TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

SECTION 7 – CORRESPONDENCE

NORTHEAST SUPPLY ENHANCEMENT PROJECT

January 2020

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MacLeod, Steven

From: MacLeod, Steven
Sent: Tuesday, July 10, 2018 10:03 AM
To: 'Jones, Christopher'; Normant, Jeff
Cc: Dacanay, Kira; Davis, Kelly; Foster, Ruth; Hice Dunton, Lyndie; Horner, Scott (Scott.Horner@williams.com); Clements, Blake; Sue Quackenbush; Mochrie, Sara; Olson, Karen; 'Merz, Dan'; 'Christine Roy'; 'Richard Scott'
Subject: RE: Transco NESE Project - mitigation follow-up

Chris,
We understand that NJ waters crossed by the Project do not meet the definition of "Shellfish Habitat" at N.J.A.C. 7:7-9.2 due to their 303(d) listings; However, the Project route will cross Surf Clam Areas as defined at N.J.A.C. 7:7-9.3. Therefore, we are following up since Jeff Normant had previously indicated that surf clam mitigation would be required.

If NJDEP has concluded that hard clam and/or surf clam mitigation is no longer considered necessary for the Project, please advise.

Sincerely,
Steve

ecology and environment, inc.

Steven MacLeod, *Environmental Scientist*
368 Pleasant View Drive, Lancaster, NY 14086
Office Phone: 716-684-8060 x3907 • Work Cell: 716-462-0845
smacleod@ene.com • www.ene.com

From: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Sent: Monday, July 9, 2018 3:10 PM
To: MacLeod, Steven <SMacLeod@ene.com>; Normant, Jeff <Jeff.Normant@dep.nj.gov>
Cc: Dacanay, Kira <Kira.Dacanay@dep.nj.gov>; Davis, Kelly <Kelly.Davis@dep.nj.gov>; Foster, Ruth <Ruth.Foster@dep.nj.gov>; Hice Dunton, Lyndie <LHiceDunton@ene.com>; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Clements, Blake <Blake.Clements@williams.com>; Sue Quackenbush <squackenbush@amygreene.com>; Mochrie, Sara <SMochrie@ene.com>; Olson, Karen <Karen.Olson@williams.com>
Subject: RE: Transco NESE Project - mitigation follow-up

Good afternoon Steve,

It was not anticipated by the NJDEP that there would be a shellfish mitigation requirement. Are you asking for the formula because your understanding was that there would be?

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

From: MacLeod, Steven [mailto:SMacLeod@ene.com]
Sent: Monday, July 09, 2018 1:49 PM

To: Normant, Jeff <Jeff.Normant@dep.nj.gov>
Cc: Dacanay, Kira <Kira.Dacanay@dep.nj.gov>; Davis, Kelly <Kelly.Davis@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Foster, Ruth <Ruth.Foster@dep.nj.gov>; Hice Dunton, Lyndie <LHiceDunton@ene.com>; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Clements, Blake <Blake.Clements@williams.com>; Sue Quackenbush <squackenbush@amygreene.com>; Mochrie, Sara <SMochrie@ene.com>
Subject: Transco NESE Project - mitigation follow-up

Hello Jeff,
Following up on our exchange from 2016/2017 (see attached email chain), could you please provide the equation that NJDEP will use for calculating mitigation for surf clam impacts within the Northeast Supply Enhancement Project pipeline buffer north of Sandy Hook, surf clam density (or CPUE), and surf clam value (i.e., cost per clam) that would be applied?

(You previously provided the equation for hard clam mitigation; is the surf clam mitigation equation the same?)

Thank you,
Steve

ecology and environment, inc.

Steven MacLeod, *Environmental Scientist*
368 Pleasant View Drive, Lancaster, NY 14086
Office Phone: 716-684-8060 x3907 • Work Cell: 716-462-0845
smacleod@ene.com • www.ene.com

From:	Mochrie, Sara
To:	Resnick, Matthew; christopher.jones@dep.nj.gov; Diane.Dow@dep.nj.gov
Cc:	Horner, Scott (Scott.Horner@williams.com); Olson, Karen; "Dean, Joseph" (Joseph.Dean@Williams.com); dan.merz@williams.com; Christine Roy; Richard Scott; Eakin,Megan; Perry, Katharine; Sue Quackenbush (squackenbush@amygreene.com); Bill Macholdt; Sundar, Nischint
Subject:	NESE Needs - Engineer Signature and Seal - Email #2
Date:	Tuesday, July 17, 2018 3:35:03 PM
Attachments:	image003.jpg image004.jpg NESE Jun 2018 Stormwater Mng Rprt Seal page.JPEG

Diane, Chris and Matt,

Attached here as email #2 is the engineer signature and seal page.

Hard copies were signed and sealed (both NJDEP and clerk copies). Electronic copies don't reflect this because NJDEP regulations require a raised seal.

Also, signatures on Page 2 of the application –one from PS&S, one from AECOM – comply with the certification request. The signature page specifies that it's regarding the stormwater management report specifically.

The certification statements on the application pages match the regulations excerpted below for ease of review.

If you require further documentation, please let us know as soon as possible. Also please confirm receipt of this email.

Thanks,
Sara

From: Mochrie, Sara
Sent: Tuesday, July 17, 2018 5:12 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; christopher.jones@dep.nj.gov; 'Diane.Dow@dep.nj.gov' <Diane.Dow@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Olson, Karen <Karen.Olson@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com)

<Joseph.Dean@Williams.com>; dan.merz@williams.com; Christine Roy <CRoy@rutterroy.com>; 'Richard Scott' <RScott@rutterroy.com>; Eakin,Megan <MEakin@ene.com>; Perry, Katharine <KPerry@ene.com>; Sue Quackenbush (squackenbush@amygreene.com) <squackenbush@amygreene.com>; Bill Macholdt <bmacholdt@amygreene.com>
Subject: NESE Needs - News paper Notices - Email #1

Diane, Chris, and Matt,

Attached and in a series of emails to follow (due to size limitations), you will find items responding to the purported deficiencies from the Eastern Environmental Law Center (EELC) that were provided to the NESE Project Team via email transmittal today.

Not certain what files the EELC reviewed via the OPRA request or at the clerks offices but the relevant information is provided here again for ease of review and was part of our application submissions in June of 2018.

If you require further documentation, please let us know as soon as possible. Also please confirm receipt of each email in the event that files sizes are too large.

You also confirmed via our phone call today that you have in your possession CD copies of the applications.

Thanks,
Sara

Sara Mochrie, *Principal-Project Manager*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
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From: Dow, Diane <Diane.Dow@dep.nj.gov>
Sent: Tuesday, July 17, 2018 1:37 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Bill Macholdt (bmacholdt@amygreene.com) <bmacholdt@amygreene.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: RE: Transco.

It will not be administratively deficient but we want to make sure our file is perfect.

From: Resnick, Matthew
Sent: Tuesday, July 17, 2018 1:29 PM
To: Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Bill Macholdt (bmacholdt@amygreene.com) <bmacholdt@amygreene.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>
Subject: Transco.

Sara, Joseph, and Bill, please see the attached letter. Can you please send me the pictures referenced in the administrative deficiency, and the Engineer's Certification required under the FHA Rules NJAC 7:13-18.2(i) and (j). I need them **today,** otherwise the application will be declared administratively deficient. PDF is fine.

From:	Mochrie, Sara
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Subject:	NESE Needs - Photo Log - Email #3
Date:	Tuesday, July 17, 2018 8:26:11 PM
Attachments:	NESE NJ wetland photo log.pdf image001.jpg image002.jpg

Diane, Chris, and Matt,

Attached here as email #3 is the photo log that was part of the wetland delineation report. As discussed during our call today the Wetland Delineation Report was submitted in June 2018 with the new permit application. As requested we will submit another copy in case you still can't find the one previously submitted.

This is a very large file that bounced back from email when first sent. Please confirm receipt of this email.

Thanks,
Sara

From: Mochrie, Sara
Sent: Tuesday, July 17, 2018 5:35 PM
To: 'Resnick, Matthew' <Matthew.Resnick@dep.nj.gov>; christopher.jones@dep.nj.gov; 'Diane.Dow@dep.nj.gov' <Diane.Dow@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Olson, Karen <Karen.Olson@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; 'dan.merz@williams.com' <dan.merz@williams.com>; 'Christine Roy' <CRoy@rutterroy.com>; 'Richard Scott' <RScott@rutterroy.com>; Eakin,Megan <MEakin@ene.com>; Perry, Katharine <KPerry@ene.com>; Sue Quackenbush (squackenbush@amygreene.com) <squackenbush@amygreene.com>; Bill Macholdt <bmacholdt@amygreene.com>; Sundar, Nischint <NSundar@ene.com>
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AFFIDAVIT OF PUBLICATION

Publisher's Fee $49.02 Affidavit $35.00

State of New Jersey } **SS.**
Somerset County

Personally appeared _____

Of the **Courier News,** a newspaper printed in Freehold, New Jersey and published in Somerville, in said County and State, and of general circulation in said county, who being duly sworn, deposeth and saith that the advertisement of which the annexed is a true copy, has been published in the said newspaper 1 times, once in each issue as follows:

06/22/18 **A.D 2018**

_____
Notary Public of New Jersey

Ad Number: 0002990645

MELANIE C ALTZ
NOTARY PUBLIC, STATE OF NEW JERSEY
MY COMMISSION EXPIRES
NOV. 19 2019

Ad Number: 0002990645 Run Dates: 06/22/18

SOMERSET COUNTY

LEGAL NOTICE

Applications for NJDEP Individual Freshwater Wetlands Permit, Flood Hazard Verification, and Flood Hazard Area Individual Permit

Take Notice that applications for an Individual Freshwater Wetlands Permit, Flood Hazard Area Verification under Method 5 and Flood Hazard Area Individual Permit have been submitted to the New Jersey Department of Environmental Protection, Division of Land Use Regulation (NJDEP or Department) for the development described below. Transco withdrew its previous applications for approval under the Freshwater Wetlands Protection Act rules and Flood Hazard Area Control Act rules for the Project on June 14, 2018. The reason for this withdrawal and resubmittal is to provide the Department with additional time to comply with the timeframes by which it must act on Transco's requests for a Water Quality Certificate (WQC) pursuant to Section 401(a)(1) of the Clean Water Act (CWA), 33 U.S.C. §1341(a)(1). The scope of the Project has not changed.

APPLICANT:	Transcontinental Gas Pipe Line Company LLC (Transco)
PROJECT NAME:	Northeast Supply Enhancement Project
PROJECT DESCRIPTION:	Construction of Compressor Station 206 in Franklin Township, Somerset County, NJ. Construction of the Madison Loop gas line in Old Bridge Township and Sayreville Borough, Middlesex County, NJ.
BLOCK AND LOT:	Multiple
MUNICIPALITIES:	Franklin Township/Old Bridge Township an Sayreville Borough
COUNTY:	Somerset County/Middlesex County

The complete permit application packages can be reviewed at either the municipal clerk's offices in the municipalities in which the site subject to the application is located, or by appointment at the Department's Trenton Office. The Department of Environmental Protection welcomes comments and any information that you may provide concerning the proposed development and site. Please submit your written comments within 30 calendar days of the date to the Department publishes notice of the application in the DEP Bulletin (http://www.nj.gov/dep/bulletin/):

N.J. Department of Environmental Protection
Division of Land Use Regulation
Mail Code 501-02A; P.O. Box 420
Trenton, NJ 08625-0420
Attn: Bureau of Urban Growth & Redevelopment

Questions about the application may be addressed to:

Joseph Dean
Transcontinental Gas Pipe Line Company
2800 Post Oak Boulevard
Houston, Texas 77056
(49.02)

0002990645-01

AFFIDAVIT OF PUBLICATION

Publisher's Fee $49.28 Affidavit $35.00

State of New Jersey } **SS.**
Middlesex County

Personally appeared _____

Of the **Home News Tribune,** a newspaper printed in Freehold, New Jersey and published in East Brunswick, in said County and State, and of general circulation in said county, who being duly sworn, deposeth and saith that the advertisement of which the annexed is a true copy, has been published in the said newspaper 1 times, once in each issue as follows:

06/21/18 **A.D 2018**

_____
Notary Public of New Jersey

Ad Number: 0002988901

MELANIE C. ALTZ
NOTARY PUBLIC, STATE OF NEW JERSEY
MY COMMISSION EXPIRES
NOV. 19 2019

Ad Number: 0002988901 Run Dates: 06/21/18

LEGAL NOTICE

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APPLICANT: Transcontinental Gas Pipe Line Company LLC (Transco)
PROJECT NAME: Northeast Supply Enhancement Project
PROJECT DESCRIPTION: Construction of Compressor Station 206 in Franklin Township, Somerset County, NJ. Construction of the Madison Loop gas line in Old Bridge Township and Sayreville Borough, Middlesex County, NJ.
BLOCK AND LOT: Multiple
MUNICIPALITIES: Franklin Township/Old Bridge Township and Sayreville Borough
COUNTY: Somerset County/Middlesex County

The complete permit application packages can be reviewed at either the municipal clerk's offices in the municipalities in which the site subject to the application is located, or by appointment at the Department's Trenton Office. The Department of Environmental Protection welcomes comments and any information that you may provide concerning the proposed development and site. Please submit your written comments within 30 calendar days of the date to the Department publishes notice of the application in the DEP Bulletin (http://www.nj.gov/dep/bulletin/):

N.J. Department of Environmental Protection
Division of Land Use Regulation
Mail Code 501-02A; P.O. Box 420
Trenton, NJ 08625-0420
Attn: Bureau of Urban Growth & Redevelopment

Questions about the application may be addressed to:

Joseph Dean
Transcontinental Gas Pipe Line Company
2800 Post Oak Boulevard
Houston, Texas 77056
($49.28)

0002988901-01

AFFIDAVIT OF PUBLICATION

Publisher's Fee $47.52 Affidavit $35.00

State of New Jersey } **SS.**
Middlesex County

Personally appeared _____

Of the **Home News Tribune,** a newspaper printed in Freehold, New Jersey and published in East Brunswick, in said County and State, and of general circulation in said county, who being duly sworn, deposeth and saith that the advertisement of which the annexed is a true copy, has been published in the said newspaper 1 times, once in each issue as follows:

06/21/18 **A.D 2018**

_____
Notary Public of New Jersey

Ad Number: 0002988946

MELANIE C ALT
MY COMMISSION EXPIRES NOV. 19 2019
NOTARY PUBLIC, STATE OF NEW JERSEY

Ad Number: 0002988946 Run Dates: 06/21/18

LEGAL NOTICE

Application for NJDEP Waterfront Development Individual Permit
and Coastal Wetlands Individual Permit

Take Notice that an application for a Waterfront Development Individual Permit and Coastal Wetlands Individual Permit has been submitted to the New Jersey Department of Environmental Protection, Division of Land Use Regulation (NJDEP or Department) for the development described below. Transco withdrew its previous application for approval under the Waterfront Development Law and Coastal Wetlands Act of 1970 for the Project on June 14, 2018. The reason for this withdrawal and resubmittal is to provide the Department with additional time to comply with the timeframes by which it must act on Transco's requests for a Water Quality Certificate (WQC) pursuant to Section 401(a)(1) of the Clean Water Act (CWA), 33 U.S.C. §1341(a)(1). The scope of the Project has not changed.

APPLICANT: Transcontinental Gas Pipe Line Company LLC (Transco)
PROJECT NAME: Northeast Supply Enhancement Project
PROJECT DESCRIPTION: Construction of the Madison Loop gas line in Old Bridge Township and Sayreville Borough, Middlesex County, NJ.
Construction of the Raritan Bay Loop gas line in Sayreville Borough, Middlesex County, NJ and offshore waters of Raritan Bay
BLOCK AND LOT: Multiple
MUNICIPALITIES: Old Bridge Township and Sayreville Borough
COUNTY: Middlesex County

The complete permit application package can be reviewed at either the municipal clerk's offices in the municipalities in which the site subject to the application is located, or by appointment at the Department's Trenton Office. The Department of Environmental Protection welcomes comments and any information that you may provide concerning the proposed development and site. Please submit your written comments within 30 calendar days of the date to the Department publishes notice of the application in the DEP Bulletin (http://www.nj.gov/dep/bulletin/):

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Transcontinental Gas Pipe Line Company
2800 Post Oak Boulevard
Houston, Texas 77056
($47.52)

