.53E-02		
So. NJ/Phil/Wilmington Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	1.4		10.8		1.5	1.41E-02		
No. NJ/NY/CT Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	28.0		648.6		59.7	45.2		

*Locations are designated as in attainment for all other pollutants.

Key:

NT = Nonattainment

MT = Maintenance

CO = Carbon monoxide

VOC = Volatile organica compounds

NO_x = Oxides of Nitrogen

PM_{xx} = Particulate Matter smaller than X.X micrometers

SO₂ = Sulfur Dioxide



	Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January		24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February		24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March		24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April		24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May		24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June		24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March		24	240	33%	79	8	1	10-hour work days and 6-day work weeks

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	6	324	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	6	288	Diesel	85	3.7	33.5	113.6	6.7	5.6	0.1	50,169.8
Generator	Generator Sets	5	120	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
RT hoe	Tractors/Loaders/Backhoes	2	108	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
Welding Rigs	Welders	20	1080	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
Front End Loader	Tractors/Loaders/Backhoes	2	108	Diesel	95	29.1	196.8	209.9	26.8	26.0	0.2	66,027.2
Dozer	Crawler Tractor/Dozers	6	324	Diesel	410	9.5	58.9	154.2	10.8	10.5	0.6	220,070.6
Excavator	Excavator	8	432	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	10	540	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5

Equipment Type	MOVES Equip Type	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	90	50	611,280	0.1	3.3	0.2	3.0E-03	0.0	3.2E-03	435.0	1.6E-04	4.6E-04	2.8E-05	1.7E-03	6.3E-04	no longer available
Company trucks	Light Commercial Truck	20	50	135,840	0.1	1.9	1.0	3.74E-02	3.44E-02	1.9E-03	567.6	3.8E-04	5.4E-03	9.4E-04	1.1E-03	1.1E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	1	50	6,792	0.1	2.3	4.1	3.08E-02	2.84E-02	5.6E-03	1668.9	6.1E-05	2.6E-03	3.0E-04	1.7E-04	3.0E-03	no longer available
Water Delivery Trucks	Combination Short-haul Truck	1	7	650	0.1	2.3	4.1	3.08E-02	2.84E-02	5.6E-03	1668.9	6.1E-05	2.6E-03	3.0E-04	1.7E-04	3.0E-03	no longer available
Contractor trucks	Light Commercial Truck	45	50	305,840	0.1	1.9	1.0	3.74E-02	3.44E-02	1.9E-03	567.6	3.8E-04	5.4E-03	9.4E-04	1.1E-03	1.1E-02	no longer available

Total VMT = 1,060,202

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.12E-03	1.70E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

579,547 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	15.57	4.67

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMТ	lb/VMТ
Paved Roads	0.01	1.45E-03
Unpaved Roads	16.40	1.64

AP-42 Section 13.2.1.3 (1/2011)
AP-42 Section 13.2.2.1 (1/2011)

1,630 VMТ

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.8

2.1 1,000 lbs of abrasive

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

Project Emissions

907.185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site grading, excavation, and filling	NA	NA	NA	NA	NA	NA	NA	57.4	17.2	NA	NA	NA
Paved Roads (commuter and delivery vehicles)	NA	NA	NA	NA	NA	NA	NA	3.1	0.8	NA	NA	NA
Unpaved Roads (construction equipment)	NA	NA	NA	NA	NA	NA	NA	13.4	1.3	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	0.0	0.0	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	90	NA	NA	NA	0.0	2.2	0.1	2.01E-03	1.78E-03	2.15E-03	293	2.03E-03
Company Trucks	20	NA	NA	NA	2.11E-02	0.3	0.2	5.59E-03	5.15E-03	2.87E-04	85	2.83E-03
Delivery Trucks	1	NA	NA	NA	6.09E-04	1.71E-02	3.06E-02	2.31E-04	2.12E-04	4.18E-05	12	4.58E-05
Water Delivery Trucks	1	NA	NA	NA	5.83E-05	1.64E-03	2.93E-03	2.21E-05	2.03E-05	4.00E-06	1	4.38E-06
Contractor trucks	45	NA	NA	NA	4.75E-02	0.6	0.4	1.26E-02	1.16E-02	6.46E-04	191	6.36E-03
Construction Equipment Exhaust												
Tractor W/Trailer	6	320	324	7335	0.1	0.5	1.2	0.1	0.1	3.81E-03	1,389	NA
Air Compressor	6	85	288	6520	2.63E-02	0.2	0.8	4.12E-02	3.99E-02	9.96E-04	361	NA
Generator	5	13	120	2717	0.2	10.6	0.1	4.41E-03	4.05E-03	2.96E-04	41	NA
RT hoe	2	330	108	2445	0.2	0.7	1.2	0.1	0.1	1.63E-03	557	NA
Welding Rigs	20	345	1080	24451	2.5	14.0	20.8	2.0	1.9	1.80E-02	5,818	NA
Front End Loader	2	95	108	2445	0.1	0.5	0.6	0.1	0.1	5.20E-04	178	NA
Dozer	6	410	324	7335	0.1	0.5	1.2	0.1	0.1	4.84E-03	1,779	NA
Excavator	8	350	432	9780	0.1	0.4	1.0	0.1	0.1	5.45E-03	2,025	NA
Side boom	10	330	540	12226	0.2	0.9	3.1	0.1	0.1	6.61E-03	2,361	NA
Total Project Emissions					3.4	31.4	30.7	76.6	21.8	4.53E-02	16092.2	1.13E-02



Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
July	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
August	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
September	24	240	33%	79	8	1	10-hour work days and 6-day work weeks

Equipment Type	MOVES Equip Type	Avg Qty	AVG Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	1	54	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	2	96	Diesel	85	3.7	33.5	118.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	3	72	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
Ext-Boom RT Hoe	Tractors/Loaders/Backhoes	1	54	Diesel	330	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RT Forklift	Rough Terrain Forklifts	1	24	Diesel	185	4.6	20.8	61.3	4.6	4.4	0.3	99,299.3
Welding Rigs	Welders	6	324	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
60 ft Man lift	Cranes	1	48	Diesel	95	2.1	19.4	100.8	3.4	3.3	0.2	56,078.4
Ramax Compactor	Roller	1	24	Gasoline	22	112.8	6,029.0	59.0	2.7	2.5	0.2	23,009.0
Excavator	Excavator	2	108	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	0	0	Diesel	330	12.5	63.5	227.9	10.8	10.5	0.5	175,204.5
Crane	Cranes	2	108	Diesel	175	28.0	65.4	230.6	15.6	15.2	0.5	92,843.2

[illegible]

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.12E-03	1.70E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

55,094 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	NA	NA

Fugitives from Dozer (AP-42

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Paved Roads	0.01	1.36E-03
Unpaved Roads	15.57	1.56

AP-42 Section 13.2.1.3 (1/2011)

460 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	NA	NA

AP-42 Table 13.2.6

1,000 lbs of abrasive

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

Project Emissions

907.185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site Clearing, Excavation & Filling	NA	NA	NA	NA	NA	NA	NA	3.09E-02	4.67E-03	NA	NA	NA
Paved Roads	NA	NA	NA	NA	NA	NA	NA	0.9	0.2	NA	NA	NA
Unpaved Roads	NA	NA	NA	NA	NA	NA	NA	3.6	0.4	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	19	NA	NA	NA	1.01E-02	0.6	0.0	5.74E-04	5.08E-04	6.13E-04	83.8	5.79E-04
Company Trucks	7	NA	NA	NA	1.00E-02	0.1	0.1	2.65E-03	2.44E-03	1.36E-04	40.3	1.34E-03
Delivery Trucks	1	NA	NA	NA	8.24E-04	2.32E-02	4.15E-02	3.12E-04	2.87E-04	5.66E-05	16.9	6.20E-05
Contractor trucks	8	NA	NA	NA	1.14E-02	0.2	0.1	3.03E-03	2.79E-03	1.55E-04	46.0	1.53E-03
Construction Equipment Exhaust												
Tractor W/Trailer	1	320	54	1655	1.56E-02	0.1	0.3	1.84E-02	1.79E-02	8.59E-04	313.3	NA
Air Compressor	2	85	96	2941	1.19E-02	0.1	0.4	1.86E-02	1.80E-02	4.49E-04	162.7	NA
Generator	3	13	72	2206	0.2	8.6	0.1	3.58E-03	3.29E-03	2.40E-04	33.1	NA
Ext-Boom RT Hoe	1	330	54	1655	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.0	NA
RT Forklift	1	185	24	735	3.69E-03	1.68E-02	4.97E-02	3.70E-03	3.59E-03	2.18E-04	80.5	NA
Welding Rigs	6	345	324	9927	1.0	5.7	8.5	0.8	0.8	7.32E-03	2,362.2	NA
60 ft Man lift	1	95	48	1471	3.41E-03	3.15E-02	0.2	5.44E-03	5.28E-03	2.45E-04	90.9	NA
Ramax Compactor	1	22	24	735	0.1	4.9	4.78E-02	2.17E-03	1.99E-03	1.35E-04	18.7	NA
Excavator	2	350	108	3309	2.31E-02	0.1	0.3	2.58E-02	2.50E-02	1.84E-03	685.3	NA
Crane	2	175	108	3309	0.1	0.2	0.8	0.1	0.1	1.84E-03	338.7	NA
Total Project Emissions					1.4	20.7	10.8	5.4	1.5	1.41E-02	4272.2	3.51E-03



Compressor Station 206 - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
July	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
August	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
September	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
October	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
		Totals		2,078	208	35	

Hours per day = 10
Days per week = 6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	1	54	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	2	96	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	3	72	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
Ext-Boom RT Hoe	Tractors/Loaders/Backhoes	1	54	Diesel	330	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RT Forklift	Rough Terrain Forklifts	1	24	Diesel	165	4.6	20.8	61.3	4.6	4.4	0.3	99,299.3
Welding Rigs	Welders	10	540	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
60 ft Man lift	Cranes	2	96	Diesel	95	2.1	19.4	100.8	3.4	3.3	0.2	56,078.4
Ramox Compactor	Rollers	1	24	Gasoline	22	112.8	6,029.0	59.0	2.7	2.5	0.2	23,009.0
Excavator	Excavator	2	108	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	1	54	Diesel	339	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
Crane	Cranes	2	108	Diesel	175	28.0	65.5	230.6	15.6	15.2	0.5	92,843.2

Generated using EPA MOVES. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.

* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	25	50	259,800	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	6	50	62,352	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	2	50	20,784	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	10	50	103,920	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available

Total VMT = 446,856

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))
51,686 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	NA	NA

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/MT	lb/MT
Paved Roads	0.01	1.42E-03
Unpaved Roads	14.43	1.44

AP-42 Section 13.2.1.3 (1/2011)
AP-42 Section 13.2.2.1 (1/2011)
624 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	NA	NA

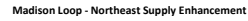
AP-42 Table 13.2.6
1,000 lbs of abrasive

Process Type	Emission Factors
	PM ₁₀
Welding	NA

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site Clearing, Excavation & Filling	NA	NA	NA	NA	NA	NA	NA	4.64E-02	7.03E-03	NA	NA	NA
Paved Roads	NA	NA	NA	NA	NA	NA	NA	1.3	0.3	NA	NA	NA
Unpaved Roads	NA	NA	NA	NA	NA	NA	NA	4.5	0.4	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	25	NA	NA	NA	0.0	0.9	0.0	8.54E-04	7.55E-04	9.12E-04	124.6	8.62E-04
Company Trucks	6	NA	NA	NA	9.70E-03	0.1	0.1	2.57E-03	2.36E-03	1.32E-04	39.0	1.30E-03
Delivery Trucks	2	NA	NA	NA	1.86E-03	0.1	0.1	7.06E-04	6.50E-04	1.28E-04	38.2	1.40E-04
Contractor trucks	10	NA	NA	NA	1.62E-02	0.2	0.1	4.28E-03	3.94E-03	2.20E-04	65.0	2.16E-03
Construction Equipment Exhaust												
Tractor W/Trailer	1	320	54	1871	1.77E-02	0.1	0.3	2.08E-02	2.02E-02	9.71E-04	354.2	NA
Air Compressor	2	85	96	3325	1.34E-02	0.1	0.4	2.10E-02	2.04E-02	5.08E-04	183.9	NA
Generator	3	13	72	2494	0.2	9.7	0.1	4.04E-03	3.72E-03	2.72E-04	37.4	NA
Ext-Boom RT Hoe	1	330	54	1871	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.0	NA
RT Forklift	1	185	24	831	4.17E-03	1.90E-02	0.1	4.18E-03	4.05E-03	2.46E-04	91.0	NA
Welding Rigs	10	345	540	18706	1.9	10.7	15.9	1.5	1.38E-02	1.38E-02	4,451.0	NA
60 ft Man lift	2	95	96	3325	7.72E-03	0.1	0.4	1.23E-02	1.19E-02	5.54E-04	205.6	NA
Ramex Compactor	1	22	24	831	0.1	5.5	0.1	2.45E-03	2.26E-03	1.53E-04	21.1	NA
Excavator	2	350	108	3741	2.61E-02	0.1	0.4	2.91E-02	2.83E-02	2.08E-03	774.8	NA
Side boom	1	330	54	1871	2.59E-02	0.1	0.5	2.22E-02	2.16E-02	1.01E-03	361.3	NA
Crane	2	175	108	3741	0.1	0.3	1.0	0.1	2.08E-03	2.08E-03	382.9	NA
Total Project Emissions					2.4	28.2	19.4	7.5	2.4	2.31E-02	7129.9	4.46E-03



Month	Total Work Days	Total Work Hours	% of Actual Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	12	120	33%	40	4	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	12	120	33%	40	4	1	10-hour work days and 6-day work weeks

Totals	799	80	13
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Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	6	324	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	6	288	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	5	120	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
RT hoe	Tractors/Loaders/Backhoes	2	108	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
Crane	Cranes	0	0	Diesel	185	3.6	12.1	48.3	2.8	2.7	0.3	96,231.6
Welding Rigs	Welders	14	756	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
Front End Loader	Tractors/Loaders/Backhoes	2	108	Diesel	95	29.1	196.8	209.9	26.8	26.0	0.2	66,027.2
Dozer	Tractors/Loaders/Backhoes	4	216	Diesel	410	9.5	58.9	154.2	10.8	10.5	0.6	220,070.6
Excavator	Excavator	6	324	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	8	432	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
HDD Rig	Bore/Drill Rigs	3	162	Diesel	175	48.8	157.5	574.8	34.6	33.6	0.6	92,776.9

* HC emissions assume exhaust and evaporative losses

Equipment Type	MOVES Equip. Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MTBE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	38	50	151,848	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	15	50	59,940	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	1	50	3,996	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	45	50	179,820	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available

Total VMT = 395,604

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

203,257 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	15.57	4.67

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Paved Roads	0.01	1.69E-03
Unpaved Roads	19.87	1.99

AP-42 Section 13.2.1.3 (1/2011)
AP-42 Section 13.2.2.1 (1/2011)

VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

0.7 1,000 lbs of abrasive

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site grading, excavation, and filling	NA	NA	NA	NA	NA	NA	NA	22.6	6.7	NA	NA	NA
Paved Roads (commuter and delivery vehicles)	NA	NA	NA	NA	NA	NA	NA	1.4	0.3	NA	NA	NA
Unpaved Roads (construction equipment)	NA	NA	NA	NA	NA	NA	NA	8.3	0.8	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	4.71E-03	4.71E-04	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	38	NA	NA	NA	8.80E-03	0.6	0.0	4.99E-04	4.41E-04	5.33E-04	72.8	5.04E-04
Company Trucks	15	NA	NA	NA	9.32E-03	0.1	0.1	2.47E-03	2.27E-03	1.27E-04	37.5	1.25E-03
Delivery Trucks	1	NA	NA	NA	3.58E-04	1.01E-02	1.80E-02	1.36E-04	1.25E-04	2.46E-05	7.4	2.70E-05
Contractor trucks	45	NA	NA	NA	2.80E-02	0.4	0.2	7.40E-03	6.81E-03	3.80E-04	112.5	3.74E-03
Construction Equipment Exhaust												
Tractor W/Trailer	6	320	324	4316	4.08E-02	0.3	0.7	4.81E-02	4.66E-02	2.24E-03	817.1	NA
Air Compressor	6	85	288	3836	1.55E-02	0.1	0.5	2.42E-02	2.35E-02	5.86E-04	212.2	NA
Generator	5	13	120	1598	0.1	6.2	0.1	2.59E-03	2.38E-03	1.74E-04	24.0	NA
RT hoe	2	330	108	1439	0.1	0.4	0.7	0.1	0.1	9.58E-04	327.6	NA
Welding Rigs	14	345	756	10070	1.0	5.8	8.6	0.8	0.8	7.43E-03	2,396.2	NA
Front End Loader	2	95	108	1439	4.61E-02	0.3	0.3	4.25E-02	4.12E-02	3.06E-04	104.7	NA
Dozer	4	410	216	2877	3.00E-02	0.2	0.5	3.44E-02	3.34E-02	1.90E-03	697.9	NA
Excavator	6	350	324	4316	3.01E-02	0.2	0.4	3.36E-02	3.26E-02	2.40E-03	893.7	NA
Side boom	8	330	432	5754	0.1	0.4	1.4	0.1	0.1	3.11E-03	1,111.3	NA
HDD Rig	3	175	162	2158	0.1	0.4	1.4	16.9	5.1	1.33E-03	220.7	NA
Total Project Emissions					1.6	15.3	14.9	50.3	14.2	2.15E-02	7035.5	5.52E-03



Raritan Bay Loop Equipment Emissions

HDD Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Morgan Onshore HDD -	MOB	Kenworth	450	16	8.32E-05	2.43E-04	1.08E-03	6.52E-05	6.33E-05	1.13E-05	4.3	-
		Backhoe	300	48	2.87E-03	1.24E-02	2.39E-03	2.47E-03	2.39E-03	2.90E-05	9.9	-
	DeMOB	Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-
	HDD Pilot Hole	Drill Rig CAT Power Unit	1,750	228	0.1	0.3	1.7	0.1	0.1	7.08E-04	233.3	-
	HDD Hole Opening	Drill Rig CAT Power Unit	1,750	144	0.1	0.2	1.1	3.72E-02	3.61E-02	4.47E-04	147.4	-
	Pull-back String	Drill Rig CAT Power Unit	1,750	96	3.40E-02	0.1	0.7	2.48E-02	2.40E-02	2.98E-04	98.2	-
	HDD Pilot Hole	Mud Rig Genset-MQ	350	228	1.06E-02	0.1	0.2	8.05E-03	7.81E-03	1.45E-04	46.7	-
	HDD Hole Opening	Mud Rig Genset-MQ	350	144	6.69E-03	3.32E-02	0.1	5.08E-03	4.93E-03	9.14E-05	29.5	-
	Pull-back String	Mud Rig Genset-MQ	350	96	4.46E-03	2.21E-02	0.1	3.39E-03	3.29E-03	6.09E-05	19.7	-
	HDD Pilot Hole	Trackhoe - 240	177	228	8.04E-03	3.48E-02	0.1	6.91E-03	6.71E-03	8.14E-05	27.8	-
	HDD Hole Opening	Trackhoe - 240	177	144	5.08E-03	2.20E-02	3.72E-02	4.37E-03	4.24E-03	5.14E-05	17.6	-
	Pull-back String	Trackhoe - 240	177	96	3.39E-03	1.47E-02	2.48E-02	2.91E-03	2.82E-03	3.43E-05	11.7	-
	HDD Pilot Hole	Forklift - 10,000# & Over	130	228	8.04E-04	3.67E-03	1.08E-02	8.06E-04	7.81E-04	4.75E-05	17.5	-
	HDD Hole Opening	Forklift - 10,000# & Over	130	144	5.08E-04	2.32E-03	6.84E-03	5.09E-04	4.94E-04	3.00E-05	11.1	-
	Pull-back String	Forklift - 10,000# & Over	22	96	7.36E-04	3.47E-03	8.76E-03	3.97E-04	3.85E-04	5.09E-06	1.4	-
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	228	1.34E-03	4.52E-03	1.80E-02	1.06E-03	1.03E-03	9.87E-05	36.7	-
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	144	8.46E-04	2.85E-03	1.14E-02	6.67E-04	6.47E-04	6.23E-05	23.2	-
	Pull-back String	R.T. Crane 50-75 Ton	275	96	5.64E-04	1.90E-03	7.59E-03	4.45E-04	4.32E-04	4.16E-05	15.5	-
	HDD Pilot Hole	Triplex Pump	540	228	1.64E-02	0.1	0.3	1.30E-02	1.26E-02	2.23E-04	72.0	-
	HDD Hole Opening	Triplex Pump	540	144	1.04E-02	0.1	0.2	8.19E-03	7.94E-03	1.41E-04	45.5	-
	Pull-back String	Triplex Pump	540	96	6.91E-03	3.46E-02	0.1	5.46E-03	5.30E-03	9.40E-05	30.3	-
Morgan Offshore HDD -	MOB	Kenworth	450	10	5.20E-05	1.52E-04	6.76E-04	4.08E-05	3.96E-05	7.03E-06	2.7	-
		Generators	250	240	1.01E-02	3.63E-02	0.1	7.25E-03	7.03E-03	1.09E-04	35.1	-
	DeMOB	Kenworth	450	6	3.12E-05	9.10E-05	4.06E-04	2.45E-05	2.37E-05	4.22E-06	1.6	-
	HDD Pilot Hole	Drill Rig CAT Power Unit	1,750	84	2.98E-02	0.1	0.6	2.17E-02	2.10E-02	2.61E-04	86.0	-
	HDD Hole Opening	Drill Rig CAT Power Unit	1,750	120	4.25E-02	0.2	0.9	3.10E-02	3.01E-02	3.73E-04	122.8	-
	Pull-back String	Drill Rig CAT Power Unit	1,750	96	3.40E-02	0.1	0.7	2.48E-02	2.40E-02	2.98E-04	98.2	-
	HDD Pilot Hole	Mud Rig Genset-MQ	350	84	3.90E-03	1.94E-02	0.1	2.96E-03	2.88E-03	5.33E-05	17.2	-
	HDD Hole Opening	Mud Rig Genset-MQ	350	120	5.58E-03	2.77E-02	0.1	4.24E-03	4.11E-03	7.62E-05	24.6	-
	Pull-back String	Mud Rig Genset-MQ	350	96	4.46E-03	2.21E-02	0.1	3.39E-03	3.29E-03	6.09E-05	19.7	-
	HDD Pilot Hole	Trackhoe - 240	177	84	2.96E-03	1.28E-02	2.17E-02	2.55E-03	2.47E-03	3.00E-05	10.3	-
	HDD Hole Opening	Trackhoe - 240	177	120	4.23E-03	1.83E-02	3.10E-02	3.64E-03	3.53E-03	4.28E-05	14.7	-
	Pull-back String	Trackhoe - 240	177	96	3.39E-03	1.47E-02	2.48E-02	2.91E-03	2.82E-03	3.43E-05	11.7	-
	HDD Pilot Hole	Forklift - 10,000# & Over	130	84	2.96E-04	1.35E-03	3.99E-03	2.97E-04	2.88E-04	1.75E-05	6.5	-
	HDD Hole Opening	Forklift - 10,000# & Over	130	120	4.23E-04	1.93E-03	5.70E-03	4.24E-04	4.11E-04	2.50E-05	9.2	-
	Pull-back String	Forklift - 10,000# & Over	22	96	7.36E-04	3.47E-03	8.76E-03	3.97E-04	3.85E-04	5.09E-06	1.4	-
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	84	4.94E-04	1.66E-03	6.64E-03	3.89E-04	3.78E-04	3.64E-05	13.5	-
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	120	7.05E-04	2.38E-03	9.49E-03	5.56E-04	5.40E-04	5.19E-05	19.3	-
	Pull-back String	R.T. Crane 50-75 Ton	275	96	5.64E-04	1.90E-03	7.59E-03	4.45E-04	4.32E-04	4.16E-05	15.5	-
	HDD Pilot Hole	Triplex Pump	540	84	6.04E-03	3.03E-02	0.1	4.78E-03	4.63E-03	8.23E-05	26.5	-
	HDD Hole Opening	Triplex Pump	540	120	8.63E-03	4.32E-02	0.1	6.82E-03	6.62E-03	1.18E-04	37.9	-
	Pull-back String	Triplex Pump	540	96	6.91E-03	3.46E-02	0.1	5.46E-03	5.30E-03	9.40E-05	30.3	-
CP Cable Drill - Onshore	MOB	Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-
	DeMOB	Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-
	HDD Pilot Hole	Drill Rig CAT Power Unit	202	48	1.32E-03	5.42E-03	1.79E-02	1.10E-03	1.07E-03	1.70E-05	5.7	-
	Pull-back String	Drill Rig CAT Power Unit	202	36	9.93E-04	4.06E-03	1.34E-02	8.28E-04	8.03E-04	1.28E-05	4.3	-
	HDD Pilot Hole	Mud Rig & Reclaimer Pumps	25	48	4.49E-04	2.09E-03	5.08E-03	2.43E-04	2.36E-04	2.87E-06	0.8	-
	Pull-back String	Mud Rig & Reclaimer Pumps	25	36	3.37E-04	1.57E-03	3.81E-03	1.83E-04	1.77E-04	2.15E-06	0.6	-
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	400 Amp Welder	33	72	7.94E-04	3.52E-03	8.32E-03	5.73E-04	5.56E-04	5.28E-06	1.8	-
		20kW Generator	30	72	4.15E-04	1.60E-03	7.22E-03	2.60E-04	2.52E-04	4.07E-06	1.4	-
		Light Plant	25	72	6.35E-04	3.01E-03	7.44E-03	3.51E-04	3.41E-04	4.27E-06	1.2	-
		250 cfm Aircompressor	80	72	2.73E-04	2.50E-03	8.48E-03	4.28E-04	4.15E-04	1.04E-05	3.7	-
		Crawler Crane	95	72	1.67E-04	1.54E-03	8.00E-03	2.66E-04	2.58E-04	1.20E-05	4.5	-
		Shallow Water Tug	660	24	1.58E-03	2.93E-02	3.40E-02	1.76E-03	1.76E-03	7.62E-03	4.0	0.45

Ambrose East Offshore HDD	MOB	Kenworth	450	21	0.0	3.18E-04	1.42E-03	8.56E-05	8.31E-05	1.48E-05	5.6	-
		W751 Generator	425	900	0.1	0.3	0.8	3.86E-02	3.74E-02	6.94E-04	223.7	-
		W751 Aux Generator	160	900	2.72E-02	0.1	0.4	2.23E-02	2.17E-02	2.62E-04	84.2	-
		Jacking Compressors	525	300	1.17E-02	0.1	0.2	9.84E-03	9.54E-03	2.71E-04	92.2	-
		50T Cherry picker	250	900	7.18E-03	3.40E-02	0.1	7.11E-03	6.89E-03	3.63E-04	133.1	-
		400 Amp Welder	33	150	1.65E-03	7.34E-03	1.73E-02	1.19E-03	1.16E-03	1.10E-05	3.8	-
		20kW Generator	30	900	5.19E-03	2.00E-02	0.1	3.25E-03	3.15E-03	5.08E-05	17.6	-
		Light Plant	25	1,800	1.59E-02	0.1	0.2	8.78E-03	8.52E-03	1.07E-04	29.0	-
		250 cfm Aircompressor	80	150	5.69E-04	5.21E-03	1.77E-02	8.91E-04	8.65E-04	2.16E-05	7.8	-
	DeMOB	Kenworth	450	12	6.24E-05	1.82E-04	8.11E-04	4.89E-05	4.75E-05	8.44E-06	3.2	-
		HDD Pilot Hole	1,750	120	4.25E-02	0.2	0.9	3.10E-02	3.01E-02	3.73E-04	122.8	-
		HDD Hole Opening	1,750	72	2.55E-02	0.1	0.5	1.86E-02	1.80E-02	2.24E-04	73.7	-
		Pull-back String	1,750	60	2.13E-02	0.1	0.4	1.55E-02	1.50E-02	1.86E-04	61.4	-
		HDD Pilot Hole	350	120	5.58E-03	2.77E-02	0.1	4.24E-03	4.11E-03	7.62E-05	24.6	-
		HDD Hole Opening	350	72	3.35E-03	1.66E-02	0.1	2.54E-03	2.46E-03	4.57E-05	14.7	-
		Pull-back String	350	60	2.79E-03	1.38E-02	4.62E-02	2.12E-03	2.05E-03	3.81E-05	12.3	-
		HDD Pilot Hole	177	120	4.23E-03	1.83E-02	3.10E-02	3.64E-03	3.53E-03	4.28E-05	14.7	-
		HDD Hole Opening	177	72	2.54E-03	1.10E-02	1.86E-02	2.18E-03	2.12E-03	2.57E-05	8.8	-
		Pull-back String	177	60	2.12E-03	9.16E-03	1.55E-02	1.82E-03	1.77E-03	2.14E-05	7.3	-
	HDD Pilot Hole	Forklift - 10,000# & Over	130	120	4.23E-04	1.93E-03	5.70E-03	4.24E-04	4.11E-04	2.50E-05	9.2	-
		HDD Hole Opening	130	72	2.54E-04	1.16E-03	3.42E-03	2.54E-04	2.47E-04	1.50E-05	5.5	-
		Pull-back String	22	60	4.60E-04	2.17E-03	5.47E-03	2.48E-04	2.41E-04	3.18E-06	0.9	-
		HDD Pilot Hole	275	120	7.05E-04	2.38E-03	9.49E-03	5.56E-04	5.40E-04	5.19E-05	19.3	-
		HDD Hole Opening	275	72	4.23E-04	1.43E-03	5.69E-03	3.34E-04	3.24E-04	3.12E-05	11.6	-
		Pull-back String	275	60	3.53E-04	1.19E-03	4.74E-03	2.78E-04	2.70E-04	2.60E-05	9.7	-
		HDD Pilot Hole	540	120	8.63E-03	4.32E-02	0.1	6.82E-03	6.62E-03	1.18E-04	37.9	-
		HDD Hole Opening	540	72	5.18E-03	2.59E-02	0.1	4.09E-03	3.97E-03	7.05E-05	22.7	-
		Pull-back String	540	60	4.32E-03	2.16E-02	0.1	3.41E-03	3.31E-03	5.88E-05	19.0	-
Ambrose West Offshore HDD	MOB	Kenworth	450	31	1.59E-04	4.63E-04	2.06E-03	1.24E-04	1.21E-04	2.14E-05	8.1	-
		W750 Generator	325	1,110	4.79E-02	0.2	0.8	3.64E-02	3.53E-02	6.54E-04	211.0	-
		Jacking Compressors	525	370	1.44E-02	0.1	0.3	1.21E-02	1.18E-02	3.34E-04	113.7	-
		50T Cherry picker	250	1,110	8.85E-03	4.19E-02	0.1	8.76E-03	8.50E-03	4.47E-04	164.2	-
		400 Amp Welder	33	185	2.04E-03	9.06E-03	2.14E-02	1.47E-03	1.43E-03	1.36E-05	4.6	-
		20kW Generator	30	1,110	6.40E-03	2.46E-02	0.1	4.01E-03	3.89E-03	6.27E-05	21.7	-
		Light Plant	25	2,220	1.96E-02	0.1	0.2	1.08E-02	1.05E-02	1.32E-04	35.8	-
		250 cfm Aircompressor	80	185	7.02E-04	6.43E-03	2.18E-02	1.10E-03	1.07E-03	2.66E-05	9.6	-
	DeMOB	Kenworth	450	13	6.50E-05	1.90E-04	8.45E-04	5.10E-05	4.94E-05	8.79E-06	3.3	-
		HDD Pilot Hole	1,750	168	0.1	0.2	1.2	4.34E-02	4.21E-02	5.22E-04	171.9	-
		HDD Hole Opening	1,750	72	2.55E-02	0.1	0.5	1.86E-02	1.80E-02	2.24E-04	73.7	-
		Pull-back String	1,750	60	2.13E-02	0.1	0.4	1.55E-02	1.50E-02	1.86E-04	61.4	-
		HDD Pilot Hole	350	168	7.81E-03	3.87E-02	0.1	5.93E-03	5.75E-03	1.07E-04	34.4	-
		HDD Hole Opening	350	72	3.35E-03	1.66E-02	0.1	2.54E-03	2.46E-03	4.57E-05	14.7	-
		Pull-back String	350	48	2.23E-03	1.11E-02	3.70E-02	1.69E-03	1.64E-03	3.05E-05	9.8	-
		HDD Pilot Hole	177	168	5.93E-03	2.57E-02	4.35E-02	5.09E-03	4.94E-03	6.00E-05	20.5	-
		HDD Hole Opening	177	72	2.54E-03	1.10E-02	1.86E-02	2.18E-03	2.12E-03	2.57E-05	8.8	-
		Pull-back String	177	48	1.69E-03	7.33E-03	1.24E-02	1.46E-03	1.41E-03	1.71E-05	5.9	-
	HDD Pilot Hole	Forklift - 10,000# & Over	130	168	5.92E-04	2.70E-03	7.98E-03	5.94E-04	5.76E-04	3.50E-05	12.9	-
		HDD Hole Opening	130	72	2.54E-04	1.16E-03	3.42E-03	2.54E-04	2.47E-04	1.50E-05	5.5	-
		Pull-back String	22	48	3.68E-04	1.73E-03	4.38E-03	1.98E-04	1.93E-04	2.55E-06	0.7	-
		HDD Pilot Hole	275	168	9.88E-04	3.33E-03	1.13E-02	7.79E-04	7.55E-04	7.27E-05	27.0	-
		HDD Hole Opening	275	72	4.23E-04	1.43E-03	5.69E-03	3.34E-04	3.24E-04	3.12E-05	11.6	-
		Pull-back String	275	48	2.82E-04	9.51E-04	3.80E-03	2.22E-04	2.16E-04	2.08E-05	7.7	-
		HDD Pilot Hole	540	168	1.21E-02	0.1	0.2	9.55E-03	9.27E-03	1.65E-04	53.1	-
		HDD Hole Opening	540	72	5.18E-03	2.59E-02	0.1	4.09E-03	3.97E-03	7.05E-05	22.7	-
		Pull-back String	540	48	3.45E-03	1.73E-02	0.1	2.73E-03	2.65E-03	4.70E-05	15.2	-
W541 - Crane Barge	W541 - Crane Barge	W541-Hoist Engine	400	1,428	2.39E-02	0.1	0.4	2.06E-02	2.00E-02	9.36E-04	334.3	-
		W541-Swing Engine	525	1,428	3.14E-02	0.2	0.6	2.70E-02	2.62E-02	1.23E-03	438.8	-
		W541-Auxiliary Generator	85	1,428	2.97E-02	0.2	0.4	3.00E-02	2.91E-02	2.46E-04	78.9	-
		Deck Winch #1	238	238	1.81E-03	8.55E-03	2.58E-02	1.79E-03	1.74E-03	9.13E-05	33.5	-
		Deck Winch #2	160	238	1.25E-03	7.21E-03	2.13E-02	1.69E-03	1.64E-03	6.13E-05	22.5	-
		400 Amp Welder	33	238	2.62E-03	1.16E-02	2.75E-02	1.89E-03	1.84E-03	1.74E-05	6.0	-
		20kW Generator	30	1,428	8.23E-03	3.17E-02	0.1	5.16E-03	5.00E-03	8.06E-05	27.9	-
		Light Plant	25	2,856	2.52E-02	0.1	0.3	1.39E-02	1.35E-02	1.69E-04	46.0	-
		250 cfm Aircompressor	80	238	9.03E-04	8.27E-03	2.80E-02	1.41E-03	1.37E-03	3.42E-05	12.4	-
					907,185	grams/ton	18.4					