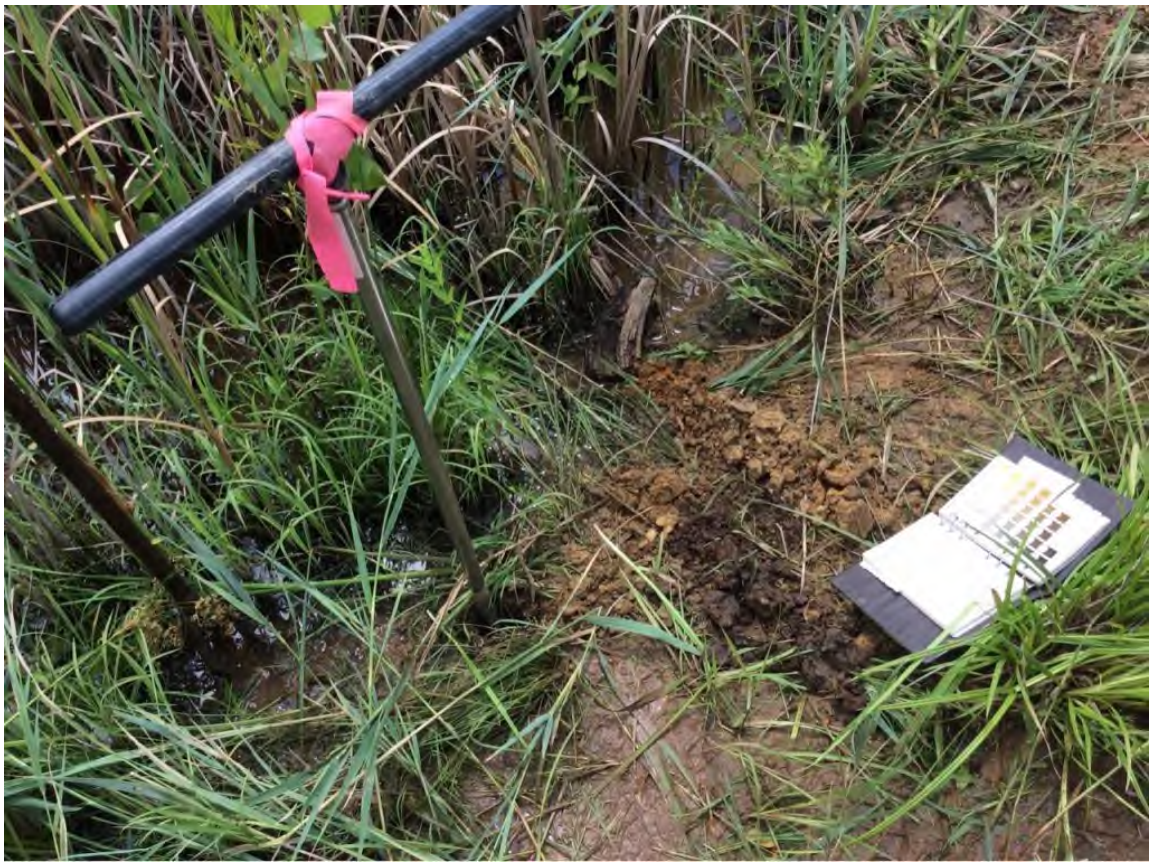
0002988946-01

8 Wetlands Data Packages

8B. Wetland Data Sheets and Photographs

W-T01-001 Photo Log

ID:W-T01-001A-1 Date:08/15/2016 Direction:S Position:Wetland Overview



ID:W-T01-001A-1 Date:08/15/2016 Direction:N Position:Wetland Pit

W-T01-001 Photo Log

ID:U-T01-001-1 Date:08/15/2016 Direction:N Position:Upland Overview

ID:U-T01-001-1 Date:08/15/2016 Direction:N Position:Upland Pit

W-T01-002 Photo Log

ID:W-T01-002A-1 Date:08/16/2016 Direction:S Position:Wetland Overview

ID:W-T01-002A-1 Date:08/16/2016 Direction:N Position:Wetland Pit

W-T01-002 Photo Log

ID:W-T01-002B-1 Date:08/16/2016 Direction:SW Position:Wetland Overview

ID:W-T01-002B-1 Date:08/16/2016 Direction:SW Position:Wetland Pit

W-T01-002 Photo Log

ID:U-T01-002-1 Date:08/16/2016 Direction:N Position:Upland Overview

ID:U-T01-002-1 Date:08/16/2016 Direction:N Position:Upland Pit

W-T01-003 Photo Log

ID:W-T01-003A-1 Date:08/16/2016 Direction:E Position:Wetland Overview

ID:W-T01-003A-1 Date:08/16/2016 Direction:W Position:Wetland Pit

W-T01-003 Photo Log

ID:W-T01-003C-1 Date:08/16/2016 Direction:E Position:Wetland Overview

ID:W-T01-003C-1 Date:08/16/2016 Direction:E Position:Wetland Pit

W-T01-003 Photo Log

ID:U-T01-003-1 Date:08/16/2016 Direction:W Position:Upland Overview

ID:U-T01-003-1 Date:08/16/2016 Direction:W Position:Upland Pit

W-T01-004 Photo Log

ID:W-T01-004A-1 Date:08/18/2016 Direction:SW Position:Wetland Overview

ID:W-T01-004A-1 Date:08/18/2016 Direction:N Position:Wetland Pit

W-T01-004 Photo Log

ID:U-T01-004-1 Date:08/18/2016 Direction:NE Position:Upland Overview

ID:U-T01-004-1 Date:08/18/2016 Direction:N Position:Upland Pit

W-T01-005 Photo Log

ID:W-T01-005A-1 Date:08/18/2016 Direction:E Position:Wetland Overview

ID:W-T01-005A-1 Date:08/18/2016 Direction:E Position:Wetland Pit

W-T01-005 Photo Log

ID:U-T01-005 Date:08/18/2016 Direction:W Position:Upland Overview

ID:U-T01-005 Date:08/18/2016 Direction:W Position:Upland Pit

W-T01-006 Photo Log

ID:W-T01-006A-1 Date:08/19/2016 Direction:SE Position:Wetland Overview

ID:W-T01-006A-1 Date:08/19/2016 Direction:SE Position:Wetland Pit

W-T01-006 Photo Log

ID:U-T01-006-1 Date:08/19/2016 Direction:E Position:Upland Overview

ID:U-T01-006-1 Date:08/19/2016 Direction:E Position:Upland Pit

W-T01-007 Photo Log

ID:W-T01-007A-1 Date:08/19/2016 Direction:W Position:Wetland Overview

ID:W-T01-007A-1 Date:08/19/2016 Direction:W Position:Wetland Pit

W-T01-007 Photo Log

ID:W-T01-007C-1 Date:08/19/2016 Direction:SW Position:Wetland Overview

ID:W-T01-007C-1 Date:08/19/2016 Direction:SW Position:Wetland Pit

W-T01-007 Photo Log

ID:U-T01-007-1 Date:08/19/2016 Direction:SE Position:Upland Overview

ID:U-T01-007-1 Date:08/19/2016 Direction:SE Position:Upland Pit

W-T01-008 Photo Log

ID:W-T01-008A-1 Date:08/18/2016 Direction:N Position:Wetland Overview

ID:W-T01-008A-1 Date:08/18/2016 Direction:N Position:Wetland Pit

W-T01-008 Photo Log

ID:U-T01-008-1 Date:08/18/2016 Direction:N Position:Upland Overview

ID:U-T01-008-1 Date:08/18/2016 Direction:N Position:Upland Pit

W-T01-009 Photo Log

ID:W-T01-009A-1 Date:08/18/2016 Direction:N Position:Wetland Overview

ID:W-T01-009A-1 Date:08/18/2016 Direction:S Position:Wetland Pit

W-T01-009 Photo Log

ID:U-T01-009-1 Date:08/18/2016 Direction:W Position:Upland Overview

ID:U-T01-009-1 Date:08/18/2016 Direction:W Position:Upland Pit

W-T01-010 Photo Log

ID:W-T01-010C-1 Date:08/18/2016 Direction:S Position:Wetland Overview

ID:W-T01-010C-1 Date:08/18/2016 Direction:S Position:Wetland Pit

W-T01-010 Photo Log

ID:U-T01-010-1 Date:08/18/2016 Direction:N Position:Upland Overview

ID:U-T01-010-1 Date:08/18/2016 Direction:N Position:Upland Pit

W-T01-011 Photo Log

ID:W-T01-011A-1 Date:08/20/2016 Direction:W Position:Wetland Overview

ID:W-T01-011A-1 Date:08/20/2016 Direction:W Position:Wetland Pit

W-T01-011 Photo Log

ID:U-T01-011-1 Date:08/20/2016 Direction:W Position:Upland Overview

ID:U-T01-011-1 Date:08/20/2016 Direction:W Position:Upland Pit

W-T01-012 Photo Log

ID:W-T01-012D-1 Date:08/20/2016 Direction:S Position:Wetland Overview

ID:W-T01-012D-1 Date:08/20/2016 Direction:S Position:Wetland Pit

W-T01-012 Photo Log

ID:U-T01-012-1 Date:08/20/2016 Direction:W Position:Upland Overview

ID:U-T01-012-1 Date:08/20/2016 Direction:W Position:Upland Pit

W-T01-013 Photo Log

ID:W-T01-013C-1 Date:10/31/2016 Direction:SW Position:Wetland Overview

ID:W-T01-013C-1 Date:10/31/2016 Direction:SW Position:Wetland Pit

W-T01-013 Photo Log

ID:U-T01-013-1 Date:10/31/2016 Direction:NW Position:Upland Overview

ID:U-T01-013-1 Date:10/31/2016 Direction:NW Position:Upland Pit

W-T01-014 Photo Log

ID:W-T01-014A-1 Date:08/22/2016 Direction:E Position:Wetland Overview

ID:W-T01-014A-1 Date:08/22/2016 Direction:N Position:Wetland Pit

W-T01-014 Photo Log

ID:W-T01-014B-1 Date:08/22/2016 Direction:W Position:Wetland Overview

ID:W-T01-014B-1 Date:08/22/2016 Direction:E Position:Wetland Pit

W-T01-014 Photo Log

ID:W-T01-014C-1 Date:08/22/2016 Direction:E Position:Wetland Overview

ID:W-T01-014C-1 Date:08/22/2016 Direction:E Position:Wetland Pit

W-T01-014 Photo Log

ID:U-T01-014-1 Date:08/22/2016 Direction:W Position:Upland Overview

ID:U-T01-014-1 Date:08/22/2016 Direction:W Position:Upland Pit

W-T15-004 Photo Log

ID:W-T15-004C-1 Date:12/11/2016 Direction:E Position:Wetland Overview

ID:W-T15-004C-1 Date:12/11/2016 Direction:N Position:Wetland Pit

W-T15-004 Photo Log

ID:U-T15-004-1 Date:12/11/2016 Direction:SW Position:Upland Overview

ID:U-T15-004-1 Date:12/11/2016 Direction:S Position:Upland Pit

W-T01-015 Photo Log

ID:W-T01-015A-1 Date:08/22/2016 Direction:E Position:Wetland Overview

ID:W-T01-015A-1 Date:08/22/2016 Direction:E Position:Wetland Pit

W-T01-015 Photo Log

ID:U-T01-015-1 Date:08/22/2016 Direction:N Position:Upland Overview

ID:U-T01-015-1 Date:08/22/2016 Direction:E Position:Upland Pit

W-T01-016 Photo Log

ID:W-T01-016D-1 Date:08/23/2016 Direction:SW Position:Wetland Overview

ID:W-T01-016D-1 Date:08/23/2016 Direction:SW Position:Wetland Pit

W-T01-016 Photo Log

ID:U-T01-016-1 Date:08/23/2016 Direction:SE Position:Upland Overview

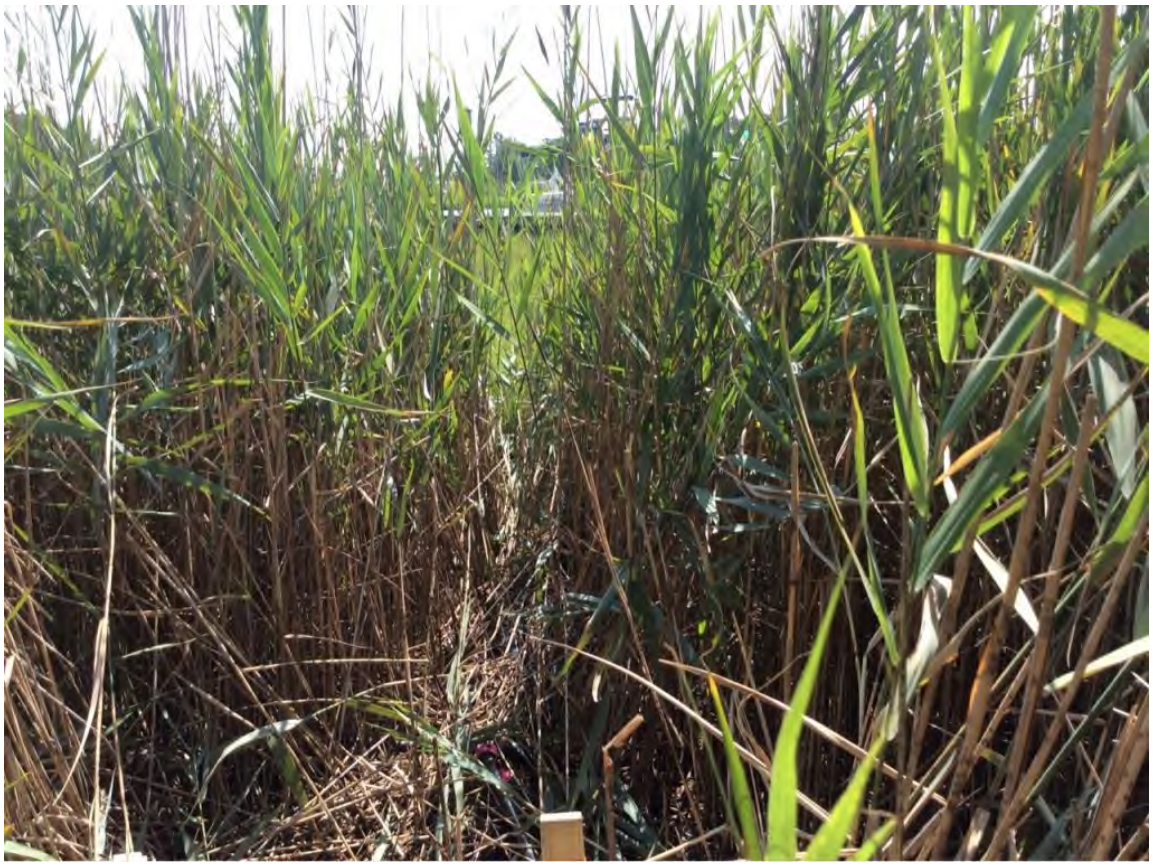
ID:U-T01-016-1 Date:08/23/2016 Direction:SE Position:Upland Pit

W-T01-017 Photo Log

ID:W-T01-017A-1 Date:08/25/2016 Direction:E Position:Wetland Overview

ID:W-T01-017A-1 Date:08/25/2016 Direction:E Position:Wetland Pit

W-T01-017 Photo Log



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ID:W-T01-017D-1 Date:08/25/2016 Direction:SW Position:Wetland Pit

W-T01-017 Photo Log

ID:U-T01-017-1 Date:08/25/2016 Direction:NE Position:Upland Overview

ID:U-T01-017-1 Date:08/25/2016 Direction:NE Position:Upland Pit

W-T07-001 Photo Log

ID:W-T07-001C-1 Date:08/23/2016 Direction:E Position:Wetland Overview

ID:W-T07-001C-1 Date:08/23/2016 Direction:E Position:Wetland Pit

W-T07-001 Photo Log

ID:W-T07-001D-1 Date:08/23/2016 Direction:S Position:Wetland Overview

ID:W-T07-001D-1 Date:08/23/2016 Direction:S Position:Wetland Pit

W-T07-001 Photo Log

ID:U-T07-001-1 Date:08/23/2016 Direction:W Position:Upland Overview

ID:U-T07-001-1 Date:08/23/2016 Direction:W Position:Upland Pit

W-T07-002 Photo Log

ID:W-T07-002A-1 Date:08/23/2016 Direction:SW Position:Wetland Overview

ID:W-T07-002A-1 Date:08/23/2016 Direction:SW Position:Wetland Pit

W-T07-002 Photo Log

ID:U-T07-002-1 Date:08/23/2016 Direction:E Position:Upland Overview

ID:U-T07-002-1 Date:08/23/2016 Direction:E Position:Upland Pit

W-T07-003 Photo Log

ID:W-T07-003A-1 Date:08/24/2016 Direction:S Position:Wetland Overview

ID:W-T07-003A-1 Date:08/24/2016 Direction:S Position:Wetland Pit

W-T07-003 Photo Log

ID:W-T07-003B-1 Date:08/24/2016 Direction:S Position:Wetland Overview

ID:W-T07-003B-1 Date:08/24/2016 Direction:S Position:Wetland Pit

W-T07-003 Photo Log

ID:U-T07-003-1 Date:08/24/2016 Direction:N Position:Upland Overview

ID:U-T07-003-1 Date:08/24/2016 Direction:N Position:Upland Pit

W-T07-004 Photo Log

ID:W-T07-004D-1 Date:08/25/2016 Direction:N Position:Wetland Overview

ID:W-T07-004D-1 Date:08/25/2016 Direction:NW Position:Wetland Pit

W-T07-004 Photo Log

ID:U-T07-004-1 Date:08/25/2016 Direction:E Position:Upland Overview

ID:U-T07-004-1 Date:08/25/2016 Direction:E Position:Upland Pit

W-T08-001 Photo Log

ID:W-T08-001A-1 Date:11/07/2016 Direction:NE Position:Wetland Overview

ID:W-T08-001A-1 Date:11/07/2016 Direction:N Position:Wetland Pit

W-T08-001 Photo Log

ID:U-T08-001-1 Date:11/07/2016 Direction:E Position:Upland Overview

ID:U-T08-001-1 Date:11/07/2016 Direction:N Position:Upland Pit

W-T09-001 Photo Log

ID:W-T09-001A-1 Date:10/06/2016 Direction:S Position:Wetland Overview

ID:W-T09-001A-1 Date:10/06/2016 Direction:S Position:Wetland Pit

W-T09-001 Photo Log

ID:W-T09-001C-1 Date:10/11/2016 Direction:W Position:Wetland Overview

ID:W-T09-001C-1 Date:10/11/2016 Direction:E Position:Wetland Pit

W-T09-001 Photo Log

ID:U-T09-001-1 Date:10/11/2016 Direction:E Position:Upland Overview

ID:U-T09-001-1 Date:10/11/2016 Direction:W Position:Upland Pit

W-T09-002 Photo Log

ID:W-T09-002A-1 Date:10/17/2016 Direction:SW Position:Wetland Overview

ID:W-T09-002A-1 Date:10/17/2016 Direction:SW Position:Wetland Pit

W-T09-002 Photo Log

ID:W-T09-002B-1 Date:11/07/2016 Direction:W Position:Wetland Overview

ID:W-T09-002B-1 Date:11/07/2016 Direction:W Position:Wetland Pit

W-T09-002 Photo Log

ID:W-T09-002C-1 Date:10/17/2016 Direction:E Position:Wetland Overview

ID:W-T09-002C-1 Date:10/17/2016 Direction:N Position:Wetland Pit

W-T09-002 Photo Log

ID:U-T09-002-1 Date:11/07/2016 Direction:E Position:Upland Overview

ID:U-T09-002-1 Date:11/07/2016 Direction:E Position:Upland Pit

W-T09-003 Photo Log

ID:W-T09-003A-1 Date:10/17/2016 Direction:W Position:Wetland Overview

ID:W-T09-003A-1 Date:10/17/2016 Direction:W Position:Wetland Pit

W-T09-003 Photo Log

ID:W-T09-003C-1 Date:10/17/2016 Direction:N Position:Wetland Overview

ID:W-T09-003C-1 Date:10/17/2016 Direction:N Position:Wetland Pit

W-T09-003 Photo Log

ID:U-T09-003-1 Date:10/17/2016 Direction:E Position:Upland Overview

ID:U-T09-003-1 Date:10/17/2016 Direction:E Position:Upland Pit

W-T15-001 Photo Log

ID:W-T15-001A-1 Date:12/07/2016 Direction:SE Position:Wetland Overview

ID:W-T15-001A-1 Date:12/07/2016 Direction:N Position:Wetland Pit

W-T15-001 Photo Log

ID:U-T15-001-1 Date:12/07/2016 Direction:SE Position:Upland Overview

ID:U-T15-001-1 Date:12/07/2016 Direction:N Position:Upland Pit

W-T15-002 Photo Log

ID:W-T15-002A-1 Date:12/09/2016 Direction:NW Position:Wetland Overview

ID:W-T15-002A-1 Date:12/09/2016 Direction:N Position:Wetland Pit

W-T15-002 Photo Log

ID:U-T15-002-1 Date:12/09/2016 Direction:SE Position:Upland Overview

ID:U-T15-002-1 Date:12/09/2016 Direction:N Position:Upland Pit

W-T15-003 Photo Log

ID:W-T15-003A-1 Date:12/10/2016 Direction:NE Position:Wetland Overview

ID:W-T15-003A-1 Date:12/10/2016 Direction:N Position:Wetland Pit

W-T15-003 Photo Log

ID:W-T15-003A-2 Date:12/11/2016 Direction:NE Position:Wetland Overview

ID:W-T15-003A-2 Date:12/11/2016 Direction:N Position:Wetland Pit

W-T15-003 Photo Log

ID:W-T15-003A-3 Date:12/11/2016 Direction:SW Position:Wetland Overview

ID:W-T15-003A-3 Date:12/11/2016 Direction:N Position:Wetland Pit

W-T15-003 Photo Log

ID:W-T15-003C-1 Date:12/11/2016 Direction:S Position:Wetland Overview

ID:W-T15-003C-1 Date:12/11/2016 Direction:N Position:Wetland Pit

W-T15-003 Photo Log

ID:U-T15-003-1 Date:12/10/2016 Direction:NE Position:Upland Overview

ID:U-T15-003-1 Date:12/10/2016 Direction:N Position:Upland Pit

W-T15-003 Photo Log

ID:U-T15-003-2 Date:12/11/2016 Direction:S Position:Upland Overview

ID:U-T15-003-2 Date:12/11/2016 Direction:N Position:Upland Pit

W-T15-003 Photo Log

ID:U-T15-003-3 Date:12/11/2016 Direction:SE Position:Upland Overview

ID:U-T15-003-3 Date:12/11/2016 Direction:N Position:Upland Pit

W-T15-003 Photo Log

ID:U-T15-003-4 Date:12/11/2016 Direction:N Position:Wetland Overview

ID:U-T15-003-4 Date:12/11/2016 Direction:N Position:Wetland Pit

W-T17-002 Photo Log

ID:W-T17-002A-3 Date:01/12/2017 Direction:NW Position:Wetland Overview

ID:W-T17-002A-3 Date:01/12/2017 Direction:N Position:Wetland Pit

W-T17-002 Photo Log

ID:U-T17-002-1 Date:01/12/2017 Direction:E Position:Upland Overview

ID:U-T17-002-1 Date:01/12/2017 Direction:N Position:Upland Pit

UVP-T01-001 Photo Log

ID:UVP-T01-001 Date:08/15/2016 Direction:NE Position:Upland Overview

UVP-T01-002 Photo Log

ID:UVP-T01-002 Date:08/18/2016 Direction:E Position:Upland Overview

ID:UVP-T01-002 Date:08/18/2016 Direction:E Position:Upland Pit

UVP-T01-003 Photo Log

ID:UVP-T01-003 Date:08/18/2016 Direction:N Position:Upland Pit

UVP-T01-004 Photo Log

ID:UVP-T01-004 Date:08/19/2016 Direction:S Position:Upland Overview

ID:UVP-T01-004 Date:08/19/2016 Direction:S Position:Upland Pit

UVP-T01-005 Photo Log

ID:UVP-T01-005 Date:08/22/2016 Direction:E Position:Upland Pit

UVP-T01-006 Photo Log

ID:UVP-T01-006 Date:08/22/2016 Direction:NW Position:Upland Overview

ID:UVP-T01-006 Date:08/22/2016 Direction:NE Position:Upland Pit

UVP-T01-007 Photo Log

ID:UVP-T01-007 Date:08/23/2016 Direction:NE Position:Upland Overview

ID:UVP-T01-007 Date:08/23/2016 Direction:NE Position:Upland Pit

UVP-T01-008 Photo Log

ID:UVP-T01-008 Date:08/24/2016 Direction:NE Position:Upland Overview

UVP-T01-009 Photo Log

ID:UVP-T01-009 Date:09/27/2016 Direction:SE Position:Upland Overview

UVP-T01-010 Photo Log

ID:UVP-T01-010 Date:09/27/2016 Direction:N Position:Upland Overview

9 Watercourse Data Package

WW-T01-001 Photo Log

ID:WW-T01-001 Date:08/16/2016 Direction:N Type:Ephemeral Position:Upstream

ID:WW-T01-001 Date:08/16/2016 Direction:S Type:Ephemeral Position:Downstream

WW-T01-001A Photo Log

ID:WW-T01-001A Date:08/16/2016 Direction:E Type:Ephemeral Position:Upstream

ID:WW-T01-001A Date:08/16/2016 Direction:W Type:Ephemeral Position:Downstream

WW-T01-002 Photo Log

ID:WW-T01-002 Date:08/16/2016 Direction:SE Type:Intermittent Position:Upstream

ID:WW-T01-002 Date:08/16/2016 Direction:SW Type:Intermittent Position:Downstream

WW-T01-002A Photo Log

ID:WW-T01-002A Date:08/16/2016 Direction:SE Type:Ephemeral Position:Upstream

ID:WW-T01-002A Date:08/16/2016 Direction:NW Type:Ephemeral Position:Downstream

WW-T01-002B Photo Log

ID:WW-T01-002B Date:08/19/2016 Direction:SW Type:Ephemeral Position:Upstream

ID:WW-T01-002B Date:08/19/2016 Direction:NE Type:Ephemeral Position:Downstream

WW-T01-003 Photo Log

ID:WW-T01-003 Date:10/31/2016 Direction:NW Type:Intermittent Position:Upstream

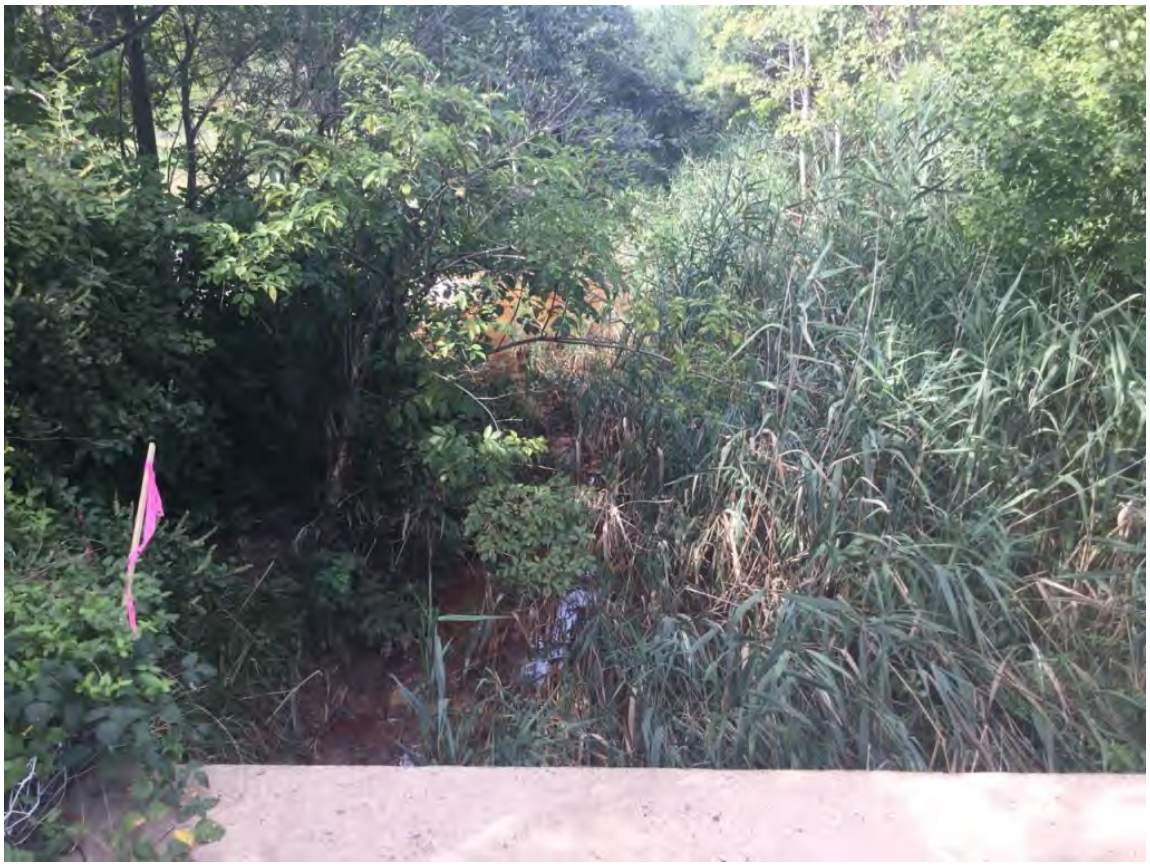
ID:WW-T01-003 Date:10/31/2016 Direction:SE Type:Intermittent Position:Downstream

WW-T01-004 Photo Log

ID:WW-T01-004 Date:08/24/2016 Direction:W Type:Intermittent Position:Upstream

ID:WW-T01-004 Date:08/24/2016 Direction:E Type:Intermittent Position:Downstream

WW-T07-001 Photo Log



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ID:WW-T07-001 Date:08/25/2016 Direction:E Type:Perennial Position:Downstream

WW-T09-001-1 Photo Log

ID:WW-T09-001-1 Date:10/18/2016 Direction:W Type: Position:Upstream

ID:WW-T09-001-1 Date:10/18/2016 Direction:E Type: Position:Downstream

WW-T09-002-1 Photo Log

ID:WW-T09-002-1 Date:10/18/2016 Direction:N Type: Position:Upstream

ID:WW-T09-002-1 Date:10/18/2016 Direction:S Type: Position:Downstream

WW-T13-001 Photo Log

ID:WW-T13-001 Date:12/06/2016 Direction:NE Type:Intermittent Position:Upstream

ID:WW-T13-001 Date:12/06/2016 Direction:SW Type:Intermittent Position:Downstream

WW-T13-002 Photo Log

ID:WW-T13-002 Date:12/06/2016 Direction:E Type:Ephemeral Position:Upstream

ID:WW-T13-002 Date:12/06/2016 Direction:W Type:Ephemeral Position:Downstream

WW-T15-002 Photo Log

ID:WW-T15-002 Date:12/10/2016 Direction:NE Type:Intermittent Position:Upstream

ID:WW-T15-002 Date:12/10/2016 Direction:SW Type:Intermittent Position:Downstream

WW-T15-002A Photo Log

ID:WW-T15-002A Date:12/10/2016 Direction:E Type:Intermittent Position:Upstream

ID:WW-T15-002A Date:12/10/2016 Direction:W Type:Intermittent Position:Downstream

WW-T15-003 Photo Log

ID:WW-T15-003 Date:12/10/2016 Direction:NW Type:Intermittent Position:Upstream

ID:WW-T15-003 Date:12/10/2016 Direction:S Type:Intermittent Position:Downstream

WW-T15-004 Photo Log

ID:WW-T15-004 Date:12/10/2016 Direction:NE Type:Intermittent Position:Upstream

ID:WW-T15-004 Date:12/10/2016 Direction:SW Type:Intermittent Position:Downstream

WW-T15-004A Photo Log

ID:WW-T15-004A Date:12/10/2016 Direction:NE Type:Intermittent Position:Upstream

ID:WW-T15-004A Date:12/10/2016 Direction:SW Type:Intermittent Position:Downstream

WW-T15-004B Photo Log

ID:WW-T15-004B Date:12/10/2016 Direction:N Type:Intermittent Position:Upstream

ID:WW-T15-004B Date:12/10/2016 Direction:S Type:Intermittent Position:Downstream

WW-T15-005 Photo Log

ID:WW-T15-005 Date:12/10/2016 Direction:NE Type:Ephemeral Position:Upstream

ID:WW-T15-005 Date:12/10/2016 Direction:SW Type:Ephemeral Position:Downstream

WW-T19-001 Photo Log

ID:WW-T19-001 Date:04/18/2017 Direction:SW Type:Perennial Position:Upstream

ID:WW-T19-001 Date:04/18/2017 Direction:SE Type:Perennial Position:Across

A Photo Log, Raritan Bay Loop

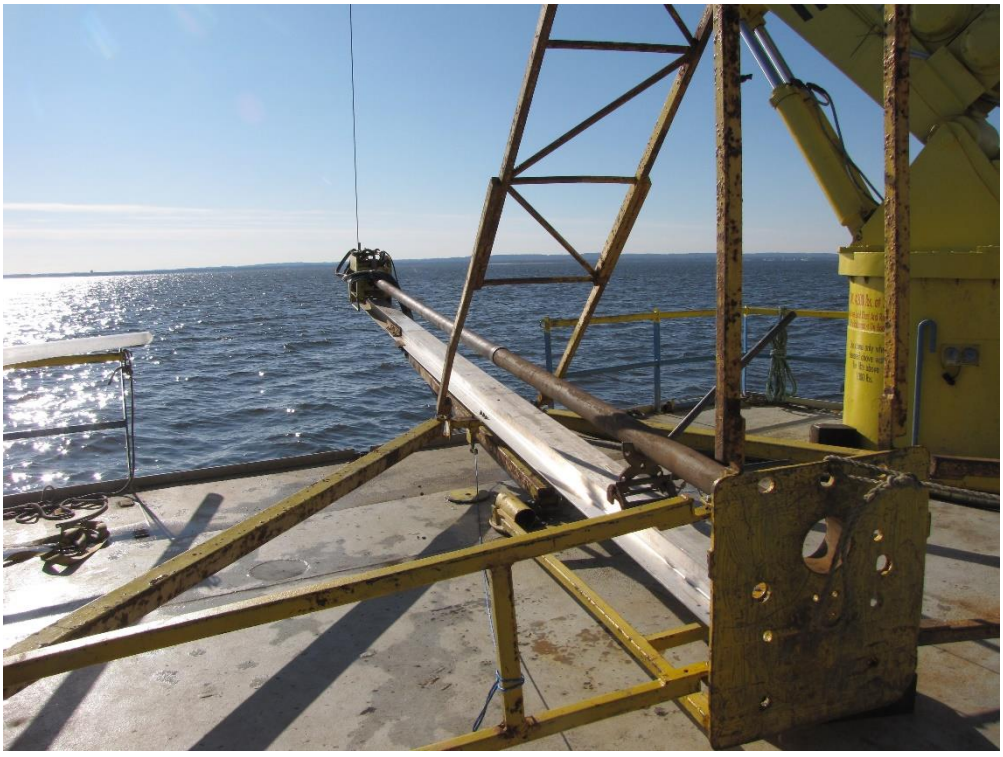

Photo 1 View 1 of the Raritan Bay Loop Project Area

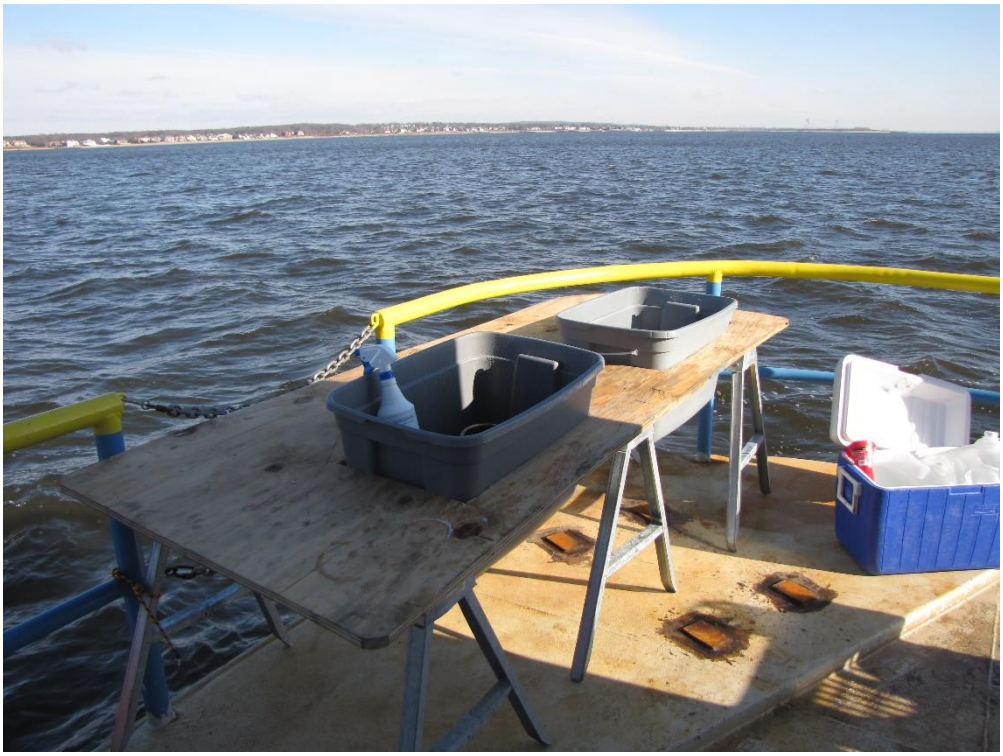

Photo 2 View 2 of the Raritan Bay Loop Project Area

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF PERMIT COORDINATION AND ENVIRONMENTAL REVIEW
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SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. MCCABE
Commissioner

July 18, 2018

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulation Commission
888 First Street, NE
Washington, DC 20426

Mr. Scott Horner
Williams Transco
2800 Post Oak Boulevard
PO Box 1396
Houston, Texas 77056

RE: Transcontinental (Transco) Gas Pipeline Company
Northeast Supply Enhancement Project
Middlesex, Monmouth and Somerset Counties
FERC Docket #PF 16-5; CP-17-101-000
Comments on Supplemental Reports to Draft EIS

Dear Ms. Bose and Mr. Horner:

On May 14, 2018, the New Jersey Department of Environmental Protection's (NJDEP) Office of Permit Coordination and Environmental Review (PCER) issued comments on the Draft Environmental Impact Statement (EIS) for the proposed Transco Northeast Supply Enhancement (NESE) Project. On May 30, 2018, the NJDEP distributed Supplemental Reports prepared by Transco and posted to the Federal Energy Regulation Commission (FERC) docket on May 11, 2018 in response to the FERC prepared Draft EIS. This project proposes the installation of 3.4 miles of natural gas pipeline looping in a predominantly existing right of way in Middlesex County (Madison Loop), 23.4 miles of pipeline in State waters of New Jersey and New York (Raritan Bay Loop), and one new compressor station (206) in Franklin Township, Somerset County. For the Raritan Loop, 0.16 miles is located on-shore and 5.96 miles is located offshore and in NJ waters. In addition, the NJDEP previously provided comments on the Draft Resource Reports (January 10, 2017) and on the Final Resource Reports (May 11, 2017) for this proposed project.

Based on the information provided in the Transco Supplemental Reports, we offer the following comments for your consideration.

Land Use Regulation Program

The Division of Land Use Regulation (Division) is currently reviewing for completeness permit applications for this project submitted to the Department on June 20, 2018 including a

Freshwater Wetlands Individual Permit, a Flood Hazard Area Permit, an In-Water and Upland Waterfront Development Permit and a Coastal Wetland Permit.

- June 23, 2017 - Transcontinental Gas Pipeline Company, LLC (Transco) submitted an application to the Division of Land Use Regulation (the Division) for a Flood Hazard Area Permit and a Freshwater Wetland Individual Permit for the Compressor Station and Madison Loop portions of the NESE project.
- July 10, 2017 - Transco submitted an application for a Coastal Wetland Permit and an In-Water and Upland Waterfront Development Permits for a portion of the Madison Loop and the Raritan Loop portions of the NESE project.
- June 15, 2018 - All of these applications were withdrawn due to technical deficiencies.
- June 20, 2018 - Transco resubmitted all of these applications to the Division.

Based upon the Division's review to date of the June 20 permit application submittal, the current application remains deficient. The Division will be issuing Transco a formal letter that outlines these deficiencies. These deficiencies are noted as follows:

1. The submitted project plans and tax maps for the Madison Loops shows construction, temporary access roads, staging areas, easement expansion, and new pipe line alignment outside of Transco's existing right-of-way on at least seven (7) properties not owned by Transco. Written property owner consent for the affected properties is required.

2. Transco has a pending application with the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity (Certificate). FERC's decision establishes public interest and need for the project under the Natural Gas Act. Because the applicant has not obtained the FERC Certificate, it has not been demonstrated that there is a need for the project, nor has Transco shown that the project would meet the public interest under the federally authorized Freshwater Wetlands and Water Quality Certificate Standards. A copy of the FERC Certificate is required.

3. Transco has not demonstrated that the proposed methods to install the Raritan Loop demonstrate compliance with the New Dredging rules under N.J.A.C. 7:7-12.7(c)5 and 12.7(c)6. In particular, Transco proposes to install the new pipeline from mile marker 12+50 to 14+05 in the Raritan Bay via the use of clam shell bucket. This will result in dredging a 60-foot wide path for 8000 linear feet, and the generation of approximately 69,000 cubic yards of dredged material. Transco proposes both Horizontal Directional Drilling (HDD) and the use of a jet trencher to install other portions of the pipeline and has not provided a rationale that demonstrates that these methods cannot be used between mile markers 12+50 and 14+05 within the Raritan Bay. Additional information is required to demonstrate that the expanded use of HDD and jet trenching would be unfeasible.

4. Transco performed sediment testing and analysis of the proposed dredge material. However, that testing and analysis was not a Division approved Sediment Sampling and Analysis Plan as required by Appendix G of the Coastal Zone Management Rules. Without an approved Sampling and Analysis Plan, the Division is unable to

evaluate the proposed dredge material for appropriate upland disposal. A proposed Sampling and Analysis plan is required.

5. Transco proposes to take dredged material to the Historic Area Remediation Site (HARS) and all dredged materials not accepted by the HARS to an alternate upland placement site. However, Transco has not received an approval from the Army Core of Engineers to place the dredged material at the HARS site, and Transco has not provided a letter of acceptance from any other acceptable dredge placement site for the dredged material. Documentation from a suitable disposal facility is required for disposal of the dredged material.

6. Pursuant to N.J.A.C. 7:13-12.1(g)2, concentrated overland flow that causes erosion to property not owned by an applicant is considered an adverse impact to that property. Transco is proposing to construct two (2) swales adjacent to the proposed Compressor Station access road. These swales would receive runoff from the access road, concentrate that flow, and then ultimately discharge the runoff onto the adjacent property not owned by applicant. This discharge has the potential to cause erosion on property not owned by the applicant. Transco must demonstrate that this runoff will not result in erosion or adverse impact to the offsite property. Additionally, Transco must submit information that demonstrates that it has consent to discharge the stormwater onto the adjacent property, or that is has obtained an easement or entered into an agreement to purchase the property pursuant to N.J.A.C. 7:13-12.1(f).

7. Transco has proposed a bioretention pond in the proposed Compressor Station site design. The submitted information does not identify the elevation of the seasonal high groundwater table as required by the Stormwater Management Rule and *New Jersey Stormwater Best Management Practices Manual.* Without the elevation of the seasonal high groundwater table DEP cannot determine whether the bioretention basin is designed such that the minimum required 2-foot separation from the bottom of the bioretention's soil media to the seasonal high groundwater table has been attained as required by the Stormwater Management Rule and the *New Jersey Stormwater Best Management Practices Manual.* Soil boring data that identifies the seasonal high groundwater elevation is required.

8. Transco must analyze the pervious and impervious surfaces separately to accurately compute the stormwater runoff rates and volumes of the existing and proposed site conditions. The submitted calculations cannot be relied upon to demonstrate compliance with the water quality standards set forth at N.J.A.C. 7:8-5.5, and the water quantity and recharge standards set forth at N.J.A.C. 7:8-5.4 because the analysis was not done in this manner. Revise calculations are required that analyze the pervious and impervious surfaces separately.

9. The stormwater runoff from the proposed compressor station and access road is conveyed to two distinct analysis points, the freshwater wetlands complex near Georgetown-Franklin Turnpike and the Tributary to Carters Brook. Therefore, Transco must demonstrate compliance with the water quantity standards for each distinct analysis point.

10. Transco has designed the proposed access road, such that stormwater runoff from approximately 72,000 square feet of pavement will bypass the proposed bioretention facility and not receive any water quality treatment. Transco intends to compensate for said bypass by capturing and treating runoff from the compressor station area. However, most of the compressor station area does not receive vehicular traffic (i.e. buildings, gravel area beneath the proposed compressor station equipment) and thus is considered clean. Therefore, capturing and treating runoff from these areas cannot be used to compensate for not treating runoff from the proposed access road. Additionally, the project must be designed to provide 80 percent TSS removal rate for two distinct analysis points, the freshwater wetlands complex near Georgetown-Franklin Turnpike and the Tributary to Carters Brook. Therefore, a revised Stormwater management design is required that treats the 72,000 square feet of access road.

11. Transco has assumed the proposed bioretention facility will receive 90% TSS removal credit. However, to receive said credit, the proposed bioretention facility must be designed to have at least two feet of soil bed media and the basin must be planted as a terrestrial forested community (average of 1,000 stems per acre). As currently proposed, the basin does not satisfy this design criteria.

If you have any additional comment, please contact Christopher Jones, Manager, Bureau of Urban Growth & Redevelopment at (609) 984-6216 or Christina Albizati of the Division of Land Use Regulation at (609) 633-6757.

Natural and Historic Resources

Fish and Wildlife - Endangered & Non-game Species Program

In addition to comments provided on the Draft EIS on May 14, 2018, the Endangered and Non-game Species Program (ENSP) offers the following additional comment on the Draft EIS and Supplemental Reports.

1. Pg. 4-48: "Construction could result in the mortality of less mobile animals such as small rodents, reptiles, amphibians, and invertebrates, which may be unable to escape the immediate construction area, but wildlife mortality is not anticipated to be significant"
    - ENSP personnel need to know what the basis is for determining the significance/insignificance of the loss of an individual to a local population in order to complete this review.

2. At this time, ENSP concurs with revisions/clarifications regarding the following items:
    a. The vegetation clearing timing restriction to be implemented during project site preparation, construction, and restoration to minimize harm to migratory songbirds; i.e., avoid clearing vegetation April 1 through August 31, (pg. 4-72).

b. The vegetation clearing timing restriction to be implemented during work at Compressor Station 206 to minimize harm to Indiana Bats; i.e., clearing trees ≥5 inch DBH from Oct 1 to March 31.
   - However, please note, there is suitable forest habitat for Northern Long-eared Bats along the project length including the entire onshore length and specifically, the westernmost segment west of Rte. 9. Although Transco is not required under the federal listing (per the 4(d) rule), ENSP requests Transco voluntarily extend the tree clearing restriction to the entire onshore project length to minimize the risk of harm to these bats as well.

c. Vehicle speed limits to minimize impacts from vehicle and equipment traffic of no more than 15mph (pg. 4-287) and proposed speeds (10 knots) for aquatic vessels 65-ft or larger from November 1 to April 30 to protect Right whales.

d. Proposal to conduct construction activities during daylight hours to the extent practicable.

3. At this time, ENSP concerns regarding marine wildlife:

   a. Although the ENSP generally defers to the National Marine Fisheries Service on mitigation actions relating to marine mammals and sea turtles, we feel strongly that, despite efforts to minimize impacts from sea floor disturbance, proposed actions will pose a threat to surrounding marine wildlife, including sea turtles. Sea turtles are dependent upon vision to locate prey, making individuals especially vulnerable to effects of turbidity/suspended sediments associated with pipeline construction. Disturbance from construction activities, and mortality to benthic prey items from excavations and smothering, may force sea turtles away from preferred foraging areas, possibly putting them at increased risk to ship strikes. Finally, with increases in turbidity, it is possible that shipboard observers may not be able to readily spot sea turtles and marine mammals that have wandered into construction areas, putting them at increased risk from ship strikes and other project impacts. We strongly encourage that construction activities be kept to a minimum from June through October.

   b. We concur with the Bureau of Marine Fisheries (BMF) that dredging and developing timing restrictions designed to protect anadromous fish migrations (e.g. endangered populations of Atlantic and shortnose sturgeon) MUST be observed (i.e. no work/dredging between March 1-June 30). Sturgeon are susceptible to boat strikes, increased turbidity, and sensory disturbances, esp. from pile driving. Although sturgeon are likely to move away from areas before pile driving exceeds behavior disturbance thresholds, it is possible that they could be attracted to construction areas due to the presence of prey items that have been stirred up during construction. It is therefore critical that these activities be completely avoided during migration periods and not just to the extent practicable.

   c. ENSP defers to the National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (USFWS) on best management practices (BMP's)/mitigation actions relating to marine mammals and sea turtles, and await results of ongoing consultations. We concur with the applicant that speed restrictions should be imposed to protect right whales between 1 Nov and 30 April, and that vessels should

stay at least 150 feet from sea turtles. We highly recommend, however, that project activities in areas proximate to seal haul out sites/foraging areas do not take place during months when seals are known to occur (November-April). A portion of the proposed pipeline construction lies within the ENSP's Species Occurrence Area (SOA) for harbor seal. It is critical that overwintering seals are able to travel to foraging areas and back to their haul out sites without disturbance.

d. As noted, ENSP defers to the National Marine Fisheries Service and the US Fish and Wildlife Service (USFWS) on actions relating to marine mammals and sea turtles.

4. The proposed Transco NESE Pipeline extends through the Raritan Bay, an area that has been documented for horseshoe crab spawning (critical to migrating shorebirds) as well as migratory shorebird presence during spring and fall migrations. As such, the proposed trenching activity to install the pipeline can have detrimental impacts on these species if conducted during these critical periods.

   To minimize harm, ENSP recommends that no activity occur near-shore (i.e., the beach) or off-shore between April 15 and September 15, the same restriction implemented for dredging activities by the DFW, Bureau of Marine Fisheries. In addition, the topography and sand composition of the shoreline should not be altered long-term. Therefore, ENSP recommends mitigation measures be implemented to restore (and/or improve) the shoreline for horseshoe crab spawning/egg-laying and shorebird access. Guidance parameters for shoreline restoration and improvement can be provided by ENSP biologist, Amanda Dey at Amanda.Dey@dep.nj.gov and/or 856-785-2711).

If there are any questions please contact Kelly Davis of the DFW Office of Environmental Review at (908) 236-2118 or kelly.davis@dep.nj.gov.

Thank you for the opportunity to review and provide comment on the May 11, 2018 posted Supplemental Information Reports. If you have any additional questions, please do not hesitate to call me at (609) 292-3600.

Sincerely,

Ruth W. Foster, PhD, P.G, Acting Director
Office of Permit Coordination and Environmental Review

cc.
Eric Wachter, Chief of Staff
Richard Dalton, NJGS
Christopher Jones, NJDEP Land Use
Matthew Resnick, Land Use
Kelly Davis, NJDEP DFW
Sara Mochrie, Ecology and Environment

State of New Jersey

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625-0420
www.nj.gov/dep/landuse

CATHERINE R. McCABE
Commissioner

JUL 18 2018

Sara Mochrie, Principal-Project Manager
Ecology and Environment, INC
368 Pleasant View Drive
Lancaster, NY 14086

CERTIFIED MAIL

RE: Deficiency Letter for a Freshwater Wetlands Individual Permit, Flood Hazard Area Individual Permit, Flood Hazard Area Verification, Waterfront In Water Individual Permit, Waterfront Upland Individual Permit, Coastal Wetlands Permit
DLUR File No. 0000-01-1001.3: FWW170001, FHA 170001, FHA 170002 CSW170001, WFD170001, WFD170002
Applicant: Transcontinental Gas Pipeline Company (Transco)
Project: Transcontinental Gas Pipeline Northeast Supply Enhancement Project
Project Location: Old Bridge Township, Sayreville Township, Middlesex County Franklin Township, Somerset County
Block: Multiple
Lot: Multiple

Dear Mrs. Mochrie:

We have reviewed the above referenced permit application and find that the project as proposed is technically deficient with regards to the points enumerated below. In accordance with Coastal Zone Management rules outlined under N.J.A.C. 7:7 et seq., Freshwater Wetlands Protection Act outlined under N.J.A.C. 7:7A et seq., and Flood Hazard Control Act Rules outlined under N.J.A.C. 7:13 et seq. The following items are deficient;

1. The submitted project plans and tax maps for the Madison Loops shows construction, temporary access roads, staging areas, easement expansion, and new pipe line alignment outside of Transco's existing right-of-way on at least three (3) properties not owned by Transco. Please provide written property owner consent for the affected properties.

2. Transco has provided sediment testing and analysis of the proposed dredge material for raw bulk sediment chemistry and a geotechnical analysis. However, additional testing is required if the material is to be processed and placed at an upland placement site. This additional testing is referred to as the structural fill protocol and/or processed dredged material product testing as per the Department's Dredging Technical Manual. The Department notes that while a letter of acceptance from Clean Earth demonstrates that the facility has the capacity to process the proposed amount of material, it did not identify a beneficial use site for the material because the additional analyses

mentioned above are necessary to evaluate the placement of the material at a given site. Therefore, it is necessary for Transco to resample the dredged material to be removed from the locations within the exit pit area and clamshell bucket dredging areas using the structural fill protocol. Transco should submit a new sediment and analysis plan to the NJDEP for review and approval prior to proceeding with the additional sampling event.

3. Transco proposes to take dredged material to the Historic Area Remediation Site (HARS) and all dredged materials not accepted by the HARS to an alternate upland placement site. However, Transco has not received an approval from the Army Corps of Engineers to place the dredged material at the HARS site and has not provided an appropriate letter of acceptance from any other acceptable dredge placement site for the dredged material that indicates the material meets their analytical requirements.

4. Please provide any letters or communication with the US Army Core of Engineers that the agency is aware and in agreement on removal of sediment from the Ambrose Channel and the Jamaica Bay Entrance Channel to be used as backfill material in the dredge areas and exit pits. Please note that due to fine-grained nature of the material identified in the U.S. Navy Earle Entrance Channel or the Sandy Hook Channel, it does not appear that material from these channels would be appropriate for the use of this material as backfill in the dredge areas.

5. Pursuant to N.J.A.C. 7:13-12.1(g)2, concentrated overland flow that causes erosion to property not owned by an applicant is considered an adverse impact to that property. Transco is proposing to construct two (2) swales adjacent to the proposed Compressor Station access road. These swales would receive runoff from the access road, concentrate that flow, and then ultimately discharge the runoff onto the adjacent property not owned by applicant. This discharge has the potential to cause erosion on property not owned by the applicant. Transco must demonstrate that this runoff will not result in erosion or adverse impact to the offsite property. Additionally, Transco must submit information that demonstrates that it has consent to discharge the stormwater onto the adjacent property, or that is has obtained an easement or entered into an agreement to purchase the property pursuant to N.J.A.C. 7:13-12.1(f).

6. Transco must analyze the pervious and impervious surfaces separately to accurately compute the stormwater runoff rates and volumes of the existing and proposed site conditions. The submitted calculations cannot be relied upon to demonstrate compliance with the water quality standards set forth at N.J.A.C. 7:8-5.5, and the water quantity and recharge standards set forth at N.J.A.C. 7:8-5.4 because the analysis was not done in this manner. Please revise the calculations to analyze the pervious and impervious surfaces separately.

7. The stormwater runoff from the proposed compressor station and access road is conveyed to two distinct analysis points, the freshwater wetlands complex near Georgetown-Franklin Turnpike and the Tributary to Carters Brook. As such, Transco must demonstrate compliance with the water quantity standards for each distinct analysis point.

8. Transco has designed the proposed access road, such that stormwater runoff from approximately 72,000 square feet of pavement will bypass the proposed bioretention facility and not receive any water quality treatment. Transco intends to compensate for said bypass by capturing and treating runoff from the compressor station area. However, most of the compressor station area does not receive vehicular traffic (i.e. buildings, gravel area beneath the proposed compressor station equipment) and thus is considered clean. Therefore, capturing and treating runoff from these areas cannot be used to compensate for not treating runoff from the proposed access road. Additionally, please note the project must be designed to provide 80 percent TSS removal rate for two distinct

analysis points, the freshwater wetlands complex near Georgetown-Franklin Turnpike and the Tributary to Carters Brook. Please submit a revised Stormwater management design that treats the 72,000 square feet of access road.

9. Transco has assumed the proposed bioretention facility will receive 90% TSS removal credit. However, to receive said credit, the proposed bioretention facility must be designed to have at least two feet of soil bed media and the basin must be planted as a terrestrial forested community (average of 1,000 stems per acre). Please provide Landscape Plan which illustrates the proposed number of plantings for each species and planting density. Additionally, please provide a Section View of the proposed bioretention facility, which illustrates the basin, depth of planting bed, and seasonal high groundwater table.

10. As per the Coastal Zone Management Act Federal Consistency Regulations, specifically Part 930.60, it should be noted that DLUR's review has not yet begun and a response to the above listed deficiencies must be submitted before the State's review of the requested Consistency Certification can commence.

If you have any questions concerning this letter, please do not hesitate to contact Matthew Resnick of my staff via email at Matthew.Resnick@dep.nj.gov or via telephone at (609) 777-3955.

Sincerely,

Christopher Jones, Manager
Bureau of Urban Growth and Redevelopment
Division of Land Use Regulation

cc

Transcontinental Gas Pipeline Co. Atten: Joseph Dean, Manager EH&S, 2800 Post Oak Road Blvd, Suite 900, Houston, Texas, 77056,

Army Core of Engineers, New York District, 26 Federal Plaza, New York, New York, 10278,

Ms. Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, NE, Washington, DC 240426

Ruth W. Foster, PhD., Acting Director
New Jersey Department of Environmental Protection
Office of Permit Coordination and Environmental Review
Mail Code 401-07J
401 East State Street – PO Box 420

Northeast Supply Enhancement (NESE) Project

NJDEP Project Meeting Minutes

Date: August 1, 2018
Time: 9:30 am – 12:00 pm
Location: NJDEP Office, 501 E. State St., Trenton, NJ

Participants

Transco: Sarah Behrends, Blake Clements, Brian Ham, Joe Dean, Scott Horner*, Chris Martinez*, Karen Olson
E&E: Meghan Albers, Megan Eakin*, Steven MacLeod, Sara Mochrie, Katharine Perry
Amy Greene: Bill Macholdt, Sue Quackenbush
AECOM: Pete Haas
NJDEP: Kelly Davis, Chris Jones, Stephen Olivera, Matt Resnick, Magda Usarek-Witek

* Participant by phone

Meeting Summary

Prior to discussing the agenda, Mr. Jones brought up two items:

- Compressor Station 206 Access Road
    - Councilman Chase in the Township of Franklin indicated to the New Jersey Department of Environmental Protection (NJDEP) that authorization to use the Higgins Farm access road to reach Compressor Station 206 could be obtained. NJDEP indicated that Transco should consider this.
    - Transco provided background information related to its consideration of the use of the Higgins Farm access road. The Higgins have executed a Deed of Easement conveying their non-agricultural development rights in the property to Franklin Township. Given the Deed of Easement, neither the Higgins nor Franklin Township can convey the necessary rights to Transco for use of the road. In addition, the Environmental Protection Agency (EPA) has indicated to Transco that the EPA may not allow use of the site as an access road as that could inhibit the EPA's ability to continue site remediation.
        - NJDEP requested Transco further explore the EPA road as an option, potentially reaching out to the EPA for a formal written position.
        - NJDEP would follow up with Councilman Chase to determine if this is something the Mayor would consider.