Pipelay Related Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	778	432	0.1	1.4	1.9	0.1	0.1	1.80E-03	190.8	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	144	3.43E-02	0.6	0.9	3.81E-02	3.81E-02	0.2	87.7	-
Pipelay of Ambrose HDD String	Antares Anchor Handling >12ft WD	Tug Robert	2,000	84	2.95E-02	0.5	0.7	2.82E-02	2.82E-02	7.10E-04	75.3	0.79
		Tug Elizabeth	2,000	84	2.95E-02	0.5	0.7	2.82E-02	2.82E-02	7.10E-04	75.3	0.79
		Caterpillar 3412 DITA 580kW	778	252	4.35E-02	0.8	1.1	4.16E-02	4.16E-02	1.05E-03	111.3	-
	Seven Antares	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	84	2.00E-02	0.4	0.5	2.22E-02	2.22E-02	0.1	51.2	-

Pipelay of Morgan HDD String	Anchor Handling <12ft WD	Linda Miller	660	91	6.02E-03	0.1	0.1	6.68E-03	6.68E-03	2.90E-02	15.4	0.45		
		Anchor Barge #37 Barge	99	30	3.01E-04	0.0	0.0	4.46E-04	4.46E-04	1.45E-03	0.8	0.45		
		Gabby Miller	660	91	6.02E-03	0.1	0.1	6.68E-03	6.68E-03	2.90E-02	15.4	0.45		
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	91	4.40E-04	0.0	0.0	5.94E-04	5.76E-04	2.16E-05	7.9	-		
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	91	7.21E-04	0.0	0.0	7.14E-04	6.93E-04	3.65E-05	13.4	-		
		Tug Robert	2,000	91	3.20E-02	0.6	0.8	3.06E-02	3.06E-02	7.70E-04	81.8	0.79		
	Anchor Handling >12ft WD	Tug Elizabeth	2,000	91	3.20E-02	0.6	0.8	3.06E-02	3.06E-02	7.70E-04	81.8	0.79		
		Caterpillar 3412 DITA 580kW	778	274	4.73E-02	0.9	1.2	4.52E-02	4.52E-02	1.14E-03	120.8	-		
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-		
	Shallow Water Barge	Additional GE6 for pipelay ops 800kW	1,073	91	2.17E-02	0.4	0.5	2.41E-02	2.41E-02	0.1	55.5	-		
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)		Anchor Handling <12ft WD	Linda Miller	660	190	1.25E-02	0.2	0.3	1.39E-02	1.39E-02	0.1	32.0	0.45	
			Anchor Barge #37 Barge	99	63	6.27E-04	0.0	0.0	9.29E-04	9.29E-04	3.02E-03	1.6	0.45	
	Gabby Miller		660	190	1.25E-02	0.2	0.3	1.39E-02	1.39E-02	0.1	32.0	0.45		
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	190	9.17E-04	0.0	0.0	1.24E-03	1.20E-03	4.50E-05	16.5	-		
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	190	1.50E-03	0.0	0.0	1.49E-03	1.44E-03	7.60E-05	27.9	-		
		Tug Robert	2,000	190	0.1	1.2	1.7	0.1	0.1	1.61E-03	170.5	0.79		
	Anchor Handling >12ft WD	Tug Elizabeth	2,000	190	0.1	1.2	1.7	0.1	0.1	1.61E-03	170.5	0.79		
		Caterpillar 3412 DITA 580kW	778	570	0.1	1.8	2.5	0.1	0.1	2.37E-03	251.8	-		
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-		
	Shallow Water Barge	Additional GE6 for pipelay ops 800kW	1,073	190	4.53E-02	0.8	1.1	0.1	0.1	0.2	115.8	-		
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)		Antares Anchor Handling <12ft WD	Linda Miller	660	82	5.43E-03	0.1	0.1	6.03E-03	6.03E-03	2.61E-02	13.9	0.45	
			Anchor Barge #37 Barge	99	27	2.72E-04	1.71E-03	5.83E-03	4.02E-04	4.02E-04	1.31E-03	0.7	0.45	
	Gabby Miller		660	82	5.43E-03	0.1	0.1	6.03E-03	6.03E-03	2.61E-02	13.9	0.45		
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	82	3.97E-04	2.29E-03	6.76E-03	5.36E-04	5.20E-04	1.95E-05	7.2	-		
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	82	6.51E-04	3.08E-03	9.30E-03	6.45E-04	6.25E-04	3.29E-05	12.1	-		
		Tug Robert	2,000	82	2.89E-02	0.5	0.7	2.76E-02	2.76E-02	6.95E-04	73.8	0.79		
	Antares Anchor Handling >12ft WD	Tug Elizabeth	2,000	82	2.89E-02	0.5	0.7	2.76E-02	2.76E-02	6.95E-04	73.8	0.79		
		Caterpillar 3412 DITA 580kW	778	247	4.27E-02	0.8	1.1	4.08E-02	4.08E-02	1.03E-03	109.1	-		
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-		
	Seven Antares	Additional GE6 for pipelay ops 800kW	1,073	82	1.96E-02	0.4	0.5	2.18E-02	2.18E-02	0.1	50.1	-		
Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)		Antares Anchor Handling <12ft WD	Linda Miller	660	72	4.75E-03	0.1	0.1	5.28E-03	5.28E-03	2.29E-02	12.1	0.45	
			Anchor Barge #37 Barge	99	24	2.37E-04	1.50E-03	5.10E-03	3.52E-04	3.52E-04	1.14E-03	0.6	0.45	
	Tug Robert		2,000	184	0.1	1.2	1.6	0.1	0.1	1.55E-03	164.7	0.79		
	Antares Anchor Handling >12ft WD	Tug Elizabeth	2,000	184	0.1	1.2	1.6	0.1	0.1	1.55E-03	164.7	0.79		
		Caterpillar 3412 DITA 580kW	778	767	0.1	2.5	3.3	0.1	0.1	3.19E-03	338.6	-		
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-		
	Seven Antares	Additional GE6 for pipelay ops 800kW	1,073	256	0.1	1.1	1.5	0.1	0.1	0.3	155.7	-		
		Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	Antares Anchor Handling >12ft WD	Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
				Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
	Caterpillar 3412 DITA 580kW			778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-	
Seven Antares	Volvo D12 MG-RC 225kW		302	0	0	0	0	0	0	0	0	-		
	Additional GE6 for pipelay ops 800kW		1,073	175	4.18E-02	0.8	1.1	4.64E-02	4.64E-02	0.2	106.7	-		
	Above Water Tie-in/ Spool @ MP16.6		Antares Anchor Handling >12ft WD	Tug Robert	2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79
Tug Elizabeth				2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79	
Caterpillar 3412 DITA 580kW				778	360	0.1	1.2	1.6	0.1	0.1	1.50E-03	159.0	-	
Seven Antares			Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-	
			Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-	
		Pipe Delivery Spread	Dockside Crane	Manitowoc 1100	332	472	6.57E-03	3.32E-02	0.1	5.64E-03	5.47E-03	2.57E-04	91.7	-
Pipeline Barge Tug				1,500	878	0.2	4.3	5.8	0.2	0.2	5.57E-03	590.8	0.79	
Diving/Construction Support Spread			Dive Barge	W571	1,502	1,638	0.4	8.0	10.9	0.5	0.5	2.1	1103.2	0.79
				Deck Winches	300	546	5.22E-03	2.47E-02	0.1	5.17E-03	5.02E-03	2.64E-04	96.9	-
				400 Amp Welder	33	273	3.01E-03	1.34E-02	3.16E-02	2.17E-03	2.11E-03	2.00E-05	6.8	-
	20kW Generator			30	1,638	9.44E-03	3.63E-02	0.2	5.92E-03	5.74E-03	9.25E-05	31.9	-	
	Light Plant			25	3,276	2.89E-02	0.1	0.3	1.60E-02	1.55E-02	1.94E-04	52.8	-	
	250 cfm Aircompressor			80	273	1.04E-03	9.49E-03	3.22E-02	1.62E-03	1.57E-03	3.93E-05	14.2	-	
	Tug 2000 HP TBN			2,000	1,070	0.4	7.0	9.5	0.4	0.4	9.04E-03	959.7	0.79	
	Crew Boat (Main Eng)			980	535	0.1	0.9	4.4	0.1	0.1	0.4	235.1	0.79	
	--(Aux engine)	12		1,070	1.60E-03	2.96E-02	4.02E-02	2.37E-03	2.37E-03	7.69E-03	4.1	0.56		
	Tug 2000 HP TBN	2,000		216	0.1	1.4	1.9	0.1	0.1	1.82E-03	193.7	0.79		
Jet Trencher	Mob	M4000 Crane	400	173	2.90E-03	1.46E-02	0.1	2.49E-03	2.41E-03	1.13E-04	40.5	-		
		400 Amp Welder	33	29	3.17E-04	1.41E-03	3.33E-03	2.29E-04	2.22E-04	2.11E-06	0.7	-		
		20kW Generator	30	173	9.96E-04	3.83E-03	1.73E-02	6.24E-04	6.05E-04	9.76E-06	3.4	-		
		Light Plant	25	230	2.03E-03	9.62E-03	2.38E-02	1.12E-03	1.09E-03	1.36E-05	3.7	-		
		250 cfm Aircompressor	80	29	1.09E-04	1.00E-03	3.39E-03	1.71E-04	1.66E-04	4.14E-06	1.5	-		
	Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	W263 Deck Winches	225	39	2.81E-04	1.33E-03	4.02E-03	2.79E-04	2.70E-04	1.42E-05	5.2	-	
			W061 Deck Winches	300	39	3.75E-04	1.78E-03	5.36E-03	3.71E-04	3.60E-04	1.90E-05	7.0	-	
			M4000 Crane	400	118	1.97E-03	9.96E-03	3.58E-02	1.69E-03	1.64E-03	7.71E-05	27.5	-	
			400 Amp Welder	33	20	2.16E-04	9.59E-04	2.27E-03	1.56E-04	1.51E-04	1.44E-06	0.5	-	
			20kW Generator	30	118	6.78E-04	2.61E-03	1.18E-02	4.25E-04	4.12E-04	6.64E-06	2.3	-	
Light Plant			25	470	4.15E-03	1.96E-02	4.86E-02	2.30E-03	2.23E-03	2.79E-05	7.6	-		
250 cfm Aircompressor			80	20	7.44E-05	6.81E-04	2.31E-03	1.16E-04	1.13E-04	2.82E-06	1.0	-		
2000 HP Tugboat			2,000	235	0.1	1.5	2.1	0.1	0.1	1.99E-03	210.9	0.79		
Crew Boat (Main Eng)			980	59	1.01E-02	0.1	0.5	1.12E-02	1.12E-02	4.87E-02	25.8	0.79		
--(Aux engine)			12	118	1.76E-04	3.25E-03	4.42E-03	2.60E-04	2.60E-04	8.45E-04	0.4	0.56		
Jetter	1250kw Generator	1,676	118	2.62E-02	0.1	0.4	1.99E-02	1.93E-02	3.57E-04	115.3	-			

Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	W263 Deck Winches	225	35	2.53E-04	1.20E-03	3.61E-03	2.50E-04	2.43E-04	1.28E-05	4.7	-	
		W061 Deck Winches	300	35	3.37E-04	1.59E-03	4.81E-03	3.34E-04	3.24E-04	1.70E-05	6.2	-	
		M4000 Crane	400	106	1.77E-03	8.94E-03	3.22E-02	1.52E-03	1.48E-03	6.92E-05	24.7	-	
		400 Amp Welder	33	18	1.94E-04	8.61E-04	2.03E-03	1.40E-04	1.36E-04	1.29E-06	0.4	-	
		20kW Generator	30	106	6.08E-04	2.34E-03	1.06E-02	3.81E-04	3.70E-04	5.96E-06	2.1	-	
		Light Plant	25	422	3.72E-03	1.76E-02	4.37E-02	2.06E-03	2.00E-03	2.50E-05	6.8	-	
		250 cfm Aircompressor	80	18	6.68E-05	6.12E-04	2.07E-03	1.05E-04	1.01E-04	2.53E-06	0.9	-	
		2000 HP Tugboat	2,000	211	0.1	1.4	1.9	0.1	0.1	1.78E-03	189.4	0.79	
		Crew Boat (Main Eng)	980	53	9.08E-03	0.1	0.4	1.01E-02	1.01E-02	4.37E-02	23.2	0.79	
		--(Aux engine)	12	106	1.58E-04	2.92E-03	3.97E-03	2.34E-04	2.34E-04	7.59E-04	0.4	0.56	
		Jetter	1250kw Generator	1,676	106	2.35E-02	0.1	0.4	1.78E-02	1.73E-02	3.21E-04	103.5	-
		Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	Barge + Tug	W263 Deck Winches	225	46	3.33E-04	1.58E-03	4.76E-03	3.30E-04	3.20E-04	1.68E-05	6.2
W061 Deck Winches	300			46	4.44E-04	2.10E-03	6.34E-03	4.40E-04	4.26E-04	2.24E-05	8.2	-	
M4000 Crane	400			139	2.33E-03	1.18E-02	4.24E-02	2.01E-03	1.95E-03	9.13E-05	32.6	-	
400 Amp Welder	33			23	2.56E-04	1.14E-03	2.68E-03	1.85E-04	1.79E-04	1.70E-06	0.6	-	
20kW Generator	30			139	8.02E-04	3.09E-03	1.40E-02	5.03E-04	4.88E-04	7.86E-06	2.7	-	
Light Plant	25			557	4.91E-03	2.33E-02	0.1	2.72E-03	2.64E-03	3.30E-05	9.0	-	
250 cfm Aircompressor	80			23	8.81E-05	8.06E-04	2.73E-03	1.38E-04	1.34E-04	3.34E-06	1.2	-	
2000 HP Tugboat	2,000			278	0.1	1.8	2.5	0.1	0.1	2.35E-03	249.7	0.79	
Crew Boat (Main Eng)	980			70	1.20E-02	0.1	0.6	1.33E-02	1.33E-02	0.1	30.6	0.79	
--(Aux engine)	12			139	2.08E-04	3.85E-03	5.23E-03	3.08E-04	3.08E-04	1.00E-03	0.5	0.56	
Jetter	1250kw Generator			1,676	139	3.10E-02	0.2	0.5	2.35E-02	2.28E-02	4.23E-04	136.5	-
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug			W263 Deck Winches	225	16	1.15E-04	5.44E-04	1.64E-03	1.14E-04	1.10E-04	5.81E-06	2.1
		W061 Deck Winches	300	16	1.53E-04	7.25E-04	2.19E-03	1.52E-04	1.47E-04	7.74E-06	2.8	-	
		M4000 Crane	400	48	8.05E-04	4.07E-03	1.46E-02	6.92E-04	6.71E-04	3.15E-05	11.2	-	
		400 Amp Welder	33	8	8.82E-05	3.92E-04	9.25E-04	6.36E-05	6.17E-05	5.86E-07	0.2	-	
		20kW Generator	30	48	2.77E-04	1.06E-03	4.82E-03	1.73E-04	1.68E-04	2.71E-06	0.9	-	
		Light Plant	25	192	1.69E-03	8.02E-03	1.99E-02	9.37E-04	9.09E-04	1.14E-05	3.1	-	
		250 cfm Aircompressor	80	8	3.04E-05	2.78E-04	9.43E-04	4.75E-05	4.61E-05	1.15E-06	0.4	-	
		2000 HP Tugboat	2,000	96	3.37E-02	0.6	0.8	3.22E-02	3.22E-02	8.11E-04	86.1	0.79	
		Crew Boat (Main Eng)	980	24	4.13E-03	3.82E-02	0.2	4.59E-03	4.59E-03	1.99E-02	10.5	0.79	
		--(Aux engine)	12	48	7.16E-05	1.33E-03	1.80E-03	1.06E-04	1.06E-04	3.45E-04	0.2	0.56	
		Jetter	1250kw Generator	1,676	48	1.07E-02	0.1	0.2	8.11E-03	7.87E-03	1.46E-04	47.1	-
		Daily Crew/Utility	Morgan HDD Crew Boat	Crew Boat (Main Eng)	600	0	0	0	0	0	0	0	0
--(Aux engine)	150			0	0	0	0	0	0	0	0	0.56	
Ambrose HDD Crew Boat	Crew Boat (Main Eng)		600	360	2.16E-02	0.1	0.8	2.40E-02	2.40E-02	0.1	55.2	0.45	
	--(Aux engine)		150	720	1.34E-02	0.2	0.3	1.49E-02	1.49E-02	0.1	34.3	0.56	
Samantha Miller LCV	Boat (Main Eng)		600	1,464	0.1	0.5	3.3	0.1	0.1	0.4	224.4	0.45	
	--(Aux engine)		150	1,464	2.73E-02	0.5	0.7	3.03E-02	3.03E-02	0.1	69.8	0.56	
Guard Vessel # 1	Boat (Main Eng)		600	3,192	0.2	1.1	7.1	0.2	0.2	0.9	489.2	0.45	
	--(Aux engine)		150	3,192	0.1	1.1	1.5	0.1	0.1	0.3	152.2	0.56	
HDD Water Delivery OSV	Main Eng		850	916	0.1	0.4	2.9	0.1	0.1	0.4	198.9	0.45	
	--(Aux engine)		150	916	1.71E-02	0.3	0.4	1.90E-02	1.90E-02	0.1	43.7	0.56	
Pre-comm OSV	--Bow Thruster		300	916	2.75E-02	0.2	1.0	3.05E-02	3.05E-02	0.1	70.2	0.45	
	Boat (Main Eng)		850	286	2.43E-02	0.1	0.9	2.70E-02	2.70E-02	0.1	62.2	0.45	
	--(Aux engine)		150	286	5.34E-03	0.1	0.1	5.94E-03	5.94E-03	2.57E-02	13.7	0.56	
	--Bow Thruster		300	286	8.59E-03	0.0	0.3	9.54E-03	9.54E-03	4.13E-02	21.9	0.45	

Dredging & Reinstatement Related Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	234	0.1	1.9	2.2	0.1	0.1	0.5	267.0	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	468	0.0	0.5	0.6	0.0	0.0	0.1	68.4	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	917	0.409404477	7.581564392	8.794614694	0.454893863	0.454893863	1.971206742	1046.255886	0.79
		HARS W551 Clam Rig (Aux Engine)	460	917	0.052454599	0.971381456	1.126802489	0.058282887	0.044683547	0.252559179	134.050641	0.56
		Tug 2000 HP TBN	2,000	1,656	0.6	10.8	14.6	0.6	0.6	1.40E-02	1485.1	0.79
		Tug 2000 HP TBN	2,000	1,656	0.6	10.8	14.6	0.6	0.6	1.40E-02	1485.1	0.79
		Crew Boat (Main Eng)	980	828	0.1	1.3	6.9	0.2	0.2	0.7	363.9	0.79
		--(Aux engine)	12	1,656	2.47E-03	4.58E-02	0.1	3.66E-03	3.66E-03	1.19E-02	6.3	0.56
		UPLAND W551 Clam Rig (Main Engine)	2,545	1,529	0.7	12.6	14.7	0.8	0.8	3.3	1744.7	0.79
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	Dredging	UPLAND W551 Clam Rig (Aux Engine)	460	3,058	0.2	3.2	3.8	0.2	0.1	0.8	447.1	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	386	0.2	3.2	3.7	0.2	0.2	0.8	441.0	0.79
		HARS W551 Clam Rig (Aux Engine)	460	386	0.0	0.4	0.5	0.0	0.0	0.1	56.5	0.56
		Tug 2000 HP TBN	2,000	3,696	1.3	24.0	32.7	1.2	1.2	3.12E-02	3314.6	0.79
		Tug 2000 HP TBN	2,000	3,696	1.3	24.0	32.7	1.2	1.2	3.12E-02	3314.6	0.79
		Crew Boat (Main Eng)	980	1,848	0.3	2.9	15.3	0.4	0.4	1.5	812.1	0.79
		--(Aux engine)	12	3,696	5.52E-03	0.1	0.1	8.17E-03	8.17E-03	2.66E-02	14.1	0.56
		UPLAND W551 Clam Rig (Main Engine)	2,545	50	2.25E-02	0.4	0.5	2.50E-02	2.50E-02	0.1	57.5	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	101	5.77E-03	0.1	0.1	6.41E-03	4.91E-03	2.78E-02	14.7	0.56
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	Tug 2000 HP TBN	2,000	168	0.1	1.1	1.5	0.1	0.1	1.42E-03	150.7	0.79
		Tug 2000 HP TBN	2,000	168	0.1	1.1	1.5	0.1	0.1	1.42E-03	150.7	0.79
		Crew Boat (Main Eng)	980	84	1.44E-02	0.1	0.7	1.60E-02	1.60E-02	0.1	36.9	0.79
		--(Aux engine)	12	168	2.51E-04	4.64E-03	6.32E-03	3.71E-04	3.71E-04	1.21E-03	0.6	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	403	0.2	3.3	3.9	0.2	0.2	0.9	460.1	0.79
		HARS W551 Clam Rig (Aux Engine)	460	403	2.31E-02	0.4	0.5	2.56E-02	1.97E-02	0.1	59.0	0.56
		Tug 2000 HP TBN	2,000	504	0.2	3.3	4.5	0.2	0.2	4.26E-03	452.0	0.79
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	Dredging	Tug 2000 HP TBN	2,000	504	0.2	3.3	4.5	0.2	0.2	4.26E-03	452.0	0.79
		Crew Boat (Main Eng)	980	252	4.33E-02	0.4	2.1	4.81E-02	4.81E-02	0.2	110.7	0.79
		--(Aux engine)	12	504	7.52E-04	1.39E-02	1.89E-02	1.11E-03	1.11E-03	3.62E-03	1.9	0.56

Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	53	0.0	0.4	0.5	0.0	0.0	0.1	60.3	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	106	6.04E-03	0.1	0.1	6.71E-03	5.15E-03	0.0	15.4	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	118	0.052515234	0.972504333	1.128105026	0.05835026	0.05835026	0.252851127	134.2055979	0.79
		HARS W551 Clam Rig (Aux Engine)	460	118	0.006728469	0.124601286	0.144537492	0.007476077	0.005731659	0.032396334	17.19497751	0.56
		Tug 2000 HP TBN	2,000	314	0.1	2.0	2.8	0.1	0.1	2.66E-03	282.0	0.79
		Tug 2000 HP TBN	2,000	314	0.1	2.0	2.8	0.1	0.1	2.66E-03	282.0	0.79
		Crew Boat (Main Eng)	980	157	2.70E-02	0.3	1.3	3.00E-02	3.00E-02	0.1	69.1	0.79
		--(Aux engine)	12	314	4.69E-04	8.69E-03	1.18E-02	6.95E-04	6.95E-04	2.26E-03	1.2	0.56
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	50	0.0	0.4	0.5	0.0	0.0	0.1	57.5	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	101	5.77E-03	0.1	0.1	6.41E-03	4.91E-03	2.78E-02	14.7	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	42	0.018755441	0.347322976	0.402894652	0.020839379	0.020839379	0.090303974	47.9305707	0.79
		HARS W551 Clam Rig (Aux Engine)	460	42	0.002403025	0.044500459	0.051620533	0.002670028	0.002047021	0.011570119	6.141063396	0.56
		Tug 2000 HP TBN	2,000	204	0.1	1.3	1.8	0.1	0.1	1.72E-03	183.0	0.79
		Tug 2000 HP TBN	2,000	204	0.1	1.3	1.8	0.1	0.1	1.72E-03	183.0	0.79
		Crew Boat (Main Eng)	980	102	1.75E-02	0.2	0.8	1.95E-02	1.95E-02	0.1	44.8	0.79
		--(Aux engine)	12	204	3.04E-04	5.64E-03	7.67E-03	4.51E-04	4.51E-04	1.47E-03	0.8	0.56
Scow Barge Spread (one / 1each)	Dredge Material Transportation	Dump Scow #1	286	1,090	0.038788502	0.215491678	1.436611187	0.043098336	0.043098336	0.186759454	99.12617188	0.56
		Dump Scow #2	286	1,090	0.038788502	0.215491678	1.436611187	0.043098336	0.043098336	0.186759454	99.12617188	0.56
		Dump Scow #3	286	1,090	0.038788502	0.215491678	1.436611187	0.043098336	0.043098336	0.186759454	99.12617188	0.56
		Dump Scow #4	286	1,090	0.038788502	0.215491678	1.436611187	0.043098336	0.043098336	0.186759454	99.12617188	0.56
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	Reinstatement	Clam Rig (Main Engine)	2,545	780	0.3	6.5	7.5	0.4	0.4	1.7	890.1	0.79
		Clam Rig (Aux Engine)	460	780	4.46E-02	0.8	1.0	4.96E-02	3.80E-02	0.2	114.0	0.56
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Crew Boat (Main Eng)	980	390	0.1	0.6	3.2	0.1	0.1	0.3	171.4	0.79
		--(Aux engine)	12	780	0.001164198	0.021559229	0.029320551	0.001724738	0.001724738	0.005605399	3.0	0.56
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	780	0.3	6.5	7.5	0.4	0.4	1.7	890.1	0.79
		W551 Clam Rig (Aux Engine)	460	780	4.46E-02	0.8	1.0	4.96E-02	3.80E-02	0.2	114.0	0.56
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Crew Boat (Main Eng)	980	390	0.1	0.6	3.2	0.1	0.1	0.3	171.4	0.79
		--(Aux engine)	12	780	1.16E-03	2.16E-02	2.93E-02	1.72E-03	1.72E-03	5.61E-03	3.0	0.56
	Dredge Material Transportation	Dump Scow #1	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #2	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #3	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #4	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Reinstatement	Clam Rig (Main Engine)	2,545	2,496	1.1	20.6	23.9	1.2	1.2	5.4	2848.4	0.79
		Clam Rig (Aux Engine)	460	2,496	0.2	3.7	4.3	0.2	0.2	1.0	514.8	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Crew Boat (Main Eng)	980	1,248	0.2	2.0	10.3	0.2	0.2	1.0	548.4	0.79
		--(Aux engine)	12	2,496	3.73E-03	0.1	0.1	5.52E-03	5.52E-03	1.79E-02	9.5	0.56
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	2,496	1.1	20.6	23.9	1.2	1.2	5.4	2848.4	0.79
		W551 Clam Rig (Aux Engine)	460	2,496	0.2	3.7	4.3	0.2	0.2	1.0	514.8	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Crew Boat (Main Eng)	980	1,248	0.2	2.0	10.3	0.2	0.2	1.0	548.4	0.79
		--(Aux engine)	12	2,496	3.73E-03	0.1	0.1	5.52E-03	5.52E-03	1.79E-02	9.5	0.56
	Dredge Material Transportation	Dump Scow #1	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
		Dump Scow #2	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
		Dump Scow #3	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
		Dump Scow #4	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
Reinstatement Spread for Morgan HDD Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	43	1.93E-02	0.4	0.4	2.14E-02	2.14E-02	0.1	49.3	0.79
		Clam Rig (Aux Engine)	460	43	3.49E-03	0.1	0.1	3.87E-03	2.97E-03	1.68E-02	8.9	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Crew Boat (Main Eng)	980	22	3.71E-03	3.44E-02	0.2	4.13E-03	4.13E-03	1.79E-02	9.5	0.79
		--(Aux engine)	12	43	9.10E-05	1.68E-03	2.29E-03	1.35E-04	1.35E-04	4.38E-04	0.2	0.79
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	43	1.93E-02	0.4	0.4	2.14E-02	2.14E-02	0.1	49.3	0.79
		W551 Clam Rig (Aux Engine)	460	43	3.49E-03	0.1	0.1	3.87E-03	2.97E-03	1.68E-02	8.9	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Crew Boat (Main Eng)	980	22	3.71E-03	3.44E-02	0.2	4.13E-03	4.13E-03	1.79E-02	9.5	0.79
		--(Aux engine)	12	43	6.45E-05	1.19E-03	1.62E-03	9.55E-05	9.55E-05	3.10E-04	0.2	0.56
	Dredge Material Transportation	Dump Scow #1	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #2	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #3	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #4	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56

Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	199	0.1	1.6	1.9	0.1	0.1	0.4	227.3	0.79
		Clam Rig (Aux Engine)	460	199	1.61E-02	0.3	0.3	1.79E-02	1.37E-02	0.1	41.1	0.79
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79
		Crew Boat (Main Eng)	980	100	1.71E-02	0.2	0.8	1.90E-02	1.90E-02	0.1	43.8	0.79
		--(Aux engine)	12	199	2.97E-04	5.51E-03	7.49E-03	4.40E-04	4.40E-04	1.43E-03	0.8	0.56
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	199	0.1	1.6	1.9	0.1	0.1	0.4	227.3	0.79
		W551 Clam Rig (Aux Engine)	460	199	1.61E-02	0.3	0.3	1.79E-02	1.37E-02	0.1	41.1	0.79
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79
		Crew Boat (Main Eng)	980	100	1.71E-02	0.2	0.8	1.90E-02	1.90E-02	0.1	43.8	0.79
		--(Aux engine)	12	199	2.97E-04	5.51E-03	7.49E-03	4.40E-04	4.40E-04	1.43E-03	0.8	0.56
	Dredge Material Transportation	Dump Scow #1	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56
		Dump Scow #2	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56
		Dump Scow #3	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56
		Dump Scow #4	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56
Reinstatement Spread for Anchorage Area	Reinstatement	Clam Rig (Main Engine)	2,545	240	0.1	2.0	2.3	0.1	0.1	0.5	273.9	0.79
		Clam Rig (Aux Engine)	460	240	1.94E-02	0.4	0.4	2.15E-02	1.65E-02	0.1	49.5	0.79
		Tug 2000 HP TBN	2,000	240	0.1	1.6	2.1	0.1	0.1	2.03E-03	215.2	0.79
		Tug 2000 HP TBN	2,000	240	0.1	1.6	2.1	0.1	0.1	2.03E-03	215.2	0.79
		Crew Boat (Main Eng)	980	120	2.06E-02	0.2	1.0	2.29E-02	2.29E-02	0.1	52.7	0.79
		--(Aux engine)	12	240	3.58E-04	6.63E-03	9.02E-03	5.31E-04	5.31E-04	1.72E-03	0.9	0.56
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	240	0.1	2.0	2.3	0.1	0.1	0.5	273.9	0.79
		W551 Clam Rig (Aux Engine)	460	240	1.94E-02	0.4	0.4	2.15E-02	1.65E-02	0.1	49.5	0.79
		Tug 2000 HP TBN	2,000	240	0.1	1.6	2.1	0.1	0.1	2.03E-03	215.2	0.79
		Tug 2000 HP TBN	2,000	240	0.1	1.6	2.1	0.1	0.1	2.03E-03	215.2	0.79
		Crew Boat (Main Eng)	980	120	2.06E-02	0.2	1.0	2.29E-02	2.29E-02	0.1	52.7	0.79
		--(Aux engine)	12	240	3.58E-04	6.63E-03	9.02E-03	5.31E-04	5.31E-04	1.72E-03	0.9	0.56
	Dredge Material Transportation	Dump Scow #1	286	40	1.42E-03	7.91E-03	0.1	1.58E-03	1.58E-03	6.85E-03	3.6	0.56
		Dump Scow #2	286	40	1.42E-03	7.91E-03	0.1	1.58E-03	1.58E-03	6.85E-03	3.6	0.56
		Dump Scow #3	286	40	1.42E-03	7.91E-03	0.1	1.58E-03	1.58E-03	6.85E-03	3.6	0.56
		Dump Scow #4	286	40	1.42E-03	7.91E-03	0.1	1.58E-03	1.58E-03	6.85E-03	3.6	0.56
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	Reinstatement	Clam Rig (Main Engine)	2,545	192	0.1	1.6	1.8	0.1	0.1	0.4	219.1	0.79
		Clam Rig (Aux Engine)	460	192	1.55E-02	0.3	0.3	1.72E-02	1.32E-02	0.1	39.6	0.79
		Tug 2000 HP TBN	2,000	192	0.1	1.2	1.7	0.1	0.1	1.62E-03	172.2	0.79
		Tug 2000 HP TBN	2,000	192	0.1	1.2	1.7	0.1	0.1	1.62E-03	172.2	0.79
		Crew Boat (Main Eng)	980	96	1.65E-02	0.2	0.8	1.83E-02	1.83E-02	0.1	42.2	0.79
		--(Aux engine)	12	192	2.87E-04	5.31E-03	7.22E-03	4.25E-04	4.25E-04	1.38E-03	0.7	0.56
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	192	0.1	1.6	1.8	0.1	0.1	0.4	219.1	0.79
		W551 Clam Rig (Aux Engine)	460	192	1.55E-02	0.3	0.3	1.72E-02	1.32E-02	0.1	39.6	0.79
		Tug 2000 HP TBN	2,000	192	0.1	1.2	1.7	0.1	0.1	1.62E-03	172.2	0.79
		Tug 2000 HP TBN	2,000	192	0.1	1.2	1.7	0.1	0.1	1.62E-03	172.2	0.79
		Crew Boat (Main Eng)	980	96	1.65E-02	0.2	0.8	1.83E-02	1.83E-02	0.1	42.2	0.79
		--(Aux engine)	12	192	2.87E-04	5.31E-03	7.22E-03	4.25E-04	4.25E-04	1.38E-03	0.7	0.56
	Dredge Material Transportation	Dump Scow #1	286	32	1.14E-03	6.32E-03	4.22E-02	1.26E-03	1.26E-03	5.48E-03	2.9	0.56
		Dump Scow #2	286	32	1.14E-03	6.32E-03	4.22E-02	1.26E-03	1.26E-03	5.48E-03	2.9	0.56
		Dump Scow #3	286	32	1.14E-03	6.32E-03	4.22E-02	1.26E-03	1.26E-03	5.48E-03	2.9	0.56
		Dump Scow #4	286	32	1.14E-03	6.32E-03	4.22E-02	1.26E-03	1.26E-03	5.48E-03	2.9	0.56
Reinstatement Spread for all other pipeline segments	Toyo Dredge Pump	W571	1,502	516	0.1	2.5	3.4	0.2	0.2	0.7	347.5	0.79
		Deck Winches	300	172	1.65E-03	7.79E-03	2.35E-02	1.63E-03	1.58E-03	8.32E-05	30.5	-
		Toyo Pump	425	516	2.92E-02	0.1	0.5	2.31E-02	2.24E-02	3.98E-04	128.3	-
		400 Amp Welder	33	86	9.48E-04	4.21E-03	9.94E-03	6.84E-04	6.64E-04	6.30E-06	2.2	-
		20kW Generator	30	516	2.97E-03	1.14E-02	0.1	1.86E-03	1.81E-03	2.91E-05	10.1	-
		Light Plant	25	1,032	9.10E-03	4.31E-02	0.1	5.04E-03	4.88E-03	6.11E-05	16.6	-
		250 cfm Aircompressor	80	86	3.26E-04	2.99E-03	1.01E-02	5.11E-04	4.96E-04	1.24E-05	4.5	-
		Tug 2000 HP TBN	2,000	516	0.2	3.4	4.6	0.2	0.2	4.36E-03	462.8	0.79
		Crew Boat (Main Eng)	980	258	4.44E-02	0.4	2.1	4.93E-02	4.93E-02	0.2	113.4	0.79
		--(Aux engine)	12	516	7.70E-04	1.43E-02	1.94E-02	1.14E-03	1.14E-03	3.71E-03	2.0	0.56



Baritan Bay Loop Equipment

HDD Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation	
Morgan Onshore HDD -	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	8	1	16	
		Backhoe	CAT 315, 320, 330 or JD110, 310	Assist in performing loading and unloading operations and movement of smaller materials and tools		1	300	Diesel	4	12	48	
	DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	2	1	4	
	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	19	12	228	
	HDD Hole Opening	Drill Rig CAT Power Unit				1	1,750	Diesel	12	12	144	
	Pull-back String	Drill Rig CAT Power Unit				1	1,750	Diesel	8	12	96	
	HDD Pilot Hole	Mud Rig Genset/MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	19	12	228	
	HDD Hole Opening	Mud Rig Genset/MQ				1	350	Diesel	12	12	144	
	Pull-back String	Mud Rig Genset/MQ				1	350	Diesel	8	12	96	
	HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	19	12	228	
	HDD Hole Opening	Trackhoe - 240				1	177	Diesel	12	12	144	
	Pull-back String	Trackhoe - 240				1	177	Diesel	8	12	96	
	HDD Pilot Hole	Forklift - 10,000# & Over	Forklift	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	19	12	228	
	HDD Hole Opening	Forklift - 10,000# & Over				1	130	Diesel	12	12	144	
	Pull-back String	Forklift - 10,000# & Over				1	22	Diesel	8	12	96	
	HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation,		1	275	Diesel	19	12	228	
	HDD Hole Opening	R.T. Crane 50-75 Ton				1	275	Diesel	12	12	144	
	Pull-back String	R.T. Crane 50-75 Ton				1	275	Diesel	8	12	96	
	HDD Pilot Hole	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	19	12	228	
	HDD Hole Opening	Triplex Pump				1	540	Diesel	12	12	144	
	Pull-back String	Triplex Pump				1	540	Diesel	8	12	96	
Morgan Offshore HDD -	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	5	1	10	
		Generators	Engines that power the auxiliary systems of the Lift Boat.			2	250	non-road Diesel	30	4	240	
	DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	3	1	6	
	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	7	12	84	
	HDD Hole Opening	Drill Rig CAT Power Unit				1	1,750	Diesel	10	12	120	
	Pull-back String	Drill Rig CAT Power Unit				1	1,750	Diesel	8	12	96	
	HDD Pilot Hole	Mud Rig Genset/MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	7	12	84	
	HDD Hole Opening	Mud Rig Genset/MQ				1	350	Diesel	10	12	120	
	Pull-back String	Mud Rig Genset/MQ				1	350	Diesel	8	12	96	
	HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	7	12	84	
	HDD Hole Opening	Trackhoe - 240				1	177	Diesel	10	12	120	
	Pull-back String	Trackhoe - 240				1	177	Diesel	8	12	96	
	HDD Pilot Hole	Forklift - 10,000# & Over	Forklift	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	7	12	84	
	HDD Hole Opening	Forklift - 10,000# & Over				1	130	Diesel	10	12	120	
	Pull-back String	Forklift - 10,000# & Over				1	22	Diesel	8	12	96	
	HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation,		1	275	Diesel	7	12	84	
	HDD Hole Opening	R.T. Crane 50-75 Ton				1	275	Diesel	10	12	120	
	Pull-back String	R.T. Crane 50-75 Ton				1	275	Diesel	8	12	96	
	HDD Pilot Hole	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	7	12	84	
	HDD Hole Opening	Triplex Pump				1	540	Diesel	10	12	120	
	Pull-back String	Triplex Pump				1	540	Diesel	8	12	96	
CP Cable Drill - Onshore	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		1	450	Diesel	1	4	4	
	DeMOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		1	450	Diesel	1	4	4	
CP Cable Drill - Offshore	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	202	Diesel	4	12	48	
	HDD Hole Opening	Drill Rig CAT Power Unit				1	202	Diesel	3	12	36	
	Pull-back String	Drill Rig CAT Power Unit				1	202	Diesel	4	12	48	
	HDD Pilot Hole	Mud Rig & Reclaimer Pumps	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		3	25	Diesel	4	12	48	
	HDD Hole Opening	Mud Rig & Reclaimer Pumps				3	25	Diesel	3	12	36	
	Pull-back String	Mud Rig & Reclaimer Pumps				3	25	Diesel	3	12	36	
	400 Amp Welder	Diesel powered welding machine	HDD Operations - Shallow Water Crane Barge	Support HDD operations		1	33	Diesel	6	12	72	
	20kW Generator	Diesel powered generator				1	30	Diesel	6	12	72	
	Light Plant	Diesel powered lighting tower				4	25	Diesel	6	12	72	
	250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	HDD Operations - W571 Jack up	General Use - Provide illumination to workers when construction activity warrants evening/night work		1	80	Diesel	6	12	72	
	Crawler Crane					1	95	Diesel	6	12	72	
	Shallow Water Tug					1	660	Diesel	2	12	24	
Ambrose East Offshore HDD	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	11	1	21	
		W751 Generator	Engine that powers the main jacking systems of the jack up barge.	Providing a stationary platform for the HDD drilling operations.		1	425	non-road Diesel	38	24	900	
		W751 Aux Generator	Engine that powers the auxiliary power systems of the jack up barge.			1	160	non-road Diesel	38	24	900	
		Jacking Compressors	Large Air Compressors			2	525	non-road Diesel	38	4	300	
		50T Cherry picker	Hydraulic Rough Terrain rubber tire crane.			1	250	non-road Diesel	38	24	900	
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	38	4	150	
		20kW Generator	Diesel powered generator			1	30	non-road Diesel	38	24	900	
		Light Plant	Diesel powered lighting tower.			4	25	non-road Diesel	38	12	1,800	
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor			1	80	non-road Diesel	38	4	150	
		DeMOB	Kenworth	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	6	1	12	
	HDD Operations - W571 Jack up	HDD Pilot Hole	Drill Rig CAT Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	10	12	120	
		HDD Hole Opening	Drill Rig CAT Power Unit			1	1,750	Diesel	6	12	72	
		Pull-back String	Drill Rig CAT Power Unit			1	1,750	Diesel	5	12	60	
		HDD Pilot Hole	Mud Rig Genset/MQ	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	10	12	120	
		HDD Hole Opening	Mud Rig Genset/MQ			1	350	Diesel	6	12	72	
		Pull-back String	Mud Rig Genset/MQ			1	350	Diesel	5	12	60	
		HDD Pilot Hole	Trackhoe - 240	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	10	12	120	
		HDD Hole Opening	Trackhoe - 240			1	177	Diesel	6	12	72	
		Pull-back String	Trackhoe - 240			1	177	Diesel	5	12	60	
		HDD Pilot Hole	Forklift - 10,000# & Over	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	10	12	120	
		HDD Hole Opening	Forklift - 10,000# & Over			1	130	Diesel	6	12	72	
		Pull-back String	Forklift - 10,000# & Over			1	130	Diesel	5	12	60	
		HDD Pilot Hole	R.T. Crane 50-75 Ton	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation,		1	275	Diesel	10	12	120	
		HDD Hole Opening	R.T. Crane 50-75 Ton			1	275	Diesel	6	12	72	
		Pull-back String	R.T. Crane 50-75 Ton			1	275	Diesel	5	12	60	
	HDD Operations - W571 Jack up	HDD Pilot Hole	Triplex Pump	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	10	12	120	
		HDD Hole Opening	Triplex Pump			1	540	Diesel	6	12	72	
		Pull-back String	Triplex Pump			1	540	Diesel	5	12	60	
		Pull-back String	Triplex Pump			1	540	Diesel	5	12	60	

Ambrose West Offshore HDD	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location	2	450	Diesel	15	1	31
	HDD Operations - W750 Jack up	W750 Generator	Engine that powers the main jacking systems of the jack up barge.	Providing a stationary platform for the HDD drilling operations.	1	325	non-road Diesel	46	24	1,110
		Jacking Compressors	Engine that powers the auxiliary power systems of the jack up barge.		2	525	non-road Diesel	46	4	370
		50T Cherry picker	Large Air Compressors		1	250	non-road Diesel	46	24	1,110
		400 Amp Welder	Hydraulic Rough Terrain rubber tire crane.		1	38	non-road Diesel	46	4	185
		20kW Generator	Diesel powered welding machine.		1	30	non-road Diesel	46	24	1,110
		Light Plant	Diesel powered lighting tower.		4	25	non-road Diesel	46	12	2,220
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.		1	80	non-road Diesel	46	4	185
		DeMOB	Kenworth		2	450	Diesel	6	1	13
		HDD Pilot Hole	Drill Rig CAT Power Unit		1	1,750	Diesel	14	12	168
		HDD Hole Opening	Drill Rig CAT Power Unit		1	1,750	Diesel	6	12	72
	Ambrose West Offshore HDD	Pull-back String	Drill Rig CAT Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig	1	1,750	Diesel	5	12	60
		HDD Pilot Hole	Mud Rig Genset-MQ		1	350	Diesel	14	12	168
		HDD Hole Opening	Mud Rig Genset-MQ		1	350	Diesel	4	12	48
		Pull-back String	Mud Rig Genset-MQ		1	350	Diesel	14	12	168
		HDD Pilot Hole	Trackhoe - 240		1	177	Diesel	6	12	72
		HDD Hole Opening	Trackhoe - 240		1	177	Diesel	4	12	48
		Pull-back String	Trackhoe - 240		1	177	Diesel	14	12	168
		HDD Pilot Hole	Forklift - 10,000# & Over		1	130	Diesel	14	12	168
		HDD Hole Opening	Forklift - 10,000# & Over		1	130	Diesel	6	12	72
		Pull-back String	Forklift - 10,000# & Over		1	130	Diesel	4	12	48
		HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	1	275	Diesel	14	12	168
		HDD Hole Opening	R.T. Crane 50-75 Ton		1	275	Diesel	6	12	72
		Pull-back String	R.T. Crane 50-75 Ton		1	275	Diesel	4	12	48
		HDD Pilot Hole	Triplex Pump		1	540	Diesel	14	12	168
		HDD Hole Opening	Triplex Pump		1	540	Diesel	6	12	72
		Pull-back String	Triplex Pump		1	540	Diesel	4	12	48
		HDD Pilot Hole	W541-Hoist Engine	W541 - Crane Barge	1	400	non-road Diesel	60	24	1,428
		HDD Hole Opening	W541-Swing Engine		1	525	non-road Diesel	60	24	1,428
		Pull-back String	W541-Auxiliary Generator		1	85	non-road Diesel	60	24	1,428
		HDD Pilot Hole	Deck Winch #1		1	238	non-road Diesel	60	4	238
		HDD Hole Opening	Deck Winch #2		1	160	non-road Diesel	60	4	238
		Pull-back String	400 Amp Welder		1	33	non-road Diesel	60	4	238
		HDD Pilot Hole	20kW Generator		1	30	non-road Diesel	60	24	1,428
		HDD Hole Opening	Light Plant		4	25	non-road Diesel	60	12	2,856
		Pull-back String	250 cfm Aircompressor		1	80	non-road Diesel	60	4	238
		HDD Pilot Hole	W541-Hoist Engine	W541 - Crane Barge	1	400	non-road Diesel	60	24	1,428
		HDD Hole Opening	W541-Swing Engine		1	525	non-road Diesel	60	24	1,428
		Pull-back String	W541-Auxiliary Generator		1	85	non-road Diesel	60	24	1,428
		HDD Pilot Hole	Deck Winch #1		1	238	non-road Diesel	60	4	238
		HDD Hole Opening	Deck Winch #2		1	160	non-road Diesel	60	4	238
		Pull-back String	400 Amp Welder		1	33	non-road Diesel	60	4	238
		HDD Pilot Hole	20kW Generator		1	30	non-road Diesel	60	24	1,428
		HDD Hole Opening	Light Plant		4	25	non-road Diesel	60	12	2,856
		Pull-back String	250 cfm Aircompressor		1	80	non-road Diesel	60	4	238

Pipelay Related Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation	
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Mobilization/ Demobilization activities for the Pipelay vessel when it is alongside at the Quaydrie		3	778	Low Sulfur Marine Diesel	6	24	432	
		Volvo D12 MG-RC 229kW	Emergency Generator for Pipelay Vessel			0	302	Low Sulfur Marine Diesel	6	24	0	
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	6	24	144	
Pipelay of Ambrose HDD String	Antares Anchor Handling >12ft WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	4	24	94	
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	4	24	84	
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	4	24	252	
	Seven Antares	Volvo D12 MG-RC 229kW	Emergency Generator for vessel	Pipelay activities associated with laying the Ambrose HDD String production.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	0	302	Low Sulfur Marine Diesel	4	24	0	
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	4	24	84	
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	4	24	91	
Pipelay of Morgan HDD String	Anchor Handling <12ft WD	Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Moving anchors in shallow water.		1	99	non-road Diesel	4	8	30	
		Gabby Miller	110kW Diesel Hydraulic Power Unit			1	660	non-road Diesel	4	24	91	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	Diesel Generator for power on the pipelay barge			1	147	non-road Diesel	4	24	91	
	Beach Pull	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	4	24	91	
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	4	24	91	
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	4	24	274	
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Shallow Water Barge	Volvo D12 MG-RC 229kW	Emergency Generator for vessel	Pipelay activities associated with laying the Morgan HDD String production.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	0	302	Low Sulfur Marine Diesel	4	24	0	
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	4	24	91	
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	8	24	190	
	Anchor Handling <12ft WD	Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Moving anchors in shallow water.		1	99	non-road Diesel	8	8	63	
		Gabby Miller	110kW Diesel Hydraulic Power Unit			1	660	non-road Diesel	8	24	190	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	Diesel Generator for power on the pipelay barge			1	248	non-road Diesel	8	24	190	
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Anchor Handling >12ft WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	8	24	190	
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	8	24	190	
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	8	24	570	
	Shallow Water Barge	Volvo D12 MG-RC 229kW	Emergency Generator for vessel	Pipelay activities associated with laying the pipeline from MP12.5 to MP14.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	0	302	Low Sulfur Marine Diesel	8	24	0	
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	8	24	190	
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	3	24	82	
Pipelay Spread from MP16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling <12ft WD	Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Moving anchors in shallow water.		1	99	non-road Diesel	3	8	27	
		Gabby Miller	110kW Diesel Hydraulic Power Unit			1	660	non-road Diesel	3	24	82	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	Diesel Generator for power on the pipelay barge			1	147	non-road Diesel	3	24	82	
	Beach Pull	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	3	24	82	
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	3	24	82	
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	3	24	247	
Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling >12ft WD	Volvo D12 MG-RC 229kW	Emergency Generator for vessel	Pipelay activities associated with laying the pipeline from MP14.5 to MP16.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	0	302	Low Sulfur Marine Diesel	3	24	0	
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	3	24	82	
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	3	8	27	
	Antares Anchor Handling <12ft WD	Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors	Moving anchors in shallow water.		1	99	non-road Diesel	3	8	24	
		Gabby Miller	110kW Diesel Hydraulic Power Unit			1	660	non-road Diesel	3	24	82	
		150 Tonne SWL Diesel Hydraulic Spooling Winch	Diesel Generator for power on the pipelay barge			1	248	non-road Diesel	3	24	82	
Pipelay Spread from MP16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling >12ft WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	3	24	82	
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	3	24	82	
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	3	24	247	
	Seven Antares	Volvo D12 MG-RC 229kW	Emergency Generator for vessel	Pipelay activities associated with laying the pipeline from MP16.5 to MP29.3.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	0	302	Low Sulfur Marine Diesel	11	24	0	
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	11	24	256	
		Tug Robert	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	7	24	175	
Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	Antares Anchor Handling >12ft WD	Tug Elizabeth	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	7	24	175	
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	7	24	526	
		Volvo D12 MG-RC 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	7	24	0	
	Seven Antares	Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP30.4 to MP35.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	1	1,073	non-road Diesel	7	24	175	
		Tug Robert	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	5	24	120	
		Tug Elizabeth	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	5	24	120	
Above Water Tie-in/ Spool @ MP16.6	Seven Antares	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Above Water Tie in Activities at MP16.6	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	5	24	360	
		Volvo D12 MG-RC 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	5	24	0	
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	5	24	120	
	Pipe Delivery Spread	Dockside Crane	Manitowoc 1100		Towing barges with pipe from load out area to pipelay vessel for installation.		1	332	Diesel	59	8	472
			Pipeline Barge Tug	Tug Trevor			1500 HP Tugboat	1	1,500	Low Sulfur Marine Diesel	37	24

Diving/Construction Support Spread	Dive Barge	W671	Engine that powers W671 crane and main systems.			1	1,502	non-road Diesel	68	24	1,638
		Deck Winches	For mooring and anchoring vessel.	Provides staging deck and hook support for diving operations.	Activities: Installation of Neptune cable crossing arrangements, installation of tie-in valve sled and tie-in spools at Rockaway manifold, installation of spoil piece at HDD, and precommissioning operations (flooding, cleaning, gauging and dewatering of pipeline)	2	300	non-road Diesel	68	4	546
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	68	4	273
		20kW Generator	Diesel powered generator			1	30	non-road Diesel	68	24	1,638
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		4	25	non-road Diesel	68	12	3,276
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides staging deck and hook support for diving operations.		1	80	non-road Diesel	68	4	273
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to W671		1	2,000	Low Sulfur Marine Diesel	45	24	1,070
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W671 during diving operations.		1	980	non-road Diesel	45	12	535
		—(Aux engine)				12	12	non-road Diesel	45	24	1,070
		Tug 2000 HP TBN				1	2,000	non-road Diesel	9	24	216
Jet Trencher	Mob	M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.		1	400	non-road Diesel	7	24	173
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	7	4	29
		20kW Generator	Diesel powered generator	Provides support to the pipeline jelling contractor.		1	30	non-road Diesel	7	24	173
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	7	4	230
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jelling contractor.		1	80	non-road Diesel	7	4	29
		W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jelling contractor.		2	225	non-road Diesel	5	4	39
		W061 Deck Winches				2	300	non-road Diesel	5	4	39
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.		1	400	non-road Diesel	5	24	118
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	5	4	20
		20kW Generator	Diesel powered generator	Provides support to the pipeline jelling contractor.		1	30	non-road Diesel	5	24	118
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	5	12	470
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jelling contractor.		1	80	non-road Diesel	5	4	20
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jelling support barge.		2	2,000	Low Sulfur Marine Diesel	5	24	235
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	5	12	59
		—(Aux engine)				12	12	non-road Diesel	5	24	118
		Jetter	1250kw Generator	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	5	24	118
		W263 Deck Winches	For mooring and anchoring vessel.			2	225	non-road Diesel	4	4	35
		W061 Deck Winches	For mooring and anchoring vessel.			2	300	non-road Diesel	4	4	35
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.		1	400	non-road Diesel	4	24	106
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	4	4	18
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 28.4 - MP 25.1)	Barge + Tug	20kW Generator	Diesel powered generator	Provides support to the pipeline jelling contractor.		1	30	non-road Diesel	4	24	106
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	4	12	422
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jelling contractor.		1	80	non-road Diesel	4	4	28
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jelling support barge.		2	2,000	Low Sulfur Marine Diesel	4	24	211
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	4	12	53
		—(Aux engine)				12	12	non-road Diesel	4	24	106
		Jetter	1250kw Generator	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	4	24	106
		W263 Deck Winches	For mooring and anchoring vessel.			2	225	non-road Diesel	6	4	46
		W061 Deck Winches				2	300	non-road Diesel	6	4	46
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.		1	400	non-road Diesel	6	24	139
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench Channel (MP 24.0 - MP 17.5)	Barge + Tug	400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	6	4	23
		20kW Generator	Diesel powered generator	Provides support to the pipeline jelling contractor.		1	30	non-road Diesel	6	24	139
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	6	12	557
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jelling contractor.		1	80	non-road Diesel	6	4	23
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jelling support barge.		2	2,000	Low Sulfur Marine Diesel	6	24	278
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	6	12	70
		—(Aux engine)				12	12	non-road Diesel	6	24	139
		Jetter	1250kw Generator	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	6	24	139
		W263 Deck Winches	For mooring and anchoring vessel.			2	225	non-road Diesel	2	4	16
		W061 Deck Winches				2	300	non-road Diesel	2	4	16
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recover the jet trencher into the water.		1	400	non-road Diesel	2	24	48
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	2	4	9
		20kW Generator	Diesel powered generator	Provides support to the pipeline jelling contractor.		1	30	non-road Diesel	2	24	48
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	2	12	192
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jelling contractor.		1	80	non-road Diesel	2	4	8
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jelling support barge.		2	2,000	Low Sulfur Marine Diesel	2	24	96
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	2	12	24
		—(Aux engine)				12	12	non-road Diesel	2	24	48
		Jetter	1250kw Generator	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	2	24	48
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the HDD operations		1	600	non-road Diesel	0	12	0
Daily Crew/Utility	Morgan HDD Crew Boat	—(Aux engine)				1	150	non-road Diesel	0	24	0
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the HDD operations		1	600	non-road Diesel	30	12	360
		—(Aux engine)				1	150	non-road Diesel	30	24	720
		Boat (Main Eng)				1	600	non-road Diesel	61	24	1,464
		—(Aux engine)	65FT Supply Vessel	For misc. supplies and placing marker buoys.		1	150	non-road Diesel	61	24	1,464
		Boat (Main Eng)	Guard Boat Vessel	For transiting site and keeping other vessels away from work site.		1	600	non-road Diesel	133	24	3,192
		—(Aux engine)				1	150	non-road Diesel	133	24	3,192
		Main Eng	150FT offshore supply vessel	For transporting supplies and water for HDD operations.		1	650	non-road Diesel	38	24	916
		—(Aux engine)				1	150	non-road Diesel	38	24	916
		—Bow Thruster				1	300	non-road Diesel	38	24	916
HDD Water Delivery OSV	Pre-comm OSV	Boat (Main Eng)	150FT offshore supply vessel	For transporting supplies and acting as a staging area for precommissioning activities.		1	850	non-road Diesel	12	24	286
		—(Aux engine)				1	150	non-road Diesel	12	24	286
		—Bow Thruster				1	300	non-road Diesel	12	24	286