- NJDEP stated that the Princeton Hydro June 2018 comment letter claimed that the alternatives analysis for the siting Compressor Station 206 was flawed. However, these are not necessarily the comments of the Division of Land Use Regulation (DLUR).

1. Project Schedule Update
    a. The Project in-service date has been revised to December 1, 2020
    b. Final Environmental Impact Statement expected in September. Permits needed by April 2019 to allow Transco time between permit issuance and the start of construction to finalize mitigation and review all permit conditions to ensure compliance.
2. Permit Timeline
    a. Hearing schedule:
        i. NJDEP indicated that once the NJDEP applications are deemed substantively complete, public "fact finding" meetings (hearings) could be held. NJDEP also indicated that the FEIS was not required prior to holding the hearings or for the application to be considered substantively complete for review.
        ii. NJDEP stated that once responses to the DLUR July 18, 2018 deficiency letter are received, the application would be substantively complete enough to proceed with the public hearings.
        iii. Transco/NJDEP agreed on October 2018 for public hearings. The hearings would cover the Freshwater Wetlands, Flood Hazard Area, and Waterfront Development applications.
        iv. Transco explained that in order to hold public hearings in October 2018, a public notice would need to be issued 30 days prior to any hearings (September 2018), venues would need to be secured in September and therefore planning for dates/locations for public hearings would need to occur in August 2018.
        v. Transco agreed to send potential dates/locations for public hearings for NJDEP to approve. Transco will secure the approved venues.
            1. NJDEP would prefer two venues, one near Compressor Station 206 and one near Madison Loop.
            2. The DLUR indicated they would not likely hold combined hearings for the de-watering permits (Madison Loop)
        vi. Interim meetings/conference calls to occur with NJDEP to ensure William's responses are sufficient for NJDEP's continued review.
    b. NJDEP indicated that there would not be any new deficiency items for the DLUR permit applications. NJDEP may ask for additional clarification, but once the comments in the deficiency letter are addressed and consent agreements have been obtained for all properties crossed by the Project, the application can be deemed technically complete and a notice of complete application will be published.
    c. For Freshwater Wetlands and Flood Hazard area technical completeness will start the 90-day time-clock for DLUR action on permits. The 1-year time-clock for NJDEP action on the application for a water quality certification was re-started at the time of application resubmittal in June 2018.
    d. For Waterfront Development technical completeness coupled with the issuance of the FEIS will start the 6-month coastal zone consistency review period.

e. NJDEP indicated that as soon as Transco has information or responses to deficiency requests to send those over for NJDEP to begin review immediately.
f. Major takeaways
    i. Once Transco responds to all items in the latest deficiency letter, and either 100% owner agreements have been obtained or FERC issues an Order, the DLUR permit applications will be technically complete.

3. Comments Received
    a. Comments were most recently received from DLUR via Deficiency Letter dated July 18, 2018.
    b. NJDEP comments on the Supplemental Reports to the Draft Environmental Impact Statement (DEIS) submitted to the FERC docket by NJDEP Office of Permit Coordination and Environmental Review, dated July 18, 2018 included inconsistencies with most recent DLUR deficiency letter, particularly related to time-of-year (TOY) restrictions.
    c. Mr. Jones suggested that Transco clarify these discrepancies directly with FERC and NJDEP Office of Permit Coordination and Environmental Review.
4. Onshore
    a. Madison Loop
        i. Property owner update: Consent agreements with all but one NJ landowner (Borough of Sayreville) are signed. Transco is currently in negotiations with the Borough of Sayreville for the remaining two parcels. Therefore, Transco may be able to acquire the parcel without condemnation, and will keep NJDEP apprised of any updates.
    b. Compressor Station 206
        i. Stormwater management and access road design (Deficiency letter item numbers 5 through 9)
            1. Item 5.
                a. NJDEP clarified that this comment only applies to the western part of the access road.
                b. To address this deficiency item, Transco should consider re-configuring the road grading to diffuse the discharge offsite. As long as runoff would be discharged into an area already receiving concentrated flow, this comment would be considered addressed. Mr. Olivera was open to communication to ensure this was addressed adequately.
            2. Item 6.
                a. Transco indicated that the initial calculations for the drainage area use composites; Transco to revise calculations to separate pervious and impervious areas.
            3. Items 7
                a. Areas where Transco can install additional Best Management Practices (BMPs) are limited because of slope.
                b. NJDEP stated Transco could consider adding a BMP for rate control in the upper slope area, and supplement with a vegetation channel with check dams to mitigate flow as it flows downslope.

c. To mitigate flows, use a uniformed gravel size for a portion of the road and supplement with a vegetated channel to mitigate flow.
    i. NJDEP requested that Transco try these two options and evaluate the results.

4. Item 8
    a. NJDEP's BMP Manual for water quality treatment is geared toward infiltration, and are difficult to apply in this scenario given the presence of wetlands and streams. NJDEP states that normally manufactured treatment devices (MTDs) would be employed.
        i. NJDEP indicated that Transco could use uniform size gravel with a non-binding agent. This could just be for a portion of the road.
        ii. Transco explained that the traffic on the road would be minimal, and similar to that of a residential driveway. The station would have two employees on the site Monday-Friday. Occasional delivery truck (once a quarter). Daily basis less than 10 vehicles across the road.
        iii. NJDEP has seen related standards on roads with minimal usage.
5. Item 9
    a. Transco will revise retention basin design to meet the 80% requirement

5. Offshore
    a. Sediment Sampling & Analysis Plan for upland disposal
        i. Transco is working with consultant (Haley Aldrich) to develop sampling plan for upland disposal. Transco expects to submit the complete plan in August 2018.
        ii. Transco asked if NJDEP would be willing to meet in August to discuss plan components prior to finalization. NJDEP encouraged such communication and suggested submittal of a draft plan for review in advance of a meeting.
        iii. NJDEP suggested using the sediment sampling and analysis plan template. Ms. Usarek-Witek agreed to email a copy to Transco.
    b. HARS
        i. Transco's testing for HARS suitability will be completed in August, and the report will likely be submitted to the USACE in September 2018.
        ii. The public notice accounted for a contingency that all clamshell-dredged material would be disposed upland.
        iii. With the Waterfront Development Permit, NJDEP would issue an acceptable use determination. The acceptable use determination will not be considered a technical deficiency but will be required prior to permit issuance. This can be modified later, but in order for NJDEP to issue the permit Transco needs to verify appropriate placement sites have been established for all the dredged material.

iv. If material from NY is coming to NJ, NJDEP would need to evaluate that material in the same way as material coming from NJ waters.
v. To get the acceptable use determination, NJDEP needs actual sediment sampling results. This is because the upland processing facility needs the analytical results in order to confirm acceptability – each facility will have its own approval criteria.
vi. Areas approved by the USACE for HARS disposal would not require sampling for upland disposal.

c. Species-related time-of-year (TOY) restrictions
   i. Transco is optimizing schedule in an attempt to observe all TOY restriction recommendations, but Transco must maintain continuity in the sequence of offshore Project construction activities, such that some flexibility in the TOY restrictions is essential. Transco noted that observation of the TOY restrictions for winter flounder and horseshoe crab would limit construction from MP12.2 to MP14.0 to 3 months (September 15 through December 15).
   ii. Kelly Davis provided feedback on TOY restrictions recommended in NJDEP's comments on the DEIS (from the Endangered and Non-game Species Program)
      1. Regarding horseshoe crab, the main concern was for dredging of the channel near Sandy Hook for backfill material and also near the Morgan shoreline. Volunteer groups have documented horseshoe crab at several nearby beaches including Morgan, South Amboy, Lawrence Harbor, and Cliffwood. Juvenile and sub-adult crabs are also known to remain in the bay for years. This species is an important food source for the red knot, which is listed as endangered in NJ.
      2. Regarding harbor seal, there is concern for activities that may affect the haul-out site on Sandy Hook Peninsula. The harbor seal is not a listed species in NJ, but the proposed TOY restriction for the seal coincides with the right whale TOY restriction that Transco anticipates would apply to pile driving, such that Transco would likely observe both restrictions.
   iii. With respect to Atlantic sturgeon TOY restrictions that may apply near the Ambrose Channel crossing, Mr. Davis indicated that NJDEP would likely defer to NOAA Fisheries recommendations.
   iv. DLUR staff advised Transco to continue coordination with NOAA Fisheries and Kelly Davis at NJDEP. DLUR will likely adopt all the TOY restrictions recommended by the NJDEP Division of Fish and Wildlife (DFW).
   v. Barring new comments, Transco is aware of the recommended offshore TOY restrictions; DLUR staff advised Transco to relay any concerns so NJDEP and Transco can work through those to establish where flexibility may be warranted.
      1. Transco will send DLUR the TOY restriction flexibility requests with details on location (by milepost), construction method, and relevant dates. (cc to Kelly Davis and Christina Albizati)
      2. Requests for flexibility in the TOY restrictions would not be considered an application deficiency.

vi. DLUR will consider whether to apply a 180-day limitation on offshore TOY restrictions for a given location based on the specific flexibility requests and feedback from NJDEP DFW.

d. Offshore backfill sources
   i. Locations of proposed channel sources are being coordinated with USACE. Transco will select the specific locations at time of backfilling based in part on when the locations were most recently dredged.
   ii. Regarding NJDEP's deficiency letter comment, Transco only needs to briefly demonstrate that coordination with the USACE is occurring.
   iii. Dredging of backfill material from the channels in NJ would need to be included in the WFD permit for the Project. The proposed channel dredging schedule will need to consider appropriate TOY restrictions.
   iv. Transco agreed to send Ms. Usarek-Witek details on how the material will be dredged from the offshore channels. E & E staff noted that an environmental bucket would be used when dredging the channels, and that scow overflow was still being considered since the dredged material would be clean sand.
   v. Ms. Usarek-Witek will forward the standard permit conditions for channel dredging to E & E staff.
   vi. Offshore backfill material can be excluded from NJDEP contaminant testing requirements if at least 90% is sand. The segment of the proposed channel sources closest to Naval Earle (east of Sandy Hook) does not meet this grain size criterion, so NJDEP recommended focusing on the other channel source areas.

e. Best Management Practices and Water Quality Monitoring
   i. Water quality requirements will consider what is feasible based on Transco's sediment modeling. Monitoring conditions will be designed to ensure construction holds to the predicted range using adaptive management, e.g., slowing dredging/backfill activities, etc. NJDEP would provide guidance during construction based on the situation.
   ii. E & E staff explained how Transco is trying to balance water quality with other concerns, e.g., slowing down backfill may reduce the extent of the suspended sediment plume, but would increase the duration of backfilling such that it may encroach on the TOY restriction for winter flounder. NJDEP asked Transco to specify the potential conflicts, and NJDEP can address accordingly in the permit for a specific range of mileposts in the permit.

f. CZC Review and mitigation
   i. NJDEP has started its review of the CZC
   ii. Mr. Jones confirmed that NJAC 7:7 does not require shellfish (e.g., hard clam) or surf clam mitigation; this has been acknowledged by the Bureau of Shellfisheries staff following that Bureau's earlier comments recommending shellfish mitigation.
   iii. Mr. Davis is discussing the need for compensatory mitigation for unavoidable impacts on critical habitat with other DFW staff, e.g., horseshoe crab habitat restoration.
   iv. Transco will separately communicate with fishers and other stakeholders regarding potential compensation for direct loss in harvest income.
   v. Transco is still developing a mitigation plan for wetland impacts.

– End Summary --

From:	Usarek-Witek, Magda
To:	Mochrie, Sara; Jones, Christopher; Resnick, Matthew
Cc:	Horner, Scott (Scott.Horner@williams.com); Clements, Blake (Blake.Clements@williams.com); Martinez, Chris (Chris.Martinez@williams.com); Behrends, Sarah; Eakin,Megan; Albers, Meghan; Perry, Katharine; MacLeod, Steven; Olson, Karen
Subject:	RE: NJDEP-NESE - Upland Disposal -Dredging SSAP
Date:	Thursday, August 16, 2018 3:15:07 PM
Attachments:	image001.jpg cp_035.doc

I can meet the 28 or 29. Please let me know how many people can attend so I can see if a conference room is available.

In the meantime you could use this form to help plan or think about how many samples you need to take.

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Thursday, August 16, 2018 4:58 PM
To: Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Clements, Blake (Blake.Clements@williams.com) <Blake.Clements@williams.com>; Martinez, Chris (Chris.Martinez@williams.com) <Chris.Martinez@williams.com>; Behrends, Sarah <Sarah.Behrends@williams.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Perry, Katharine <KPerry@ene.com>; MacLeod, Steven <SMacLeod@ene.com>; Olson, Karen <Karen.Olson@williams.com>
Subject: NJDEP-NESE - Upland Disposal -Dredging SSAP

Magda,

Per our August 1 meeting we discussed setting up a time to review the Sediment Sampling and Analysis Plan developed for dredge material for disposal at an upland facility.

Please let me know if you and others needed from NJDEP are available to meet about that SSAP on any of the following dates - August 28/29/30.

Once you confirm availability we will calendar a meeting.

Thanks in advance!
Sara

Sara Mochrie, *Principal-Project Manager*
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NEW JERSEY DREDGING PROJECTS
SEDIMENT SAMPLING AND ANALYSIS PLAN (SSAP) TEMPLATE

VERSION 3.0

Before completing this SSAP template, please determine if the proposed project qualifies for any of the testing exclusions identified in N.J.A.C. 7:7 Appendix G and contact the Division of Land Use, Office of Dredging and Sediment Technology (DLUR, ODST) to receive a confirmation that the testing exclusion is applicable to the project.

The major objective of a SSAP is to accurately characterize the horizontal and vertical distribution of the physical/geotechnical properties and contaminant concentrations of the sediment to be dredged.

This document serves as the template to develop the SSAP for a proposed dredging project. It identifies the information required by the Department to review, and ultimately approve, the SSAP for the project. The required information must be provided to the Department by entering it into the spaces provided on this template, and submitting two hard copies and one CD of the additional required documents.

The SSAP for a dredging project must be approved by the Department prior to the collection and analysis of any sediment samples. Once the final SSAP has been approved by the Department, the applicant may conduct sampling in conformance with the plan. **If the applicant collects and analyzes any sediment samples without the approval of NJDEP-ODST, it is done at risk, as any such samples may or may not be considered by the Department in making regulatory decisions regarding the proposed project.**

For additional information, see *The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters* found in Appendix G of the Coastal Zone Management Rules (N.J.A.C. 7:7). Appendix G can be accessed at: http://www.nj.gov/dep/landuse/lawsregs.html. This SSAP template incorporates much of what is required to be submitted by applicants in Appendix G as part of the permit application for a dredging project; however, additional information may be required on a project-specific basis.

Complete pages 2-6, 11-12 of the SSAP template, attach any additional required documents, and send the complete draft SSAP package to 501 E. State Street, Mail Code 501-02A, P.O. Box 420, Trenton, NJ 08625-0420. Please include an electronic (MS Word) copy in the CD requested on page 3 of this document.

Approval of the SSAP will be indicated by the signature of Department staff on page 12 of the completed template.

If you have any questions, please contact the Division of Land Use, Office of Dredging and Sediment Technology at (609) 984-6216.

Office of Dredging and Sediment Technology
Division of Land Use Regulation
Sediment Sampling and Analysis Plan (SSAP) File Number Request Form

Site Info:

Site Address:	**City:**	**State:**	**Zip:**
Site County:	**Municipality(ies):**		
Site Block(s):	**Lot(s):**		
Site NJ State Plane Coordinates	**X:**	**Y:**	
Project Description:			
Previously Issued Permit No/s.: (If applicable, please provide a copy of the permit)			

Applicant Info:

Applicant Name:		
Phone Number:	**Email Address:**	
Address:		
City:	**State:**	**Zip:**

Agent Info (if any):

Agent Name:	
Phone Number:	**Email Address:**
Address:	

City:	State:	Zip:

Proposed Dredging Plan

Method of dredging: ☐ Hydraulic ☐ Mechanical

Type of dredging: ☐ Maintenance (N.J.A.C. 7:7-12.6) ☐ New Dredging (N.J.A.C. 7:7-12.7)

Provide NJDEP-ODST with **two hard copies and one PDF version (on a CD)** of the Draft Dredging Plan.

The Proposed Dredging Plan shall include the following components:

☐ A figure identifying the geographic location of the project site.

☐ Identify the locations of all outfalls or intakes within 500' of the project site

☐ Identify all in-water structures in the vicinity of the project site.

☐ Identify the location of boat/vessel fueling stations within 500' of the project site.

☐ Hydrographic survey (see N.J.A.C. 7:7 Appendix G, Chapter II-A-2) bathymetry (include the date the hydrographic survey was conducted – this must be within 6 months of the SSAP submittal date.

- The proposed sample locations must be superimposed on the hydrographic survey (see page 6) referenced to Mean Low Water (MLW) unless you are requesting the Department to identify sample locations (see page 5).

Identify the following information:

☐ Extent of area to be dredged (square feet) _____

☐ Proposed depth(s) of dredging (feet below MLW) _____

☐ Proposed depth(s) of overdredge (feet below MLW) (if any) _____

☐ Estimated volume of sediment to be dredged (no overdredge) (cubic yards) _____

☐ Estimated volume of overdredge (cubic yards) _____

☐ Estimated total volume of sediment to be dredged (including overdredge) (cubic yards) _____

☐ Known contaminated spills _____

Proposed Dredged Material & Water Management Alternative(s)

Check applicable box(es) and identify location(s) in the space provided.

Upland Placement:

☐ Confined Disposal Facility

☐ Processed Dredged Material Facility (Mixed with Portland Cement)

☐ Beneficial Use at Site Remediation Project or Landfill

☐ Other Beneficial Use: _____

_____

Dewatering Method:

☐ Upland Temporary Dewatering Area (Ex; hay bales/silt fences)

☐ Confined Disposal Facility

☐ Barge/Scow Dewatering

☐ Geotubes

☐ Filter Press

☐ Other Dewatering Method: _____

_____

Dredge Material Management Location (street address and provide State plane coordinates): (Please any relevant information for identifying the site such as CDF name if applicable)

_____

_____

Sediment Core Sample Locations

Request Department to identify core sample locations? ☐ Yes ☐ No

Guidance on determining the proper number of cores for a project and appropriate core locations can be found in Section D of Chapter III of Appendix G.

* Depth of Collection is project depth (plus proposed overdredge) in feet below Mean Low Water (MLW).

Provide the information in the following table (expand as needed):

Sample ID Number	Location: Planned X	Location: Planned Y	Project Depth MLW	Proposed Overdredge	*Depth of Collection

Note: The latitude and longitude of the planned sample locations can be approximated using NJ Geoweb or a similar mapping application. All coordinates shall be in the **NJ State Plane Coordinate System**.

Planned Core Sample Compositing Scheme

Request Department to identify core sample compositing scheme? ☐ Yes ☐ No

Please refer to Section D of Chapter III of Appendix G for core composite guidance and rationale.

Provide the information in the following table (expand table as needed):

Composite Sample ID Number	Core Sample ID Numbers

Pages 7 and 8 to be completed by NJDEP-ODST – Proceed to Page 9

Required Sediment Sampling Tests ***

Tier I - Physical/geotechnical (Required for all projects)

- ☒ Grain size distribution (ASTM D422 or D4381)
- ☒ Total Organic Carbon (USEPA 440.0)
- ☒ Water Content (ASTMD653, D2216, or D4643)

Representative subsamples of each homogenized core sample (or distinct strata) and composite analytical sample are collected and analyzed for grain size distribution, Total Organic Carbon (TOC), and percent moisture. Samples are also subjected Bulk Sediment Chemistry, Elutriate, Effluent (Modified) Elutriate, Sequential Batch Leaching Test (SBLT), Synthetic Precipitation Leaching Procedure (SPLP), and/or biological testing as specified below.

Individual sediment core samples comprised of greater than **90% sand** (analyzed using the **hydrometer** method) are excluded from **Tier II Testing** (chemical and biological testing), and must not be composited with other sediment samples.

Tier II - Bulk Sediment Chemistry ☐

Tier II - Effluent (Modified) Elutriate ☐

Tier II - Elutriate ☐

Tier III - Sequential Batch Leaching Test (SBLT) ☐

Tier III - Synthetic Precipitation Leaching Procedure (SPLT) ☐

Tier III - Biological – Toxicity ☐

Tier III - Biological – Bioaccumulation ☐

Structural Fill Protocol (addition of Portland cement to raw dredge material and analysis for bulk sediment chemistry and SPLP) ☐
(see page 11, reporting requirement No. 20)

- Note that all compounds identified on the following page for Bulk Sediment Chemistry must also be performed for amended material and SPLP. Please see Sampling Plan Implementation Requirement #20 for additional information.

***Please note that additional analytical tests may be required by the proposed dredge material management site beyond those required by the Department's SSAP. For example, if dredge material is proposed to be disposed of at a landfill as ID27, the applicant may be required to analyze for additional parameters (Ignitability, Corrosivity, Reactive Sulfide, Reactive Cyanide) for the landfill to accept the

material.

Bulk Sediment Chemistry Analysis

☐ Semi-Volatile Compounds
☐ Volatiles (VOCs)
☐ Polychlorinated dibenzo dioxins and furans (PCDDs and PCDFs; 17 congeners)
☐ Polychlorinated biphenyls (PCBs): ☐ Aroclors or ☐ PCB Congeners (209)
☐ Organochlorine Pesticides
☐ Inorganics (including hexavalent and trivalent chrome)

Effluent (Modified) Elutriate Analysis

☐ Semi-Volatile Compounds
☐ Volatiles (VOCs)
☐ Polychlorinated dibenzo dioxins and furans (PCDDs and PCDFs; 17 congeners)
☐ Polychlorinated biphenyls (PCBs): ☐ Aroclors or ☐ PCB Congeners (209)
☐ Organochlorine Pesticides
☐ Inorganics (including hexavalent and trivalent chrome)

Analytical Requirements

All analytical procedures must be conducted by a laboratory certified by the Department's Office of Quality Assurance to perform the given analysis.

The achieved analytical detection limits for all contaminants in the Target Analyte List must be less than the applicable regulatory criteria and guidance values to which the data will be compared when evaluating the potential impacts of the proposed project. Where the Practical Quantitation Limit (PQL) for a contaminant is greater than the applicable regulatory criteria, the analytical detection limit must not exceed the PQL.

-Bulk Sediment Chemistry/Upland Placement – NJDEP Residential Soil Remediation Standards
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf

-Bulk Sediment Chemistry/Aquatic Placement – NJDEP Ecological Screening Criteria
http://www.nj.gov/dep/srp/guidance/ecoscreening/

-Elutriate and Effluent (Modified) Elutriate – NJDEP Surface Water Quality Standards (acute and chronic; saline and/or freshwater, as appropriate)
http://www.nj.gov/dep/rules/rules/njac7_9b.pdf

-Leaching tests – NJDEP Ground Water Quality Standards
http://www.nj.gov/dep/rules/rules/njac7_9c.pdf

Sampling Plan Implementation Requirements

If implementation of the approved SSAP does not provide data that are representative of, or fully characterizes, the sediment to be dredged, the Department may require the collection and analyses of additional sediment samples.

Sediment core sampling collection procedures must follow those listed in Appendix G, Attachment A and the NJDEP's Field Sampling Procedures Manual (2005), available at
http://www.state.nj.us/dep/srp/guidance/fspm/ .

(1) The Department must be notified of any deviations from the approved SSAP prior to the homogenizing, compositing, and analysis of the collected sediment samples.

(2) All sediment core sample collection activities must be properly documented. Detailed field notes/observations during sampling must be documented in a field sampling log book.

(3) NJDEP GPS Data Collection Standards must be used for positioning methods when locating all sampling points. *New Jersey Department of Environmental Protection, 2011. NJDEP GPS Data Collection Standards for GIS Data Development, June 8, 2011, 11 pp.*

(4) All sampling equipment must be properly cleaned before and after the collection of each individual sediment core sample.

(5) An inert plastic liner must be used in conjunction with each sediment core sampling device; this plastic liner must not be reused.

(6) All individual sediment core samples are to be taken to the sediment characterization depth, as specified in this document, and not any deeper.

(7) When collecting sediment core samples, the project applicant must ensure that a sufficient volume of sediment is collected to conduct all of the tests (physical and geotechnical, chemical, biological) specified in the approved SSAP.

(8) Individual sediment core samples must be photographed prior to homogenization, with the sample identification number, a length scale, and date included in the photograph.

(9) Provide core logs showing the depth of sampling (below the sediment surface and Mean Low Water) and a qualitative description of the sediment for each individual sediment core sample.

(10) Only sediment core samples collected correctly may be homogenized, composited, and analyzed.

(11) Individual sediment core samples may be homogenized in their entirety for analysis provided that there no distinct strata (apparent grain size distribution, composition, and visual characteristics) present that are greater than two (2) feet in depth. The Department shall be notified of any

sediment core samples that show grain size stratification prior to homogenizing.

(12) The entire sediment core sample (or distinct strata, when present) must be homogenized – "representative" sub-samples of a non-homogenized sediment core sample must not be collected, composited, and analyzed.

(13) Individual sediment core samples may be composited only if the grain size distribution of the sediment is similar. Individual samples should not be composited if the percentage clay, silt, or sand differ by more than 20%. The Department shall be notified of any sediment core samples that show varying grain size distribution prior to compositing samples.

(14) Representative subsamples of each homogenized core sample (or distinct strata) are combined in equal proportions (by mass) to form the composite analytical sample.

(15) The sample preservation requirements and holding times for each analysis, as specified in the analytical methods used, must be adhered to, or proposed alternatives approved by the Department prior to analysis.

(16) Sample Chain of Custody requirements must be those listed in Appendix G, Attachment A and the NJDEP's Field Sampling Procedures Manual (2005).

(17) If implementation of the approved SSAP does not provide data that are representative of, or fully characterizes, the sediment to be dredged, the Department may require the collection and analyses of additional sediment samples.

(18) Analytical laboratories must follow all of the required QA/QC procedures specified in the analytical methods used. Any deviations from these procedures must be documented and justified in the Analytical Data Report.

(19) All routine procedures associated with the sampling, handling, transport, storage, preservation, and analysis of the sediment should be specified in Standard Operating Procedure (SOP) documents maintained by the parties actually collecting and analyzing the sediment.

(20) For Structural Fill Protocol the following two tests are required:

a) For each core/composite sample/vertically stratified sample, a sample of the processed dredged material product will be created by combining measured amounts of proposed additive with a pre-weighed sample of the sediments to be dredged. The mixing time will, to the greatest extent possible, replicate the residence time in the blending facility/operation to be used in the actual full-scale project. The ratio of proposed additive to composite sediment sample, by weight, will be recorded. The dredged material product to be tested will be formed using the "recipe" (proportions of dredged material and proposed additive) which replicates the actual dredged material product to be used as structural fill on the site. The dredged material product will be pulverized, and each composite sample will be subjected to bulk sediment analyses.

b) The dredged material product samples will be pulverized, and each sample subjected to a Synthetic Precipitation Leaching Procedure (SPLP) using the USEPA Method 1312.

A final report, including the results of the raw sediment and dredged material product testing, will be submitted to the Department in a series of three (3) summary data tables: Raw sediment bulk sediment chemistry, Dredged material product bulk sediment chemistry, Dredged material product SPLP results.

Sample Collection/Homogenization/Composition

Identify the organizations that will conduct the following activities (if known):

Sediment samples will be collected by: _____

Sediment samples will be homogenized by: _____

Sediment samples will be composited by: _____

Reporting Requirements

The sediment data package must be included in the Waterfront Development Permit application. Any data package submitted to the Department shall comply with the QA/QC requirements outlined in Attachment B of the Dredging Manual. The package must be provided to the Department on a CD, or be made available electronically.

In addition, a data summary table of the results in a spreadsheet must be provided with the data package. The data summary table must present a comparison of the bulk sediment chemistry results to the Department's Residential and Non-residential Soil Remediation Standards. Where required, modified elutriate results shall be compared to the New Jersey Surface Water Quality Criteria and SPLP results shall be compared to the New Jersey Ground Water Quality Standards. The summary tables must present data with identical units and highlight all results that exceed applicable criteria. **Units for bulk sediment chemistry must be presented in milligrams per kilogram (mg/kg).**

- Dioxin data must be presented using current World Health Organization Toxic Equivalency Factors (WHO TEFs) with the calculated Toxic Equivalency (TEQ).
- PCB aroclor data must provide a summation for detected analytes.
- PCB congener data must be presented individually and summed.

One (1) hard copy of the data summary tables and one (1) FULL electronic copy of the QA/QC must be provided.

SSAP Certifications

☐ I certify that I provided accurate information and will comply with the requirements listed in the approved Sediment Sampling and Analysis Plan.

Printed Name:

Signature:

Date:

Department Review and Approval (Department signature upon approval)

☐ The Department hereby approves the Sediment Sampling and Analysis Plan dated for implementation.

NJDEP File No.	
Department Staff:	
Date:	
Signature:	

From:	Usarek-Witek, Magda
To:	Mochrie, Sara; Jones, Christopher; Resnick, Matthew
Cc:	Horner, Scott (Scott.Horner@williams.com); Clements, Blake (Blake.Clements@williams.com); Martinez, Chris (Chris.Martinez@williams.com); Behrends, Sarah; Eakin,Megan; Albers, Meghan; Perry, Katharine; MacLeod, Steven; Olson, Karen
Subject:	RE: NJDEP-NESE - Upland Disposal -Dredging SSAP
Date:	Thursday, August 16, 2018 3:18:05 PM
Attachments:	image001.jpg

Additionally,

These are some of the standard conditions placed in the New York/New Jersey Mechanical Dredging with an environmental bucket:

1. All sediments from this project shall be removed using a closed clamshell environment bucket.

2. The permittee shall employ the services of an independent dredging inspector to monitor dredging activities twice per week. The permittee shall submit the resume of the dredging inspector to the Department for review and receive written approval prior to the initiation of dredging.

3. The dredge shall be operated so as to control the rate of descent of the bucket so as to maximize the vertical cut of the clamshell bucket while not penetrating the sediment beyond the vertical dimension of the open bucket (i.e. overfilling the bucket). This will reduce the amount of free water in the dredged material, will avoid overfilling the bucket, and minimize the number of dredge bucket cycles needed to complete the dredging contract. The dredging contractor shall use appropriate software and sensors on the dredging equipment to ensure consistent compliance with this condition during the entire dredging operation. The independent dredging inspector shall monitor the operation of the software and sensors during the inspections as specified in the below conditions. Any malfunction of the software and sensors on the dredge at any time shall be immediately reported to the independent dredging inspector and the permittee by the dredging contractor and shall be immediately repaired to working order.

4. The closed clamshell environmental bucket shall be equipped with sensors to ensure complete closure of the bucket before lifting the bucket. Said sensors shall be operational during the entire dredging operation.

5. The closed clamshell environmental bucket shall be lifted slowly through the water, at a rate of 2 feet per second or less.

6. Dredged material shall be placed deliberately in the barge in order to prevent spillage of material overboard.

7. The discharge (i.e. “overflow”) of water from the barge/scow into which dredged material is placed is prohibited.

8. All barges or scows used to transport sediment shall be of solid hull construction or be sealed with concrete.

9. The gunwales of the dredge scows shall not be rinsed or hosed during dredging except to the

extent necessary to ensure the safety of workers maneuvering on the dredge scow.

10. All decant water holding scows shall be water tight and of solid hull construction.

11. Decant water from this project may only be discharged within the channel from where the sediments originated, in close proximity to the dredging contract area. Discharge to another receiving waterbody requires prior approval from the Department, and may require a New Jersey Discharge Pollutant Elimination System/Discharge to Surface Water (NJDPES/DSW) permit.

12. All decant water shall be held in the decant holding scow a minimum of 24 hours after the last addition of water to the decant holding scow. Said water contained in the decant holding scow may only be discharge after this mandatory 24-hour retention time.

    a. Should the contractor wish to reduce the required holding time, the contractor shall demonstrate that the reduced holding time is sufficient to meet a total suspended solids (TSS) background value of 30 mg/L. This TSS action level is consistent with the ambient TSS results presented in the NY District study entitled "NY and NJ Harbor Deepening Project - Total Suspended Solids (TSS) Monitoring, Interim Report" (January 2006). The total suspended solids shall be determined through gravimetric analysis. No discharge shall be permitted from the decant holding scow until the results of the gravimetric analysis have confirmed that the 30 mg/L background level has been achieved. No additional water shall be added to the decant holding scow between the time of sample acquisition and discharge. Upon successful demonstration that the reduced holding time is sufficient to meet the TSS background level of 30 mg/L, the monitoring of TSS may be suspended and the demonstrated settling time shall replace the 24-hour minimum. A successful demonstration of the reduced holding time efficiency shall be determined once three consecutive TSS analyses have confirmed that the 30 mg/L action level has been achieved by the reduced holding time.

    b. Should the contractor wish to demonstrate this reduced holding time, all records including time of last addition of decant water into the scow, time of TSS sampling and the results of TSS sampling shall be submitted to the NJDEP as soon as they become available, together with a request for a reduced holding time.

13. During pumping of the decant water from the holding scow, great care shall be taken to avoid re-suspending or pumping sediment which has settled in the decant holding scow.

14. The dredging contractor shall complete and submit the attached Dewatering Form to the independent dredging inspector on a weekly basis as part of the Quality Control Report provided to the permittee. Said Dewatering Form shall be certified by the independent dredging inspector that they have witnessed the dewatering process during the preceding week. The permittee shall submit the completed Dewatering Form with appropriate certifications by email to the Office of Dredging and Sediment Technology for the preceding week.

15. The independent dredging inspector shall perform inspections of the dredging contract a minimum of twice per week using the attached WQC Field Inspector form. The permittee shall submit the completed inspection forms to the NJDEP on at least a weekly basis.

16. REPORTING REQUIREMENTS: At the completion of the project, the permittee shall submit the following information to the Department. This information shall be submitted within three months of completion of dredging.

- Start and finish date of work order(s)
- Post-dredge hydrographic survey
- Completed "Notice of Completion of Work" attached for each work order(s)/completion of project

Thank you,

Magda

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Thursday, August 16, 2018 4:58 PM
To: Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Clements, Blake (Blake.Clements@williams.com) <Blake.Clements@williams.com>; Martinez, Chris (Chris.Martinez@williams.com) <Chris.Martinez@williams.com>; Behrends, Sarah <Sarah.Behrends@williams.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Perry, Katharine <KPerry@ene.com>; MacLeod, Steven <SMacLeod@ene.com>; Olson, Karen <Karen.Olson@williams.com>
Subject: NJDEP-NESE - Upland Disposal -Dredging SSAP

Magda,

Per our August 1 meeting we discussed setting up a time to review the Sediment Sampling and Analysis Plan developed for dredge material for disposal at an upland facility.

Please let me know if you and others needed from NJDEP are available to meet about that SSAP on any of the following dates - August 28/29/30.

Once you confirm availability we will calendar a meeting.

Thanks in advance!
Sara

Sara Mochrie, *Principal-Project Manager*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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From: Usarek-Witek, Magda
To: Clements, Blake (Blake.Clements@williams.com); Martinez, Chris (Chris.Martinez@williams.com); Behrends, Sarah; Martin, Maxwell A.; vdick@haleyaldrich.com; rscott@haleyaldrich.com; Mochrie, Sara
Cc: Dietrick, Suzanne; Nickerson, Gary
Subject: Meeting on SSAP TRANSCO
Date: Tuesday, August 28, 2018 9:41:08 AM

Hi Everyone,

I sent an email to our sediment analysis expert on the freezing time. He is out today hopefully we can get an answer tomorrow or Thursday.

Gary and I did have a couple additional questions. We noticed that the plan did not include structural fill protocol testing on any cores (this would include SPLP testing on cores with Portland cement). Most upland placement sites require this testing since this will characterize how to material will be placed on a site. It may not may sense to do it in areas where you expect to bring the material to HARS, there is over 90% sand (away from the shore). However, if you don't run this type of analysis it may be harder to get acceptance from several placement sites.

Magda Usarek-Witek

Environmental Specialist II
Office of Dredging and Sediment Technology
New Jersey Department of Environmental Protection
Magda.Usarek-Witek@dep.nj.gov | (609) 777-1866

Mailing address:

Attn: Magda Usarek-Witek
DEP, Division of Land Use
501 East State Street
Mail Code 501-02A
PO Box 420
Trenton NJ 08625
(609)984-0921

From:	Mochrie, Sara
To:	christopher.jones@dep.nj.gov; "Resnick, Matthew"; "Usarek-Witek, Magda"; "Davis, Kelly"; "Olivera, Stephen"
Cc:	Olson, Karen; Horner, Scott (Scott.Horner@williams.com); "Dean, Joseph" (Joseph.Dean@Williams.com); "Merz, Dan"; "Christine Roy"; "Richard Scott"; Eakin,Megan; Perry, Katharine; Albers, Meghan; MacLeod, Steven; Clements, Blake (Blake.Clements@williams.com); Martinez, Chris (Chris.Martinez@williams.com); "Behrends, Sarah"; Kellogg, Stephen (Stephen.Kellogg@Williams.com); Ham, Brian; Sue Quackenbush (squackenbush@amygreene.com); Bill Macholdt; "peter.haas@aecom.com"
Subject:	RE: NJDEP - NESE Meeting 8-1-18 - Minutes for Review
Date:	Wednesday, August 29, 2018 6:29:39 AM
Attachments:	8-1-18_NJDEP Meeting Minutes.pdf image001.jpg

NJDEP Team,

Please note we will be finalizing minutes from our August 1 meeting sent via the August 16 email below . We have not received any comments so we are presuming there are no adjustments needed.

Thanks again for your continued coordination,
Sara

From: Mochrie, Sara
Sent: Thursday, August 16, 2018 4:52 PM
To: christopher.jones@dep.nj.gov; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; 'Usarek-Witek, Magda' <Magda.Usarek-Witek@dep.nj.gov>; Davis, Kelly <Kelly.Davis@dep.nj.gov>; Olivera, Stephen <Stephen.Olivera@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Merz, Dan <Dan.Merz@Williams.com>; Christine Roy <croy@rutterroy.com>; Richard Scott <rscott@rutterroy.com>; Eakin,Megan <MEakin@ene.com>; Perry, Katharine <KPerry@ene.com>; Albers, Meghan <MAlbers@ene.com>; MacLeod, Steven <SMacLeod@ene.com>; Clements, Blake (Blake.Clements@williams.com) <Blake.Clements@williams.com>; Martinez, Chris (Chris.Martinez@williams.com) <Chris.Martinez@williams.com>; Behrends, Sarah <Sarah.Behrends@williams.com>; Kellogg, Stephen (Stephen.Kellogg@Williams.com) <Stephen.Kellogg@Williams.com>; Ham, Brian <Brian.Ham@Williams.com>; Sue Quackenbush (squackenbush@amygreene.com) <squackenbush@amygreene.com>; Bill Macholdt <bmacholdt@amygreene.com>; peter.haas@aecom.com
Subject: NJDEP - NESE Meeting 8-1-18 - Minutes for Review

NJDEP Permit Review Team,

Attached please find draft minutes for review from our August 1, 2018 meeting. Please indicate any comments or corrections if you could by the end of next week (8/24) and we will issue a final version as part of our deficiency response.

If there are any questions that arise during review, please don't hesitate to contact me.

Thanks in advance for your response,
Sara

Sara Mochrie, *Principal – Project Manager*
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Northeast Supply Enhancement (NESE) Project

NJDEP Project Meeting Minutes

Date: August 1, 2018
Time: 9:30 am – 12:00 pm
Location: NJDEP Office, 501 E. State St., Trenton, NJ

Participants

Transco: Sarah Behrends, Blake Clements, Brian Ham, Joe Dean, Scott Horner*, Chris Martinez*, Karen Olson
E&E: Meghan Albers, Megan Eakin*, Steven MacLeod, Sara Mochrie, Katharine Perry
Amy Greene: Bill Macholdt, Sue Quackenbush
AECOM: Pete Haas
NJDEP: Kelly Davis, Chris Jones, Stephen Olivera, Matt Resnick, Magda Usarek-Witek

* Participant by phone

Meeting Summary

Prior to discussing the agenda, Mr. Jones brought up two items:

- Compressor Station 206 Access Road
    - Councilman Chase in the Township of Franklin indicated to the New Jersey Department of Environmental Protection (NJDEP) that authorization to use the Higgins Farm access road to reach Compressor Station 206 could be obtained. NJDEP indicated that Transco should consider this.
    - Transco provided background information related to its consideration of the use of the Higgins Farm access road. The Higgins have executed a Deed of Easement conveying their non-agricultural development rights in the property to Franklin Township. Given the Deed of Easement, neither the Higgins nor Franklin Township can convey the necessary rights to Transco for use of the road. In addition, the Environmental Protection Agency (EPA) has indicated to Transco that the EPA may not allow use of the site as an access road as that could inhibit the EPA's ability to continue site remediation.
        - NJDEP requested Transco further explore the EPA road as an option, potentially reaching out to the EPA for a formal written position.
        - NJDEP would follow up with Councilman Chase to determine if this is something the Mayor would consider.

- NJDEP stated that the Princeton Hydro June 2018 comment letter claimed that the alternatives analysis for the siting Compressor Station 206 was flawed. However, these are not necessarily the comments of the Division of Land Use Regulation (DLUR).

1. Project Schedule Update
    a. The Project in-service date has been revised to December 1, 2020
    b. Final Environmental Impact Statement expected in September. Permits needed by April 2019 to allow Transco time between permit issuance and the start of construction to finalize mitigation and review all permit conditions to ensure compliance.
2. Permit Timeline
    a. Hearing schedule:
        i. NJDEP indicated that once the NJDEP applications are deemed substantively complete, public "fact finding" meetings (hearings) could be held. NJDEP also indicated that the FEIS was not required prior to holding the hearings or for the application to be considered substantively complete for review.
        ii. NJDEP stated that once responses to the DLUR July 18, 2018 deficiency letter are received, the application would be substantively complete enough to proceed with the public hearings.
        iii. Transco/NJDEP agreed on October 2018 for public hearings. The hearings would cover the Freshwater Wetlands, Flood Hazard Area, and Waterfront Development applications.
        iv. Transco explained that in order to hold public hearings in October 2018, a public notice would need to be issued 30 days prior to any hearings (September 2018), venues would need to be secured in September and therefore planning for dates/locations for public hearings would need to occur in August 2018.
        v. Transco agreed to send potential dates/locations for public hearings for NJDEP to approve. Transco will secure the approved venues.
            1. NJDEP would prefer two venues, one near Compressor Station 206 and one near Madison Loop.
            2. The DLUR indicated they would not likely hold combined hearings for the de-watering permits (Madison Loop)
        vi. Interim meetings/conference calls to occur with NJDEP to ensure William's responses are sufficient for NJDEP's continued review.
    b. NJDEP indicated that there would not be any new deficiency items for the DLUR permit applications. NJDEP may ask for additional clarification, but once the comments in the deficiency letter are addressed and consent agreements have been obtained for all properties crossed by the Project, the application can be deemed technically complete and a notice of complete application will be published.
    c. For Freshwater Wetlands and Flood Hazard area technical completeness will start the 90-day time-clock for DLUR action on permits. The 1-year time-clock for NJDEP action on the application for a water quality certification was re-started at the time of application resubmittal in June 2018.
    d. For Waterfront Development technical completeness coupled with the issuance of the FEIS will start the 6-month coastal zone consistency review period.

e. NJDEP indicated that as soon as Transco has information or responses to deficiency requests to send those over for NJDEP to begin review immediately.
f. Major takeaways
    i. Once Transco responds to all items in the latest deficiency letter, and either 100% owner agreements have been obtained or FERC issues an Order, the DLUR permit applications will be technically complete.

3. Comments Received
    a. Comments were most recently received from DLUR via Deficiency Letter dated July 18, 2018.
    b. NJDEP comments on the Supplemental Reports to the Draft Environmental Impact Statement (DEIS) submitted to the FERC docket by NJDEP Office of Permit Coordination and Environmental Review, dated July 18, 2018 included inconsistencies with most recent DLUR deficiency letter, particularly related to time-of-year (TOY) restrictions.
    c. Mr. Jones suggested that Transco clarify these discrepancies directly with FERC and NJDEP Office of Permit Coordination and Environmental Review.
4. Onshore
    a. Madison Loop
        i. Property owner update: Consent agreements with all but one NJ landowner (Borough of Sayreville) are signed. Transco is currently in negotiations with the Borough of Sayreville for the remaining two parcels. Therefore, Transco may be able to acquire the parcel without condemnation, and will keep NJDEP apprised of any updates.
    b. Compressor Station 206
        i. Stormwater management and access road design (Deficiency letter item numbers 5 through 9)
            1. Item 5.
                a. NJDEP clarified that this comment only applies to the western part of the access road.
                b. To address this deficiency item, Transco should consider re-configuring the road grading to diffuse the discharge offsite. As long as runoff would be discharged into an area already receiving concentrated flow, this comment would be considered addressed. Mr. Olivera was open to communication to ensure this was addressed adequately.
            2. Item 6.
                a. Transco indicated that the initial calculations for the drainage area use composites; Transco to revise calculations to separate pervious and impervious areas.
            3. Items 7
                a. Areas where Transco can install additional Best Management Practices (BMPs) are limited because of slope.
                b. NJDEP stated Transco could consider adding a BMP for rate control in the upper slope area, and supplement with a vegetation channel with check dams to mitigate flow as it flows downslope.

c. To mitigate flows, use a uniformed gravel size for a portion of the road and supplement with a vegetated channel to mitigate flow.
    i. NJDEP requested that Transco try these two options and evaluate the results.

4. Item 8
    a. NJDEP's BMP Manual for water quality treatment is geared toward infiltration, and are difficult to apply in this scenario given the presence of wetlands and streams. NJDEP states that normally manufactured treatment devices (MTDs) would be employed.
        i. NJDEP indicated that Transco could use uniform size gravel with a non-binding agent. This could just be for a portion of the road.
        ii. Transco explained that the traffic on the road would be minimal, and similar to that of a residential driveway. The station would have two employees on the site Monday-Friday. Occasional delivery truck (once a quarter). Daily basis less than 10 vehicles across the road.
        iii. NJDEP has seen related standards on roads with minimal usage.
5. Item 9
    a. Transco will revise retention basin design to meet the 80% requirement

5. Offshore
    a. Sediment Sampling & Analysis Plan for upland disposal
        i. Transco is working with consultant (Haley Aldrich) to develop sampling plan for upland disposal. Transco expects to submit the complete plan in August 2018.
        ii. Transco asked if NJDEP would be willing to meet in August to discuss plan components prior to finalization. NJDEP encouraged such communication and suggested submittal of a draft plan for review in advance of a meeting.
        iii. NJDEP suggested using the sediment sampling and analysis plan template. Ms. Usarek-Witek agreed to email a copy to Transco.
    b. HARS
        i. Transco's testing for HARS suitability will be completed in August, and the report will likely be submitted to the USACE in September 2018.
        ii. The public notice accounted for a contingency that all clamshell-dredged material would be disposed upland.
        iii. With the Waterfront Development Permit, NJDEP would issue an acceptable use determination. The acceptable use determination will not be considered a technical deficiency but will be required prior to permit issuance. This can be modified later, but in order for NJDEP to issue the permit Transco needs to verify appropriate placement sites have been established for all the dredged material.

iv. If material from NY is coming to NJ, NJDEP would need to evaluate that material in the same way as material coming from NJ waters.
v. To get the acceptable use determination, NJDEP needs actual sediment sampling results. This is because the upland processing facility needs the analytical results in order to confirm acceptability – each facility will have its own approval criteria.
vi. Areas approved by the USACE for HARS disposal would not require sampling for upland disposal.

c. Species-related time-of-year (TOY) restrictions
   i. Transco is optimizing schedule in an attempt to observe all TOY restriction recommendations, but Transco must maintain continuity in the sequence of offshore Project construction activities, such that some flexibility in the TOY restrictions is essential. Transco noted that observation of the TOY restrictions for winter flounder and horseshoe crab would limit construction from MP12.2 to MP14.0 to 3 months (September 15 through December 15).
   ii. Kelly Davis provided feedback on TOY restrictions recommended in NJDEP's comments on the DEIS (from the Endangered and Non-game Species Program)
      1. Regarding horseshoe crab, the main concern was for dredging of the channel near Sandy Hook for backfill material and also near the Morgan shoreline. Volunteer groups have documented horseshoe crab at several nearby beaches including Morgan, South Amboy, Lawrence Harbor, and Cliffwood. Juvenile and sub-adult crabs are also known to remain in the bay for years. This species is an important food source for the red knot, which is listed as endangered in NJ.
      2. Regarding harbor seal, there is concern for activities that may affect the haul-out site on Sandy Hook Peninsula. The harbor seal is not a listed species in NJ, but the proposed TOY restriction for the seal coincides with the right whale TOY restriction that Transco anticipates would apply to pile driving, such that Transco would likely observe both restrictions.
   iii. With respect to Atlantic sturgeon TOY restrictions that may apply near the Ambrose Channel crossing, Mr. Davis indicated that NJDEP would likely defer to NOAA Fisheries recommendations.
   iv. DLUR staff advised Transco to continue coordination with NOAA Fisheries and Kelly Davis at NJDEP. DLUR will likely adopt all the TOY restrictions recommended by the NJDEP Division of Fish and Wildlife (DFW).
   v. Barring new comments, Transco is aware of the recommended offshore TOY restrictions; DLUR staff advised Transco to relay any concerns so NJDEP and Transco can work through those to establish where flexibility may be warranted.
      1. Transco will send DLUR the TOY restriction flexibility requests with details on location (by milepost), construction method, and relevant dates. (cc to Kelly Davis and Christina Albizati)
      2. Requests for flexibility in the TOY restrictions would not be considered an application deficiency.

vi. DLUR will consider whether to apply a 180-day limitation on offshore TOY restrictions for a given location based on the specific flexibility requests and feedback from NJDEP DFW.

d. Offshore backfill sources
   i. Locations of proposed channel sources are being coordinated with USACE. Transco will select the specific locations at time of backfilling based in part on when the locations were most recently dredged.
   ii. Regarding NJDEP's deficiency letter comment, Transco only needs to briefly demonstrate that coordination with the USACE is occurring.
   iii. Dredging of backfill material from the channels in NJ would need to be included in the WFD permit for the Project. The proposed channel dredging schedule will need to consider appropriate TOY restrictions.
   iv. Transco agreed to send Ms. Usarek-Witek details on how the material will be dredged from the offshore channels. E & E staff noted that an environmental bucket would be used when dredging the channels, and that scow overflow was still being considered since the dredged material would be clean sand.
   v. Ms. Usarek-Witek will forward the standard permit conditions for channel dredging to E & E staff.
   vi. Offshore backfill material can be excluded from NJDEP contaminant testing requirements if at least 90% is sand. The segment of the proposed channel sources closest to Naval Earle (east of Sandy Hook) does not meet this grain size criterion, so NJDEP recommended focusing on the other channel source areas.

e. Best Management Practices and Water Quality Monitoring
   i. Water quality requirements will consider what is feasible based on Transco's sediment modeling. Monitoring conditions will be designed to ensure construction holds to the predicted range using adaptive management, e.g., slowing dredging/backfill activities, etc. NJDEP would provide guidance during construction based on the situation.
   ii. E & E staff explained how Transco is trying to balance water quality with other concerns, e.g., slowing down backfill may reduce the extent of the suspended sediment plume, but would increase the duration of backfilling such that it may encroach on the TOY restriction for winter flounder. NJDEP asked Transco to specify the potential conflicts, and NJDEP can address accordingly in the permit for a specific range of mileposts in the permit.

f. CZC Review and mitigation
   i. NJDEP has started its review of the CZC
   ii. Mr. Jones confirmed that NJAC 7:7 does not require shellfish (e.g., hard clam) or surf clam mitigation; this has been acknowledged by the Bureau of Shellfisheries staff following that Bureau's earlier comments recommending shellfish mitigation.
   iii. Mr. Davis is discussing the need for compensatory mitigation for unavoidable impacts on critical habitat with other DFW staff, e.g., horseshoe crab habitat restoration.
   iv. Transco will separately communicate with fishers and other stakeholders regarding potential compensation for direct loss in harvest income.
   v. Transco is still developing a mitigation plan for wetland impacts.