Dredging & Reinstatement Related Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation	
Dredging Spread for Pre-trenching the Morgan HDD Siting & Ultra Shallow Water Pipeline Transition MP12.5-MP16.6 (A1 979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	Derick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	20	12	234	
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	20	24	468	
		HARS W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	38	24	917	
		HARS W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	38	24	917	
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	69	24	1,656	
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	69	24	1,656	
		Crew Boat (Main Eng)			Crew-transfer boat		1	980	non-road Diesel	69	12	828
		-(Aux engine)					1	12	non-road Diesel	69	24	1,656
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	Dredging	UPLAND W551 Clam Rig (Main Engine)	Derick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	127	12	1,529	
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	127	24	3,058	
		HARS W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	16	24	386	
		HARS W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	16	24	386	
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	154	24	3,696	
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	154	24	3,696	
		Crew Boat (Main Eng)			Crew-transfer boat		1	980	non-road Diesel	154	12	1,848
		-(Aux engine)					1	12	non-road Diesel	154	24	3,696
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	Derick barge with crane and clam shell bucket.	For digging HDD pit.		1	2,545	non-road Diesel	4	12	50	
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	4	24	101	
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	7	24	168	
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	7	24	168	
		Crew Boat (Main Eng)			Crew-transfer boat		1	980	non-road Diesel	7	12	84
		-(Aux engine)					Provides means to transport workers to/from the W551 Dredge					

Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), WGS4 Channel Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	Reinstatement	Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.		1	2,545	non-road Diesel	8	24	192
		Clam Rig (Aux Engine)	Hydraulic excavator type material handler.			1	460	non-road Diesel	8	24	192
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to reinstatement spread.		1	2,000	Low Sulfur Marine Diesel	8	24	192
		Tug 2000 HP TBN	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	8	24	192
	Mining Sand	Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.		1	980	non-road Diesel	8	12	96
		—(Aux engine)				1	12	non-road Diesel	8	24	192
		W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For mining sand to provide reinstatement material.		1	2,545	non-road Diesel	8	24	192
		W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	8	24	192
	Dredge Material Transportation	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.		1	2,000	Low Sulfur Marine Diesel	8	24	192
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	8	24	192
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the mining spread.		1	980	non-road Diesel	8	12	96
		—(Aux engine)				1	12	non-road Diesel	8	24	192
Reinstatement Spread for all other pipeline segments	Dredge Material Transportation	Dump Scow #1	Split hull hopper barge	For transporting the mined material.		1	286	non-road Diesel	8	4	32
		Dump Scow #2				1	286	non-road Diesel	8	4	32
		Dump Scow #3				1	286	non-road Diesel	8	4	32
		Dump Scow #4				1	286	non-road Diesel	8	4	32
	Toyo Dredge Pump	W571	Engine that powers W571 crane and main systems.	Provides staging deck and hook support for diving operations.		1	1,502	non-road Diesel	22	24	516
		Deck Winches	For mooring and anchoring vessel.			2	300	non-road Diesel	22	4	172
		Toyo Pump	DP150 dredge pump	For sucking and pumping sand in critical areas near existing assets.		1	425	non-road Diesel	22	24	516
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	22	4	86
		20kW Generator	Diesel powered generator	Provides staging deck and hook support for diving operations.		1	30	non-road Diesel	22	24	516
		Light Plant	Diesel powered lighting tower.	General Use: Provide illumination to workers when construction activity warrants evening/night work.		4	25	non-road Diesel	22	12	1,032
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Provides staging deck and hook support for diving operations.		1	80	non-road Diesel	22	4	86
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to W571		1	2,000	Low Sulfur Marine Diesel	22	24	516
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W571 during diving operations.		1	980	non-road Diesel	22	12	258
		—(Aux engine)	Crew-transfer boat			1	12	non-road Diesel	22	24	516

Survey Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing a prelay survey of the offshore workpiece.	Used to power all systems on the boat.	1	600	non-road Diesel	11	12	132
		—(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	11	12	132
Post Jet Bural Survey Campaign	Post Pipeline Bural Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing a post burial survey of the pipeline to ensure adequate depth of cover.	Used to power all systems on the boat.	1	600	non-road Diesel	3	12	36
		—(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	3	12	36
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing an as-built survey of the pipeline.	Used to power all systems on the boat.	1	600	non-road Diesel	4	12	48
		—(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	4	12	48

Quayside Disposal Processing Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	Hydraulic excavator with clam bucket	For unloaded dredged material from barges at the processing facility.		1	675	Diesel	82	12	986
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	Screw conveyor with dry cement addition with mixing.	To mix/blent cement product with raw dredged material.		1	350	Electric	82	12	986
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	Hydraulic excavator with clam bucket	For unloaded dredged material from barges at the processing facility.		1	270	Diesel	82	12	986
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)				1	220	Diesel	82	12	986
Soil Transport	Post Processing Trucking to Upland Site	Dump Truck	On-Road dump truck	Hauling processed dredged material from the processor facility to final resting place.		278	450	Diesel	82	6	136,973

Pipe Transport Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Procurement	Trucking of Pipe to Storage Yard	Kenworth				60	450	Diesel	35	4	139



Raritan Bay Loop Vehicle Emissions

On Road Emission Factors

Equipment Type	Emission Factors										
	HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene
	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Commuter Vehicles	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03
Dump Truck	0.1	2.3	4.7	0.1	0.1	5.58E-03	1660.5	2.52E-04	4.64E-03	7.24E-04	7.36E-04
Pipe Delivery Truck	0.1	2.5	5.2	0.1	0.1	5.87E-03	1747.0	2.21E-04	4.93E-03	7.09E-04	6.43E-04

Paved Road Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Commuter Vehicles	0.00	0.001
Dump Truck	0.03	0.008
Pipe Delivery Truck	0.03	0.006

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Miles Traveled by Spread/Phase

Construction Phase	POB PER 24 hr shift	Average Daily Round Trip	Construction Days		Vehicle Miles Traveled	
			2026	2027	2026	2027
Morgan Onshore HDD -	20	50	0	19	0	19,000
Morgan Offshore HDD -	23	50	0	30	0	34,500
CP Cable Drill - Onshore	12	50	0	4	0	2,400
CP Cable Drill - Offshore	12	50	0	6	0	3,600
Ambrose East Offshore HDD	52	50	0	38	0	97,500
Ambrose West Offshore HDD	46	50	0	46	0	106,375
W541 - Crane Barge	34	50	0	60	0	101,150
Pipelay Spread	250	50	0	6	0	75,000
Mob/Demob						
Pipelay of Ambrose HDD String	258	50	0	4	0	45,150
Pipelay of Morgan HDD String	272	50	0	4	0	51,680
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	272	50	0	8	0	107,712
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	272	50	0	3	0	46,648
Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	266	50	0	11	0	141,645
Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	258	50	0	7	0	94,170
Above Water Tie-in/ Spool @ MP16.6	258	50	0	5	0	64,500
Pipe Delivery Spread	6	50	0	59	0	17,700
Diving/Construction Support Spread	54	50	0	68	0	184,275
Jet Trencher	20	50	0	7	0	7,200
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	30	50	0	5	0	7,350
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	30	50	0	4	0	6,600
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	30	50	0	6	0	8,700
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	30	50	0	2	0	3,000
Daily Crew/Utility	32	50	0	133	0	212,800
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	26	50	0	69	0	89,700
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	26	50	0	154	0	200,200
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	26	50	0	7	0	9,100
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	26	50	0	21	0	27,300
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	26	50	0	13.1	0	17,030
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	26	50	0	9	0	11,050
Scow Barge Spread (one / 1each)	8	50	0	273	0	109,040
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	62	50	0	33	0	100,750
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	62	50	0	104	0	322,400
Reinstatement Spread for Morgan HDD Pit Excavation	62	50	0	2	0	5,580
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	62	50	0	8	0	25,730
Reinstatement Spread for Anchorage Area	62	50	0	10	0	31,000

Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	62	50	0	8	0	24,800
Reinstatement Spread for all other pipeline segments	26	50	0	22	0	27,950
Pre Lay Survey Campaign	6	50	0	11	0	3,300
Post Jet Burial Survey Campaign	6	50	0	3	0	900
As Built Survey Campaign	6	50	0	4	0	1,200
Soil Transport	278	200	0	82	0	4,565,767
Trucking of Pipe to Storage Yard	60	120	35	0	250,320	0

Construction Phase		Emission (tons)															
		VOC		CO		NOx		PM ₁₀		PM _{2.5}		SOx		CO ₂		HAPs	
		2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027
Morgan Onshore HDD -	0	1.10E-03	0	0.07	0	3.33E-03	0	4.03E-02	0	9.94E-03	0	6.67E-05	0	9.11	0	6.30E-05	
Morgan Offshore HDD -	0	2.00E-03	0	0.13	0	0.01	0	0.07	0	1.80E-02	0	1.21E-04	0	16.54	0	1.14E-04	
CP Cable Drill - Onshore	0	1.39E-04	0	8.76E-03	0	4.21E-04	0	5.09E-03	0	1.26E-03	0	8.43E-06	0	1.15	0	7.96E-06	
CP Cable Drill - Offshore	0	2.09E-04	0	1.31E-02	0	6.32E-04	0	7.64E-03	0	1.88E-03	0	1.26E-05	0	1.73	0	1.19E-05	
Ambrose East Offshore HDD	0	5.65E-03	0	0.36	0	0.02	0	0.21	0	0.05	0	3.42E-04	0	46.76	0	3.24E-04	
Ambrose West Offshore HDD	0	6.17E-03	0	0.39	0	0.02	0	0.23	0	0.06	0	3.74E-04	0	51.01	0	3.53E-04	
W541 - Crane Barge	0	5.87E-03	0	0.37	0	0.02	0	0.21	0	0.05	0	3.55E-04	0	48.51	0	3.36E-04	
Pipeline Spread	0	4.35E-03	0	0.27	0	0.01	0	0.16	0	3.92E-02	0	2.63E-04	0	35.97	0	2.49E-04	
Mob/Demob	0	2.62E-03	0	0.16	0	0.01	0	0.10	0	2.36E-02	0	1.59E-04	0	21.65	0	1.50E-04	
Pipeline of Ambrose HDD String	0	3.00E-03	0	0.19	0	0.01	0	0.11	0	2.70E-02	0	1.81E-04	0	24.78	0	1.71E-04	
Pipeline Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	0	6.25E-03	0	0.39	0	0.02	0	0.23	0	0.06	0	3.78E-04	0	51.65	0	3.57E-04	
Pipeline Spread from MP14.5 - MP16.5 (Shallow Water)	0	2.70E-03	0	0.17	0	0.01	0	0.10	0	2.44E-02	0	1.64E-04	0	22.37	0	1.55E-04	
Pipeline Spread from M16.5 - MP 29.3 (West of Ambrose)	0	8.21E-03	0	0.52	0	0.02	0	0.30	0	0.07	0	4.97E-04	0	67.92	0	4.70E-04	
Pipeline Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	0	5.46E-03	0	0.34	0	0.02	0	0.20	0	0.05	0	3.31E-04	0	45.16	0	3.12E-04	
Above Water Tie-in/ Spool @ MP16.6	0	3.74E-03	0	0.24	0	0.01	0	0.14	0	3.37E-02	0	2.26E-04	0	30.93	0	2.14E-04	
Pipe Delivery Spread	0	1.03E-03	0	0.06	0	3.11E-03	0	3.76E-02	0	9.26E-03	0	6.22E-05	0	8.49	0	5.87E-05	
Diving/Construction Support Spread	0	1.07E-02	0	0.67	0	0.03	0	0.39	0	0.10	0	6.47E-04	0	88.37	0	6.11E-04	
Jet Trencher	0	4.17E-04	0	2.63E-02	0	1.26E-03	0	1.53E-02	0	3.77E-03	0	2.53E-05	0	3.45	0	2.39E-05	
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	0	4.26E-04	0	2.68E-02	0	1.29E-03	0	1.56E-02	0	3.84E-03	0	2.58E-05	0	3.52	0	2.44E-05	
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	0	3.83E-04	0	2.41E-02	0	1.16E-03	0	1.40E-02	0	3.45E-03	0	2.32E-05	0	3.16	0	2.19E-05	
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 - MP 17.5)	0	5.04E-04	0	3.18E-02	0	1.53E-03	0	1.85E-02	0	4.55E-03	0	3.06E-05	0	4.17	0	2.89E-05	
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	0	1.74E-04	0	1.10E-02	0	5.26E-04	0	6.37E-03	0	1.57E-03	0	1.05E-05	0	1.44	0	9.95E-06	
Daily Crew/Utility	0	0.01	0	0.78	0	0.04	0	0.45	0	0.11	0	7.47E-04	0	102.05	0	7.06E-04	
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipeline Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	0	5.20E-03	0	0.33	0	0.02	0	0.19	0	0.05	0	3.15E-04	0	43.01	0	2.98E-04	
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	0	1.16E-02	0	0.73	0	0.04	0	0.42	0	0.10	0	7.03E-04	0	96.00	0	6.64E-04	
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	0	5.28E-04	0	3.32E-02	0	1.60E-03	0	1.93E-02	0	4.76E-03	0	3.20E-05	0	4.36	0	3.02E-05	
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	0	1.58E-03	0	0.10	0	4.79E-03	0	0.06	0	1.43E-02	0	9.59E-05	0	13.09	0	9.06E-05	
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	0	9.87E-04	0	6.22E-02	0	2.99E-03	0	3.61E-02	0	8.91E-03	0	5.98E-05	0	8.17	0	5.65E-05	
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	0	6.41E-04	0	4.03E-02	0	1.94E-03	0	2.35E-02	0	5.78E-03	0	3.88E-05	0	5.30	0	3.67E-05	
Scow Barge Spread (one / 1each)	0	6.32E-03	0	0.40	0	0.02	0	0.23	0	5.70E-02	0	3.83E-04	0	52.29	0	3.62E-04	
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipeline Transition (MP12.5-MP16.6)	0	5.84E-03	0	0.37	0	0.02	0	0.21	0	0.05	0	3.54E-04	0	48.31	0	3.34E-04	
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	0	0.02	0	1.18	0	0.06	0	0.68	0	0.17	0	1.13E-03	0	154.60	0	1.07E-03	
Reinstatement Spread for Morgan HDD Pit Excavation	0	3.24E-04	0	2.04E-02	0	9.79E-04	0	1.18E-02	0	2.92E-03	0	1.96E-05	0	2.68	0	1.85E-05	
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	0	1.49E-03	0	0.09	0	4.52E-03	0	0.05	0	1.35E-02	0	9.04E-05	0	12.34	0	8.54E-05	
Reinstatement Spread for Anchorage Area	0	1.80E-03	0	0.11	0	5.44E-03	0	0.07	0	1.62E-02	0	1.09E-04	0	14.87	0	1.03E-04	
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	0	1.44E-03	0	0.09	0	4.35E-03	0	0.05	0	1.30E-02	0	8.71E-05	0	11.89	0	8.23E-05	
Reinstatement Spread for all other pipeline segments	0	1.62E-03	0	0.10	0	4.90E-03	0	0.06	0	1.46E-02	0	9.81E-05	0	13.40	0	9.27E-05	
Pre Lay Survey Campaign	0	1.91E-04	0	1.21E-02	0	5.79E-04	0	7.00E-03	0	1.73E-03	0	1.16E-05	0	1.58	0	1.09E-05	
Post Jet Burial Survey Campaign	0	5.22E-05	0	3.29E-03	0	1.58E-04	0	1.91E-03	0	4.71E-04	0	3.16E-06	0	0.43	0	2.99E-06	
As Built Survey Campaign	0	6.96E-05	0	4.38E-03	0	2.11E-04	0	2.55E-03	0	6.28E-04	0	4.21E-06	0	0.58	0	3.98E-06	
Soil Transport	0	0.68	0	11.46	0	23.70	0	75.53	0	18.75	0	0.03	0	8357.24	0	0.08	
Trucking of Pipe to Storage Yard	3.81E-02	0	0.69	0	1.45	0	3.25	0	0.81	0	1.62E-03	0	482.06	0	4.03E-03	0	
Total	3.81E-02	0.82	0.69	20.39	1.45	24.13	3.25	80.72	0.81	20.03	1.62E-03	0.04	482.06	9530.05	4.03E-03	0.08	



Raritan Bay Loop Fugitive Dust Emissions

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

29,630 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

0.03 1,000 lbs of abrasive

Project Emissions

Equipment	Emission (tons)							
	VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Site grading, excavation, and filling	NA	NA	NA	2.66E-02	4.03E-03	NA	NA	NA
Sandblasting	NA	NA	NA	2.20E-04	2.20E-05	NA	NA	NA
Total Project Emissions	0	0	0	2.68E-02	4.05E-03	0	0	0



Raritan Bay Loop Equipment Emission Factors

HDD Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Morgan Onshore HDD -	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
		Backhoe	300	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
Morgan Offshore HDD -	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
		Generators	250	0.2	0.5	2.0	0.1	0.1	1.64E-03	530.6
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
CP Cable Drill - Onshore	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	202	0.1	0.5	1.7	0.1	0.1	1.60E-03	530.6
	Pull-back String	Drill Rig CAT Power Unit	202	0.1	0.5	1.7	0.1	0.1	1.60E-03	530.6
	HDD Pilot Hole	Mud Rig & Reclaimer Pumps	25	0.3	1.6	3.8	0.2	0.2	2.17E-03	589.3
	Pull-back String	Mud Rig & Reclaimer Pumps	25	0.3	1.6	3.8	0.2	0.2	2.17E-03	589.3
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		Crawler Crane	95	2.22E-02	0.2	1.1	3.53E-02	3.43E-02	1.59E-03	590.3
		Shallow Water Tug	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9

Ambrose East Offshore HDD	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Operations - W571 Jack up	W751 Generator	425	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		W751 Aux Generator	160	0.2	0.6	2.3	0.1	0.1	1.65E-03	530.5
		Jacking Compressors	525	0.1	0.3	1.2	0.1	0.1	1.56E-03	530.8
		50T Cherry picker	250	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
Ambrose West Offshore HDD	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Operations - W750 Jack up	W750 Generator	325	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		Jacking Compressors	525	0.1	0.3	1.2	0.1	0.1	1.56E-03	530.8
		50T Cherry picker	250	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7

W541 - Crane Barge	W541 - Crane Barge	W541-Hoist Engine	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		W541-Swing Engine	525	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		W541-Auxiliary Generator	85	0.2	1.3	2.8	0.2	0.2	1.84E-03	589.7
		Deck Winch #1	238	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Deck Winch #2	160	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2

Pipelay Related Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Pipelay of Ambrose HDD String	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Pipelay of Morgan HDD String	Anchor Handling <12ft WD	Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
		Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
	Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Anchor Handling <12ft WD	Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
	Beach Pull	Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
	Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
	Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Antares Anchor Handling <12ft WD	Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0
Anchor Barge #37 Barge			99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
Gabby Miller			660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Beach Pull		110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
Antares Anchor Handling >12ft WD		Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
Seven Antares		Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling <12ft WD	Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9

Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Daily Crew/Utility	Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Morgan HDD Crew Boat	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Ambrose HDD Crew Boat	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Samantha Miller LCV	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Guard Vessel # 1	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Main Eng	850	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	HDD Water Delivery OSV	--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		--Bow Thruster	300	0.2	1.1	7.5	0.2	0.2	1.0	514.9
	Pre-comm OSV	Boat (Main Eng)	850	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		--Bow Thruster	300	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Dredging & Reinstatement Related Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	Dredging	Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9

Area Reinstatement (44,700 CuYd HARS, 10,889 CuYd - Upland)	Dredging	Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		-(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		-(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
		-(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Scow Barge Spread (one / 1each)	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		-(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		-(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		-(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		-(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Reinstatement Spread for Morgan HDD Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for Anchorage Area	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for all other pipeline segments	Toyo Dredge Pump	W571	1,502	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Toyo Pump	425	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		400 Amp Welder	33	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	25	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9

Survey Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Post Jet Burial Survey Campaign	Post Pipeline Burial Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9

Quayside Disposal Processing Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	675	1.80E-02	0.1	0.3	2.03E-02	1.96E-02	1.44E-03	536.8
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	350	0	0	0	0	0	0	0
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	270	1.06E-02	2.94E-02	0.1	8.24E-03	7.99E-03	1.42E-03	536.8
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)	220	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0



Summary of 2026 Construction Emissions (tons)									
Location	Non-Attainment Designation*	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	HAPs
Lancaster County	NT - 8 hr Ozone (2008) MT - 24 hr PM2.5 (2006)	0		0		0	0		
So. NJ/Phil/Wilmington Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	0		0		0	0		
No. NJ/NY/CT Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	0.04		1.4		0.8	1.62E-03		

*Locations are designated as in attainment for all other pollutants.

Key:

NT = Nonattainment

MT = Maintenance

CO = Carbon monoxide

VOC = Volatile organica compounds

NO_x = Oxides of Nitrogen

PM_{xx} = Particulate Matter smaller than X.X micrometers

SO₂ = Sulfur Dioxide

Summary of 2027 Construction Emissions (tons)									
Location	Non-Attainment Designation*	VOC	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	HAPs
Lancaster County	NT - 8 hr Ozone (2008) MT - 24 hr PM2.5 (2006)	3.4		30.7		21.8	4.53E-02		
So. NJ/Phil/Wilmington Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	1.4		10.8		1.5	1.41E-02		
No. NJ/NY/CT Area	NT - 8 hr Ozone (2008, 2015) MT - 24 hr PM2.5 (2006)	27.4		632.6		59.0	44.3		

*Locations are designated as in attainment for all other pollutants.

Key:

NT = Nonattainment

MT = Maintenance

CO = Carbon monoxide

VOC = Volatile organica compounds

NO_x = Oxides of Nitrogen

PM_{xx} = Particulate Matter smaller than X.X micrometers

SO₂ = Sulfur Dioxide



Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	33%	79	8	1	10-hour work days and 6-day work weeks

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	6	324	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	6	288	Diesel	85	3.7	33.5	113.6	6.7	5.6	0.1	50,169.8
Generator	Generator Sets	5	120	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
RT hoe	Tractors/Loaders/Backhoes	2	108	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
Welding Rigs	Welders	20	1080	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
Front End Loader	Tractors/Loaders/Backhoes	2	108	Diesel	95	29.1	196.8	209.9	26.8	26.0	0.2	66,027.2
Dozer	Crawler Tractor/Dozers	6	324	Diesel	410	9.5	58.9	154.2	10.8	10.5	0.6	220,070.6
Excavator	Excavator	8	432	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	10	540	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5

Equipment Type	MOVES Equip. Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	90	50	611,280	0.1	3.3	0.2	3.0E-03	0.0	3.2E-03	435.0	1.6E-04	4.6E-04	2.8E-05	1.7E-03	6.3E-04	no longer available
Company trucks	Light Commercial Truck	20	50	135,840	0.1	1.9	1.0	3.74E-02	3.44E-02	1.9E-03	567.6	3.8E-04	5.4E-03	9.4E-04	1.1E-03	1.1E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	1	50	6,792	0.1	2.3	4.1	3.08E-02	2.84E-02	5.6E-03	1668.9	6.1E-05	2.6E-03	3.0E-04	1.7E-04	3.0E-03	no longer available
Water Delivery Trucks	Combination Short-haul Truck	1	7	650	0.1	2.3	4.1	3.08E-02	2.84E-02	5.6E-03	1668.9	6.1E-05	2.6E-03	3.0E-04	1.7E-04	3.0E-03	no longer available
Contractor trucks	Light Commercial Truck	45	50	305,640	0.1	1.9	1.0	3.74E-02	3.44E-02	1.9E-03	567.6	3.8E-04	5.4E-03	9.4E-04	1.1E-03	1.1E-02	no longer available

Total VMT = 1,060,202

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.12E-03	1.70E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

579,547 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	15.57	4.67

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMET	lb/VMET
Paved Roads	0.01	1.45E-03
Unpaved Roads	16.40	1.64

AP-42 Section 13.2.1.3 (1/2011)
AP-42 Section 13.2.2.1 (1/2011)

1,630 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

2.1 1,000 lbs of abrasive

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site grading, excavation, and filling	NA	NA	NA	NA	NA	NA	NA	57.4	17.2	NA	NA	NA
Paved Roads (commuter and delivery vehicles)	NA	NA	NA	NA	NA	NA	NA	3.1	0.8	NA	NA	NA
Unpaved Roads (construction equipment)	NA	NA	NA	NA	NA	NA	NA	13.4	1.3	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	0.0	0.0	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	90	NA	NA	NA	0.0	2.2	0.1	2.01E-03	1.78E-03	2.15E-03	293	2.03E-03
Company Trucks	20	NA	NA	NA	2.11E-02	0.3	0.2	5.59E-03	5.15E-03	2.87E-04	85	2.83E-03
Delivery Trucks	1	NA	NA	NA	6.09E-04	1.71E-02	3.06E-02	2.31E-04	2.12E-04	4.18E-05	12	4.58E-05
Water Delivery Trucks	1	NA	NA	NA	5.83E-05	1.64E-03	2.93E-03	2.21E-05	2.03E-05	4.00E-06	1	4.38E-06
Contractor trucks	45	NA	NA	NA	4.75E-02	0.6	0.4	1.26E-02	1.16E-02	6.46E-04	191	6.36E-03
Construction Equipment Exhaust												
Tractor W/Trailer	6	320	324	7335	0.1	0.5	1.2	0.1	0.1	3.81E-03	1,389	NA
Air Compressor	6	85	288	6520	2.63E-02	0.2	0.8	4.12E-02	3.99E-02	9.96E-04	361	NA
Generator	5	13	120	2717	0.2	10.6	0.1	4.41E-03	4.05E-03	2.96E-04	41	NA
RT hoe	2	330	108	2445	0.2	0.7	1.2	0.1	0.1	1.63E-03	557	NA
Welding Rigs	20	345	1080	24451	2.5	14.0	20.8	2.0	1.9	1.80E-02	5,818	NA
Front End Loader	2	95	108	2445	0.1	0.5	0.6	0.1	0.1	5.20E-04	178	NA
Dozer	6	410	324	7335	0.1	0.5	1.2	0.1	0.1	4.84E-03	1,779	NA
Excavator	8	350	432	9780	0.1	0.4	1.0	0.1	0.1	5.45E-03	2,025	NA
Side boom	10	330	540	12226	0.2	0.9	3.1	0.1	0.1	6.61E-03	2,361	NA
Total Project Emissions					3.4	31.4	30.7	76.6	21.8	4.53E-02	15092.2	1.13E-02



Compressor Station 200 - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
July	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
August	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
September	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
Totals				1,838	184	31	

Hours per day = 10
Days per week = 6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVG Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO _x	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	1	54	Diesel	320	8.8	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	2	96	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	3	72	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
Ext-Boom RT Hoe	Tractors/Loaders/Backhoes	1	54	Diesel	330	0	0	0	0	0	0	0
RT Forklift	Rough Terrain Forklifts	1	24	Diesel	185	4.6	20.8	61.3	4.6	4.4	0.3	99,299.3
Welding Rigs	Welders	6	324	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
60 ft Man lift	Cranes	1	48	Diesel	95	2.1	19.4	100.8	3.4	3.3	0.2	56,078.4
Ramax Compactor	Roller	1	24	Gasoline	22	112.8	6,029.0	59.0	2.7	2.5	0.2	23,009.0
Excavator	Excavator	2	108	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	0	0	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
Crane	Cranes	2	108	Diesel	175	28.0	65.5	230.6	15.8	15.2	0.5	92,843.2

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.
* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip. Type	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	19	50	174,648	0.1	3.3	0.2	0.0	0.0	0.0	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	7	50	64,344	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	1	50	9,192	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	8	50	73,536	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available

Total VMT = 321,720

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	Ib/Ton Earth Moved	Ib/Ton Earth Moved
Site Clearing, Excavation & Filling	1.12E-03	1.70E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

55,094 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	Ib/hr	Ib/hr
Dozer	NA	NA

Fugitives from Dozer (AP-42)

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	Ib/VMT	Ib/VMT
Paved Roads	0.01	1.36E-03
Unpaved Roads	15.57	1.56

AP-42 Section 13.2.1.3 (1/2011)

AP-42 Section 13.2.2.1 (1/2011)

460 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	Ib/1000 lb abrasive	Ib/1000 lb abrasive
Sandblasting	NA	NA

AP-42 Table 13.2.6

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	PM ₁₀	PM _{2.5}
Welding	NA	NA

1,000 lbs of abrasive

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)								
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs	
Fugitive Dust													
Site Clearing, Excavation & Filling	NA	NA	NA	NA	NA	NA	NA	3.09E-02	4.67E-03	NA	NA	NA	NA
Paved Roads	NA	NA	NA	NA	NA	NA	NA	0.9	0.2	NA	NA	NA	NA
Unpaved Roads	NA	NA	NA	NA	NA	NA	NA	3.6	0.4	NA	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust													
Worker Commuter Vehicles	19	NA	NA	NA	1.01E-02	0.6	0.0	5.74E-04	5.08E-04	6.13E-04	83.8	5.79E-04	
Company Trucks	7	NA	NA	NA	1.00E-02	0.1	0.1	2.65E-03	2.44E-03	1.36E-04	40.3	1.34E-03	
Delivery Trucks	1	NA	NA	NA	8.24E-04	2.32E-02	4.15E-02	3.12E-04	2.87E-04	5.66E-05	16.9	6.20E-05	
Contractor Trucks	8	NA	NA	NA	1.14E-02	0.2	0.1	3.03E-03	2.79E-03	1.55E-04	46.0	1.53E-03	
Construction Equipment Exhaust													
Tractor W/Trailer	1	320	54	1655	1.56E-02	0.1	0.3	1.84E-02	1.79E-02	8.59E-04	313.3	NA	
Air Compressor	2	85	96	2941	1.19E-02	0.1	0.4	1.86E-02	1.80E-02	4.49E-04	162.7	NA	
Generator	3	13	72	2206	0.2	8.6	0.1	3.58E-03	3.29E-03	2.40E-04	33.1	NA	
Ext-Boom RT Hoe	1	330	54	1655	0	0	0	0	0	0	0	NA	
RT Forklift	1	185	24	735	3.69E-03	1.68E-02	4.97E-02	3.70E-03	3.59E-03	2.18E-04	80.5	NA	
Welding Rigs	6	345	324	9927	1.0	5.7	8.5	0.8	0.8	7.32E-03	2,362.2	NA	
90 ft Man lift	1	95	48	1471	3.41E-03	3.15E-02	0.2	5.44E-03	5.28E-03	2.45E-04	90.9	NA	
Ramax Compactor	1	22	24	735	0.1	4.9	0.0	2.17E-03	1.99E-03	1.35E-04	18.7	NA	
Excavator	2	350	108	3309	2.31E-02	0.1	0.3	2.58E-02	2.50E-02	1.84E-03	685.3	NA	
Crane	2	175	108	3309	0.1	0.2	0.8	0.1	0.1	1.84E-03	338.7	NA	
Total Project Emissions					1.4	20.7	10.8	5.4	1.5	1.41E-02	4272.2	3.51E-03	



Compressor Station 206 - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
June	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
July	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
August	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
September	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
October	24	240	33%	79	8	1	10-hour work days and 6-day work weeks
Totals				2,078	208	35	

Hours per day = 10
Days per week = 6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	1	54	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	2	96	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	3	72	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
Ext-Boom RT Hoe	Tractors/Loaders/Backhoes	1	54	Diesel	330	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RT Forklift	Rough Terrain Forklifts	1	24	Diesel	185	4.6	20.8	61.3	4.6	4.4	0.3	99,299.3
Welding Rigs	Welders	10	540	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
60 ft Man lift	Cranes	2	96	Diesel	95	2.1	19.4	100.8	3.4	3.3	0.2	56,078.4
Rammax Compactor	Rollers	1	24	Gasoline	22	112.8	6,029.0	59.0	2.7	2.5	0.2	23,009.0
Excavator	Excavator	2	108	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	1	54	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
Crane	Cranes	2	108	Diesel	175	28.0	65.5	230.6	15.6	15.2	0.5	92,843.2

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.

* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors												
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	MBTE
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	25	50	259,800	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03	6.34E-04	no longer available
Company trucks	Light Commercial Truck	6	50	62,352	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available
Delivery Trucks	Combination Short-haul Truck	2	50	20,784	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04	2.97E-03	no longer available
Contractor trucks	Light Commercial Truck	10	50	103,920	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03	1.11E-02	no longer available

Total VMT = 446,856

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

51,686 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	NA	NA

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Paved Roads	0.01	1.42E-03
Unpaved Roads	14.43	1.44

AP-42 Section 13.2.1.3 (1/2011)
AP-42 Section 13.2.2.1 (1/2011)

624 VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	NA	NA

AP-42 Table 13.2.6

1,000 lbs of abrasive

Process Type	Emission Factors	
	PM ₁₀	
Welding	NA	

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site Clearing, Excavation & Filling	NA	NA	NA	NA	NA	NA	NA	4.64E-02	7.03E-03	NA	NA	NA
Paved Roads	NA	NA	NA	NA	NA	NA	NA	1.3	0.3	NA	NA	NA
Unpaved Roads	NA	NA	NA	NA	NA	NA	NA	4.5	0.4	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	25	NA	NA	NA	0.0	0.9	0.0	8.54E-04	7.55E-04	9.12E-04	124.6	8.62E-04
Company Trucks	6	NA	NA	NA	9.70E-03	0.1	0.1	2.57E-03	2.36E-03	1.32E-04	39.0	1.30E-03
Delivery Trucks	2	NA	NA	NA	1.86E-03	0.1	0.1	7.06E-04	6.50E-04	1.28E-04	38.2	1.40E-04
Contractor trucks	10	NA	NA	NA	1.62E-02	0.2	0.1	4.28E-03	3.94E-03	2.20E-04	65.0	2.16E-03
Construction Equipment Exhaust												
Tractor W/Trailer	1	320	54	1871	1.77E-02	0.1	0.3	2.08E-02	2.02E-02	9.71E-04	354.2	NA
Air Compressor	2	85	96	3325	1.34E-02	0.1	0.4	2.10E-02	2.04E-02	5.08E-04	183.9	NA
Generator	3	13	72	2494	0.2	9.7	0.1	4.04E-03	3.72E-03	2.72E-04	37.4	NA
Ext-Boom RT Hoe	1	330	54	1871	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.0	NA
RT Forklift	1	185	24	831	4.17E-03	1.90E-02	0.1	4.18E-03	4.05E-03	2.46E-04	91.0	NA
Welding Rigs	10	345	540	18706	1.9	10.7	15.9	1.5	1.5	1.38E-02	4,451.0	NA
60 ft Man lift	2	95	96	3325	7.72E-03	0.1	0.4	1.23E-02	1.19E-02	5.54E-04	205.6	NA
Ramox Compactor	1	22	24	831	0.1	5.5	0.1	2.45E-03	2.26E-03	1.53E-04	21.1	NA
Excavator	2	350	108	3741	2.61E-02	0.1	0.4	2.91E-02	2.83E-02	2.08E-03	774.8	NA
Side boom	1	330	54	1871	2.59E-02	0.1	0.5	2.22E-02	2.16E-02	1.01E-03	361.3	NA
Crane	2	175	108	3741	0.1	0.3	1.0	0.1	0.1	2.08E-03	382.9	NA
Total Project Emissions					2.4	28.2	19.4	7.5	2.4	2.31E-02	7129.9	4.46E-03



Madison Loop - Northeast Supply Enhancement

Construction Duration

Month	Total Work Days	Total Work Hours	% of Actual Work Hours	Actual Work Hours	Actual Work Days	Actual Work Weeks	Notes
January	12	120	33%	40	4	1	10-hour work days and 6-day work weeks
February	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
March	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
April	24	240	100%	240	24	4	10-hour work days and 6-day work weeks
May	12	120	33%	40	4	1	10-hour work days and 6-day work weeks
		Totals		799	80	13	

Hours per day = 10
Days per week = 6

Exhaust Emission Factors

Equipment Type	MOVES Equip Type	Avg Qty	AVQ Hours per Week	Fuel	Assumed Capacity (hp)	NONROAD Emission Factors						
						HC*	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂
						g/hr	g/hr	g/hr	g/hr	g/hr	g/hr	g/hr
Tractor W/Trailer	Off Highway Tractor	6	324	Diesel	320	8.6	57.2	149.6	10.1	9.8	0.5	171,758.5
Air Compressor	Air Compressor	6	288	Diesel	85	3.7	33.5	113.6	5.7	5.6	0.1	50,169.8
Generator	Generator Sets	5	120	Gasoline	13	62.8	3,528.6	33.8	1.5	1.4	0.1	13,609.7
RT hoe	Tractors/Loaders/Backhoes	2	108	Diesel	330	59.7	258.3	437.4	51.3	49.8	0.6	206,569.2
Crane	Cranes	0	0	Diesel	185	3.6	12.1	48.3	2.8	2.7	0.3	98,231.6
Welding Rigs	Welders	14	756	Diesel	345	91.6	519.2	773.1	72.7	70.5	0.7	215,866.0
Front End Loader	Tractors/Loaders/Backhoes	2	108	Diesel	95	29.1	196.8	209.9	26.8	26.0	0.2	66,027.2
Dozer	Tractors/Loaders/Backhoes	4	216	Diesel	410	9.5	58.9	154.2	10.8	10.5	0.6	220,070.6
Excavator	Excavator	6	324	Diesel	350	6.3	34.4	90.8	7.1	6.9	0.5	187,870.8
Side boom	Cranes	8	432	Diesel	330	12.5	63.4	227.9	10.8	10.5	0.5	175,204.5
HDD Rig	Bore/Drill Rigs	3	162	Diesel	175	48.8	157.5	574.8	34.6	33.6	0.6	92,776.9

Generated using EPA MOVES5. If an HP class was unavailable for a piece of equipment, the closest available HP class was substituted.
* HC emissions assume exhaust and evaporative losses

OnRoad Emission Factors

Equipment Type	MOVES Equip Typ	Avg Qty	Daily Avg Round Trip (mi)	Total VMT	Emission Factors										
					HC	CO	NOx	PM ₁₀	PM _{2.5}	SO ₂	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene
					g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Worker commute vehicles	Passenger Vehicle	38	50	151,848	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03
Company trucks	Light Commercial Truck	15	50	59,940	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03
Delivery Trucks	Combination Short-haul Truck	1	50	3,996	0.1	2.3	4.1	3.08E-02	2.84E-02	5.59E-03	1668.9	6.12E-05	2.61E-03	3.03E-04	1.74E-04
Contractor trucks	Light Commercial Truck	45	50	179,820	0.1	1.9	1.0	3.74E-02	3.44E-02	1.92E-03	567.6	3.83E-04	5.38E-03	9.39E-04	1.06E-03

Total VMT = 395,604

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

203,257 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/hr	lb/hr
Dozer	15.57	4.67

Fugitives from Dozer (AP-42 Section 11.9 (7/1998 version))

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/VMT	lb/VMT
Paved Roads	0.01	1.69E-03
Unpaved Roads	19.87	1.99

AP-42 Section 13.2.1.3 (1/2011)

AP-42 Section 13.2.2.1 (1/2011)

VMT

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

0.7

1,000 lbs of abrasive

Process Type	Emission Factors
	PM ₁₀
Welding	NA

Project Emissions

907,185 grams/ton

Equipment	Quantity	HP	Weekly Work Hours	Total Work Hours	Emission (tons)							
					VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Fugitive Dust												
Site grading, excavation, and filling	NA	NA	NA	NA	NA	NA	NA	22.6	6.7	NA	NA	NA
Paved Roads (commuter and delivery vehicles)	NA	NA	NA	NA	NA	NA	NA	1.4	0.3	NA	NA	NA
Unpaved Roads (construction equipment)	NA	NA	NA	NA	NA	NA	NA	8.3	0.8	NA	NA	NA
Sandblasting	NA	NA	NA	NA	NA	NA	NA	4.71E-03	4.71E-04	NA	NA	NA
Welding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
On-Road Exhaust												
Worker Commuter Vehicles	38	NA	NA	NA	8.80E-03	0.6	0.0	4.99E-04	4.41E-04	5.33E-04	72.8	5.04E-04
Company Trucks	15	NA	NA	NA	9.32E-03	0.1	0.1	2.47E-03	2.27E-03	1.27E-04	37.5	1.25E-03
Delivery Trucks	1	NA	NA	NA	3.58E-04	1.01E-02	1.80E-02	1.36E-04	1.25E-04	2.46E-05	7.4	2.70E-05
Contractor trucks	45	NA	NA	NA	2.80E-02	0.4	0.2	7.40E-03	6.81E-03	3.80E-04	112.5	3.74E-03
Construction Equipment Exhaust												
Tractor W/Trailer	6	320	324	4316	4.08E-02	0.3	0.7	4.81E-02	4.66E-02	2.24E-03	817.1	NA
Air Compressor	6	85	288	3836	1.55E-02	0.1	0.5	2.42E-02	2.35E-02	5.86E-04	212.2	NA
Generator	5	13	120	1598	0.1	6.2	0.1	2.59E-03	2.38E-03	1.74E-04	24.0	NA
RT hoe	2	330	108	1439	0.1	0.4	0.7	0.1	0.1	9.58E-04	327.6	NA
Welding Rigs	14	345	756	10070	1.0	5.8	8.6	0.8	0.8	7.43E-03	2,396.2	NA
Front End Loader	2	95	108	1439	4.61E-02	0.3	0.3	4.25E-02	4.12E-02	3.06E-04	104.7	NA
Dozer	4	410	216	2877	3.00E-02	0.2	0.5	3.44E-02	3.34E-02	1.90E-03	697.9	NA
Excavator	6	350	324	4316	3.01E-02	0.2	0.4	3.36E-02	3.26E-02	2.40E-03	893.7	NA
Side boom	8	330	432	5754	0.1	0.4	1.4	0.1	0.1	3.11E-03	1,111.3	NA
HDD Rig	3	175	162	2158	0.1	0.4	1.4	16.9	5.1	1.33E-03	220.7	NA
Total Project Emissions					1.6	15.3	14.9	50.3	14.2	2.15E-02	7035.5	5.52E-03



Raritan Bay Loop Equipment Emissions

HDD Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Morgan Onshore HDD -	MOB	Kenworth	450	16	8.32E-05	2.43E-04	1.08E-03	6.52E-05	6.33E-05	1.13E-05	4.3	-
	DeMOB	Backhoe	300	48	2.87E-03	1.24E-02	2.10E-02	2.47E-03	2.39E-03	2.90E-05	9.9	-
		Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-
	HDD Pilot Hole	Drill Rig CAT Power Unit	1,750	228	0.1	0.3	1.7	0.1	0.1	7.08E-04	233.3	-
	HDD Hole Opening	Drill Rig CAT Power Unit	1,750	144	0.1	0.2	1.1	3.72E-02	3.61E-02	4.47E-04	147.4	-
	Pull-back String	Drill Rig CAT Power Unit	1,750	96	3.40E-02	0.1	0.7	2.48E-02	2.40E-02	2.98E-04	98.2	-
	HDD Pilot Hole	Mud Rig Genset-MQ	350	228	1.06E-02	0.1	0.2	8.05E-03	7.81E-03	1.45E-04	46.7	-
	HDD Hole Opening	Mud Rig Genset-MQ	350	144	6.69E-03	3.32E-02	0.1	5.08E-03	4.93E-03	9.14E-05	29.5	-
	Pull-back String	Mud Rig Genset-MQ	350	96	4.46E-03	2.21E-02	0.1	3.39E-03	3.29E-03	6.09E-05	19.7	-
	HDD Pilot Hole	Trackhoe - 240	177	228	8.04E-03	3.48E-02	0.1	6.91E-03	6.71E-03	8.14E-05	27.8	-
	HDD Hole Opening	Trackhoe - 240	177	144	5.08E-03	2.20E-02	3.72E-02	4.37E-03	4.24E-03	5.14E-05	17.6	-
	Pull-back String	Trackhoe - 240	177	96	3.39E-03	1.47E-02	2.48E-02	2.91E-03	2.82E-03	3.43E-05	11.7	-
	HDD Pilot Hole	Forklift - 10,000# & Over	130	228	8.04E-04	3.67E-03	1.08E-02	8.06E-04	7.81E-04	4.75E-05	17.5	-
	HDD Hole Opening	Forklift - 10,000# & Over	130	144	5.08E-04	2.32E-03	6.84E-03	5.09E-04	4.94E-04	3.00E-05	11.1	-
	Pull-back String	Forklift - 10,000# & Over	22	96	7.36E-04	3.47E-03	8.76E-03	3.97E-04	3.85E-04	5.09E-06	1.4	-
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	228	1.34E-03	4.52E-03	1.80E-02	1.06E-03	1.03E-03	9.87E-05	36.7	-
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	144	8.46E-04	2.85E-03	1.14E-02	6.67E-04	6.47E-04	6.23E-05	23.2	-
	Pull-back String	R.T. Crane 50-75 Ton	275	96	5.64E-04	1.90E-03	7.59E-03	4.45E-04	4.32E-04	4.16E-05	15.5	-
	HDD Pilot Hole	Triplex Pump	540	228	1.64E-02	0.1	0.3	1.30E-02	1.26E-02	2.23E-04	72.0	-
	HDD Hole Opening	Triplex Pump	540	144	1.04E-02	0.1	0.2	8.19E-03	7.94E-03	1.41E-04	45.5	-
	Pull-back String	Triplex Pump	540	96	6.91E-03	3.46E-02	0.1	5.46E-03	5.30E-03	9.40E-05	30.3	-
Morgan Offshore HDD -	MOB	Kenworth	450	10	5.20E-05	1.52E-04	6.76E-04	4.08E-05	3.96E-05	7.03E-06	2.7	-
		Generators	250	240	1.01E-02	3.63E-02	0.1	7.25E-03	7.03E-03	1.09E-04	35.1	-
	DeMOB	Kenworth	450	6	3.12E-05	9.10E-05	4.06E-04	2.45E-05	2.37E-05	4.22E-06	1.6	-
	HDD Pilot Hole	Drill Rig CAT Power Unit	1,750	84	2.98E-02	0.1	0.6	2.17E-02	2.10E-02	2.61E-04	86.0	-
	HDD Hole Opening	Drill Rig CAT Power Unit	1,750	120	4.25E-02	0.2	0.9	3.10E-02	3.01E-02	3.73E-04	122.8	-
	Pull-back String	Drill Rig CAT Power Unit	1,750	96	3.40E-02	0.1	0.7	2.48E-02	2.40E-02	2.98E-04	98.2	-
	HDD Pilot Hole	Mud Rig Genset-MQ	350	84	3.90E-03	1.94E-02	0.1	2.96E-03	2.88E-03	5.33E-05	17.2	-
	HDD Hole Opening	Mud Rig Genset-MQ	350	120	5.58E-03	2.77E-02	0.1	4.24E-03	4.11E-03	7.62E-05	24.6	-
	Pull-back String	Mud Rig Genset-MQ	350	96	4.46E-03	2.21E-02	0.1	3.39E-03	3.29E-03	6.09E-05	19.7	-
	HDD Pilot Hole	Trackhoe - 240	177	84	2.96E-03	1.28E-02	2.17E-02	2.55E-03	2.47E-03	3.00E-05	10.3	-
	HDD Hole Opening	Trackhoe - 240	177	120	4.23E-03	1.83E-02	3.10E-02	3.64E-03	3.53E-03	4.28E-05	14.7	-
	Pull-back String	Trackhoe - 240	177	96	3.39E-03	1.47E-02	2.48E-02	2.91E-03	2.82E-03	3.43E-05	11.7	-
	HDD Pilot Hole	Forklift - 10,000# & Over	130	84	2.96E-04	1.35E-03	3.99E-03	2.97E-04	2.88E-04	1.75E-05	6.5	-
	HDD Hole Opening	Forklift - 10,000# & Over	130	120	4.23E-04	1.93E-03	5.70E-03	4.24E-04	4.11E-04	2.50E-05	9.2	-
	Pull-back String	Forklift - 10,000# & Over	22	96	7.36E-04	3.47E-03	8.76E-03	3.97E-04	3.85E-04	5.09E-06	1.4	-
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	84	4.94E-04	1.66E-03	6.64E-03	3.89E-04	3.78E-04	3.64E-05	13.5	-
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	120	7.05E-04	2.38E-03	9.49E-03	5.56E-04	5.40E-04	5.19E-05	19.3	-
	Pull-back String	R.T. Crane 50-75 Ton	275	96	5.64E-04	1.90E-03	7.59E-03	4.45E-04	4.32E-04	4.16E-05	15.5	-
	HDD Pilot Hole	Triplex Pump	540	84	6.04E-03	3.03E-02	0.1	4.78E-03	4.63E-03	8.23E-05	26.5	-
	HDD Hole Opening	Triplex Pump	540	120	8.63E-03	4.32E-02	0.1	6.82E-03	6.62E-03	1.18E-04	37.9	-
	Pull-back String	Triplex Pump	540	96	6.91E-03	3.46E-02	0.1	5.46E-03	5.30E-03	9.40E-05	30.3	-
CP Cable Drill - Onshore	MOB	Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-
	DeMOB	Kenworth	450	4	2.08E-05	6.07E-05	2.70E-04	1.63E-05	1.58E-05	2.81E-06	1.1	-
	HDD Pilot Hole	Drill Rig CAT Power Unit	202	48	1.32E-03	5.42E-03	1.79E-02	1.10E-03	1.07E-03	1.70E-05	5.7	-
	Pull-back String	Drill Rig CAT Power Unit	202	36	9.93E-04	4.06E-03	1.34E-02	8.28E-04	8.03E-04	1.28E-05	4.3	-
	HDD Pilot Hole	Mud Rig & Reclaimer Pumps	25	48	4.49E-04	2.09E-03	5.08E-03	2.43E-04	2.36E-04	2.87E-06	0.8	-
	Pull-back String	Mud Rig & Reclaimer Pumps	25	36	3.37E-04	1.57E-03	3.81E-03	1.83E-04	1.77E-04	2.15E-06	0.6	-
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	400 Amp Welder	33	72	7.94E-04	3.52E-03	8.32E-03	5.73E-04	5.56E-04	5.28E-06	1.8	-
		20kW Generator	30	72	4.15E-04	1.60E-03	7.22E-03	2.60E-04	2.52E-04	4.07E-06	1.4	-
		Light Plant	25	72	6.35E-04	3.01E-03	7.44E-03	3.51E-04	3.41E-04	4.27E-06	1.2	-
		250 cfm Aircompressor	80	72	2.73E-04	2.50E-03	8.48E-03	4.28E-04	4.15E-04	1.04E-05	3.7	-
		Crawler Crane	95	72	1.67E-04	1.54E-03	8.00E-03	2.66E-04	2.58E-04	1.20E-05	4.5	-
		Shallow Water Tug	660	24	1.58E-03	2.93E-02	3.40E-02	1.76E-03	1.76E-03	7.62E-03	4.0	0.45

Ambrose East Offshore HDD	MOB	Kenworth	450	21	0.0	3.18E-04	1.42E-03	8.56E-05	8.31E-05	1.48E-05	5.6	-
		W751 Generator	425	900	0.1	0.3	0.8	3.86E-02	3.74E-02	6.94E-04	223.7	-
		W751 Aux Generator	160	900	2.72E-02	0.1	0.4	2.23E-02	2.17E-02	2.62E-04	84.2	-
		Jacking Compressors	525	300	1.17E-02	0.1	0.2	9.84E-03	9.54E-03	2.71E-04	92.2	-
		50T Cherry picker	250	900	7.18E-03	3.40E-02	0.1	7.11E-03	6.89E-03	3.63E-04	133.1	-
		400 Amp Welder	33	150	1.65E-03	7.34E-03	1.73E-02	1.19E-03	1.16E-03	1.10E-05	3.8	-
		20kW Generator	30	900	5.19E-03	2.00E-02	0.1	3.25E-03	3.15E-03	5.08E-05	17.6	-
		Light Plant	25	1,800	1.59E-02	0.1	0.2	8.78E-03	8.52E-03	1.07E-04	29.0	-
		250 cfm Aircompressor	80	150	5.69E-04	5.21E-03	1.77E-02	8.91E-04	8.65E-04	2.16E-05	7.8	-
	DeMOB	Kenworth	450	12	6.24E-05	1.82E-04	8.11E-04	4.89E-05	4.75E-05	8.44E-06	3.2	-
		HDD Pilot Hole	1,750	120	4.25E-02	0.2	0.9	3.10E-02	3.01E-02	3.73E-04	122.8	-
		HDD Hole Opening	1,750	72	2.55E-02	0.1	0.5	1.86E-02	1.80E-02	2.24E-04	73.7	-
		Pull-back String	1,750	60	2.13E-02	0.1	0.4	1.55E-02	1.50E-02	1.86E-04	61.4	-
		HDD Pilot Hole	350	120	5.58E-03	2.77E-02	0.1	4.24E-03	4.11E-03	7.62E-05	24.6	-
		HDD Hole Opening	350	72	3.35E-03	1.66E-02	0.1	2.54E-03	2.46E-03	4.57E-05	14.7	-
		Pull-back String	350	60	2.79E-03	1.38E-02	4.62E-02	2.12E-03	2.05E-03	3.81E-05	12.3	-
		HDD Pilot Hole	177	120	4.23E-03	1.83E-02	3.10E-02	3.64E-03	3.53E-03	4.28E-05	14.7	-
	HDD Hole Opening	Trackhoe - 240	177	72	2.54E-03	1.10E-02	1.86E-02	2.18E-03	2.12E-03	2.57E-05	8.8	-
		Pull-back String	177	60	2.12E-03	9.16E-03	1.55E-02	1.82E-03	1.77E-03	2.14E-05	7.3	-
		HDD Pilot Hole	130	120	4.23E-04	1.93E-03	5.70E-03	4.24E-04	4.11E-04	2.50E-05	9.2	-
		HDD Hole Opening	130	72	2.54E-04	1.16E-03	3.42E-03	2.54E-04	2.47E-04	1.50E-05	5.5	-
		Pull-back String	22	60	4.60E-04	2.17E-03	5.47E-03	2.48E-04	2.41E-04	3.18E-06	0.9	-
		HDD Pilot Hole	275	120	7.05E-04	2.38E-03	9.49E-03	5.56E-04	5.40E-04	5.19E-05	19.3	-
		HDD Hole Opening	275	72	4.23E-04	1.43E-03	5.69E-03	3.34E-04	3.24E-04	3.12E-05	11.6	-
		Pull-back String	275	60	3.53E-04	1.19E-03	4.74E-03	2.78E-04	2.70E-04	2.60E-05	9.7	-
	HDD Pilot Hole	Triplex Pump	540	120	8.63E-03	4.32E-02	0.1	6.82E-03	6.62E-03	1.18E-04	37.9	-
		HDD Hole Opening	540	72	5.18E-03	2.59E-02	0.1	4.09E-03	3.97E-03	7.05E-05	22.7	-
		Pull-back String	540	60	4.32E-03	2.16E-02	0.1	3.41E-03	3.31E-03	5.88E-05	19.0	-
Ambrose West Offshore HDD	MOB	Kenworth	450	31	1.59E-04	4.63E-04	2.06E-03	1.24E-04	1.21E-04	2.14E-05	8.1	-
		W750 Generator	325	1,110	4.79E-02	0.2	0.8	3.64E-02	3.53E-02	6.54E-04	211.0	-
		Jacking Compressors	525	370	1.44E-02	0.1	0.3	1.21E-02	1.18E-02	3.34E-04	113.7	-
		50T Cherry picker	250	1,110	8.85E-03	4.19E-02	0.1	8.76E-03	8.50E-03	4.47E-04	164.2	-
		400 Amp Welder	33	185	2.04E-03	9.06E-03	2.14E-02	1.47E-03	1.43E-03	1.36E-05	4.6	-
		20kW Generator	30	1,110	6.40E-03	2.46E-02	0.1	4.01E-03	3.89E-03	6.27E-05	21.7	-
		Light Plant	25	2,220	1.96E-02	0.1	0.2	1.08E-02	1.05E-02	1.32E-04	35.8	-
		250 cfm Aircompressor	80	185	7.02E-04	6.43E-03	2.18E-02	1.10E-03	1.07E-03	2.66E-05	9.6	-
	DeMOB	Kenworth	450	13	6.50E-05	1.90E-04	8.45E-04	5.10E-05	4.94E-05	8.79E-06	3.3	-
		HDD Pilot Hole	1,750	168	0.1	0.2	1.2	4.34E-02	4.21E-02	5.22E-04	171.9	-
		HDD Hole Opening	1,750	72	2.55E-02	0.1	0.5	1.86E-02	1.80E-02	2.24E-04	73.7	-
		Pull-back String	1,750	60	2.13E-02	0.1	0.4	1.55E-02	1.50E-02	1.86E-04	61.4	-
		HDD Pilot Hole	350	168	7.81E-03	3.87E-02	0.1	5.93E-03	5.75E-03	1.07E-04	34.4	-
		HDD Hole Opening	350	72	3.35E-03	1.66E-02	0.1	2.54E-03	2.46E-03	4.57E-05	14.7	-
		Pull-back String	350	48	2.23E-03	1.11E-02	3.70E-02	1.69E-03	1.64E-03	3.05E-05	9.8	-
		HDD Pilot Hole	177	168	5.93E-03	2.57E-02	4.35E-02	5.09E-03	4.94E-03	6.00E-05	20.5	-
	HDD Hole Opening	Trackhoe - 240	177	72	2.54E-03	1.10E-02	1.86E-02	2.18E-03	2.12E-03	2.57E-05	8.8	-
		Pull-back String	177	48	1.69E-03	7.33E-03	1.24E-02	1.46E-03	1.41E-03	1.71E-05	5.9	-
		HDD Pilot Hole	130	168	5.92E-04	2.70E-03	7.98E-03	5.94E-04	5.76E-04	3.50E-05	12.9	-
		HDD Hole Opening	130	72	2.54E-04	1.16E-03	3.42E-03	2.54E-04	2.47E-04	1.50E-05	5.5	-
		Pull-back String	22	48	3.68E-04	1.73E-03	4.38E-03	1.98E-04	1.93E-04	2.55E-06	0.7	-
		HDD Pilot Hole	275	168	9.88E-04	3.33E-03	1.33E-02	7.79E-04	7.55E-04	7.27E-05	27.0	-
		HDD Hole Opening	275	72	4.23E-04	1.43E-03	5.69E-03	3.34E-04	3.24E-04	3.12E-05	11.6	-
		Pull-back String	275	48	2.82E-04	9.51E-04	3.80E-03	2.22E-04	2.16E-04	2.08E-05	7.7	-
	HDD Pilot Hole	Triplex Pump	540	168	1.21E-02	0.1	0.2	9.55E-03	9.27E-03	1.65E-04	53.1	-
		HDD Hole Opening	540	72	5.18E-03	2.59E-02	0.1	4.09E-03	3.97E-03	7.05E-05	22.7	-
		Pull-back String	540	48	3.45E-03	1.73E-02	0.1	2.73E-03	2.65E-03	4.70E-05	15.2	-
W541 - Crane Barge	W541 - Crane Barge	W541-Hoist Engine	400	1,428	2.39E-02	0.1	0.4	2.06E-02	2.00E-02	9.36E-04	334.3	-
		W541-Swing Engine	525	1,428	3.14E-02	0.2	0.6	2.70E-02	2.62E-02	1.23E-03	438.8	-
		W541-Auxiliary Generator	85	1,428	2.97E-02	0.2	0.4	3.00E-02	2.91E-02	2.46E-04	78.9	-
		Deck Winch #1	238	238	1.81E-03	8.55E-03	2.58E-02	1.79E-03	1.74E-03	9.13E-05	33.5	-
		Deck Winch #2	160	238	1.25E-03	7.21E-03	2.13E-02	1.69E-03	1.64E-03	6.13E-05	22.5	-
		400 Amp Welder	33	238	2.62E-03	1.16E-02	2.75E-02	1.89E-03	1.84E-03	1.74E-05	6.0	-
		20kW Generator	30	1,428	8.23E-03	3.17E-02	0.1	5.16E-03	5.00E-03	8.06E-05	27.9	-
		Light Plant	25	2,856	2.52E-02	0.1	0.3	1.39E-02	1.35E-02	1.69E-04	46.0	-
		250 cfm Aircompressor	80	238	9.03E-04	8.27E-03	2.80E-02	1.41E-03	1.37E-03	3.42E-05	12.4	-
					907,185	grams/ton	18.4					

Pipelay Related Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	778	432	0.1	1.4	1.9	0.1	0.1	1.80E-03	190.8	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	144	3.43E-02	0.6	0.9	3.81E-02	3.81E-02	0.2	87.7	-
Pipelay of Ambrose HDD String	Antares Anchor Handling >12ft WD	Tug Robert	2,000	84	2.95E-02	0.5	0.7	2.82E-02	2.82E-02	7.10E-04	75.3	0.79
		Tug Elizabeth	2,000	84	2.95E-02	0.5	0.7	2.82E-02	2.82E-02	7.10E-04	75.3	0.79
		Caterpillar 3412 DITA 580kW	778	252	4.35E-02	0.8	1.1	4.16E-02	4.16E-02	1.05E-03	111.3	-
	Seven Antares	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	84	2.00E-02	0.4	0.5	2.22E-02	2.22E-02	0.1	51.2	-
		Linda Miller	660	91	6.02E-03	0.1	0.1	6.68E-03	6.68E-03	2.90E-02	15.4	0.45
Pipelay of Morran HDD String	Anchor Handling <12ft WD	Anchor Barge #37 Barge	99	30	3.01E-04	0.0	0.0	4.46E-04	4.46E-04	1.45E-03	0.8	0.45
		Gabby Miller	660	91	6.02E-03	0.1	0.1	6.68E-03	6.68E-03	2.90E-02	15.4	0.45
		110kW Diesel Hydraulic Power Unit	147	91	4.40E-04	0.0	0.0	5.94E-04	5.76E-04	2.16E-05	7.9	-
	Beach Pull	150 Tonne SWL Diesel Hydraulic Spooling Winch	248	91	7.21E-04	0.0	0.0	7.14E-04	6.93E-04	3.65E-05	13.4	-

Pipelay in margin 100' using	Anchor Handling >12ft WD	Tug Robert	2,000	91	3.20E-02	0.6	0.8	3.06E-02	3.06E-02	7.70E-04	81.8	0.79
		Tug Elizabeth	2,000	91	3.20E-02	0.6	0.8	3.06E-02	3.06E-02	7.70E-04	81.8	0.79
		Caterpillar 3412 DITA 580kW	778	274	4.73E-02	0.9	1.2	4.52E-02	4.52E-02	1.14E-03	120.8	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	91	2.17E-02	0.4	0.5	2.41E-02	2.41E-02	0.1	55.5	-
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Anchor Handling <12ft WD	Linda Miller	660	190	1.25E-02	0.2	0.3	1.39E-02	1.39E-02	0.1	32.0	0.45
		Anchor Barge #37 Barge	99	63	6.27E-04	0.0	0.0	9.29E-04	9.29E-04	3.02E-03	1.6	0.45
		Gabby Miller	660	190	1.25E-02	0.2	0.3	1.39E-02	1.39E-02	0.1	32.0	0.45
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	190	9.17E-04	0.0	0.0	1.24E-03	1.20E-03	4.50E-05	16.5	-
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	190	1.50E-03	0.0	0.0	1.49E-03	1.44E-03	7.60E-05	27.9	-
		Tug Robert	2,000	190	0.1	1.2	1.7	0.1	0.1	1.61E-03	170.5	0.79
	Anchor Handling >12ft WD	Tug Elizabeth	2,000	190	0.1	1.2	1.7	0.1	0.1	1.61E-03	170.5	0.79
		Caterpillar 3412 DITA 580kW	778	570	0.1	1.8	2.5	0.1	0.1	2.37E-03	251.8	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
	Shallow Water Barge	Additional GE6 for pipelay ops 800kW	1,073	190	4.53E-02	0.8	1.1	0.1	0.1	0.2	115.8	-
		Linda Miller	660	82	5.43E-03	0.1	0.1	6.03E-03	6.03E-03	2.61E-02	13.9	0.45
		Anchor Barge #37 Barge	99	27	2.72E-04	1.71E-03	5.83E-03	4.02E-04	4.02E-04	1.31E-03	0.7	0.45
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Beach Pull	Gabby Miller	660	82	5.43E-03	0.1	0.1	6.03E-03	6.03E-03	2.61E-02	13.9	0.45
		110kW Diesel Hydraulic Power Unit	147	82	3.97E-04	2.29E-03	6.76E-03	5.36E-04	5.20E-04	1.95E-05	7.2	-
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	82	6.51E-04	3.08E-03	9.30E-03	6.45E-04	6.25E-04	3.29E-05	12.1	-
	Antares Anchor Handling >12ft WD	Tug Robert	2,000	82	2.89E-02	0.5	0.7	2.76E-02	2.76E-02	6.95E-04	73.8	0.79
		Tug Elizabeth	2,000	82	2.89E-02	0.5	0.7	2.76E-02	2.76E-02	6.95E-04	73.8	0.79
		Caterpillar 3412 DITA 580kW	778	247	4.27E-02	0.8	1.1	4.08E-02	4.08E-02	1.03E-03	109.1	-
	Seven Antares	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	82	1.96E-02	0.4	0.5	2.18E-02	2.18E-02	0.1	50.1	-
		Linda Miller	660	72	4.75E-03	0.1	0.1	5.28E-03	5.28E-03	2.29E-02	12.1	0.45
	Antares Anchor Handling >12ft WD	Anchor Barge #37 Barge	99	24	2.37E-04	1.50E-03	5.10E-03	3.52E-04	3.52E-04	1.14E-03	0.6	0.45
		Tug Robert	2,000	184	0.1	1.2	1.6	0.1	0.1	1.55E-03	164.7	0.79
		Tug Elizabeth	2,000	184	0.1	1.2	1.6	0.1	0.1	1.55E-03	164.7	0.79
Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	Antares Anchor Handling >12ft WD	Caterpillar 3412 DITA 580kW	778	767	0.1	2.5	3.3	0.1	0.1	3.19E-03	338.6	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	256	0.1	1.1	1.5	0.1	0.1	0.3	155.7	-
	Seven Antares	Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
	Antares Anchor Handling >12ft WD	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	175	4.18E-02	0.8	1.1	4.64E-02	4.64E-02	0.2	106.7	-
		Tug Robert	2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79
	Seven Antares	Tug Elizabeth	2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79
		Caterpillar 3412 DITA 580kW	778	360	0.1	1.2	1.6	0.1	0.1	1.50E-03	159.0	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
Pipe Delivery Spread	Dockside Crane	Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-
		Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
	Pipeline Barge Tug	Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	175	4.18E-02	0.8	1.1	4.64E-02	4.64E-02	0.2	106.7	-
	Antares Anchor Handling >12ft WD	Tug Robert	2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79
		Tug Elizabeth	2,000	120	4.21E-02	0.8	1.1	4.02E-02	4.02E-02	1.01E-03	107.6	0.79
		Caterpillar 3412 DITA 580kW	778	360	0.1	1.2	1.6	0.1	0.1	1.50E-03	159.0	-
	Seven Antares	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-
		Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
Diving/Construction Support Spread	Dive Barge	Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
	Material Barge Tug	Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-
		Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
	Jet Trencher	Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-
	Jet Trencher	Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-
		Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
	Jet Trencher	Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
	Jet Trencher	Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-
		Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
	Jet Trencher	Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
	Jet Trencher	Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-
		Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
	Jet Trencher	Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
	Jet Trencher	Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-
		Tug Robert	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
		Tug Elizabeth	2,000	175	0.1	1.1	1.5	0.1	0.1	1.48E-03	157.1	0.79
	Jet Trencher	Caterpillar 3412 DITA 580kW	778	526	0.1	1.7	2.3	0.1	0.1	2.19E-03	232.1	-
		Volvo D12 MG-RC 225kW	302	0	0	0	0	0	0	0	0	-
		Additional GE6 for pipelay ops 800kW	1,073	120	2.86E-02	0.5	0.7	3.18E-02	3.18E-02	0.1	73.1	-

Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	Barge + Tug	W263 Deck Winches	225	46	3.33E-04	1.58E-03	4.76E-03	3.30E-04	3.20E-04	1.68E-05	6.2	-		
		W061 Deck Winches	300	46	4.44E-04	2.10E-03	6.34E-03	4.40E-04	4.26E-04	2.24E-05	8.2	-		
		M4000 Crane	400	139	2.33E-03	1.18E-02	4.24E-02	2.01E-03	1.95E-03	9.13E-05	32.6	-		
		400 Amp Welder	33	23	2.56E-04	1.14E-03	2.68E-03	1.85E-04	1.79E-04	1.70E-06	0.6	-		
		20kW Generator	30	139	8.02E-04	3.09E-03	1.40E-02	5.03E-04	4.88E-04	7.86E-06	2.7	-		
		Light Plant	25	557	4.91E-03	2.33E-02	0.1	2.72E-03	2.64E-03	3.30E-05	9.0	-		
		250 cfm Aircompressor	80	23	8.81E-05	8.06E-04	2.73E-03	1.38E-04	1.34E-04	3.34E-06	1.2	-		
		2000 HP Tugboat	2,000	278	0.1	1.8	2.5	0.1	0.1	2.35E-03	249.7	0.79		
		Crew Boat (Main Eng)	980	70	1.20E-02	0.1	0.6	1.33E-02	1.33E-02	0.1	30.6	0.79		
		---(Aux engine)	12	139	2.08E-04	3.85E-03	5.23E-03	3.08E-04	3.08E-04	1.00E-03	0.5	0.56		
		1250kw Generator	1,676	139	3.10E-02	0.2	0.5	2.35E-02	2.28E-02	4.23E-04	136.5	-		
		Jetter												
		Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	W263 Deck Winches	225	16	1.15E-04	5.44E-04	1.64E-03	1.14E-04	1.10E-04	5.81E-06	2.1	-
				W061 Deck Winches	300	16	1.53E-04	7.25E-04	2.19E-03	1.52E-04	1.47E-04	7.74E-06	2.8	-
M4000 Crane	400			48	8.05E-04	4.07E-03	1.46E-02	6.92E-04	6.71E-04	3.15E-05	11.2	-		
400 Amp Welder	33			8	8.82E-05	3.92E-04	9.25E-04	6.36E-05	6.17E-05	5.86E-07	0.2	-		
20kW Generator	30			48	2.77E-04	1.06E-03	4.82E-03	1.73E-04	1.68E-04	2.71E-06	0.9	-		
Light Plant	25			192	1.69E-03	8.02E-03	1.99E-02	9.37E-04	9.09E-04	1.14E-05	3.1	-		
250 cfm Aircompressor	80			8	3.04E-05	2.78E-04	9.43E-04	4.75E-05	4.61E-05	1.15E-06	0.4	-		
2000 HP Tugboat	2,000			96	3.37E-02	0.6	0.8	3.22E-02	3.22E-02	8.11E-04	86.1	0.79		
Crew Boat (Main Eng)	980			24	4.13E-03	3.82E-02	0.2	4.59E-03	4.59E-03	1.99E-02	10.5	0.79		
---(Aux engine)	12			48	7.16E-05	1.33E-03	1.80E-03	1.06E-04	1.06E-04	3.45E-04	0.2	0.56		
1250kw Generator	1,676			48	1.07E-02	0.1	0.2	8.11E-03	7.87E-03	1.46E-04	47.1	-		
Jetter														
Daily Crew/Utility	Morgan HDD Crew Boat			Crew Boat (Main Eng)	600	0	0	0	0	0	0	0	0	0.45
				---(Aux engine)	150	0	0	0	0	0	0	0	0	0.56
	Ambrose HDD Crew Boat	Crew Boat (Main Eng)	600	360	2.16E-02	0.1	0.8	2.40E-02	2.40E-02	0.1	55.2	0.45		
		---(Aux engine)	150	720	1.34E-02	0.2	0.3	1.49E-02	1.49E-02	0.1	34.3	0.56		
	Samantha Miller LCV	Boat (Main Eng)	600	1,464	0.1	0.5	3.3	0.1	0.1	0.4	224.4	0.45		
		---(Aux engine)	150	1,464	2.73E-02	0.5	0.7	3.03E-02	3.03E-02	0.1	69.8	0.56		
	Guard Vessel # 1	Boat (Main Eng)	600	3,192	0.2	1.1	7.1	0.2	0.2	0.9	489.2	0.45		
		---(Aux engine)	150	3,192	0.1	1.1	1.5	0.1	0.1	0.3	152.2	0.56		
	HDD Water Delivery OSV	Main Eng	850	916	0.1	0.4	2.9	0.1	0.1	0.4	198.9	0.45		
		---(Aux engine)	150	916	1.71E-02	0.3	0.4	1.90E-02	1.90E-02	0.1	43.7	0.56		
		---Bow Thruster	300	916	2.75E-02	0.2	1.0	3.05E-02	3.05E-02	0.1	70.2	0.45		
		Boat (Main Eng)	850	286	2.43E-02	0.1	0.9	2.70E-02	2.70E-02	0.1	62.2	0.45		
	Pre-comm OSV	---(Aux engine)	150	286	5.34E-03	0.1	0.1	5.94E-03	5.94E-03	2.57E-02	13.7	0.56		
		---Bow Thruster	300	286	8.59E-03	0.0	0.3	9.54E-03	9.54E-03	4.13E-02	21.9	0.45		

907,185 grams/ton 103.0

Dredging & Reinstatement Related Equipment													
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor	
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	234	0.1	1.9	2.2	0.1	0.1	0.5	267.0	0.79	
		UPLAND W551 Clam Rig (Aux Engine)	460	468	0.0	0.5	0.6	0.0	0.0	0.1	68.4	0.56	
		HARS W551 Clam Rig (Main Engine)	2,545	916.8	0.409404477	7.581564392	8.794614694	0.454893863	0.454893863	1.971206742	1046.255886	0.79	
		HARS W551 Clam Rig (Aux Engine)	460	916.8	0.052454599	0.971381456	1.126802489	0.058282887	0.044683547	0.252559179	134.050641	0.56	
		Tug 2000 HP TBN	2,000	1,656	0.6	10.8	14.6	0.6	0.6	1.40E-02	1485.1	0.79	
		Tug 2000 HP TBN	2,000	1,656	0.6	10.8	14.6	0.6	0.6	1.40E-02	1485.1	0.79	
		Crew Boat (Main Eng)	980	828	0.1	1.3	6.9	0.2	0.2	0.7	363.9	0.79	
		--(Aux engine)	12	1,656	2.47E-03	4.58E-02	0.1	3.66E-03	3.66E-03	1.19E-02	6.3	0.56	
		UPLAND W551 Clam Rig (Main Engine)	2,545	1,529	0.7	12.6	14.7	0.8	0.8	3.3	1744.7	0.79	
		UPLAND W551 Clam Rig (Aux Engine)	460	3,058	0.2	3.2	3.8	0.2	0.1	0.8	447.1	0.56	
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	Dredging	HARS W551 Clam Rig (Main Engine)	2,545	386	0.2	3.2	3.7	0.2	0.2	0.8	441.0	0.79	
		HARS W551 Clam Rig (Aux Engine)	460	386	0.0	0.4	0.5	0.0	0.0	0.1	56.5	0.56	
		Tug 2000 HP TBN	2,000	3,696	1.3	24.0	32.7	1.2	1.2	3.12E-02	3314.6	0.79	
		Tug 2000 HP TBN	2,000	3,696	1.3	24.0	32.7	1.2	1.2	3.12E-02	3314.6	0.79	
		Crew Boat (Main Eng)	980	1,848	0.3	2.9	15.3	0.4	0.4	1.5	812.1	0.79	
		--(Aux engine)	12	3,696	5.52E-03	0.1	0.1	8.17E-03	8.17E-03	2.66E-02	14.1	0.56	
		UPLAND W551 Clam Rig (Main Engine)	2,545	50	2.25E-02	0.4	0.5	2.50E-02	2.50E-02	0.1	57.5	0.79	
		UPLAND W551 Clam Rig (Aux Engine)	460	101	5.77E-03	0.1	0.1	6.41E-03	4.91E-03	2.78E-02	14.7	0.56	
		Tug 2000 HP TBN	2,000	168	0.1	1.1	1.5	0.1	0.1	1.42E-03	150.7	0.79	
		Tug 2000 HP TBN	2,000	168	0.1	1.1	1.5	0.1	0.1	1.42E-03	150.7	0.79	
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	Crew Boat (Main Eng)	980	84	1.44E-02	0.1	0.7	1.60E-02	1.60E-02	0.1	36.9	0.79	
		--(Aux engine)	12	168	2.51E-04	4.64E-03	6.32E-03	3.71E-04	3.71E-04	1.21E-03	0.6	0.56	
		HARS W551 Clam Rig (Main Engine)	2,545	403	0.2	3.3	3.9	0.2	0.2	0.9	460.1	0.79	
		HARS W551 Clam Rig (Aux Engine)	460	403	2.31E-02	0.4	0.5	2.56E-02	1.97E-02	0.1	59.0	0.56	
		Tug 2000 HP TBN	2,000	504	0.2	3.3	4.5	0.2	0.2	4.26E-03	452.0	0.79	
		Tug 2000 HP TBN	2,000	504	0.2	3.3	4.5	0.2	0.2	4.26E-03	452.0	0.79	
		Crew Boat (Main Eng)	980	252	4.33E-02	0.4	2.1	4.81E-02	4.81E-02	0.2	110.7	0.79	
		--(Aux engine)	12	504	7.52E-04	1.39E-02	1.89E-02	1.11E-03	1.11E-03	3.62E-03	1.9	0.56	
		UPLAND W551 Clam Rig (Main Engine)	2,545	53	0.0	0.4	0.5	0.0	0.0	0.1	60.3	0.79	
		UPLAND W551 Clam Rig (Aux Engine)	460	106	6.04E-03	0.1	0.1	6.71E-03	5.15E-03	0.0	15.4	0.56	
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	Dredging	HARS W551 Clam Rig (Main Engine)	2,545	117.6	0.052515234	0.972504333	1.128105026	0.05835026	0.05835026	0.252851127	134.2055979	0.79	
		HARS W551 Clam Rig (Aux Engine)	460	117.6	0.006728469	0.124601286	0.144537492	0.007476077	0.005731659	0.032396334	17.19497751	0.56	
		Tug 2000 HP TBN	2,000	314	0.1	2.0	2.8	0.1	0.1	2.66E-03	282.0	0.79	
		Tug 2000 HP TBN	2,000	0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.0	0.79	
		Crew Boat (Main Eng)	980	157	2.70E-02	0.3	1.3	3.00E-02	3.00E-02	0.1	69.1	0.79	
		--(Aux engine)	12	314	4.69E-04	8.69E-03	1.18E-02	6.95E-04	6.95E-04	2.26E-03	1.2	0.56	

Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Additt Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	50	0.0	0.4	0.5	0.0	0.0	0.1	57.5	0.79
		UPLAND W551 Clam Rig (Aux Engine)	460	101	5.77E-03	0.1	0.1	6.41E-03	4.91E-03	2.78E-02	14.7	0.56
		HARS W551 Clam Rig (Main Engine)	2,545	42	0.018755441	0.347322976	0.402894652	0.020839379	0.020839379	0.090303974	47.9305707	0.79
		HARS W551 Clam Rig (Aux Engine)	460	42	0.002403025	0.044500459	0.051620533	0.002670028	0.002047021	0.011570119	6.141063396	0.56
		Tug 2000 HP TBN	2,000	144	0.1	0.9	1.3	0.0	0.0	1.22E-03	129.1	0.79
		Tug 2000 HP TBN	2,000	204	0.1	1.3	1.8	0.1	0.1	1.72E-03	183.0	0.79
		Crew Boat (Main Eng)	980	102	1.75E-02	0.2	0.8	1.95E-02	1.95E-02	0.1	44.8	0.79
		--(Aux engine)	12	204	3.04E-04	5.64E-03	7.67E-03	4.51E-04	4.51E-04	1.47E-03	0.8	0.56
		Dump Scow #1	286	1090.4	0.038788502	0.215491678	1.436611187	0.043098336	0.043098336	0.186759454	99.12617188	0.56
Scow Barge Spread (one / 1each)	Dredge Material Transportation	Dump Scow #2	286	1090.4	0.038788502	0.215491678	1.436611187	0.043098336	0.043098336	0.186759454	99.12617188	0.56
		Dump Scow #3	286	1090.4	0.038788502	0.215491678	1.436611187	0.043098336	0.043098336	0.186759454	99.12617188	0.56
		Dump Scow #4	286	1090.4	0.038788502	0.215491678	1.436611187	0.043098336	0.043098336	0.186759454	99.12617188	0.56
		Clam Rig (Main Engine)	2,545	780	0.3	6.5	7.5	0.4	0.4	1.7	890.1	0.79
		Clam Rig (Aux Engine)	460	780	4.46E-02	0.8	1.0	4.96E-02	3.80E-02	0.2	114.0	0.56
	Reinstatement	Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Crew Boat (Main Eng)	980	390	0.1	0.6	3.2	0.1	0.1	0.3	171.4	0.79
		--(Aux engine)	12	780	0.001164198	0.021559229	0.029320551	0.001724738	0.001724738	0.005605399	3.0	0.56
		W551 Clam Rig (Main Engine)	2,545	780	0.3	6.5	7.5	0.4	0.4	1.7	890.1	0.79
		W551 Clam Rig (Aux Engine)	460	780	4.46E-02	0.8	1.0	4.96E-02	3.80E-02	0.2	114.0	0.56
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Tug 2000 HP TBN	2,000	780	0.3	5.1	6.9	0.3	0.3	6.59E-03	699.5	0.79
		Crew Boat (Main Eng)	980	390	0.1	0.6	3.2	0.1	0.1	0.3	171.4	0.79
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	Mining Sand	--(Aux engine)	12	780	1.16E-03	2.16E-02	2.93E-02	1.72E-03	1.72E-03	5.61E-03	3.0	0.56
		Dump Scow #1	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #2	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #3	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Dump Scow #4	286	130	4.62E-03	2.57E-02	0.2	5.14E-03	5.14E-03	2.23E-02	11.8	0.56
		Clam Rig (Main Engine)	2,545	2,496	1.1	20.6	23.9	1.2	1.2	5.4	2848.4	0.79
		Clam Rig (Aux Engine)	460	2,496	0.2	3.7	4.3	0.2	0.2	1.0	514.8	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Mining Sand	Crew Boat (Main Eng)	980	1,248	0.2	2.0	10.3	0.2	0.2	1.0	548.4	0.79
		--(Aux engine)	12	2,496	3.73E-03	0.1	0.1	5.52E-03	5.52E-03	1.79E-02	9.5	0.56
		W551 Clam Rig (Main Engine)	2,545	2,496	1.1	20.6	23.9	1.2	1.2	5.4	2848.4	0.79
		W551 Clam Rig (Aux Engine)	460	2,496	0.2	3.7	4.3	0.2	0.2	1.0	514.8	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Tug 2000 HP TBN	2,000	2,496	0.9	16.2	22.1	0.8	0.8	2.11E-02	2238.5	0.79
		Crew Boat (Main Eng)	980	1,248	0.2	2.0	10.3	0.2	0.2	1.0	548.4	0.79
		--(Aux engine)	12	2,496	3.73E-03	0.1	0.1	5.52E-03	5.52E-03	1.79E-02	9.5	0.56
		Dump Scow #1	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
	Dredge Material Transportation	Dump Scow #2	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
		Dump Scow #3	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
		Dump Scow #4	286	416	1.48E-02	0.1	0.5	1.64E-02	1.64E-02	0.1	37.8	0.56
Reinstatement Spread for Morgan HDD Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	43	1.93E-02	0.4	0.4	2.14E-02	2.14E-02	0.1	49.3	0.79
		Clam Rig (Aux Engine)	460	43	3.49E-03	0.1	0.1	3.87E-03	2.97E-03	1.68E-02	8.9	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Crew Boat (Main Eng)	980	22	3.71E-03	3.44E-02	0.2	4.13E-03	4.13E-03	1.79E-02	9.5	0.79
		--(Aux engine)	12	43	9.10E-05	1.68E-03	2.29E-03	1.35E-04	1.35E-04	4.38E-04	0.2	0.79
		W551 Clam Rig (Main Engine)	2,545	43	1.93E-02	0.4	0.4	2.14E-02	2.14E-02	0.1	49.3	0.79
		W551 Clam Rig (Aux Engine)	460	43	3.49E-03	0.1	0.1	3.87E-03	2.97E-03	1.68E-02	8.9	0.79
		Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
	Mining Sand	Tug 2000 HP TBN	2,000	43	1.52E-02	0.3	0.4	1.45E-02	1.45E-02	3.65E-04	38.7	0.79
		Crew Boat (Main Eng)	980	22	3.71E-03	3.44E-02	0.2	4.13E-03	4.13E-03	1.79E-02	9.5	0.79
		--(Aux engine)	12	43	6.45E-05	1.19E-03	1.62E-03	9.55E-05	9.55E-05	3.10E-04	0.2	0.56
		Dump Scow #1	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #2	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #3	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
		Dump Scow #4	286	7	2.56E-04	1.42E-03	9.49E-03	2.85E-04	2.85E-04	1.23E-03	0.7	0.56
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	199	0.1	1.6	1.9	0.1	0.1	0.4	227.3	0.79
		Clam Rig (Aux Engine)	460	199	1.61E-02	0.3	0.3	1.79E-02	1.37E-02	0.1	41.1	0.79
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79
		Crew Boat (Main Eng)	980	100	1.71E-02	0.2	0.8	1.90E-02	1.90E-02	0.1	43.8	0.79
		--(Aux engine)	12	199	2.97E-04	5.51E-03	7.49E-03	4.40E-04	4.40E-04	1.43E-03	0.8	0.56
		W551 Clam Rig (Main Engine)	2,545	199	0.1	1.6	1.9	0.1	0.1	0.4	227.3	0.79
		W551 Clam Rig (Aux Engine)	460	199	1.61E-02	0.3	0.3	1.79E-02	1.37E-02	0.1	41.1	0.79
		Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79
	Mining Sand	Tug 2000 HP TBN	2,000	199	0.1	1.3	1.8	0.1	0.1	1.68E-03	178.6	0.79
		Crew Boat (Main Eng)	980	100	1.71E-02	0.2	0.8	1.90E-02	1.90E-02	0.1	43.8	0.79
		--(Aux engine)	12	199	2.97E-04	5.51E-03	7.49E-03	4.40E-04	4.40E-04	1.43E-03	0.8	0.56
		Dump Scow #1	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56
		Dump Scow #2	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56
		Dump Scow #3	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56
		Dump Scow #4	286	33	1.18E-03	6.56E-03	4.37E-02	1.31E-03	1.31E-03	5.69E-03	3.0	0.56

Reinstatement Spread for Anchorage Area	Reinstatement	Clam Rig (Main Engine)	2,545	240	0.1	2.0	2.3	0.1	0.1	0.5	273.9	0.79	
		Clam Rig (Aux Engine)	460	240	1.94E-02	0.4	0.4	2.15E-02	1.65E-02	0.1	49.5	0.79	
		Tug 2000 HP TBN	2,000	240	0.1	1.6	2.1	0.1	0.1	2.03E-03	215.2	0.79	
		Tug 2000 HP TBN	2,000	0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.0	0.79	
		Crew Boat (Main Eng)	980	120	2.06E-02	0.2	1.0	2.29E-02	2.29E-02	0.1	52.7	0.79	
		--(Aux engine)	12	240	3.58E-04	6.63E-03	9.02E-03	5.31E-04	5.31E-04	1.72E-03	0.9	0.56	
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.79	
		W551 Clam Rig (Aux Engine)	460	0	0.00E+00	0.0	0.0	0.00E+00	0.00E+00	0.0	0.0	0.79	
		Tug 2000 HP TBN	2,000	0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.0	0.79	
		Tug 2000 HP TBN	2,000	0	0.0	0.0	0.0	0.0	0.0	0.00E+00	0.0	0.79	
		Crew Boat (Main Eng)	980	0	0.00E+00	0.0	0.0	0.00E+00	0.00E+00	0.0	0.0	0.79	
		--(Aux engine)	12	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.0	0.56	
	Dredge Material Transportation	Dump Scow #1	286	0	0.00E+00	0.00E+00	0.0	0.00E+00	0.00E+00	0.00E+00	0.0	0.56	
		Dump Scow #2	286	0	0.00E+00	0.00E+00	0.0	0.00E+00	0.00E+00	0.00E+00	0.0	0.56	
		Dump Scow #3	286	0	0.00E+00	0.00E+00	0.0	0.00E+00	0.00E+00	0.00E+00	0.0	0.56	
		Dump Scow #4	286	0	0.00E+00	0.00E+00	0.0	0.00E+00	0.00E+00	0.00E+00	0.0	0.56	
	Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	Reinstatement	Clam Rig (Main Engine)	2,545	192	0.1	1.6	1.8	0.1	0.1	0.4	219.1	0.79
			Clam Rig (Aux Engine)	460	192	1.55E-02	0.3	0.3	1.72E-02	1.32E-02	0.1	39.6	0.79
Tug 2000 HP TBN			2,000	192	0.1	1.2	1.7	0.1	0.1	1.62E-03	172.2	0.79	
Tug 2000 HP TBN			2,000	137	0.0	0.9	1.2	0.0	0.0	1.16E-03	122.7	0.79	
Crew Boat (Main Eng)			980	96	1.65E-02	0.2	0.8	1.83E-02	1.83E-02	0.1	42.2	0.79	
--(Aux engine)			12	192	2.87E-04	5.31E-03	7.22E-03	4.25E-04	4.25E-04	1.38E-03	0.7	0.56	
Mining Sand		W551 Clam Rig (Main Engine)	2,545	137	0.1	1.1	1.3	0.1	0.1	0.3	156.1	0.79	
		W551 Clam Rig (Aux Engine)	460	137	1.10E-02	0.2	0.2	1.23E-02	9.41E-03	0.1	28.2	0.79	
		Tug 2000 HP TBN	2,000	137	0.0	0.9	1.2	0.0	0.0	1.16E-03	122.7	0.79	
		Tug 2000 HP TBN	2,000	137	0.0	0.9	1.2	0.0	0.0	1.16E-03	122.7	0.79	
		Crew Boat (Main Eng)	980	68	1.18E-02	0.1	0.6	1.31E-02	1.31E-02	0.1	30.1	0.79	
		--(Aux engine)	12	137	2.04E-04	3.78E-03	5.14E-03	3.02E-04	3.02E-04	9.83E-04	0.5	0.56	
Dredge Material Transportation		Dump Scow #1	286	23	8.11E-04	4.51E-03	3.00E-02	9.01E-04	9.01E-04	3.91E-03	2.1	0.56	
		Dump Scow #2	286	23	8.11E-04	4.51E-03	3.00E-02	9.01E-04	9.01E-04	3.91E-03	2.1	0.56	
		Dump Scow #3	286	23	8.11E-04	4.51E-03	3.00E-02	9.01E-04	9.01E-04	3.91E-03	2.1	0.56	
		Dump Scow #4	286	23	8.11E-04	4.51E-03	3.00E-02	9.01E-04	9.01E-04	3.91E-03	2.1	0.56	
Reinstatement Spread for all other pipeline segments		Toyo Dredge Pump	W571	1,502	516	0.1	2.5	3.4	0.2	0.2	0.7	347.5	0.79
			Deck Winches	300	172	1.65E-03	7.79E-03	2.35E-02	1.63E-03	1.58E-03	8.32E-05	30.5	-
	Toyo Pump		425	516	2.92E-02	0.1	0.5	2.31E-02	2.24E-02	3.98E-04	128.3	-	
	400 Amp Welder		33	86	9.48E-04	4.21E-03	9.94E-03	6.84E-04	6.64E-04	6.30E-06	2.2	-	
	20kW Generator		30	516	2.97E-03	1.14E-02	0.1	1.86E-03	1.81E-03	2.91E-05	10.1	-	
	Light Plant		25	1,032	9.10E-03	4.31E-02	0.1	5.04E-03	4.88E-03	6.11E-05	16.6	-	
	250 cfm Aircompressor		80	86	3.26E-04	2.99E-03	1.01E-02	5.11E-04	4.96E-04	1.24E-05	4.5	-	
	Tug 2000 HP TBN		2,000	516	0.2	3.4	4.6	0.2	0.2	4.36E-03	462.8	0.79	
	Crew Boat (Main Eng)		980	258	4.44E-02	0.4	2.1	4.93E-02	4.93E-02	0.2	113.4	0.79	
	--(Aux engine)		12	516	7.70E-04	1.43E-02	1.94E-02	1.14E-03	1.14E-03	3.71E-03	2.0	0.56	
			907,185		grams/ton		451.7						

Survey Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	600	132	7.92E-03	4.40E-02	0.3	8.80E-03	8.80E-03	3.81E-02	20.2	0.45
		--(Aux engine)	150	132	2.46E-03	4.56E-02	0.1	2.74E-03	2.74E-03	1.19E-02	6.3	0.56
Post Jet Burial Survey Campaign	Post Pipeline Burial Survey	Crew Boat (Main Eng)	600	36	2.16E-03	1.20E-02	0.1	2.40E-03	2.40E-03	1.04E-02	5.5	0.45
		--(Aux engine)	150	36	6.72E-04	1.24E-02	1.69E-02	7.46E-04	7.46E-04	3.23E-03	1.7	0.56
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	600	48	2.88E-03	1.60E-02	0.1	3.20E-03	3.20E-03	1.39E-02	7.4	0.45
		--(Aux engine)	150	48	8.96E-04	1.66E-02	2.26E-02	9.95E-04	9.95E-04	4.31E-03	2.3	0.56