– End Summary --

From: Horner, Scott <Scott.Horner@williams.com>
Sent: Friday, August 31, 2018 2:43 PM
To: Christopher Jones (Christopher.Jones@dep.nj.gov) <Christopher.Jones@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>; Clements, Blake <Blake.Clements@williams.com>; Ham, Brian <Brian.Ham@Williams.com>; Kellogg, Stephen <Stephen.Kellogg@Williams.com>; Merz, Dan <Dan.Merz@Williams.com>; Mochrie, Sara <SMochrie@ene.com>; Matthew Resnick (Matthew.Resnick@dep.nj.gov) <Matthew.Resnick@dep.nj.gov>; Stephen Olivera (Stephen.Olivera@dep.nj.gov) <Stephen.Olivera@dep.nj.gov>; Jaaskelainen, Su-Lin <SuLin.Jaaskelainen@williams.com>; Eakin,Megan <MEakin@ene.com>; MacLeod, Steven <SMacLeod@ene.com>; Foster, Ruth <Ruth.Foster@dep.nj.gov>
Subject: Northeast Supply Enhancement Project - Response to NJDEP Deficiency Letter

Good Afternoon Chris,

Please see the attachment containing Transcontinental Gas Pipe Line, LLC's responses to the New Jersey Department of Environmental Protection Division of Land Use Regulation deficiency letter dated July 18, 2018 for the Northeast Supply Enhancement Project. A hard-copy of the full package should be delivered to your attention next Tuesday (09/04).

Kind regards,
Scott Horner

Scott Horner | Williams | Senior Environmental Scientist | Atlantic – Gulf| Engineering and Construction |Environmental Permitting

Office: 713-215-4953 | Cell: 832-954-4916 | Fax: 713-215-2222 | 2800 Post Oak Blvd., Level 11| Houston, TX 77056

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Transcontinental Gas Pipe Line Company, LLC
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Houston, Texas 77251-1396
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August 31, 2018

Christopher Jones, Manager
New Jersey Department of Environmental Protection
Division of Land Use Regulation
Bureau of Urban Growth and Redevelopment
Mail Code 501-02A
P.O. Box 420
Trenton, NJ 08625

Reference: Transcontinental Gas Pipe Line Company, LLC
Proposed Northeast Supply Enhancement Project
Response to Deficiency Letter for Freshwater Wetlands Individual Permit, Flood Hazard Area Individual Permit, Flood Hazard Area Verification, Waterfront Development (Upland & In-water) Individual Permit, Coastal Wetlands Permit
DLUR File No. 0000-01-1001.3: FWW170001, FHA 170001, FHA 170002, CSW170001, WFD170001, WFD170002

Dear Mr. Jones:

On June 23, 2017, Transcontinental Gas Pipe Line, LLC (Transco) submitted an application to the New Jersey Department of Environmental Protection (NJDEP) Division of Land Use Regulation (DLUR) requesting a Flood Hazard Area Individual Permit & Verification and a Freshwater Wetlands Individual Permit. On July 10, 2017, Transco submitted an application requesting a Waterfront Development Individual Permit & Wetlands Act of 1970 Permit for the Northeast Supply Enhancement Project (Project). In order to provide NJDEP with additional time to comply with the timeframes by which it must act on Transco's request for a Water Quality Certification pursuant to Section 401(a)(1) of the Clean Water Act, 33 U.S.C §1341(a)(1), Transco withdrew these applications from NJDEP review on June 15, 2018. Transco resubmitted its request for the aforementioned permits and corresponding permit applications June 20, 2018.

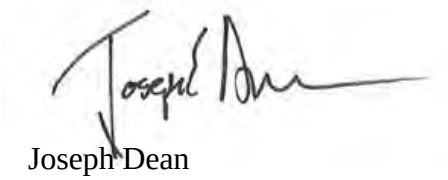
On July 18, 2018, the NJDEP DLUR issued a deficiency letter on Transco's June 20, 2018 permit applications. On August 1, 2018, Transco held a meeting with the NJDEP DLUR to review and discuss Transco's permit applications and the deficiency items. Transco's response to the deficiency letter is attached.

Transco has also included herein a list of time-of-year (TOY) restriction associated with sensitive marine species. Based on the TOY restriction recommendations from multiple resource protection agencies (NJDEP, New York State Department of Environmental Conservation, and National Oceanic and Atmospheric Administration National Marine Fisheries Service), and the currently proposed construction schedule, flexibility is requested on certain TOY restriction dates as discussed in the meeting July 18, 2018 (see attached).

If you have any questions regarding this response, or require additional Project information, please do not hesitate to contact Karen Olson at (713) 215-4232 or via email at Karen.Olson@williams.com or Scott Horner at (713) 215-4953 or via email at Scott.Horner@williams.com. Alternatively, you can contact Ms. Sara Mochrie, Project Manager at Ecology and Environment, Inc. at (716) 684-8060 or via email at smochrie@ene.com.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC



Joseph Dean
Manager, Environmental Health and Safety

cc (via e-mail): Stephen Kellogg, Transco
Blake Clements, Transco
Scott Horner, Transco
Karen Olson, Transco
Brian Ham, Transco
Su-Lin Jaaskelainen, Transco
Sara Mochrie, E & E
Megan Eakin, E & E
Steven MacLeod, E & E
Matt Resnick, NJDEP (DLUR)
Ruth Foster, NJDEP (PCER)

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

RESPONSES TO NJDEP COMMENTS ON APPLICATIONS FOR FRESHWATER WETLANDS INDIVIDUAL PERMIT, FLOOD HAZARD AREA INDIVIDUAL PERMIT AND VERIFICATION, WATERFRONT DEVELOPMENT (UPLAND & IN-WATER), AND COASTAL WETLANDS PERMIT

DATED JULY 18, 2018

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
DOCKET NO. CP17-101-000

Responses to NJDEP Comments on the Northeast Supply Enhancement Project
dated July 18, 2018

1. The submitted project plans and tax maps for the Madison Loops show construction, temporary access roads, staging areas, easement expansion, and new pipe line alignment outside of Transco's existing right-of-way on at least three (3) properties not owned by Transco. Please provide written property owner consent for the affected properties.

Response:

There is now only one property owner with two parcels (out of 23 properties), not owned by Transco, within regulated features for which Transco is seeking consent. Transco has reached an agreement in principle with the fee owner of the remaining two parcels and anticipates obtaining the executed agreements by the end of September 2018. Copies of the easement obtained for the construction of the Northeast Supply Enhancement Project (Project) or consent letters, are enclosed (see Attachment 1) evidencing property owner consent. A copy of the easement for the remaining parcels will be provided to NJDEP upon receipt. Note land plat drawings have been removed from the easements in Attachment 1, however, the relevant lot and block information is described within the easements.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
DOCKET NO. CP17-101-000

Responses to NJDEP Comments on the Northeast Supply Enhancement Project
dated July 18, 2018

2. Transco has provided sediment testing and analysis of the proposed dredge material for raw bulk sediment chemistry and a geotechnical analysis. However, additional testing is required if the material is to be processed and placed at an upland placement site. This additional testing is referred to as the structural fill protocol and/or processed dredged material product testing as per the Department's Dredging Technical Manual. The Department notes that while a letter of acceptance from Clean Earth demonstrates that the facility has the capacity to process the proposed amount of material, it did not identify a beneficial use site for the material because the additional analyses mentioned above are necessary to evaluate the placement of the material at a given site. Therefore, it is necessary for Transco to resample the dredged material to be removed from the locations within the exit pit area and clamshell bucket dredging areas using the structural fill protocol. Transco should submit a new sediment and analysis plan to the NJDEP for review and approval prior to proceeding with the additional sampling event.

Response:

Transco has developed a draft Sediment Sampling and Analysis Plan (SSAP) for upland disposal of dredged materials (see Attachment 5). On August 28, 2018, Transco met with the NJDEP Division of Land Use (DLUR) to review the draft sampling protocol and proposed campaign schedule. Transco will finalize the draft SSAP based upon comments received during that meeting and submit the final SSAP to the NJDEP DLUR on September 14, 2018.

3. Transco proposed to take dredged material to the Historic Area Remediation Site (HARS) and all dredged material not accepted by HARS to an alternate upland placement site. However, Transco has not received an approval from the Army Corps of Engineers to place the dredged material at the HARS site and has not provided an appropriate letter of acceptance from any other acceptable dredge placement site for the dredged material that indicated the material meets their analytical requirements.

Response:

Transco has conducted a survey campaign to characterize the chemical composition of offshore sediments for which disposal at the HARS is a proposed option. Laboratory analysis of these sediments, required as part of Transco's Marine Protection, Research, and Sanctuaries Act (MPRSA) Section 103 permit application to dispose of materials at the HARS, is anticipated to be complete in September 2018. Transco intends to submit a complete analysis report to the United States Army Corps of Engineers (USACE) for review in October 2018.

Based on communications with the USACE (Knowles 2018), Transco anticipates that the USACE will issue a decision regarding Transco's Section 103 Application by January 2019. Transco will provide a copy of the approval once received.

REFERENCE:

Knowles, Stephen C. 2018. Personal communication, USACE New York District, Regulatory Branch, Eastern Permits Section. E-mail to Sara Mochrie, Ecology and Environment, Inc. March 29, 2016.

4. Please provide any letters or communication with the US Army Corps of Engineers that the agency is aware and in agreement on removal of sediment from the Ambrose Channel and the Jamaica Bay Entrance Channel to be used as backfill material in the dredge areas and exit pits. Please note that due to fine-grained nature of the material identified in the U.S. Navy Earle Entrance Channel or the Sandy Hook Channel, it does not appear that material from these channels would be appropriate for the use of this material as backfill in the dredge areas.

Response:

Transco is coordinating with the U.S. Army Corps of Engineers (USACE) New York District (NYD) on proposed channels as sources of backfill material.

Transco met with the USACE NYD staff on January 26, 2017 to discuss potential in-water sources of backfill material. In this meeting, USACE stated that it could be possible for Transco to obtain a permit to dredge Ambrose Channel, or other channels with historically suitable material, such as Sandy Hook Channel or the Naval Station Earle Pier access channel in Sandy Hook Bay. Transco met with the USACE NYD staff again on July 25, 2017 to further discuss in-water backfill sources. During this meeting, the USACE stated that the Jamaica Bay Entrance Channel may also be a viable site. Meeting summaries from both meetings are attached (Attachment 2).

In September 2017, Transco provided the USACE with supplemental information that formally updated the joint permit application for the Project (USACE File No. NAN-2016-00908-EHA) to identify the following three channel areas as potential sources for backfill:

- Ambrose Channel (seaward of Lower New York Bay Lateral)
- Jamaica Bay Entrance Channel (Rockaway Inlet)
- Naval Station Earle Entrance Channel/Sandy Hook Channel

Transco indicated in the September 2017 supplement to the USACE that selection of the specific channel and area where supplemental backfill is placed would depend on conditions at time of construction, e.g., available volume, vessel traffic patterns, and timing of federal maintenance dredging activities.

These three channel areas were identified in the USACE's Public Notice of Transco's application for a permit, issued March 27, 2018. Therefore, based on communications with the USACE to date, Transco anticipates that the use of the proposed channel backfill sources will be approved by the USACE.

Transco acknowledges that an area of the Naval Station Earle Entrance Channel west of the Sandy Hook Peninsula, contained silt and clay content that exceed 10% during recent testing by the U.S. Navy, as reported in USACE Public Notice No. NAN-2011-00278-WMI (issued February 27, 2015). Transco understands that the NJDEP would require additional chemical testing prior to use of material from this channel area, identified as "Area C1" in the referenced notice. Therefore,

since sufficient amount of suitable material with less than 10% silt/clay is expected to be available in the other identified channel areas, Transco will no longer seek approval to use Area C1 as a supplemental backfill source. However, other proposed areas of Naval Station Earle Entrance Channel/Sandy Hook Channel previously identified as having less than 10% fines will still be considered for use as backfill material.

5. Pursuant to N.J.A.C. 7:13-12.1(g)2, concentrated overland flow that causes erosion to property not owned by the applicant is considered as adverse impact to that property. Transco is proposing to construct two (2) swales adjacent to the proposed Compressor Station access road. These swales would receive runoff from the access road, concentrate that flow, and then ultimately discharge the runoff onto the adjacent property not owned by the applicant. This discharge has the potential to cause erosion on property not owned by the applicant. Transo must demonstrate that this runoff will not result in erosion or adverse impact to the offsite property. Additionally, Transco must submit information that demonstrates that it has consent to discharge the stormwater onto the adjacent property, or that is has obtained an easement or entered into an agreement to purchase the property pursuant to N.J.A.C. 7:13-12.1(f).

Response:

Per discussions with NJDEP on August 1, 2018, the two (2) swales referenced in this comment were labeled as "Swale 1" and Swale 2" on the previously submitted stormwater management plan drawings, and were located on either side of the proposed crowned access road to capture runoff from the roadway and convey it down to an existing low point. The concern related to these swales was that they could potentially direct concentrated flow off-site to an area that was not previously receiving concentrated flow. The existing topography in this area drains from north to south, such that no discharge will be directed to the off-site property to the north. To address discharge to the property to the south, Swale 1 has been revised to extend the length of the road from the high point to Culvert 2 which conveys an existing stream. Swale 2 has been relocated to the northern side of the access road to Culvert 7 which convey an existing drainage way. The access road grading has been revised from a crowned configuration to a cross-slope configuration to direct runoff from the road to these swales. In doing so, all runoff from the proposed access road will be directed to culverts which are conveying existing streams or drainage ways, such that no new concentrated off-site discharges will be created in this area and no increase in runoff will be generated (this is discussed further in response to Comment #7). Additionally, riprap conduit outlet protection has been designed in accordance with the State of New Jersey Standards for Soil Erosion and Sediment Control and will be installed at the exits of the proposed culverts to provide velocity dissipation and mitigate erosion, which have been reviewed and approved by the Somerset-Union Soil Conservation District in their certification of the Soil Erosion and Sediment Controls plans. As such, this runoff will not create adverse impacts in accordance with N.J.A.C. 7:13-12.1(g)2., and requirements pursuant to N.J.A.C. 7:13-12.1(f) would not apply. See Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans.

6. Transco must analyze the pervious and impervious surfaces separately to accurately compute the stormwater runoff rates and volumes of the existing and proposed site conditions. The submitted calculations cannot be relied upon to demonstrate compliance with the water quality standards set forth at N.J.A.C. 7:8-5.5, and the water quantity and recharge standards set forth at N.J.A.C. 7:8-5.4 because the analysis was not done in this manner. Please revise the calculations to analyze the pervious and impervious surfaces separately.

Response:

The previously submitted calculations computed stormwater runoff volumes by analyzing surface types separately; however the runoff rates were computed using weighed curve numbers. A revised routing analysis has been performed which analyzes the surface types (pervious and impervious) separately (see Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans).

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
DOCKET NO. CP17-101-000

Responses to NJDEP Comments on the Northeast Supply Enhancement Project
dated July 18, 2018

7. The stormwater runoff from the proposed compressor station and access road is conveyed to two distinct analysis points, the freshwater wetlands complex near Georgetown-Franklin Turnpike and the Tributary to Carters brook. As such, Transco must demonstrate compliance with the water quantity standards for each distinct analysis point.

Response:

The stormwater calculations have been revised to breakdown the site for the two (2) analysis points: the Tributary to Carters Brook (designated as Point-of-Interest, or POI #1), and the freshwater wetlands complex near Georgetown-Franklin Turnpike (designated as POI #2). POI #1 is located to the east and contains the majority of the site (approximately 93% of the limit of disturbance). Runoff in this area is captured via a series of swales and culverts and conveyed to a Bio-Retention Basin located east of the compressor station, which will provide rate control via volumetric storage and an outlet structure. POI #2 is located to the west and contains a small portion of the access road which drains towards existing wetlands, streams and drainage ways. Since most of this area consists of wetlands/streams/steep slopes, and the limit of disturbance has been narrowed in efforts to minimize impacts to these features, the available space for proposed stormwater best management practices (BMPs) is limited. Pursuant to discussions held with NJDEP on August 1, 2018, two (2) shallow detention basins have been added within upland areas to capture runoff and restrict flow rates, and the proposed surface of the access road has been changed from asphalt to gravel to lessen the quantity of runoff. Additionally, a dense "brush" type of vegetation is being proposed to be established within the pervious areas of this POI to further reduce post-development runoff rates to be less than pre-development rates. See Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans.

8. Transco has designed the proposed access road, such that stormwater runoff from approximately 72,000 square feet of pavement will bypass the proposed bioretention facility and not receive any water quality treatment. Transco intends to compensate for said bypass by capturing and treating runoff from the compressor station area. However, most of the compressor station area does not receive vehicular traffic (i.e. buildings, gravel area beneath the proposed compressor station equipment) and thus is considered clean. Therefore, capturing and treating runoff from these areas cannot be used to compensate for not treating runoff from the proposed access road. Additionally, please note the project must be designed to provide 80 percent TSS removal rate for two distinct analysis points, the freshwater wetlands complex near Georgetown-Franklin Turnpike and the Tributary to Carters Brook. Please submit a revised Stormwater management design that treats the 72,000 square feet of access road.

Response:

The entire access road surface, as well as the compressor station loop road and parking area has been revised from asphalt to gravel, which reduces runoff rates and improves the water quality of runoff. Additionally, proposed curb has been provided along the southern edge of the access road to capture all runoff from the access road within POI #1 and convey it to the Bio-Retention Basin located to the east of the site which will provide additional water quality treatment. See Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans. It should also be noted that the facility will typically be staffed with only two (2) employees, thus the amount of vehicular traffic to the site will be minimal.

9. Transco has assumed the proposed bioretention facility will receive 90% TSS removal credit. However, to receive said credit, the proposed bioretention facility must be designed to have at least two feet of soil bed media and the basin must be planted as a terrestrial forested community (average of 1,000 stems per acre). Please provide Landscape Plan which illustrates the proposed number of plantings for each species and planting density. Additionally, please provide a Section View of the proposed bioretention facility, which illustrates the basin, depth of planting bed, and seasonal high groundwater table.

Response:

As discussed within the response to Comment #8, most of the impervious areas associated with the site (access road, loop road, parking area) have been replaced with gravel to reduce pollutants and promote water quality. The remaining impervious areas (buildings, equipment pads, etc.) will not receive vehicular traffic. As such, the Bio-Retention Basin has been revised to the parameters associated with an 80% TSS removal credit, including two feet of soil bed media and site tolerant grasses. See Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans.

10. As per the Coastal Zone Management Act Federal Consistency Regulations, specifically Part 930.60, it should be noted that DLUR's review has not yet begun and a response to the above listed deficiencies must be submitted before the State's review of the requested Consistency Certification can commence.

Response:

Transco acknowledges that per the Coastal Zone Management Act Federal Consistency Regulations, the DLUR's review of Transco's Coastal Zone Consistency Assessment has not yet begun. During a meeting between Transco and the DLUR on August 1, 2018, the DLUR noted that Transco's complete responses to the above listed deficiencies and the issuance of the FEIS will commence the State's review of Transco's Coastal Zone Consistency Assessment. DLUR noted that the above listed deficiencies included items associated with Transco's Waterfront Development Permit Application, which will be used to review and approve the Project's consistency with enforceable policies of New Jersey's Coastal Zone Management Program. The DLUR did not anticipate issuing any new technical deficiencies on any of Transco's permit applications currently under review by the DLUR.

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENTS

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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LIST OF ATTACHMENTS

ATTACHMENT 1 **COPIES OF EASEMENTS OBTAINED FOR THE CONSTRUCTION OF THE NORTHEAST SUPPLY ENHANCEMENT PROJECT**

ATTACHMENT 2 **MEETING SUMMARIES FROM USACE NYD MEETINGS**

ATTACHMENT 3 **STORMWATER MANAGEMENT REPORT**

ATTACHMENT 4 **POST CONSTRUCTION STORMWATER MANAGEMENT PLANS**

ATTACHMENT 5 **DRAFT SEDIMENT SAMPLING AND ANALYSIS PLAN**

ATTACHMENT 6 **TIME-OF-YEAR RESTRICTION FLEXIBILITY REQUEST**

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT 1

COPIES OF EASEMENTS OBTAINED FOR THE CONSTRUCTION OF THE NORTHEAST SUPPLY ENHANCEMENT PROJECT

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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Prepared by: Mark Stevens, Esq.

Line #: _____
R/W #: _____
Tax #: _____
Municipality: _____
County: _____
State: _____

SUPPLEMENTAL RIGHT OF WAY AGREEMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

This Supplemental Right of Way Agreement (this "Agreement"), made the 30 day of JANUARY, 2018 by and between MANZO OLD BRIDGE PROPERTIES, LLC, a New Jersey limited liability company having an address at 429 Delray Drive, Lavallette, New Jersey 08735 (hereinafter called GRANTOR whether one or more) and TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC, a Delaware limited liability company having an office at 2800 Post Oak Boulevard, Houston, TX 77056-6106 it successors and assigns (hereinafter called GRANTEE).

WHEREAS, by agreement dated June 8, 1967 and recorded in the Middlesex County Clerk's Office, in Deed Book 2582 at Page 861 as the same may have been heretofore supplemented and amended (herein individually and collectively referred to as the "Original Agreement") the Grantor or Grantor's predecessor in title granted, bargained, sold and conveyed unto the Grantee's predecessor in interest, its successors and assigns, a right of way and easement therein more particularly described or referred to for the purpose, among other things, of laying, constructing, maintaining, operating, repairing, altering, replacing, and removing one or more of its pipelines and appurtenant facilities for the transportation of gas, oil, petroleum and petroleum products or other liquids, gases or substances of any kind which can be transported through pipelines, under, upon, over, through and across those certain lands located in the Township of Madison, Middlesex County, New Jersey, which Township subsequently became known as Township of Old Bridge, Middlesex County, New Jersey and described as follows:

Block 5001, Lot 13.16 as described in deed dated December 30, 2003 and recorded in the Middlesex County Clerk's Office on March 2, 2004 in Deed Book 5285, Page 314.