Quayside Disposal Processing Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	Total Hours of Operation	VOC (tons)	CO (tons)	NOx (tons)	PM ₁₀ (tons)	PM _{2.5} (tons)	SO ₂ (tons)	CO ₂ (tons)	Load Factor
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	675	986	1.32E-02	0.1	0.2	1.49E-02	1.44E-02	1.06E-03	393.9	-
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	350	986	0	0	0	0	0	0	0	-
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	270	986	3.12E-03	8.63E-03	0.0	2.42E-03	2.35E-03	4.16E-04	157.6	-
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)	220	986	0.0	0.2	0.3	0.0	0.0	4.38E-04	149.7	-
			907,185		grams/ton							



Baritan Bay Loop Equipment

HDD Equipment												
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation	
Morgan Onshore HDD -	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	8	1	16	
		Backhoe	CAT 315, 320, 330 or JD110, 310	Assist in performing loading and unloading operations and movement of smaller materials and tools		1	300	Diesel	4	12	48	
	DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	2	1	4	
	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	19	12	228	
	HDD Hole Opening	Drill Rig CAT Power Unit				1	1,750	Diesel	12	12	144	
	Pull-back String	Drill Rig CAT Power Unit				1	1,750	Diesel	8	12	96	
	HDD Pilot Hole	Mud Rig Genset-MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	19	12	228	
	HDD Hole Opening	Mud Rig Genset-MQ				1	350	Diesel	12	12	144	
	Pull-back String	Mud Rig Genset-MQ				1	350	Diesel	8	12	96	
	HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	19	12	228	
	HDD Hole Opening	Trackhoe - 240				1	177	Diesel	12	12	144	
	Pull-back String	Trackhoe - 240				1	177	Diesel	8	12	96	
	HDD Pilot Hole	Forklift - 10,000# & Over	Forklift	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	19	12	228	
	HDD Hole Opening	Forklift - 10,000# & Over				1	130	Diesel	12	12	144	
	Pull-back String	Forklift - 10,000# & Over				1	22	Diesel	8	12	96	
	HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation,		1	275	Diesel	19	12	228	
	HDD Hole Opening	R.T. Crane 50-75 Ton				1	275	Diesel	12	12	144	
	Pull-back String	R.T. Crane 50-75 Ton				1	275	Diesel	8	12	96	
	HDD Pilot Hole	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	19	12	228	
	HDD Hole Opening	Triplex Pump				1	540	Diesel	12	12	144	
	Pull-back String	Triplex Pump				1	540	Diesel	8	12	96	
Morgan Offshore HDD -	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		2	450	Diesel	5	1	10	
		Generators	Engines that power the auxiliary systems of the Lift Boat.			2	250	non-road Diesel	30	4	240	
	DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location		2	450	Diesel	3	1	6	
	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	1,750	Diesel	7	12	84	
	HDD Hole Opening	Drill Rig CAT Power Unit				1	1,750	Diesel	10	12	120	
	Pull-back String	Drill Rig CAT Power Unit				1	1,750	Diesel	8	12	96	
	HDD Pilot Hole	Mud Rig Genset-MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations		1	350	Diesel	7	12	84	
	HDD Hole Opening	Mud Rig Genset-MQ				1	350	Diesel	10	12	120	
	Pull-back String	Mud Rig Genset-MQ				1	350	Diesel	8	12	96	
	HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary		1	177	Diesel	7	12	84	
	HDD Hole Opening	Trackhoe - 240				1	177	Diesel	10	12	120	
	Pull-back String	Trackhoe - 240				1	177	Diesel	8	12	96	
	HDD Pilot Hole	Forklift - 10,000# & Over	Forklift	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem		1	130	Diesel	7	12	84	
	HDD Hole Opening	Forklift - 10,000# & Over				1	130	Diesel	10	12	120	
	Pull-back String	Forklift - 10,000# & Over				1	22	Diesel	8	12	96	
	HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation,		1	275	Diesel	7	12	84	
	HDD Hole Opening	R.T. Crane 50-75 Ton				1	275	Diesel	10	12	120	
	Pull-back String	R.T. Crane 50-75 Ton				1	275	Diesel	8	12	96	
	HDD Pilot Hole	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation		1	540	Diesel	7	12	84	
	HDD Hole Opening	Triplex Pump				1	540	Diesel	10	12	120	
	Pull-back String	Triplex Pump				1	540	Diesel	8	12	96	
CP Cable Drill - Onshore	MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		1	450	Diesel	1	4	4	
		Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location		1	450	Diesel	1	4	4	
	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig		1	202	Diesel	4	12	48	
	HDD Hole Opening	Drill Rig CAT Power Unit				1	202	Diesel	3	12	36	
	Pull-back String	Mud Rig & Reclaimer Pumps				3	25	Diesel	4	12	48	
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	Mud Rig & Reclaimer Pumps				3	25	Diesel	3	12	36	
		400 Amp Welder	Diesel powered welding machine			1	33	Diesel	6	12	72	
		20kW Generator	Diesel powered generator			1	30	Diesel	6	12	72	
		Light Plant	Diesel powered lighting tower			4	25	Diesel	6	12	72	
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor			1	80	Diesel	6	12	72	
		Crawler Crane				1	95	Diesel	6	12	72	
		Shallow Water Tug				1	660	Diesel	2	12	24	
		MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location	2	450	Diesel	11	1	21	
		W751 Generator	Engine that powers the main jacking systems of the jack up barge.	Providing a stationary platform for the HDD drilling operations.		1	425	non-road Diesel	38	24	900	
		W751 Aux Generator	Engine that powers the auxiliary power systems of the jack up barge.			1	160	non-road Diesel	38	24	900	
Ambrose East Offshore HDD	HDD Operations - W571 Jack up	Jacking Compressors	Large Air Compressors			2	525	non-road Diesel	38	4	300	
		50T Cherry picker	Hydraulic Rough Terrain rubber tire crane.			1	250	non-road Diesel	38	24	900	
		400 Amp Welder	Diesel powered welding machine	Support HDD operations		1	33	non-road Diesel	38	4	150	
		20kW Generator	Diesel powered generator	Support HDD operations		1	30	non-road Diesel	38	24	900	
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	25	non-road Diesel	38	12	1,800	
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Support HDD operations		1	80	non-road Diesel	38	4	150	
		DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location	2	450	Diesel	6	1	12	
		HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig	1	1,750	Diesel	10	12	120	
		HDD Hole Opening	Drill Rig CAT Power Unit			1	1,750	Diesel	6	12	72	
		Pull-back String	Drill Rig CAT Power Unit			1	1,750	Diesel	5	12	60	
	HDD Operations - W750 Jack up	HDD Pilot Hole	Mud Rig Genset-MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations	1	350	Diesel	10	12	120	
		HDD Hole Opening	Mud Rig Genset-MQ			1	350	Diesel	6	12	72	
		Pull-back String	Mud Rig Genset-MQ			1	350	Diesel	5	12	60	
		HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pit when necessary	1	177	Diesel	10	12	120	
		HDD Hole Opening	Trackhoe - 240			1	177	Diesel	6	12	72	
		Pull-back String	Trackhoe - 240			1	177	Diesel	5	12	60	
		HDD Pilot Hole	Forklift - 10,000# & Over	Forklift	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem	1	130	Diesel	10	12	120	
		HDD Hole Opening	Forklift - 10,000# & Over			1	130	Diesel	6	12	72	
		Pull-back String	Forklift - 10,000# & Over			1	22	Diesel	5	12	60	
		HDD Pilot Hole	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation,	1	275	Diesel	10	12	120	
		HDD Hole Opening	R.T. Crane 50-75 Ton			1	275	Diesel	6	12	72	
		Pull-back String	R.T. Crane 50-75 Ton			1	275	Diesel	5	12	60	
Ambrose West Offshore HDD	HDD Operations - W750 Jack up	HDD Pilot Hole	Triplex Pump	CAT Engine Type OPI Mud Pump 3500, 500	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation	1	540	Diesel	10	12	120	
		HDD Hole Opening	Triplex Pump			1	540	Diesel	6	12	72	
		Pull-back String	Triplex Pump			1	540	Diesel	5	12	60	
		MOB	Kenworth	Semi Tractor	Mobilizing Drill Rig and ancillary equipment to drill site or dock location	2	450	Diesel	15	1	31	
		W750 Generator	Engine that powers the main jacking systems of the jack up barge.	Providing a stationary platform for the HDD drilling operations.		1	325	non-road Diesel	46	24	1,110	
		Jacking Compressors	Engine that powers the auxiliary power systems of the jack up barge.			2	525	non-road Diesel	46	4	370	
		50T Cherry picker	Large Air Compressors			1	250	non-road Diesel	46	24	1,110	
		400 Amp Welder	Hydraulic Rough Terrain rubber tire crane.	Support HDD operations		1	33	non-road Diesel	46	4	185	
		20kW Generator	Diesel powered welding machine	Support HDD operations		1	30	non-road Diesel	46	24	1,110	
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		4	25	non-road Diesel	46	12	2,220	
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor	Support HDD operations		1	80	non-road Diesel	46	4	185	
		DeMOB	Kenworth	Semi Tractor	Demobilizing Drill Rig and ancillary equipment from drill site or dock location	2	450	Diesel	6	1	12	
	HDD Operations - W750 Jack up	HDD Pilot Hole	Drill Rig CAT Power Unit	HDD Rig Power Unit	Power Unit set beside Drill Rig provides necessary power to run planetary drives, vices, turntable for the Drill Rig	1	1,750	Diesel	14	12	168	
		HDD Hole Opening	Drill Rig CAT Power Unit			1	1,750	Diesel	6	12	72	
		Pull-back String	Drill Rig CAT Power Unit			1	1,750	Diesel	5	12	60	
		HDD Pilot Hole	Mud Rig Genset-MQ	Cat Model Generator	Provides Power to the 5,000 Gallon Mud Tank/Rig for running Mixing and Recycling Operations	1	350	Diesel	14	12	168	
		HDD Hole Opening	Mud Rig Genset-MQ			1	350	Diesel	6	12	72	

WS41 - Crane Barge	WS41 - Crane Barge	HDD Pilot Hole	Trackhoe - 240	Komatsu Trackhoe/Excavator	Assists in moving and setting up equipment, staging materials, excavating entry/exit pt when necessary	1	177	Diesel	14	12	168
		HDD Hole Opening	Trackhoe - 240			1	177	Diesel	6	12	72
		Pull-back String	Trackhoe - 240			1	177	Diesel	4	12	48
		HDD Pilot Hole	Forklift - 10,000# & Over			1	130	Diesel	14	12	168
		HDD Hole Opening	Forklift - 10,000# & Over	Forklift	Moving and Delivering materials, skids, tooling, staging pumps and equipment, moving storage tanks, moving drill stem	1	130	Diesel	6	12	72
		Pull-back String	Forklift - 10,000# & Over			1	130	Diesel	4	12	48
		HDD Pilot Hole	R.T. Crane 50-75 Ton			1	275	Diesel	14	12	168
		HDD Hole Opening	R.T. Crane 50-75 Ton			1	275	Diesel	6	12	72
		Pull-back String	R.T. Crane 50-75 Ton	Rough Terrain Crane	Lifting and placing larger heavier equipment, tooling and materials to sustain HDD operation, placing drill stem for HDD operation.	1	275	Diesel	4	12	48
		HDD Pilot Hole	Triples Pump			1	540	Diesel	14	12	168
		HDD Hole Opening	Triples Pump			1	540	Diesel	6	12	72
		Pull-back String	Triples Pump			1	540	Diesel	4	12	48
			WS41 Host Engine	Engine that powers the crane hoist winches.	Pumps volumes of drill mud to back end of drill stem during drilling and reaming stages of HDD operation	1	400	non-road Diesel	60	24	1,428
			WS41 Swing Engine			1	325	non-road Diesel	60	24	1,428
			WS41 Auxiliary Generator			1	85	non-road Diesel	60	24	1,428
			Deck Winch #1		Providing Hook support along side the W750 Jack up barge during HDD operations.	1	238	non-road Diesel	60	4	238
			Deck Winch #2	For mooring and anchoring vessel		1	160	non-road Diesel	60	4	238
			400 Amp Welder	Diesel powered welding machine		1	33	non-road Diesel	60	4	238
			20kW Generator	Diesel powered generator		1	30	non-road Diesel	60	24	1,428
			Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.	4	25	non-road Diesel	60	12	2,856
			250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Providing Hook support along side the W750 Jack up barge during HDD operations.	1	80	non-road Diesel	60	4	238

Pipelay Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation (Day)	Total Hours of Operation
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Mobilization/ Demobilization activities for the Pipelay vessel when it is alongside at the Quayside		8	778	Low Sulfur Marine Diesel	6	24	432
		Volvo D12 MGR-C 229kW	Emergency Generator for Pipelay Vessel			0	302	Low Sulfur Marine Diesel	6	24	0
Pipelay of Ambrose HDD String	Antares Anchor Handling >12H WD	Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge	Moving anchors		1	1,073	non-road Diesel	6	24	144
		Tug Robert	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	4	24	84
	Seven Antares	Tug Elizabeth	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the Ambrose HDD String production.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	1	2,000	Low Sulfur Marine Diesel	4	24	84
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	4	24	252
	Anchor Handling <12H WD	Volvo D12 MGR-C 229kW	Emergency Generator for vessel	Moving anchors in shallow water.		0	302	Low Sulfur Marine Diesel	4	24	0
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	4	24	84
	Beach Pull	Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	4	24	91
		Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors.			1	99	non-road Diesel	4	8	30
		Gabby Miller	110kW Diesel Hydraulic Power Unit			1	660	non-road Diesel	4	24	91
		150 Tonne SWL Diesel Hydraulic Spooling Winch				1	147	non-road Diesel	4	24	91
Pipelay of Morgan HDD String	Anchor Handling >12H WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	4	24	91
		Tug Elizabeth	Diesel Generator for power on the pipelay barge			1	2,000	Low Sulfur Marine Diesel	4	24	91
	Shallow Water Barge	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the Morgan HDD String production.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	4	24	274
		Volvo D12 MGR-C 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	4	24	0
	Anchor Handling <12H WD	Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge	Moving anchors in shallow water.		1	1,073	non-road Diesel	4	24	91
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	8	24	190
	Beach Pull	Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors.			1	99	non-road Diesel	8	8	63
		Gabby Miller	110kW Diesel Hydraulic Power Unit			1	660	non-road Diesel	8	24	190
		150 Tonne SWL Diesel Hydraulic Spooling Winch				1	147	non-road Diesel	8	24	190
		Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	8	24	190
Pipelay Spread from MP12.5 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Anchor Handling >12H WD	Tug Elizabeth	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP12.5 to MP14.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	1	2,000	Low Sulfur Marine Diesel	8	24	190
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	8	24	274
	Shallow Water Barge	Volvo D12 MGR-C 229kW	Emergency Generator for vessel	Moving anchors in shallow water.		0	302	Low Sulfur Marine Diesel	8	24	0
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	8	24	190
	Antares Anchor Handling <12H WD	Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	3	8	23
		Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors.			1	99	non-road Diesel	3	8	27
	Beach Pull	Gabby Miller	110kW Diesel Hydraulic Power Unit			1	660	non-road Diesel	3	24	82
		150 Tonne SWL Diesel Hydraulic Spooling Winch				1	147	non-road Diesel	3	24	82
	Antares Anchor Handling >12H WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	3	24	82
		Tug Elizabeth	Diesel Generator for power on the pipelay barge			1	2,000	Low Sulfur Marine Diesel	3	24	82
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Seven Antares	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP14.5 to MP16.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	3	24	247
		Volvo D12 MGR-C 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	3	24	0
	Antares Anchor Handling <12H WD	Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge	Moving anchors in shallow water.		1	1,073	non-road Diesel	3	24	82
		Linda Miller	660 HP shallow draft tug boat			1	660	non-road Diesel	3	24	72
	Antares Anchor Handling >12H WD	Anchor Barge #37 Barge	Deck Barge with A-Frame to lift and deploy Anchors.	Moving anchors		1	99	non-road Diesel	3	8	24
		Tug Robert	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	8	24	184
	Seven Antares	Tug Elizabeth	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP16.5 to MP20.3.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	1	2,000	Low Sulfur Marine Diesel	11	24	767
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	11	24	0
	Antares Anchor Handling >12H WD	Volvo D12 MGR-C 229kW	Emergency Generator for vessel	Moving anchors		0	302	Low Sulfur Marine Diesel	11	24	0
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	11	24	256
Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	Antares Anchor Handling >12H WD	Tug Robert	2000 HP Tugboat	Moving anchors		1	2,000	Low Sulfur Marine Diesel	7	24	175
		Tug Elizabeth	Diesel Generator for power on the pipelay barge			1	2,000	Low Sulfur Marine Diesel	7	24	175
	Seven Antares	Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge	Pipelay activities associated with laying the pipeline from MP30.4 to MP35.5.	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	3	778	Low Sulfur Marine Diesel	7	24	526
		Volvo D12 MGR-C 229kW	Emergency Generator for vessel			0	302	Low Sulfur Marine Diesel	7	24	0
	Antares Anchor Handling >12H WD	Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge	Moving anchors		1	1,073	non-road Diesel	7	24	175
		Tug Robert	2000 HP Tugboat			1	2,000	Low Sulfur Marine Diesel	5	24	120
	Above Water Tie-in/ Spool @ MP16.6	Tug Elizabeth	Diesel Generator for power on the pipelay barge	Above Water Tie in Activities at MP16.6	Activities : Pipeline Welding, NDE, FJC Application, Mooring Winches, Crane Operation	1	2,000	Low Sulfur Marine Diesel	5	24	120
		Caterpillar 3412 DITA 580kW	Diesel Generator for power on the pipelay barge			3	778	Low Sulfur Marine Diesel	5	24	360
	Seven Antares	Volvo D12 MGR-C 229kW	Emergency Generator for vessel	Provides staging deck and hook support for diving operations.		0	302	Low Sulfur Marine Diesel	5	24	0
		Additional G66 for pipelay ops 800kW	Diesel Generator for power on the pipelay barge			1	1,073	non-road Diesel	45	24	1,070
Pipe Delivery Spread	Docksie Crane	Manitowoc 1100		Towing barges with pipe from load out area to pipelay vessel for installation.		1	332	Diesel	59	8	472
		Pipeline Barge Tug	Tug Trevor			1	1,500	Low Sulfur Marine Diesel	37	24	878
	Dive Barge	WS71	Engine that powers WS71 crane and main systems.	Provides staging deck and hook support for diving operations.		1	1,502	non-road Diesel	68	24	1,638
		Deck Winches	For mooring and anchoring vessel			1	300	non-road Diesel	68	4	546
	Diving/Construction Support Spread	400 Amp Welder	Diesel powered welding machine	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	33	non-road Diesel	68	4	273
		20kW Generator	Diesel powered generator			1	30	non-road Diesel	68	24	1,638
		Light Plant	Diesel powered lighting tower.	Provides staging deck and hook support for diving operations.		4	25	non-road Diesel	68	12	3,276
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.			1	80	non-road Diesel	68	4	273
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to WS71		1	2,000	Low Sulfur Marine Diesel	45	24	1,070
		Crew Boat (Main End)	Crew-transfer boat			1	80	non-road Diesel	45	12	535
Material Barge Tug		-(Aux engine)		Provides means to transport workers to/from the WS71 during diving operations.		1	12	non-road Diesel	45	24	1,070
		Tug 2000 HP TBN	2000 HP Tugboat			1	2,000	non-road Diesel	9	24	216
	Jet Trencher	M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	7	24	173
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	7	4	29
	Mob	20kW Generator	Diesel powered generator	Provides support to the pipeline jetting contractor.		1	30	non-road Diesel	7	24	173
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		8	25	non-road Diesel	7	4	230
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.			1	80	non-road Diesel	7	4	29

Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.		2	225	non-road Diesel	5	4	39
		W061 Deck Winches				2	300	non-road Diesel	5	4	39
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	5	24	118
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.		1	33	non-road Diesel	5	4	20
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	30	non-road Diesel	5	24	118
		Light Plant	Diesel powered lighting tower.			8	25	non-road Diesel	5	12	470
	Jettie	250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jetting contractor.		1	80	non-road Diesel	5	4	30
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.		2	2,000	Low Sulfur Marine Diesel	5	24	235
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	5	12	59
		-(Aux engine)				1	12	non-road Diesel	5	24	118
		1250kw Generator	Power Generation of the JetTrencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	5	24	118
		W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.		2	225	non-road Diesel	4	4	35
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	W061 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.		2	300	non-road Diesel	4	4	35
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	4	24	106
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.		1	33	non-road Diesel	4	4	18
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	30	non-road Diesel	4	24	106
		Light Plant	Diesel powered lighting tower.			8	25	non-road Diesel	4	12	422
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jetting contractor.		1	80	non-road Diesel	4	4	38
	Jettie	2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.		2	2,000	Low Sulfur Marine Diesel	4	24	211
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	4	12	53
		-(Aux engine)				1	12	non-road Diesel	4	24	106
		1250kw Generator	Power Generation of the JetTrencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	4	24	106
		W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.		2	225	non-road Diesel	6	4	46
		W061 Deck Winches				2	300	non-road Diesel	6	4	46
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0-MP 17.5)	Barge + Tug	M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	6	24	139
		400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.		1	33	non-road Diesel	6	4	23
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	30	non-road Diesel	6	24	139
		Light Plant	Diesel powered lighting tower.			8	25	non-road Diesel	6	12	557
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jetting contractor.		1	80	non-road Diesel	6	4	23
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.		2	2,000	Low Sulfur Marine Diesel	6	24	278
	Jettie	Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	6	12	70
		-(Aux engine)				1	12	non-road Diesel	6	24	139
		1250kw Generator	Power Generation of the JetTrencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	6	24	139
		W263 Deck Winches	For mooring and anchoring vessel.	Provides support to the pipeline jetting contractor.		2	225	non-road Diesel	2	4	56
		W061 Deck Winches				2	300	non-road Diesel	2	4	56
		M4000 Crane	Launch and Recovery System (LARS) for Jet Trencher	The LARS is used to lower and recovery the jet trencher into the water.		1	400	non-road Diesel	2	24	48
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	400 Amp Welder	Diesel powered welding machine	Provides support to the pipeline jetting contractor.		1	33	non-road Diesel	2	4	8
		20kW Generator	Diesel powered generator	General Use. Provide illumination to workers when construction activity warrants evening/night work.		1	30	non-road Diesel	2	24	48
		Light Plant	Diesel powered lighting tower.			8	25	non-road Diesel	2	12	192
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides support to the pipeline jetting contractor.		1	80	non-road Diesel	2	4	8
		2000 HP Tugboat	2000 HP Tugboat	Provides towing and anchor support to jetting support barge.		2	2,000	Low Sulfur Marine Diesel	2	24	24
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the jet support barge.		1	980	non-road Diesel	2	12	24
	Jettie	-(Aux engine)				1	12	non-road Diesel	2	24	48
		1250kw Generator	Power Generation of the JetTrencher	The generator is used to supply power to the jet trencher that is on the seabed burying the pipeline.		1	1,676	non-road Diesel	2	24	48
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the HDD operations		1	600	non-road Diesel	0	12	0
		-(Aux engine)				1	150	non-road Diesel	20	12	360
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the HDD operations		1	150	non-road Diesel	30	24	720
		Samantha Miller LCV	60FT Supply Vessel	For misc. supplies and placing marker buoys.		1	600	non-road Diesel	61	24	1,464
Daily Crew/Utility	Guard Vessel # 1	-(Aux engine)				1	150	non-road Diesel	61	24	1,464
		Boat (Main Eng)	Guard Boat Vessel	For transiting site and keeping other vessels away from work site.		1	600	non-road Diesel	133	24	3,192
		-(Aux engine)				1	150	non-road Diesel	133	24	3,192
		Main Eng	150FT offshore supply vessel	For transporting supplies and water for HDD operations.		1	850	non-road Diesel	38	24	916
		-(Aux engine)				1	150	non-road Diesel	38	24	916
		-Bow Thruster				1	300	non-road Diesel	38	24	916
	Pre-comm OSV	Boat (Main Eng)	150FT offshore supply vessel	For transporting supplies and acting as a staging area for precommissioning activities.		1	850	non-road Diesel	12	24	286
		-(Aux engine)				1	150	non-road Diesel	12	24	286
		-Bow Thruster				1	300	non-road Diesel	12	24	286

Dredging & Reinstatement Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Dredging Spread for Pre-trenching the Morgan HDD Siting & Ultra Shallow Water Pipeline Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	2,545	non-road Diesel	20	12	234
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	20	24	468
		HARS W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	38	24	917
		HARS W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	38	24	917
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	69	24	1,656
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	69	24	1,656
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	Dredging	Crew Boat (Main Eng)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.		1	980	non-road Diesel	69	12	828
		-(Aux engine)				1	12	non-road Diesel	69	24	1,656
		UPLAND W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	127	12	1,529
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	127	24	3,058
		HARS W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	16	24	386
		HARS W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	16	24	386
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	154	24	3,696
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	154	24	3,696
		Crew Boat (Main Eng)				1	980	non-road Diesel	154	12	1,848
		-(Aux engine)				1	12	non-road Diesel	154	24	3,696
		UPLAND W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	4	12	50
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	4	24	101
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,000 CuYd - HARS, 32,450 CuYd - HARS)	Dredging	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	7	24	168
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	7	24	168
		Crew Boat (Main Eng)				1	980	non-road Diesel	7	12	84
		-(Aux engine)				1	12	non-road Diesel	7	24	168
		HARS W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	17	24	403
		HARS W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	17	24	403
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	Dredging	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.		1	2,000	Low Sulfur Marine Diesel	21	24	504
		Tug 2000 HP TBN				1	2,000	Low Sulfur Marine Diesel	21	24	504
		Crew Boat (Main Eng)				1	980	non-road Diesel	21	12	252
		-(Aux engine)				1	12	non-road Diesel	21	24	504
		UPLAND W551 Clam Rig (Main Engine)				1	2,545	non-road Diesel	4	12	53
		UPLAND W551 Clam Rig (Aux Engine)				1	460	non-road Diesel	4	24	106

Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (1,152 CuYd HARS), V084 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & A88d Chapel Segment MP 25.30 to 25.61 (4,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For digging trench prior to laying pipe.	1	2,545	non-road Diesel	4	12	50
		UPLAND W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	4	24	101
		HARS W551 Clam Rig (Main Engine)			1	2,545	non-road Diesel	2	24	47
		HARS W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	2	24	42
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to dredging spread.	1	2,000	Low Sulfur Marine Diesel	6	24	144
Scow Barge Spread (one / reach)	Dredge Material Transportation	Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	9	24	204
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W551 Dredge	1	980	non-road Diesel	9	12	102
		--(Aux engine)			1	12	non-road Diesel	9	24	204
		Dump Scow #1	Hopper barge	For transporting dredged material to Upland processing and the HARS site.	1	286	non-road Diesel	273	4	1,090
		Dump Scow #2			1	286	non-road Diesel	273	4	1,090
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipeline Transition (MP12.5-MP16.6)	Reinstatement	Dump Scow #3			1	286	non-road Diesel	273	4	1,090
		Dump Scow #4			1	286	non-road Diesel	273	4	1,090
		Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	33	24	780
		Clam Rig (Aux Engine)	Hydraulic excavator type material handler.		1	460	non-road Diesel	33	24	780
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to reinstatement spread.	1	2,000	Low Sulfur Marine Diesel	33	24	780
	Mining Sand	Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	33	24	780
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	33	12	390
		--(Aux engine)			1	12	non-road Diesel	33	24	780
		W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For mining sand to provide reinstatement material.	1	2,545	non-road Diesel	33	24	780
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	33	24	780
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Reinstatement	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	33	24	780
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the mining spread.	1	980	non-road Diesel	33	12	390
		--(Aux engine)			1	12	non-road Diesel	33	24	780
		Dump Scow #1	Split hull hopper barge	For transporting the mined material.	1	286	non-road Diesel	33	4	130
		Dump Scow #2			1	286	non-road Diesel	33	4	130
	Dredge Material Transportation	Dump Scow #3			1	286	non-road Diesel	33	4	130
		Dump Scow #4			1	286	non-road Diesel	33	4	130
		Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	104	24	2,496
		Clam Rig (Aux Engine)	Hydraulic excavator type material handler.		1	460	non-road Diesel	104	24	2,496
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to reinstatement spread.	1	2,000	Low Sulfur Marine Diesel	104	24	2,496
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Reinstatement	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to reinstatement spread.	1	2,000	Low Sulfur Marine Diesel	104	24	2,496
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	104	12	1,248
		--(Aux engine)			1	12	non-road Diesel	104	24	2,496
		W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For mining sand to provide reinstatement material.	1	2,545	non-road Diesel	104	24	2,496
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	104	24	2,496
	Mining Sand	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	104	24	2,496
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the mining spread.	1	980	non-road Diesel	104	12	1,248
		--(Aux engine)			1	12	non-road Diesel	104	24	2,496
		Dump Scow #1	Split hull hopper barge	For transporting the mined material.	1	286	non-road Diesel	104	4	416
		Dump Scow #2			1	286	non-road Diesel	104	4	416
Reinstatement Spread for Morgan HDD P1 Excavation	Reinstatement	Dump Scow #3			1	286	non-road Diesel	104	4	416
		Dump Scow #4			1	286	non-road Diesel	104	4	416
		Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	2	24	43
		Clam Rig (Aux Engine)	Hydraulic excavator type material handler.		1	460	non-road Diesel	2	24	43
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to reinstatement spread.	1	2,000	Low Sulfur Marine Diesel	2	24	43
	Mining Sand	Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	2	24	43
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	2	12	22
		--(Aux engine)			1	12	non-road Diesel	2	24	43
		W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For mining sand to provide reinstatement material.	1	2,545	non-road Diesel	2	24	43
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	2	24	43
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Reinstatement	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	2	24	43
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the mining spread.	1	980	non-road Diesel	2	12	22
		--(Aux engine)			1	12	non-road Diesel	2	24	43
		Dump Scow #1	Split hull hopper barge	For transporting the mined material.	1	286	non-road Diesel	2	4	7
		Dump Scow #2			1	286	non-road Diesel	2	4	7
	Dredge Material Transportation	Dump Scow #3			1	286	non-road Diesel	2	4	7
		Dump Scow #4			1	286	non-road Diesel	2	4	7
		Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	8	24	199
		Clam Rig (Aux Engine)	Hydraulic excavator type material handler.		1	460	non-road Diesel	8	24	199
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to reinstatement spread.	1	2,000	Low Sulfur Marine Diesel	8	24	199
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Reinstatement	Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	8	24	199
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	8	12	100
		--(Aux engine)			1	12	non-road Diesel	8	24	199
		W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For mining sand to provide reinstatement material.	1	2,545	non-road Diesel	8	24	199
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	8	24	199
	Mining Sand	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	8	24	199
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the mining spread.	1	980	non-road Diesel	8	12	100
		--(Aux engine)			1	12	non-road Diesel	8	24	199
		Dump Scow #1	Split hull hopper barge	For transporting the mined material.	1	286	non-road Diesel	8	4	33
		Dump Scow #2			1	286	non-road Diesel	8	4	33
Reinstatement Spread for Anchorage Area	Reinstatement	Dump Scow #3			1	286	non-road Diesel	8	4	33
		Dump Scow #4			1	286	non-road Diesel	8	4	33
		Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	10	24	240
		Clam Rig (Aux Engine)	Hydraulic excavator type material handler.		1	460	non-road Diesel	10	24	240
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to reinstatement spread.	1	2,000	Low Sulfur Marine Diesel	10	24	240
	Mining Sand	Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	0	24	0
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	0	12	120
		--(Aux engine)			1	12	non-road Diesel	0	24	240
		W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For mining sand to provide reinstatement material.	1	2,545	non-road Diesel	0	24	0
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	0	24	0
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), V084 Clamshell Segment MP33.54 to 33.93 & A88d Chapel Segment MP 25.30 to 25.61	Reinstatement	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	0	24	0
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the mining spread.	1	980	non-road Diesel	0	12	0
		--(Aux engine)			1	12	non-road Diesel	0	24	0
		Dump Scow #1	Split hull hopper barge	For transporting the mined material.	1	286	non-road Diesel	0	4	0
		Dump Scow #2			1	286	non-road Diesel	0	4	0
	Dredge Material Transportation	Dump Scow #3			1	286	non-road Diesel	0	4	0
		Dump Scow #4			1	286	non-road Diesel	0	4	0
		Clam Rig (Main Engine)	For mooring and anchoring vessel.	Performing backfilling of pipeline trench with sand.	1	2,545	non-road Diesel	8	24	192
		Clam Rig (Aux Engine)	Hydraulic excavator type material handler.		1	460	non-road Diesel	8	24	192
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to reinstatement spread.	1	2,000	Low Sulfur Marine Diesel	8	24	192
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), V084 Clamshell Segment MP33.54 to 33.93 & A88d Chapel Segment MP 25.30 to 25.61	Reinstatement	Tug 2000 HP TBN			1	2,000	Low Sulfur Marine Diesel	6	24	137
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the reinstatement spread.	1	980	non-road Diesel	6	12	96
		--(Aux engine)			1	12	non-road Diesel	6	24	192
		W551 Clam Rig (Main Engine)	Derrick barge with crane and clam shell bucket.	For mining sand to provide reinstatement material.	1	2,545	non-road Diesel	6	24	137
		W551 Clam Rig (Aux Engine)			1	460	non-road Diesel	6	24	137
	Mining Sand	Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to the mining spread.	1	2,000	Low Sulfur Marine Diesel	6	24	137
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the mining spread.	1	980	non-road Diesel	6	12	68
		--(Aux engine)			1	12	non-road Diesel	6	24	137
		Dump Scow #1	Split hull hopper barge	For transporting the mined material.	1	286	non-road Diesel	6	4	23
		Dump Scow #2			1	286	non-road Diesel	6	4	23
	Dredge Material Transportation	Dump Scow #3			1	286	non-road Diesel	6	4	23
		Dump Scow #4			1	286	non-road Diesel	6	4	23