WHEREAS, at the request of the Grantee, the Grantor has consented and agreed to further modify, amend, supplement and enlarge said Original Agreement in the manner hereinafter set forth:

NOW, THEREFORE, in consideration of the sum of [redacted] and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said Grantor does hereby by general warranty grant, bargain, sell, convey, ratify and confirm unto the Grantee, its successors and assigns, all that right of way and easement with the appurtenant rights and privileges and subject to the duties and obligations, all as described or referred to in the Original Agreement, except that the said right of way and easement is hereby modified, amended, supplemented and enlarged as follows:

1. Grantee's existing pipeline is constructed within the permanent right of way and easement hereinafter described. One or more additional pipelines, facilities or improvements may be constructed under the provisions of this Agreement and shall be located within the permanent right of way and easement hereinafter described. In addition, and without limiting the generality of the foregoing, Grantor acknowledges that Grantee shall also have the right to use (and survey), without any further payment to Grantor, the permanent right of way and easement hereinafter described during the course of planning and construction of any additional pipelines, facilities or improvements. For purposes of this Agreement, the term "facilities" includes, by way of illustration and without limitation, valves, regulators, meters, cathodic protection equipment and facilities, electronic and

communications equipment for pipeline facilities, piping and fittings, pipeline markers and vent pipes.

2. The permanent right of way and easement shall be a strip of land identified as "Area of Existing Right of Way" and "Area of Right of Way", all as shown on a four sheet drawing marked "Exhibit A," attached hereto and made a part hereof.

3. During the course of construction of the first additional pipeline, facilities or improvements authorized above, Grantee shall have the right to enter upon, clear off, and use additional strips of land contiguous to the right of way described above, such strips of land being identified on the attached "Exhibit A" as "Area of Temporary Work Space#1 Outside Existing Right of Way", "Area of Temporary Work Space#2 Outside Existing Right of Way", "Area of Temporary Access Road #AR-MS-001", "Area of Temporary Access Road #AR-MS-002", and "Area of Temporary Access Road #AR-MS-003".

4. Grantor acknowledges that Grantee shall have the option of making reasonable adjustments to the location and area of the permanent right of way and easement, as well as any temporary workspace, based upon issues that may arise after execution of this Agreement, including, but not limited to, design, constructability or field conditions. Upon request of Grantee, Grantor will promptly execute any necessary documents to be recorded. Grantor will be compensated at fair market value for any further expansion of the right of way and easements granted.

5. Grantee shall have all other rights and benefits necessary or convenient for the full enjoyment or use of the rights herein granted, including, but without limiting same to, the free and full right of ingress, and egress over and across the land of Grantor to and from the described right of way and easement, by means of roads or other access areas utilized by Grantor, and the right, from time to time as it may find convenient, to cut or remove all trees, undergrowth and other obstructions from the permanent right of way, without liability for damages naturally resulting from the proper exercise of the rights granted herein.

Grantor specifically covenants and agrees:

(a) The strip of land, first above described, is the permanent right of way granted.

(b) Without Grantee's prior written consent, Grantor will not, and will not permit any other person to, (i) build or place any structures or other encroachments on said permanent right of way or any part thereof, (ii) change the grade of said permanent right of way or any part thereof, (iii) plant trees or shrubs on said permanent right of way or any part thereof, (iv) pave longitudinally along and upon said permanent right of way or any part thereof, (v) use said permanent right of way or any part thereof in such a way as to interfere with Grantee's immediate and unimpeded access to said permanent right of way, or (vi) otherwise interfere with Grantee's lawful exercise of any of the rights herein granted.

(c) Following construction of any additional pipelines, facilities or improvements, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property and access the right of way and easements granted, at all times and as needed, to perform any and all restoration activities in connection with the construction of the additional pipeline, facilities or improvements, or in accordance with any federal, state or local restoration requirements, including but not limited to, any requirements set forth by the Federal Energy Regulatory Commission.

(d) Upon 3 days' notice to Grantor, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property from time to time to conduct certain investigations and inspections in the immediate area adjacent to Grantee's existing pipeline right of way and easement, including but not limited to, civil surveys, topographical surveys, archeological and cultural resources surveys, biological surveys, environmental surveys, or any other inspections that may be required by any federal, state or local governmental agency. Grantee shall restore or repair Grantor's property, as nearly as practicable and permissible, to its condition prior to the commencement of the survey work.

TO HAVE AND TO HOLD said right of way and easement unto said Grantee, its successors and assigns, for so long as a pipeline is maintained thereon.

Grantor acknowledges that part of the consideration above recited is payment in full for any damages caused or to be caused by the construction of the first additional pipeline, facilities or improvements hereunder.

Grantee, by its acceptance hereof, covenants and agrees:

(a) Except for the damages caused by the construction of the existing pipeline(s) and the first additional pipeline, facilities or improvements authorized hereunder, Grantee will reimburse the Grantor for any loss or damage to property which Grantor may suffer as a consequence of the laying, constructing, altering, repairing, removing, changing the size of, or replacing any pipelines, facilities or improvements, in the exercise of the rights herein granted except that neither the Grantor nor any persons or firms holding under the Grantor shall assert any claims for severance or consequential damages.

(b) It will defend and save harmless the Grantor from any claims or suits which may be asserted against the Grantor arising out of any negligent acts of Grantee, its agents or employees, in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor.

Except as herein modified and amended, the Original Agreement is hereby ratified and confirmed in all respects.

It is agreed that the Original Agreement and this Agreement, cover all the agreements between the parties with respect to the subject matter and no representations or statements, verbal or written, have been made, modifying, adding to, or changing the terms thereof.

It is further agreed that if any term of this Agreement is found to be void or invalid, such provision shall be fully severable herefrom and such invalidity shall not affect the remaining terms of this Agreement, which shall continue in full force and effect, and this Agreement shall be reformed and construed as if such invalid provision had never been contained herein, and if possible, such provision shall be reformed to the maximum extent permitted under applicable law to render same valid, operative and enforceable to reflect the intent of Grantor and Grantee as expressed herein.

It is further agreed that the several terms, covenants, conditions and agreements herein contained shall in every case be binding upon and inure to the benefit of the respective parties hereto, their respective heirs, executors, successors and assigns, with the same force and effect as if specifically mentioned in each instance where a party is named.

IN WITNESS WHEREOF, the Grantor has hereunto set their hand this 30th day of January, 2018.

ATTEST / WITNESS:

Silvia Wiehe

MANZO OLD BRIDGE PROPERTIES, LLC

By: Roger Passarella

Roger Passarella, Managing Member

ACKNOWLEDGMENT

STATE OF ~~NEW JERSEY~~ FLORIDA

COUNTY OF LEE

On this _____ day of _____, 2018, before me a Notary Public of the State of ~~New Jersey~~ Florida, the undersigned officer, personally appeared Roger Passarella, who acknowledged him/herself to be the Managing Member of Manzo Old Bridge Properties, LLC, a limited liability company of the State of New Jersey, and that as such officer, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the limited liability company by himself as such officer.

Although the instrument transferring the easement interest herein is to be recorded in a deed book, the instrument or interest transferred is not a "deed" as defined in N.J.S.A. 46:15-5, and no realty transfer fee is applicable.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public

SZILVIA WIEBE
MY COMMISSION # FF947750
EXPIRES: February 24, 2020

Printed Name

My Commission Expires: 02/24/2020

After recording please return to:
Rutter & Roy, LLP
3 Paragon Way, Suite 300
Freehold, NJ 07728

Prepared by: Mark Stevens, Esq.

Line #: 11-209
R/W #: 6-6B
Tax #:
Municipality: OLD BRIDGE TWP
County: MIDDLESEX
State: NEW JERSEY

SUPPLEMENTAL RIGHT OF WAY AGREEMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

This Supplemental Right of Way Agreement (this "Agreement"), made the 30 day of JANUARY, 2018 by and between MANZO INDUSTRIAL PARK ASSOCIATION, INC., a New Jersey non-profit corporation having an address at 429 Delray Drive, Lavallette, New Jersey 08735 (hereinafter called GRANTOR whether one or more) and TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC, a Delaware limited liability company having an office at 2800 Post Oak Boulevard, Houston, TX 77056-6106 it successors and assigns (hereinafter called GRANTEE).

WHEREAS, by agreement dated June 8, 1967 and recorded in the Middlesex County Clerk's Office, in Deed Book 2582 at Page 861 as the same may have been heretofore supplemented and amended (herein individually and collectively referred to as the "Original Agreement") the Grantor or Grantor's predecessor in title granted, bargained, sold and conveyed unto the Grantee's predecessor in interest, its successors and assigns, a right of way and easement therein more particularly described or referred to for the purpose, among other things, of laying, constructing, maintaining, operating, repairing, altering, replacing, and removing one or more of its pipelines and appurtenant facilities for the transportation of gas, oil, petroleum and petroleum products or other liquids, gases or substances of any kind which can be transported through pipelines, under, upon, over, through and across those certain lands located in the Township of Madison, Middlesex County, New Jersey, which Township subsequently became known as Township of Old Bridge, Middlesex County, New Jersey and described as follows:

Block 5001, Lot 13.17 as described in deed dated April 18, 2002 and recorded in the Middlesex County Clerk's Office on April 18, 2002 in Deed Book 5036, Page 484.

AWHEREAS, at the request of the Grantee, the Grantor has consented and agreed to further modify, amend, supplement and enlarge said Original Agreement in the manner hereinafter set forth:

NOW, THEREFORE, in consideration of the sum of [redacted] and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said Grantor does hereby by general warranty grant, bargain, sell, convey, ratify and confirm unto the Grantee, its successors and assigns, all that right of way and easement with the appurtenant rights and privileges and subject to the duties and obligations, all as described or referred to in the Original Agreement, except that the said right of way and easement is hereby modified, amended, supplemented and enlarged as follows:

1. Grantee's existing pipeline is constructed within the permanent right of way and easement hereinafter described. One or more additional pipelines, facilities or improvements may be constructed under the provisions of this Agreement and shall be located within the permanent right of way and easement hereinafter described. In addition, and without limiting the generality of the foregoing, Grantor acknowledges that Grantee shall also have the right to use (and survey), without any further payment to Grantor, the permanent right of way and easement hereinafter described during the course of planning and construction of any additional pipelines, facilities or improvements. For purposes of this Agreement, the term "facilities" includes, by way of illustration and without limitation, valves, regulators, meters, cathodic protection equipment and facilities, electronic and

communications equipment for pipeline facilities, piping and fittings, pipeline markers and vent pipes.

2. The permanent right of way and easement shall be a strip of land identified as "Area of Existing Right of Way" and "Area of Right of Way", all as shown on a four sheet drawing marked "Exhibit A," attached hereto and made a part hereof.

3. Grantor acknowledges that, during the course of construction of the first additional pipeline, facilities or improvements authorized above, Grantee has the right to enter upon, clear off, and use an additional strip (or strips) of land contiguous to the right of way described above, such strip (or strips) of land being identified on the attached "Exhibit A" as "Area of Disturbance Within Existing Right of Way", "Area of Temporary Work Space#1 Within Manzo Boulevard", "Area of Temporary Work Space#2 Within Manzo Boulevard", "Area of Temporary Work Space#3 Within Manzo Boulevard", "Area of Disturbance Within Existing Permanent Access Road #AR-MS-010", "Area of Temporary Access Road #AR-MS-001 Within Manzo Boulevard", and "Area of Temporary Access Road #AR-MS-002 Within Manzo Boulevard".

4. Grantor acknowledges that Grantee shall have the option of making reasonable adjustments to the location and area of the permanent right of way and easement, as well as any temporary workspace, based upon issues that may arise after execution of this Agreement, including, but not limited to, design, constructability or field conditions. Upon request of Grantee, Grantor will promptly execute any necessary documents to be recorded. Grantor will be compensated at fair market value for any further expansion of the right of way and easements granted.

5. Grantee shall have all other rights and benefits necessary or convenient for the full enjoyment or use of the rights herein granted, including, but without limiting same to, the free and full right of ingress, and egress over and across the land of Grantor to and from the described right of way and easement, by means of roads or other access areas utilized by Grantor, and the right, from time to time as it may find convenient, to cut or remove all trees, undergrowth and other obstructions from the permanent right of way, without liability for damages naturally resulting from the proper exercise of the rights granted herein.

Grantor specifically covenants and agrees:

(a) The strip of land, first above described, is the permanent right of way granted.

(b) Without Grantee's prior written consent, Grantor will not, and will not permit any other person to, (i) build or place any structures or other encroachments on said permanent right of way or any part thereof, (ii) change the grade of said permanent right of way or any part thereof, (iii) plant trees or shrubs on said permanent right of way or any part thereof, (iv) pave longitudinally along and upon said permanent right of way or any part thereof, (v) use said permanent right of way or any part thereof in such a way as to interfere with Grantee's immediate and unimpeded access to said permanent right of way, or (vi) otherwise interfere with Grantee's lawful exercise of any of the rights herein granted.

(c) Following construction of any additional pipelines, facilities or improvements, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property and access the right of way and easements granted, at all times and as needed, to perform any and all restoration activities in connection with the construction of the additional pipeline, facilities or improvements, or in accordance with any federal, state or local restoration requirements, including but not limited to, any requirements set forth by the Federal Energy Regulatory Commission.

(d) Upon 3 days' notice to Grantor, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property from time to time to conduct certain investigations and inspections in the immediate area adjacent to Grantee's existing pipeline right of way and easement, including but not limited to, civil surveys, topographical surveys, archeological and cultural resources surveys, biological surveys, environmental surveys, or any other inspections that may be required by any federal, state or local governmental agency. Grantee shall restore or repair Grantor's property, as nearly as practicable and permissible, to its condition prior to the commencement of the survey work.

TO HAVE AND TO HOLD said right of way and easement unto said Grantee, its successors and assigns, for so long as a pipeline is maintained thereon.

Grantor acknowledges that part of the consideration above recited is payment in full for any damages caused or to be caused by the construction of the first additional pipeline, facilities or improvements hereunder.

Grantee, by its acceptance hereof, covenants and agrees:

(a) Except for the damages caused by the construction of the existing pipeline(s) and the first additional pipeline, facilities or improvements authorized hereunder, Grantee will reimburse the Grantor for any loss or damage to property which Grantor may suffer as a consequence of the laying, constructing, altering, repairing, removing, changing the size of, or replacing any pipelines, facilities or improvements, in the exercise of the rights herein granted except that neither the Grantor nor any persons or firms holding under the Grantor shall assert any claims for severance or consequential damages.

(b) It will defend and save harmless the Grantor from any claims or suits which may be asserted against the Grantor arising out of any negligent acts of Grantee, its agents or employees, in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor.

Except as herein modified and amended, the Original Agreement is hereby ratified and confirmed in all respects.

It is agreed that the Original Agreement and this Agreement, cover all the agreements between the parties with respect to the subject matter and no representations or statements, verbal or written, have been made, modifying, adding to, or changing the terms thereof.

It is further agreed that if any term of this Agreement is found to be void or invalid, such provision shall be fully severable herefrom and such invalidity shall not affect the remaining terms of this Agreement, which shall continue in full force and effect, and this Agreement shall be reformed and construed as if such invalid provision had never been contained herein, and if possible, such provision shall be reformed to the maximum extent permitted under applicable law to render same valid, operative and enforceable to reflect the intent of Grantor and Grantee as expressed herein.

It is further agreed that the several terms, covenants, conditions and agreements herein contained shall in every case be binding upon and inure to the benefit of the respective parties hereto, their respective heirs, executors, successors and assigns, with the same force and effect as if specifically mentioned in each instance where a party is named.

IN WITNESS WHEREOF, the Grantor has hereunto set their hand this 30th day of January, 2018.

ATTEST/ WITNESS:

Silvia Wiehe

MANZO INDUSTRIAL PARK ASSOCIATION, INC.

By: Roger Passarella

Roger Passarella, President
Board of Trustees

ACKNOWLEDGMENT

STATE OF ~~NEW JERSEY~~ FLORIDA

COUNTY OF LEE

On this 30th day of January 2018, before me a Notary Public of the State of ~~New Jersey,~~ Florida the undersigned officer personally appeared Roger Passarella, who acknowledged him/herself to be the President of the Trustee Board of Manzo Industrial Park Association, Inc., a New Jersey not-for-profit corporation, and that he as such officer, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as such officer.

Although the instrument transferring the easement interest herein is to be recorded in a deed book, the instrument or interest transferred is not a "deed" as defined in N.J.S.A. 46:15-5, and no realty transfer fee is applicable.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Szilvia Wiebe

Notary Public

SZILVIA WIEBE
MY COMMISSION # FF947750
EXPIRES: February 24, 2020

Szilvia Wiebe

Printed Name

My Commission Expires: 02/24/2020

After recording please return to:

Rutter & Roy, LLP
3 Paragon Way, Suite 300
Freehold, NJ 07728

Prepared by: _____

Line #: 11-207
R/W #: 6-8, 6-9, 6-10 & 6-11
Tax #: 5000/4, 18 & 23
Municipality: Old Bridge
County: Middlesex
State: New Jersey

SUPPLEMENTAL RIGHT OF WAY AGREEMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

This Supplemental Right of Way Agreement (this "Agreement"), made the 19 day of July, 2018 by and between **ESTATE OF JOHN J. BRUNETTI**, having an address at Post Office Box 1004, Old Bridge, New Jersey 08857 (hereinafter called GRANTOR whether one or more) and **TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC**, a Delaware limited liability company having an office at 2800 Post Oak Boulevard, Houston, Texas 77056 it successors and assigns (hereinafter called GRANTEE).

WHEREAS, by an agreement dated August 11, 1967 and recorded in the Middlesex County Clerk's Office, in Deed Book 2590 at Page 475, and an addendum dated July 16, 1968 and recorded in the Middlesex County Clerk's Office, in Deed Book 2632 at Page 892, as the same may have been heretofore supplemented and amended (herein individually and collectively referred to as the "Original Agreements") the Grantor or Grantor's predecessor in title granted, bargained, sold and conveyed unto the Grantee's predecessor in interest, its successors and assigns, a right of way and easement therein more particularly described or referred to for the purpose, among other things, of laying, constructing, maintaining, operating, repairing, altering, replacing, and removing its pipeline and appurtenant facilities for the transportation of natural gas, under, upon, over, through and across those certain lands located in the Township of Old Bridge, Middlesex County, New Jersey, and described as follows:

Block 5000, Lots 4, 18, and 23 as described in deed dated January 19, 1970 and recorded in the Middlesex County Clerk's Office on August 18, 1971 in Deed Book 2742, Page 924 and in deed dated January 22, 1970 and recorded in the Middlesex County Clerk's Office on October 22, 1971 in Deed Book 2749, Page 1128.

WHEREAS, at the request of the Grantee, the Grantor has consented and agreed to further modify, amend, supplement and enlarge said Original Agreement in the manner hereinafter set forth:

NOW, THEREFORE, in consideration of the sum of [redacted] and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said Grantor does hereby by general warranty grant, bargain, sell, convey, ratify and confirm unto the Grantee, its successors and assigns, all that right of way and easement with the appurtenant rights and privileges and subject to the duties and obligations, all as described or referred to in the Original Agreement, except that the said right of way and easement is hereby modified, amended, supplemented and enlarged as follows:

1. Grantee's existing pipeline is constructed within the permanent right of way and easement hereinafter described. One additional pipeline, facilities or improvements may be constructed under the provisions of this Agreement and shall be located within the permanent right of way and easement hereinafter described. Should the Federal Energy Regulatory Commission fail to issue a Certificate of Public Convenience and Necessity for the Project for the additional pipeline, facilities or improvements authorized above within five (5) years from the date of this Agreement, this Agreement shall terminate. In such an event, Grantor specifically covenants and agrees that the Original Agreement, and the rights granted thereunder, shall remain in full force and effect.

In addition, and without limiting the generality of the foregoing, Grantor acknowledges that Grantee shall also have the right to use (and survey), without any further payment to Grantor, the permanent right of way and easement hereinafter described during the course of planning of any additional pipelines, facilities or improvements. For purposes of this Agreement, the term "facilities" includes, by way of illustration and without limitation, cathodic protection equipment and facilities, electronic and communications equipment for pipeline facilities, piping and fittings, pipeline markers and vent pipes. No above ground appurtenances (other than test posts, vents, or pipeline markers) shall be constructed within the permanent right of way and easement.

2. The permanent right of way and easement shall be a strip of land identified as "Area of Existing Right of Way", "Area of Right of Way", and "Area of Right of Way Within Existing Right of Way", all as shown on a drawing marked "Exhibit A," attached hereto and made a part hereof.

3. During the course of construction of the additional pipeline, facilities or improvements authorized above, Grantee shall have the right to enter upon, clear off, and use an additional strip (or strips) of land contiguous to the right of way described above, such strip (or strips) of land being identified on the attached "Exhibit A" as "Area of Temporary Work Space Outside Existing Right of Way" and "Area of Temporary Work Space Within Existing Right of Way".

4. Grantor acknowledges that Grantee shall have the option of making reasonable adjustments to the location and area of the permanent right of way and easement, as well as any temporary workspace, based upon issues that may arise after execution of this Agreement, including, but not limited to, design, constructability or field conditions. Upon request of Grantee, Grantor will promptly execute any necessary documents to be recorded. Grantor will be compensated at fair market value for any further expansion of the right of way and easements granted.

5. Grantee shall have all other rights and benefits necessary or convenient for the full enjoyment or use of the rights herein granted, including, but without limiting same to, the free and full right of ingress, and egress over and across the land of Grantor to and from the described right of way and easement, by means of roads or other access areas utilized by Grantor, and the right, from time to time as it may find convenient, to cut or remove all trees, undergrowth and other obstructions from the permanent right of way, without liability for damages naturally resulting from the proper exercise of the rights granted herein.

Grantor specifically covenants and agrees:

(a) The strip of land, first above described, is the permanent right of way granted.

(b) Without Grantee's prior written consent, Grantor will not, and will not permit any other person to, (i) build or place any structures or other encroachments on said permanent right of way or any part thereof, (ii) change the grade of said permanent right of way or any part thereof, (iii) plant trees or shrubs on said permanent right of way or any part thereof, (iv) pave longitudinally along and upon said permanent right of way or any part thereof, (v) use said permanent right of way or any part thereof in such a way as to interfere with Grantee's immediate and unimpeded access to said permanent right of way, or (vi) otherwise interfere with Grantee's lawful exercise of any of the rights herein granted.

(c) Following construction of the additional pipeline, facilities or improvements, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property and access the right of way and easements granted, at all times and as needed, to perform any and all restoration activities in connection with the construction of the additional pipeline, facilities or improvements, or in accordance with any federal, state or local restoration requirements, including but not limited to, any requirements set forth by the Federal Energy Regulatory Commission.

(d) Upon 3 days' notice to Grantor, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property from time to time to conduct certain investigations and inspections in the immediate area adjacent to Grantee's existing pipeline right of way and easement, including but not limited to, civil surveys, topographical surveys, archeological and cultural resources surveys, biological surveys, environmental surveys, or

any other inspections that may be required by any federal, state or local governmental agency. Grantee shall restore or repair Grantor's property, as nearly as practicable and permissible, to its condition prior to the commencement of the survey work.

TO HAVE AND TO HOLD said right of way and easement unto said Grantee, its successors and assigns, for so long as a pipeline is maintained thereon.

Grantor acknowledges that part of the consideration above recited is payment in full for any damages caused or to be caused by the construction of the additional pipeline, facilities or improvements hereunder.

Grantee, by its acceptance hereof, covenants and agrees:

(a) Except for the damages caused by the construction of the existing pipeline(s) and the additional pipeline, facilities or improvements authorized hereunder, Grantee will reimburse the Grantor for any loss or damage to property which Grantor may suffer as a consequence of the laying, constructing, altering, repairing, removing, changing the size of, or replacing any pipelines, facilities or improvements, in the exercise of the rights herein granted except that neither the Grantor nor any persons or firms holding under the Grantor shall assert any claims for severance or consequential damages.

(b) It will defend and save harmless the Grantor from any claims or suits which may be asserted against the Grantor arising out of any negligent acts of Grantee, its agents or employees, in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor.

Except as herein modified and amended, the Original Agreements are hereby ratified and confirmed in all respects.

It is agreed that the Original Agreements and this Agreement, cover all the agreements between the parties with respect to the subject matter and no representations or statements, verbal or written, have been made, modifying, adding to, or changing the terms thereof.

It is further agreed that if any term of this Agreement is found to be void or invalid, such provision shall be fully severable herefrom and such invalidity shall not affect the remaining terms of this Agreement, which shall continue in full force and effect, and this Agreement shall be reformed and construed as if such invalid provision had never been contained herein, and if possible, such provision shall be reformed to the maximum extent permitted under applicable law to render same valid, operative and enforceable to reflect the intent of Grantor and Grantee as expressed herein.

It is further agreed that the several terms, covenants, conditions and agreements herein contained shall in every case be binding upon and inure to the benefit of the respective parties hereto, their respective heirs, executors, successors and assigns, with the same force and effect as if specifically mentioned in each instance where a party is named.

IN WITNESS WHEREOF, the Grantor has hereunto set their hand this 19 day of July, 2018.