Reinstatement Spread for all other pipeline segments	Toyo Dredge Pump	W571	Engine that powers W571 crane and main systems.	Provides staging deck and hook support for diving operations.		1	1,502	non-road Diesel	22	24	516
		Deck Winches	For mooring and anchoring vessel.			2	300	non-road Diesel	22	4	172
		Toyo Pump	DP150 dredge pump	For sucking and pumping sand in critical areas near existing assets.		1	425	non-road Diesel	22	24	516
		400 Amp Welder	Diesel powered welding machine			1	33	non-road Diesel	22	4	86
		20kW Generator	Diesel powered generator	Provides staging deck and hook support for diving operations.		1	30	non-road Diesel	22	24	516
		Light Plant	Diesel powered lighting tower.	General Use. Provide illumination to workers when construction activity warrants evening/night work.		4	25	non-road Diesel	22	12	1,032
		250 cfm Aircompressor	Smaller, diesel powered tool grade, air compressor.	Provides staging deck and hook support for diving operations.		1	80	non-road Diesel	22	4	86
		Tug 2000 HP TBN	2000 HP Tugboat	Provides towing and anchor support to W571		1	2,000	Low Sulfur Marine Diesel	22	24	516
		Crew Boat (Main Eng)	Crew-transfer boat	Provides means to transport workers to/from the W571 during diving operations.		1	980	non-road Diesel	22	12	258
		—(Aux engine)	Crew-transfer boat			1	12	non-road Diesel	22	24	516

Survey Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing a prelay survey of the offshore workpiece.	Used to power all systems on the boat.	1	600	non-road Diesel	11	12	132
		—(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	11	12	132
Post Jet Burial Survey Campaign	Post Pipeline Burial Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing a post burial survey of the pipeline to ensure adequate depth of cover.	Used to power all systems on the boat.	1	600	non-road Diesel	3	12	36
		—(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	3	12	36
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	Main Engine of a Survey Boat	The Survey Boat will be performing an as-built survey of the pipeline.	Used to power all systems on the boat.	1	600	non-road Diesel	4	12	48
		—(Aux engine)	Auxiliary Engine of Survey Boat		Back up power for survey boat.	1	150	non-road Diesel	4	12	48

Quayside Disposal Processing Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	Hydraulic excavator with clam bucket	For unloaded dredged material from barges at the processing facility.		1	675	Diesel	82	12	986
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	Screw conveyor with dry cement addition with mixing.	To mix/blent cement product with raw dredged material.		1	350	Electric	82	12	986
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	Hydraulic excavator with clam bucket	For unloaded dredged material from barges at the processing facility.		1	270	Diesel	82	12	986
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)				1	220	Diesel	82	12	986
Soil Transport	Post Processing Trucking to Upland Site	Dump Truck	On-Road dump truck	Hauling processed dredged material from the processor facility to final resting place.		278	450	Diesel	82	6	136,973

Pipe Transport Related Equipment											
CONSTRUCTION PHASE	Activity	Equipment Type	Description of Equipment	Task Being Performed	Additional Information	Pieces of Equipment	Horsepower	Fuel Type	Days of Operation	Hours of Operation / Day	Total Hours of Operation
Procurement	Trucking of Pipe to Storage Yard	Kenworth				60	450	Diesel	35	4	139



Raritan Bay Loop Vehicle Emissions

On Road Emission Factors

Equipment Type	Emission Factors										
	HC	CO	NOx	PM ₁₀	PM _{2.5}	SO _x	CO ₂	1,3-Butadiene	Acetaldehyde	Acrolein	Benzene
	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi	g/mi
Commuter Vehicles	0.1	3.3	0.2	0.0	0.0	3.19E-03	435.0	1.56E-04	4.60E-04	2.79E-05	1.73E-03
Dump Truck	0.1	2.3	4.7	0.1	0.1	5.58E-03	1660.5	2.52E-04	4.64E-03	7.24E-04	7.36E-04
Pipe Delivery Truck	0.1	2.5	5.2	0.1	0.1	5.87E-03	1747.0	2.21E-04	4.93E-03	7.09E-04	6.43E-04

Paved Road Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	Ib/VMT	Ib/VMT
Commuter Vehicles	0.00	0.001
Dump Truck	0.03	0.008
Pipe Delivery Truck	0.03	0.006

AP-42 Section 13.2.1.3 (1/2011)

Miles Traveled by Spread/Phase

Construction Phase	POB PER 24 hr shift	Average Daily Round Trip	Construction Days		Vehicle Miles Traveled	
			2026	2027	2026	2027
Morgan Onshore HDD -	20	50	0	19	0	19,000
Morgan Offshore HDD -	23	50	0	30	0	34,500
CP Cable Drill - Onshore	12	50	0	4	0	2,400
CP Cable Drill - Offshore	12	50	0	6	0	3,600
Ambrose East Offshore HDD	52	50	0	38	0	97,500
Ambrose West Offshore HDD	46	50	0	46	0	106,375
W541 - Crane Barge	34	50	0	60	0	101,150
Pipelay Spread	250	50	0	6	0	75,000
Moby/Demob	258	50	0	4	0	45,150
Pipelay of Ambrose HDD String	272	50	0	4	0	51,680
Pipelay of Morgan HDD String	272	50	0	8	0	107,712
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	272	50	0	3	0	46,648
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	266	50	0	11	0	141,645
Pipelay Spread from MP16.5 - MP 29.3 (West of Ambrose)	258	50	0	7	0	94,170
Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	258	50	0	5	0	64,500
Above Water Tie-in/ Spool @ MP16.6	6	50	0	59	0	17,700
Pipe Delivery Spread	54	50	0	68	0	184,275
Diving/Construction Support Spread	20	50	0	7	0	7,200
Jet Trencher	30	50	0	5	0	7,350
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	30	50	0	4	0	6,600
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	30	50	0	6	0	8,700
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	30	50	0	2	0	3,000
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	32	50	0	133	0	212,800
Daily Crew/Utility	26	50	0	69	0	89,700
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	26	50	0	154	0	200,200
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	26	50	0	7	0	9,100
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	26	50	0	21	0	27,300
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	26	50	0	13.1	0	17,030
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	26	50	0	9	0	11,050
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Additi Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	8	50	0	273	0	109,040
Scow Barge Spread (one / 1each)	62	50	0	33	0	100,750
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	62	50	0	104	0	322,400
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	62	50	0	2	0	5,580
Reinstatement Spread for Morgan HDD Pit Excavation	62	50	0	8	0	25,730
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	62	50	0	10	0	31,000
Reinstatement Spread for Anchorage Area						

Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	62	50	0	8	0	24,800
Reinstatement Spread for all other pipeline segments	26	50	0	22	0	27,950
Pre Lay Survey Campaign	6	50	0	11	0	3,300
Post Jet Burial Survey Campaign	6	50	0	3	0	900
As Built Survey Campaign	6	50	0	4	0	1,200
Soil Transport	278	200	0	82	0	4,565,767
Trucking of Pipe to Storage Yard	60	120	35	0	250,320	0

Worker Commuter Vehicle OnRoad Emissions by Spread/Phase

907,185

grams/ton

2000

lbs/ton

Construction Phase	Emission (tons)															
	VOC		CO		NOx		PM ₁₀		PM _{2.5}		SOx		CO ₂		HAPs	
	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027	2026	2027
Morgan Onshore HDD -	0	1.10E-03	0	0.07	0	3.33E-03	0	4.03E-02	0	9.94E-03	0	6.67E-05	0	9.11	0	6.30E-05
Morgan Offshore HDD -	0	2.00E-03	0	0.13	0	0.01	0	0.07	0	1.80E-02	0	1.21E-04	0	16.54	0	1.14E-04
CP Cable Drill - Onshore	0	1.39E-04	0	8.76E-03	0	4.21E-04	0	5.09E-03	0	1.26E-03	0	8.43E-06	0	1.15	0	7.96E-06
CP Cable Drill - Offshore	0	2.09E-04	0	1.31E-02	0	6.32E-04	0	7.64E-03	0	1.88E-03	0	1.26E-05	0	1.73	0	1.19E-05
Ambrose East Offshore HDD	0	5.65E-03	0	0.36	0	0.02	0	0.21	0	0.05	0	3.42E-04	0	46.76	0	3.24E-04
Ambrose West Offshore HDD	0	6.17E-03	0	0.39	0	0.02	0	0.23	0	0.06	0	3.74E-04	0	51.01	0	3.53E-04
WS411 - Crane Barge	0	5.87E-03	0	0.37	0	0.02	0	0.21	0	0.05	0	3.55E-04	0	48.51	0	3.36E-04
Pipeline Spread	0	4.35E-03	0	0.27	0	0.01	0	0.16	0	3.92E-02	0	2.63E-04	0	35.97	0	2.49E-04
Mob/Demob	0	2.62E-03	0	0.16	0	0.01	0	0.10	0	2.36E-02	0	1.59E-04	0	21.65	0	1.50E-04
Pipeline of Ambrose HDD String	0	3.00E-03	0	0.19	0	0.01	0	0.11	0	2.70E-02	0	1.81E-04	0	24.78	0	1.71E-04
Pipeline of Morgan HDD String	0	6.25E-03	0	0.39	0	0.02	0	0.23	0	0.06	0	3.78E-04	0	51.65	0	3.57E-04
Pipeline Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	0	2.70E-03	0	0.17	0	0.01	0	0.10	0	2.44E-02	0	1.64E-04	0	22.37	0	1.55E-04
Pipeline Spread from MP14.5 - MP16.5 (Shallow Water)	0	8.21E-03	0	0.52	0	0.02	0	0.30	0	0.07	0	4.97E-04	0	67.92	0	4.70E-04
Pipeline Spread from M16.5 - MP 29.3 (West of Ambrose)	0	5.46E-03	0	0.34	0	0.02	0	0.20	0	0.05	0	3.31E-04	0	45.16	0	3.12E-04
Pipeline Spread from - MP 30.4 to MP 35.5 (East of Ambrose - Rockaway Manifold)	0	3.74E-03	0	0.24	0	0.01	0	0.14	0	3.37E-02	0	2.26E-04	0	30.93	0	2.14E-04
Above Water Tie-in/ Spool @ MP16.6	0	1.03E-03	0	0.06	0	3.11E-03	0	3.76E-02	0	9.26E-03	0	6.22E-05	0	8.49	0	5.87E-05
Pipe Delivery Spread	0	1.07E-02	0	0.67	0	0.03	0	0.39	0	0.10	0	6.47E-04	0	88.37	0	6.11E-04
Diving/Construction Support Spread	0	4.17E-04	0	2.63E-02	0	1.26E-03	0	1.53E-02	0	3.77E-03	0	2.53E-05	0	3.45	0	2.39E-05
Jet Trencher	0	4.26E-04	0	2.68E-02	0	1.29E-03	0	1.56E-02	0	3.84E-03	0	2.58E-05	0	3.52	0	2.44E-05
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	0	3.83E-04	0	2.41E-02	0	1.16E-03	0	1.40E-02	0	3.45E-03	0	2.32E-05	0	3.16	0	2.19E-05
Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	0	5.04E-04	0	3.18E-02	0	1.53E-03	0	1.85E-02	0	4.55E-03	0	3.06E-05	0	4.17	0	2.89E-05
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	0	1.74E-04	0	1.10E-02	0	5.26E-04	0	6.37E-03	0	1.57E-03	0	1.05E-05	0	1.44	0	9.95E-06
Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	0	0.01	0	0.78	0	0.04	0	0.45	0	0.11	0	7.47E-04	0	102.05	0	7.06E-04
Daily Crew/Utility	0	5.20E-03	0	0.33	0	0.02	0	0.19	0	0.05	0	3.15E-04	0	43.01	0	2.98E-04
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipeline Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	0	1.16E-02	0	0.73	0	0.04	0	0.42	0	0.10	0	7.03E-04	0	96.00	0	6.64E-04
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	0	5.28E-04	0	3.32E-02	0	1.60E-03	0	1.93E-02	0	4.76E-03	0	3.20E-05	0	4.36	0	3.02E-05
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	0	1.58E-03	0	0.10	0	4.79E-03	0	0.06	0	1.43E-02	0	9.59E-05	0	13.09	0	9.06E-05
Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	0	9.87E-04	0	6.22E-02	0	2.99E-03	0	3.61E-02	0	8.91E-03	0	5.98E-05	0	8.17	0	5.65E-05
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16,790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	0	6.41E-04	0	4.03E-02	0	1.94E-03	0	2.35E-02	0	5.78E-03	0	3.88E-05	0	5.30	0	3.67E-05
Scow Barge Spread (one / each)	0	6.32E-03	0	0.40	0	0.02	0	0.23	0	5.70E-02	0	3.83E-04	0	52.29	0	3.62E-04
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipeline Transition (MP12.5-MP16.6)	0	5.84E-03	0	0.37	0	0.02	0	0.21	0	0.05	0	3.54E-04	0	48.31	0	3.34E-04
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	0	0.02	0	1.18	0	0.06	0	0.68	0	0.17	0	1.13E-03	0	154.60	0	1.07E-03
Reinstatement Spread for Morgan HDD Pit Excavation	0	3.24E-04	0	2.04E-02	0	9.79E-04	0	1.18E-02	0	2.92E-03	0	1.96E-05	0	2.68	0	1.85E-05
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	0	1.49E-03	0	0.09	0	4.52E-03	0	0.05	0	1.35E-02	0	9.04E-05	0	12.34	0	8.54E-05
Reinstatement Spread for Anchorage Area	0	1.80E-03	0	0.11	0	5.44E-03	0	0.07	0	1.62E-02	0	1.09E-04	0	14.87	0	1.03E-04
Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	0	1.44E-03	0	0.09	0	4.35E-03	0	0.05	0	1.30E-02	0	8.71E-05	0	11.89	0	8.23E-05
Reinstatement Spread for all other pipeline segments	0	1.62E-03	0	0.10	0	4.90E-03	0	0.06	0	1.46E-02	0	9.81E-05	0	13.40	0	9.27E-05
Pre Lay Survey Campaign	0	1.91E-04	0	1.21E-02	0	5.79E-04	0	7.00E-03	0	1.73E-03	0	1.16E-05	0	1.58	0	1.09E-05
Post Jet Burial Survey Campaign	0	5.22E-05	0	3.29E-03	0	1.58E-04	0	1.91E-03	0	4.71E-04	0	3.16E-06	0	0.43	0	2.99E-06
As Built Survey Campaign	0	6.96E-05	0	4.38E-03	0	2.11E-04	0	2.55E-03	0	6.28E-04	0	4.21E-06	0	0.58	0	3.98E-06
Soil Transport	0	0.68	0	11.46	0	23.70	0	75.53	0	18.75	0	0.03	0	8357.24	0	0.08
Trucking of Pipe to Storage Yard	3.81E-02	0	0.69	0	1.45	0	3.25	0	0.81	0	1.62E-03	0	482.06	0	4.03E-03	0
Total	3.81E-02	0.82	0.69	20.39	1.45	24.13	3.25	80.72	0.81	20.03	1.62E-03	0.04	482.06	9530.05	4.03E-03	0.08



Raritan Bay Loop Fugitive Dust Emissions

Fugitive Dust Emission Factors

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/Ton Earth Moved	lb/Ton Earth Moved
Site Clearing, Excavation & Filling	1.80E-03	2.72E-04

Materials Handling (AP-42 Section 13.2.4 (11/2006 version))

29,630 Tons of Earth Moved

Process Type	Emission Factors	
	PM ₁₀	PM _{2.5}
	lb/1000 lb abrasive	lb/1000 lb abrasive
Sandblasting	13	1.3

AP-42 Table 13.2.6

0.03

1,000 lbs of abrasive

Project Emissions

Equipment	Emission (tons)							
	VOC	CO	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂	HAPs
Site grading, excavation, and filling	NA	NA	NA	2.66E-02	4.03E-03	NA	NA	NA
Sandblasting	NA	NA	NA	2.20E-04	2.20E-05	NA	NA	NA
Total Project Emissions	0	0	0	2.68E-02	4.05E-03	0	0	0



Raritan Bay Loop Equipment Emission Factors

HDD Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Morgan Onshore HDD -	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
		Backhoe	300	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
Morgan Offshore HDD -	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
		Generators	250	0.2	0.5	2.0	0.1	0.1	1.64E-03	530.6
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
CP Cable Drill - Onshore	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	202	0.1	0.5	1.7	0.1	0.1	1.60E-03	530.6
	Pull-back String	Drill Rig CAT Power Unit	202	0.1	0.5	1.7	0.1	0.1	1.60E-03	530.6
	HDD Pilot Hole	Mud Rig & Reclaimer Pumps	25	0.3	1.6	3.8	0.2	0.2	2.17E-03	589.3
	Pull-back String	Mud Rig & Reclaimer Pumps	25	0.3	1.6	3.8	0.2	0.2	2.17E-03	589.3
CP Cable Drill - Offshore	HDD Operations - Shallow Water Crane Barge	400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		Crawler Crane	95	2.22E-02	0.2	1.1	3.53E-02	3.43E-02	1.59E-03	590.3
		Shallow Water Tug	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9

Ambrose East Offshore HDD	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Operations - W571 Jack up	W751 Generator	425	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		W751 Aux Generator	160	0.2	0.6	2.3	0.1	0.1	1.65E-03	530.5
		Jacking Compressors	525	0.1	0.3	1.2	0.1	0.1	1.56E-03	530.8
		50T Cherry picker	250	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
Ambrose West Offshore HDD	MOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Operations - W750 Jack up	W750 Generator	325	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		Jacking Compressors	525	0.1	0.3	1.2	0.1	0.1	1.56E-03	530.8
		50T Cherry picker	250	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
	DeMOB	Kenworth	450	1.05E-02	3.06E-02	0.1	8.22E-03	7.97E-03	1.42E-03	536.8
	HDD Pilot Hole	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Hole Opening	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	Pull-back String	Drill Rig CAT Power Unit	1750	0.2	0.8	3.8	0.1	0.1	1.61E-03	530.5
	HDD Pilot Hole	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Mud Rig Genset-MQ	350	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Pilot Hole	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Hole Opening	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	Pull-back String	Trackhoe - 240	177	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0
	HDD Pilot Hole	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	HDD Hole Opening	Forklift - 10,000# & Over	130	2.46E-02	0.1	0.3	2.47E-02	2.39E-02	1.45E-03	536.8
	Pull-back String	Forklift - 10,000# & Over	22	0.3	1.5	3.8	0.2	0.2	2.19E-03	595.1
	HDD Pilot Hole	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Hole Opening	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	Pull-back String	R.T. Crane 50-75 Ton	275	1.94E-02	0.1	0.3	1.53E-02	1.48E-02	1.43E-03	531.0
	HDD Pilot Hole	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	HDD Hole Opening	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Pull-back String	Triplex Pump	540	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7

W541 - Crane Barge	W541 - Crane Barge	W541-Hoist Engine	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		W541-Swing Engine	525	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		W541-Auxiliary Generator	85	0.2	1.3	2.8	0.2	0.2	1.84E-03	589.7
		Deck Winch #1	238	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Deck Winch #2	160	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2

Pipelay Related Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Pipelay Spread Mob/Demob	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Pipelay of Ambrose HDD String	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Pipelay of Morgan HDD String	Anchor Handling <12ft WD	Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
		Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Anchor Handling >12ft WD	Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Shallow Water Barge	Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Pipelay Spread from MP12.50 - MP14.5 (Ultra Shallow Water On Bottom Pull)	Anchor Handling <12ft WD	Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
		Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Anchor Handling >12ft WD	Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Shallow Water Barge	Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Pipelay Spread from MP14.5 - MP16.5 (Shallow Water)	Antares Anchor Handling <12ft WD	Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
		Gabby Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
	Beach Pull	110kW Diesel Hydraulic Power Unit	147	2.98E-02	0.2	0.5	4.02E-02	3.90E-02	1.46E-03	536.7
		150 Tonne SWL Diesel Hydraulic Spooling Winch	248	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Antares Anchor Handling >12ft WD	Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Seven Antares	Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Linda Miller	660	0.2	3.7	4.3	0.2	0.2	1.0	514.9
Pipelay Spread from M16.5 - MP 29.3 (West of Ambrose)	Antares Anchor Handling <12ft WD	Anchor Barge #37 Barge	99	0.2	1.3	4.3	0.3	0.3	1.0	514.9
		Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Antares Anchor Handling >12ft WD	Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
	Seven Antares	Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
Pipelay Spread from - MP 30.4 to MP 35.5 (East of Ambrose -	Antares Anchor Handling >12ft WD	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9

Rockaway Manifold)	Seven Antares	Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Above Water Tie-in/ Spool @ MP16.6	Antares Anchor Handling >12ft WD	Tug Robert	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Tug Elizabeth	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Seven Antares	Caterpillar 3412 DITA 580kW	778	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Volvo D12 MG-RC 225kW	302	0.2	3.7	4.3	0.2	0.2	4.85E-03	514.9	
		Additional GE6 for pipelay ops 800kW	1073	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
Pipe Delivery Spread	Dockside Crane	Manitowoc 1100	332	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9	
	Pipeline Barge Tug	Tug Trevor	1500	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
Diving/Construction Support Spread	Dive Barge	W571	1502	0.2	3.7	5.1	0.2	0.2	1.0	514.9	
		Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0	
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8	
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
		Tug 2000 HP TBN	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9	
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9	
	Material Barge Tug	Tug 2000 HP TBN	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
	Jet Trencher	Mob	M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
			400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
			20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
Light Plant			24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
250 cfm Aircompressor			80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
Equipment needed for Jet Trencher - Rockaway Manifold to Ambrose East (MP 35.2 to 30.4)	Barge + Tug	W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9	
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0	
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8	
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9	
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9	
	Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7	
	Equipment needed for Jet Trencher - Ambrose West to Chapel Hill Channel (MP 29.4 - MP 25.1)	Barge + Tug	W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
			W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
			M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
			400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
			20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
Light Plant			24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
250 cfm Aircompressor			80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
2000 HP Tugboat			2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
Crew Boat (Main Eng)			980	0.2	1.9	9.7	0.2	0.2	1.0	514.9	
--(Aux engine)			12	0.2	3.7	5.1	0.3	0.3	1.0	514.9	
Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7		
Equipment needed for Jet Trencher - Anchorage Area to Raritan Channel (MP 24.0 -MP 17.5)	Barge + Tug	W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7	
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9	
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0	
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8	
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3	
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2	
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9	
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9	
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9	
	Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7	

Equipment needed for Jet Trencher - Raritan Channel to Pre-lay Trench (MP 17.5 - MP 16.6)	Barge + Tug	W263 Deck Winches	225	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		W061 Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		M4000 Crane	400	3.80E-02	0.2	0.7	3.27E-02	3.17E-02	1.49E-03	530.9
		400 Amp Welder	32.7	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	24.8	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		2000 HP Tugboat	2000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		—(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Jetter	1250kw Generator	1676	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
	Daily Crew/Utility	Morgan HDD Crew Boat	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0
—(Aux engine)			150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Ambrose HDD Crew Boat		Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		—(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Samantha Miller LCV		Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		—(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Guard Vessel # 1		Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		—(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
HDD Water Delivery OSV		Main Eng	850	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		—(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		—Bow Thruster	300	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Pre-comm OSV		Boat (Main Eng)	850	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		—(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		—Bow Thruster	300	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Dredging & Reinstatement Related Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Dredging Spread for Pre-trenching the Morgan HDD String & Ultra Shallow Water Pipelay Transition MP12.5-MP16.6 (41,979 CuYd - HARS, 133,694 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Pre-trenching the Raritan (290,470 CuYd Upland) & Chapel Hill Channel (131,729- HARS) Crossings	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Morgan and CP Cable HDD Pit Excavation (9,931 CuYd - Upland + 461 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for Ambrose HDD East & West Pit Excavation (14,050 CuYd - HARS, 32,450 CuYd - HARS)	Dredging	HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9

Dredging Spread for Anchorage Area pre-trenching (44,490 CuYd - HARS, 10,889 CuYd - Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Dredging Spread for RDL Neptune Crossing to RDL Tie-in Location MP 35.2 to MP35.5 (13,152 CuYd HARS), VC64 Clamshell Segment MP33.54 to 33.93 (16790 CuYd Upland), & Addtl Chapel Segment MP 25.30 to 25.61 (14,778 CuYd Upland)	Dredging	UPLAND W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		UPLAND W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		HARS W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Scow Barge Spread (one / 1 each)	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
Reinstatement Spread for the Morgan HDD String & Ultra Shallow Water Pipelay Transition (MP12.5-MP16.6)	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for the Raritan & Chapel Hill Channel Crossings	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Reinstatement Spread for Morgan HDD Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for Ambrose HDD East & West Pit Excavation	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for Anchorage Area	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9

Reinstatement Spread for RDL Neptune Crossing to RDL Tie-in Location (MP 35.2 to MP35.5), VC64 Clamshell Segment MP33.54 to 33.93 & Addtl Chapel Segment MP 25.30 to 25.61	Reinstatement	Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Mining Sand	W551 Clam Rig (Main Engine)	2,545	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		W551 Clam Rig (Aux Engine)	460	0.2	3.7	4.3	0.2	0.2	1.0	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9
	Dredge Material Transportation	Dump Scow #1	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #2	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #3	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		Dump Scow #4	286	0.2	1.1	7.5	0.2	0.2	1.0	514.9
Reinstatement Spread for all other pipeline segments	Toyo Dredge Pump	W571	1,502	0.2	3.7	5.1	0.2	0.2	1.0	514.9
		Deck Winches	300	2.89E-02	0.1	0.4	2.87E-02	2.78E-02	1.46E-03	536.7
		Toyo Pump	425	0.1	0.6	2.0	0.1	0.1	1.65E-03	530.7
		400 Amp Welder	33	0.3	1.4	3.2	0.2	0.2	2.03E-03	695.0
		20kW Generator	30	0.2	0.7	3.0	0.1	0.1	1.71E-03	589.8
		Light Plant	25	0.3	1.5	3.8	0.2	0.2	2.17E-03	589.3
		250 cfm Aircompressor	80	4.30E-02	0.4	1.3	0.1	0.1	1.63E-03	590.2
		Tug 2000 HP TBN	2,000	0.2	3.7	5.1	0.2	0.2	4.85E-03	514.9
		Crew Boat (Main Eng)	980	0.2	1.9	9.7	0.2	0.2	1.0	514.9
		--(Aux engine)	12	0.2	3.7	5.1	0.3	0.3	1.0	514.9

Survey Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Pre Lay Survey Campaign	Pre lay Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
Post Jet Burial Survey Campaign	Post Pipeline Burial Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9
As Built Survey Campaign	As Built Survey	Crew Boat (Main Eng)	600	0.2	1.1	7.5	0.2	0.2	1.0	514.9
		--(Aux engine)	150	0.2	3.7	5.1	0.2	0.2	1.0	514.9

Quayside Disposal Processing Equipment										
CONSTRUCTION PHASE	Activity	Equipment Type	Horsepower	VOC (g/hp-hr)	CO (g/hp-hr)	NOx (g/hp-hr)	PM ₁₀ (g/hp-hr)	PM _{2.5} (g/hp-hr)	SO ₂ (g/hp-hr)	CO ₂ (g/hp-hr)
Soil Offload	Offloading of Barges	Komatsu PC 1250 (Hyd Excavator)	675	1.80E-02	0.1	0.3	2.03E-02	1.96E-02	1.44E-03	536.8
Soil Processing	Screening, conveying and processing of Sediment	Pugmill Processing System	350	0	0	0	0	0	0	0
Soil Handling	Staging and loading of Material	Komatsu PC 360 (Hyd Excavator)	270	1.06E-02	2.94E-02	0.1	8.24E-03	7.99E-03	1.42E-03	536.8
Soil Handling	Staging and loading of Material	Komatsu WA 420 (Loader)	220	0.2	0.8	1.3	0.2	0.2	1.83E-03	626.0



APPENDIX D MOVES OUTPUT FILES



APPENDIX E LAND USE ACREAGE AFFECTED BY PROJECT

Facility	County	Onshore Land Affected During Construction (acres) ^a
Pipeline Facilities		
Pennsylvania		
Quarryville Loop	Lancaster County	210.74
New Jersey		
Madison Loop	Middlesex County	75.17
Raritan Bay Loop	Middlesex County	2.76
	Union County	5.49
	Hudson County	5.84
Aboveground Facilities		
Pennsylvania		
Compressor Station 200	Chester County	28.94
New Jersey		
Compressor Station 206	Somerset County	27.15

Note:

^a Acreages presented in the table for construction include areas that will be crossed by HDD and not impacted during construction.



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