ATTEST / WITNESS:

LILLIAN M. ARMELY

DUANE T. CLIBURN

ESTATE OF JOHN J. BRUNETTI

By: _____

John J. Brunetti, Jr.
Co-personal Representative

ACKNOWLEDGMENT

STATE OF Florida

COUNTY OF Miami-Dade

On this, the 19th day of July, 2018, before me, a Notary Public of the State of Florida, the undersigned, John J. Brunetti, Jr, personally appeared, known to me (or satisfactorily proven) to be the person whose name is subscribed to the within instrument, and acknowledged that s/he executed the same for the uses and purposes therein contained.

Although the instrument transferring the easement interest herein is to be recorded in a deed book, the instrument or interest transferred is not a "deed" as defined in N.J.S.A. 46:15-5, and no realty transfer fee is applicable.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public

SYLVIA M. MARTINEZ
Notary Public - State of Florida
My Comm. Expires Jan 12, 2019
Commission # FF 159931

Sylvia M. Martinez
Printed Name

My Commission Expires: 1/12/19

After recording please return to:
Williams - Transco Pipeline
99 Farber Road
Princeton, New Jersey 08540

Line #: 11-207
R/W #: 6-14C
Tax #: 4185/10
Municipality: Old Bridge
County: Middlesex
State: New Jersey

Prepared by: _____

SUPPLEMENTAL RIGHT OF WAY AGREEMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

This Supplemental Right of Way Agreement (this "Agreement"), made the 23rd day of _____, 2018 by and between **PARKWOOD GARDENS ASSOCIATES/MADISON**, a partnership, having an address at 820 Morris Turnpike – Suite 301, Short Hills, New Jersey 07078 (hereinafter called GRANTOR whether one or more) and **TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC,** a Delaware limited liability company having an office at 2800 Post Oak Boulevard, Houston, TX 77056-6106 it successors and assigns (hereinafter called GRANTEE).

WHEREAS, by agreement dated April 15, 1968 and recorded in the Middlesex County Clerk's Office, in Deed Book 2616 at Page 1141 as the same may have been heretofore supplemented and amended (herein individually and collectively referred to as the "Original Agreement") the Grantor or Grantor's predecessor in title granted, bargained, sold and conveyed unto the Grantee's predecessor in interest, its successors and assigns, a right of way and easement therein more particularly described or referred to for the purpose, among other things, of laying, constructing, maintaining, operating, repairing, altering, replacing, and removing one or more of its pipelines and appurtenant facilities for the transportation of gas, oil, petroleum and petroleum products, under, upon, over, through and across those certain lands located in the Township of Old Bridge, Middlesex County, New Jersey, and described as follows:

Block 4185, Lot 10 as described in deed dated December 12, 1977 and recorded in the Middlesex County Clerk's Office on April 20, 1978 in Deed Book 3026, Page 328.

WHEREAS, at the request of the Grantee, the Grantor has consented and agreed to further modify, amend, supplement and enlarge said Original Agreement in the manner hereinafter set forth:

NOW, THEREFORE, in consideration of the sum of [redacted] and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said Grantor does hereby by general warranty grant, bargain, sell, convey, ratify and confirm unto the Grantee, its successors and assigns, all that right of way and easement with the appurtenant rights and privileges and subject to the duties and obligations, all as described or referred to in the Original Agreement, except that the said right of way and easement is hereby modified, amended, supplemented and enlarged as follows:

1. Grantee's existing pipeline is constructed within the permanent right of way and easement hereinafter described. One or more additional pipelines, facilities or improvements may be constructed under the provisions of this Agreement and shall be located within the permanent right of way and easement hereinafter described. In addition, and without limiting the generality of the foregoing, Grantor acknowledges that Grantee shall also have the right to use (and survey), without any further payment to Grantor, the permanent right of way and easement hereinafter described during the course of planning and construction of any additional pipelines, facilities or improvements. For purposes of this Agreement, the term "facilities" includes, by way of illustration and without limitation, valves, regulators, meters, cathodic protection equipment and facilities, electronic and communications equipment for pipeline facilities, piping and fittings, pipeline markers and vent pipes.

2. The permanent right of way and easement shall be a strip of land identified as "Area of Existing Right of Way" and "Area of Right of Way", all as shown on a drawing marked "Exhibit A," attached hereto and made a part hereof.

3. During the course of construction of the first of the additional pipelines, facilities or improvements authorized above, Grantee shall have the right to enter upon, clear off, and use an additional strip (or strips) of land, such strip (or strips) of land being identified on the attached "Exhibit A" as "Area of Temporary Work Space Outside Existing Right of Way" and "Area of Temporary Access Road".

4. Grantor acknowledges that Grantee shall have the option of making reasonable adjustments to the location and area of the permanent right of way and easement, as well as any temporary workspace, based upon issues that may arise after execution of this Agreement, including, but not limited to, design, constructability or field conditions. Upon request of Grantee, Grantor will promptly execute any necessary documents to be recorded. Grantor will be compensated at fair market value for any further expansion of the right of way and easements granted.

5. Grantee shall have all other rights and benefits necessary or convenient for the full enjoyment or use of the rights herein granted, including, but without limiting same to, the free and full right of ingress, and egress over and across the land of Grantor to and from the described right of way and easement, by means of roads or other access areas utilized by Grantor, and the right, from time to time as it may find convenient, to cut or remove all trees, undergrowth and other obstructions from the permanent right of way, without liability for damages naturally resulting from the proper exercise of the rights granted herein.

Grantor specifically covenants and agrees:

(a) The strip of land, first above described, is the permanent right of way granted.

(b) Without Grantee's prior written consent, Grantor will not, and will not permit any other person to, (i) build or place any structures or other encroachments on said permanent right of way or any part thereof, (ii) change the grade of said permanent right of way or any part thereof, (iii) plant trees or shrubs on said permanent right of way or any part thereof, (iv) pave longitudinally along and upon said permanent right of way or any part thereof, (v) use said permanent right of way or any part thereof in such a way as to interfere with Grantee's immediate and unimpeded access to said permanent right of way, or (vi) otherwise interfere with Grantee's lawful exercise of any of the rights herein granted.

(c) Following construction of any additional pipelines, facilities or improvements, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property and access the right of way and easements granted, at all times and as needed, to perform any and all restoration activities in connection with the construction of the additional pipeline, facilities or improvements, or in accordance with any federal, state or local restoration requirements, including but not limited to, any requirements set forth by the Federal Energy Regulatory Commission.

(d) Upon 3 days' notice to Grantor, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property from time to time to conduct certain investigations and inspections in the immediate area adjacent to Grantee's existing pipeline right of way and easement, including but not limited to, civil surveys, topographical surveys, archeological and cultural resources surveys, biological surveys, environmental surveys, or any other inspections that may be required by any federal, state or local governmental agency. Grantee shall restore or repair Grantor's property, as nearly as practicable and permissible, to its condition prior to the commencement of the survey work.

TO HAVE AND TO HOLD said right of way and easement unto said Grantee, its successors and assigns, for so long as a pipeline is maintained thereon.

Grantor acknowledges that part of the consideration above recited is payment in full for any damages caused or to be caused by the construction of the first additional pipeline, facilities or improvements hereunder.

Grantee, by its acceptance hereof, covenants and agrees:

(a) Except for the damages caused by the construction of the existing pipeline(s) and the first additional pipeline, facilities or improvements authorized hereunder, Grantee will reimburse the Grantor for any loss or damage to property which Grantor may suffer as a consequence of the laying, constructing, altering, repairing, removing, changing the size of, or replacing any pipelines, facilities or improvements, in the exercise of the rights herein granted except that neither the Grantor nor any persons or firms holding under the Grantor shall assert any claims for severance or consequential damages.

(b) It will defend and save harmless the Grantor from any claims or suits which may be asserted against the Grantor arising out of any negligent acts of Grantee, its agents or employees, in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor.

Except as herein modified and amended, the Original Agreement is hereby ratified and confirmed in all respects.

It is agreed that the Original Agreement and this Agreement, cover all the agreements between the parties with respect to the subject matter and no representations or statements, verbal or written, have been made, modifying, adding to, or changing the terms thereof.

It is further agreed that if any term of this Agreement is found to be void or invalid, such provision shall be fully severable herefrom and such invalidity shall not affect the remaining terms of this Agreement, which shall continue in full force and effect, and this Agreement shall be reformed and construed as if such invalid provision had never been contained herein, and if possible, such provision shall be reformed to the maximum extent permitted under applicable law to render same valid, operative and enforceable to reflect the intent of Grantor and Grantee as expressed herein.

It is further agreed that the several terms, covenants, conditions and agreements herein contained shall in every case be binding upon and inure to the benefit of the respective parties hereto, their respective heirs, executors, successors and assigns, with the same force and effect as if specifically mentioned in each instance where a party is named.

IN WITNESS WHEREOF, the Grantor has hereunto set their hand this 23 day of May, 2018.

ATTEST / WITNESS:

Stephanie Green

Stephanie Green
Print Name

PARKWOOD GARDENS ASSOCIATES/MADISON

By: Zygmunt Wilf

Zygmunt Wilf
Print Name

ACKNOWLEDGMENT

STATE OF NEW JERSEY
COUNTY OF Essex

On this 23rd day of May, 2018, before me a Notary Public of the State of New Jersey, the undersigned officer, personally appeared Zygmunt Wilf, who acknowledged him/herself to be a partner of **PARKWOOD GARDENS ASSOCIATES/MADISON**, a partnership, and that he/she as partner, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the partnership by him/herself as partner.

Although the instrument transferring the easement interest herein is to be recorded in a deed book, the instrument or interest transferred is not a "deed" as defined in N.J.S.A. 46:15-5, and no realty transfer fee is applicable.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Stephanie Green
Notary Public

Stephanie Green
Printed Name

My Commission Expires: 4/17/23

After recording please return to:
Williams - Transco Pipeline
99 Farber Road
Princeton, New Jersey 08540

STEPHANIE L. GREEN
Notary Public, State of New Jersey
My Commission Expires April 17, 2023

GAS PIPELINE – Transco
2800 Post Oak Blvd. (77056)
P. O. Box 1396
Land Dept., Level 11
Houston, TX 77251-1396

April 27th, 2018

BY FED EX

Bruce Carta
332 Cherry Drive
Steamboat Springs, Colorado 80487-3070

Re: Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
FERC Docket No. CP17-101
Block 4185, Lots 28.11 and 28.12
Old Bridge Township, Middlesex County, New Jersey

Dear Mr. Carta:

As part of its proposed Northeast Supply Enhancement Project (the "Project"), Transcontinental Gas Pipe Line Company, LLC's ("Transco") will be submitting environmental permit applications to the New Jersey Department of Environmental Protection, which permit applications will, among other properties, impact the above-referenced properties owned by R.D.K. Inc., a New Jersey corporation ("RDK").

As an heir of the Estate of Mary Ann Kerestes (the Secretary of RDK and wife of the late Russell Kerestes, a record owner and President of RDK), we ask that you consent, by counter-signing this letter below, for Transco to apply for the necessary environmental permits and to conduct the Project activities across portions of RDK's property, assuming that those activities are ultimately certificated and ordered by the Federal Energy Regulatory Commission. It is understood that your consent does not constitute a grant of any property rights to Transco, and your right to negotiate with Transco for the permanent and temporary easements needed for the Project and as to the compensation to ultimately be paid for such easements is reserved.

Transco will defend and save harmless Bruce Carta from any claims or suits which may be asserted against the Bruce Carta arising out of any negligent acts of the Transco, its agents or employees, in its exercise of the rights herein granted.

Very truly yours,
Charles Ryan
CHARLES RYAN

Agreed to this 30 day of May, 2018

Bruce Carta

April 4th, 2018

BY FED EX

Laura Carta
320 Lewis Street
Havre de Grace, Maryland 21078-3404

Re: Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
FERC Docket No. CP17-101
Block 4185, Lots 28.11 and 28.12
Old Bridge Township, Middlesex County, New Jersey

Dear Ms. Carta:

As part of its proposed Northeast Supply Enhancement Project (the "Project"), Transcontinental Gas Pipe Line Company, LLC's ("Transco") will be submitting environmental permit applications to the New Jersey Department of Environmental Protection, which permit applications will, among other properties, impact the above-referenced properties owned by R.D.K. Inc., a New Jersey corporation ("RDK").

As a beneficiary of the Estate of Mary Ann Kerestes (the Secretary of RDK and wife of the late Russell Kerestes, a record owner and President of RDK), we ask that you consent, by counter-signing this letter below, for Transco to apply for the necessary environmental permits and to conduct the Project activities across portions of RDK's property, assuming that those activities are ultimately certificated and ordered by the Federal Energy Regulatory Commission. It is understood that your consent does not constitute a grant of any property rights to Transco, and your right to negotiate with Transco for the permanent and temporary easements needed for the Project and as to the compensation to ultimately be paid for such easements is reserved.

Transco will defend and save harmless Laura Carta from any claims or suits which may be asserted against the Laura Carta arising out of any negligent acts of the Transco, its agents or employees, in its exercise of the rights herein granted.

Very truly yours,

Charles Ryan

CHARLES RYAN

Agreed to this 24th day of April, 2018

Laura Carta

Laura Carta

Prepared by: _____

Line # NJ-MI-18, 19, 21 & 27
R/W # 5A-OL, 5A-1, 5A-1A & 5A3
Parcel # 449.08/103, 449/12, 449/13.01 & 449/10.03
Municipality: Sayreville
County: Middlesex
State: New Jersey

TEMPORARY WORK SPACE PERMIT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

For and in consideration of [redacted] in hand paid, the undersigned **LA MER IIIC, LLC, LA MER V, LLC, and LA MER VI, LLC,** each a New Jersey limited liability company, having an address of 433 River Road, Highland Park, New Jersey 08904 (collectively, with its successors and assigns, the **GRANTOR**), grant to **TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC**, a Delaware limited liability company having an office at 2800 Post Oak Boulevard, Houston, TX 77056-6106, (hereinafter called GRANTEE), the right to clear and use temporarily, during the construction of a natural gas pipeline, the area depicted and described on the attached Exhibit "A" as "Area of Temporary Workspace". This area shall be for Grantee's, its contractors, subcontractors, agents or assigns, use for a one-year period from the date construction activities begin or until all construction and restoration activities have been completed and satisfied in accordance with any federal, state or local restoration requirements, including but not limited to, any requirements set forth by the Federal Energy Regulatory Commission.

Grantor warrants and represents that Grantor owns the Property, and that no other person or entity owns an interest therein. Grantor also acknowledges that Grantee has submitted the necessary environmental applications to the New Jersey Department of Environmental Protection in connection with its proposed Northeast Supply Enhancement Project ("Project"), and hereby consents for Transco to apply for the necessary environmental permits and to conduct the Project activities across portions of this property.

Grantee will restore the area used, as nearly as practicable and permissible, to its prior condition and contour. Grantee will pay for any and all actual physical damages arising from its use of this area.

The Temporary Work Space Permit shall extinguish automatically without any need for further action by either party at midnight on the last day of the twelfth month after the completion of construction on the Grantor's property, unless further restoration is required by the Federal Energy Regulatory Commission or any other governmental agency with jurisdiction to require Grantee to perform restoration work on the property.

Grantor agrees that in the event Grantor enters into a real estate contract for sale of this property at any time during the term of this Temporary Work Space Permit, Grantor will inform the potential purchaser of the existence of this Temporary Work Space Permit and the purchaser's obligations to comply with its terms. Grantor also agrees to inform Grantee that the property is under contract within thirty (30) days of entering into such contract.

Grantee, by the acceptance hereof, covenants and agrees that it will defend and save harmless the Grantor from any claims or suits which may be asserted against the

Grantor arising out of any negligent acts of the Grantee, its agents or employees, in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor.

All agreements herein contained shall be deemed to run with the land and shall extend to and be binding upon the respective legal representatives, successors and assigns of the parties hereto.

Signed this 3rd day of January, ~~2017~~ 2018.

WITNESS

Bret Kaplan

LA MER IIIC, LLC

Michael Kaplan, President

WITNESS

Bret Kaplan

LA MER V, LLC

Michael Kaplan, President

WITNESS

Bret Kaplan

LA MER VI, LLC

Michael Kaplan, President

ACKNOWLEDGMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

On this 3rd day of January, 2017, before me a Notary Public of the State of New Jersey, the undersigned officer, personally appeared Michael Kaplan, who acknowledged himself to be the President of La Mer IIIC, LLC, La Mer V, LLC and La Mer VI, LLC, each a limited liability company, and that he as such officer, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the limited liability companies by himself as such officer.

Although the instrument transferring the easement interest herein is to be recorded in a deed book, the instrument or interest transferred is not a "deed" as defined in N.J.S.A. 46:15-5, and no realty transfer fee is applicable.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public

Liza Ann Glazner
Printed Name

My Commission Expires: 6/27/21

LIZA ANN GLAZNER
A Notary Public of New Jersey
My Commission Expires June 27, 2021

After recording please return to:
Williams - Transco Pipeline
99 Farber Road
Princeton, New Jersey 08540

Prepared by: _____

Line #: 11-207
R/W #: 5A-5.1
Tax #: 451/1.10
Municipality: Sayreville
County: Middlesex
State: New Jersey

SUPPLEMENTAL RIGHT OF WAY AGREEMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

This Supplemental Right of Way Agreement (this "Agreement"), made the 29th day of March, 2018 by and between **GOLDEN AGE DEVELOPMENT GROUP, LLC**, a New Jersey limited liability company, having an address at 60 Monmouth Park Highway, West Long Branch, New Jersey 07764 (hereinafter called GRANTOR whether one or more) and T**RANSCONTINENTAL GAS PIPE LINE COMPANY, LLC,** a Delaware limited liability company having an office at 2800 Post Oak Boulevard, Houston, TX 77056-6106 it successors and assigns (hereinafter called GRANTEE).

WHEREAS, by agreement dated February 8, 2007 and recorded in the Middlesex County Clerk's Office, in Deed Book 5881 at Page 575 as the same may have been heretofore supplemented and amended (herein individually and collectively referred to as the "Original Agreement") the Grantor or Grantor's predecessor in title granted, bargained, sold and conveyed unto the Grantee's predecessor in interest, its successors and assigns, a right of way and easement therein more particularly described or referred to for the purpose, among other things, of laying, constructing, maintaining, inspecting, operating, repairing, altering, replacing, changing the size of, and removing its pipeline and appurtenant facilities for the transportation of gas, oil, petroleum and petroleum products or other liquids, gases or substances of any kind which can be transported through pipelines, under, upon, over, through and across those certain lands located in the Borough of Sayreville, Middlesex County, New Jersey, and described as follows:

Block 451, Lot 1.10 as described in deed dated June 27, 2002 and recorded in the Middlesex County Clerk's Office on July 19, 2002 in Deed Book 5070, Page 515.

WHEREAS, at the request of the Grantee, the Grantor has consented and agreed to further modify, amend, supplement and enlarge said Original Agreement in the manner hereinafter set forth:

NOW, THEREFORE, in consideration of the sum of [redacted] and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said Grantor does hereby by general warranty grant, bargain, sell, convey, ratify and confirm unto the Grantee, its successors and assigns, all that right of way and easement with the appurtenant rights and privileges and subject to the duties and obligations, all as described or referred to in the Original Agreement, except that the said right of way and easement is hereby modified, amended, supplemented and enlarged as follows:

1. Grantee's existing pipeline is constructed within the permanent right of way and easement hereinafter described. One additional pipeline, facilities or improvements may be constructed under the provisions of this Agreement and shall be located within the permanent right of way and easement hereinafter described. In addition, and without limiting the generality of the foregoing, Grantor acknowledges that Grantee shall also have the right to use (and survey), without any further payment to Grantor, the permanent right of way and easement hereinafter described during the course of planning of any additional pipelines, facilities or improvements. For purposes of this Agreement, the term "facilities" includes, by way of illustration and without limitation, valves, regulators, meters, cathodic protection equipment and facilities, electronic and communications equipment for pipeline facilities, piping and fittings, pipeline markers and vent pipes.

2. The permanent right of way and easement shall be a strip of land identified as "Area of Existing Right of Way", "Area of Right of Way", and "Area of Right of Way within Existing Right of Way", all as shown on a drawing marked "Exhibit A," attached hereto and made a part hereof.

3. During the course of construction of the additional pipeline, facilities or improvements authorized above, Grantee shall have the right to enter upon, clear off, and use an additional strip (or strips) of land contiguous to and within the right of way described above, such strip (or strips) of land being identified on the attached "Exhibit A" as "Area of Temporary Work Space within Existing Right of Way" and "Area of Temporary Work Space Outside Existing Right of Way".

4. Grantor acknowledges that Grantee shall have the option of making reasonable adjustments to the location and area of the permanent right of way and easement, as well as any temporary workspace, based upon issues that may arise after execution of this Agreement, including, but not limited to, design, constructability or field conditions. Upon request of Grantee, Grantor will promptly execute any necessary documents to be recorded. Grantor will be compensated at fair market value for any further expansion of the right of way and easements granted.

5. Grantee shall have all other rights and benefits necessary or convenient for the full enjoyment or use of the rights herein granted, including, but without limiting same to, the free and full right of ingress, and egress over and across the land of Grantor to and from the described right of way and easement, by means of roads or other access areas utilized by Grantor, and the right, from time to time as it may find convenient, to cut or remove all trees, undergrowth and other obstructions from the permanent right of way, without liability for damages naturally resulting from the proper exercise of the rights granted herein.

Grantor specifically covenants and agrees:

(a) The strip of land, first above described, is the permanent right of way granted.

(b) Without Grantee's prior written consent, Grantor will not, and will not permit any other person to, (i) build or place any structures or other encroachments on said permanent right of way or any part thereof, (ii) change the grade of said permanent right of way or any part thereof, (iii) plant trees or shrubs on said permanent right of way or any part thereof, (iv) pave longitudinally along and upon said permanent right of way or any part thereof, (v) use said permanent right of way or any part thereof in such a way as to interfere with Grantee's immediate and unimpeded access to said permanent right of way, or (vi) otherwise interfere with Grantee's lawful exercise of any of the rights herein granted.

(c) Following construction of the pipeline, facilities or improvements, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property and access the right of way and easements granted, at all times and as needed, to perform any and all restoration activities in connection with the construction of the additional pipeline, facilities or improvements, or in accordance with any federal, state or local restoration requirements, including but not limited to, any requirements set forth by the Federal Energy Regulatory Commission.

(d) Upon 3 days' notice to Grantor, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property from time to time to conduct certain investigations and inspections in the immediate area adjacent to Grantee's existing pipeline right of way and easement, including but not limited to, civil surveys, topographical surveys, archeological and cultural resources surveys, biological surveys, environmental surveys, or any other inspections that may be required by any federal, state or local governmental agency. Grantee shall restore or repair Grantor's property, as nearly as practicable and permissible, to its condition prior to the commencement of the survey work.

TO HAVE AND TO HOLD said right of way and easement unto said Grantee, its successors and assigns, for so long as a pipeline is maintained thereon.

Grantor acknowledges that part of the consideration above recited is payment in full for any damages caused or to be caused by the construction of the additional pipeline, facilities or improvements hereunder.

Grantee, by its acceptance hereof, covenants and agrees:

(a) Except for the damages caused by the construction of the existing pipeline(s) and the additional pipeline, facilities or improvements authorized hereunder, Grantee will reimburse the Grantor for any loss or damage to property which Grantor may suffer as a consequence of the laying, constructing, altering, repairing, removing, changing the size of, or replacing any pipelines, facilities or improvements, in the exercise of the rights herein granted except that neither the Grantor nor any persons or firms holding under the Grantor shall assert any claims for severance or consequential damages.

(b) It will defend and save harmless the Grantor from any claims or suits which may be asserted against the Grantor arising out of any negligent acts of Grantee, its agents or employees, in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor.

Except as herein modified and amended, the Original Agreement is hereby ratified and confirmed in all respects.

It is agreed that the Original Agreement and this Agreement, cover all the agreements between the parties with respect to the subject matter and no representations or statements, verbal or written, have been made, modifying, adding to, or changing the terms thereof.

It is further agreed that if any term of this Agreement is found to be void or invalid, such provision shall be fully severable herefrom and such invalidity shall not affect the remaining terms of this Agreement, which shall continue in full force and effect, and this Agreement shall be reformed and construed as if such invalid provision had never been contained herein, and if possible, such provision shall be reformed to the maximum extent permitted under applicable law to render same valid, operative and enforceable to reflect the intent of Grantor and Grantee as expressed herein.

It is further agreed that the several terms, covenants, conditions and agreements herein contained shall in every case be binding upon and inure to the benefit of the respective parties hereto, their respective heirs, executors, successors and assigns, with the same force and effect as if specifically mentioned in each instance where a party is named.

IN WITNESS WHEREOF, the Grantor has hereunto set their hand this 29th day of March, 2018.

ATTEST / WITNESS:

PETER S. WERSINGER, III, ESQ.,
Secretary

GOLDEN AGE DEVELOPMENT GROUP, LLC

ROBERT M. KAYE
Chairman and CEO

ACKNOWLEDGMENT

STATE OF NEW JERSEY

COUNTY OF MONMOUTH

On this 29th day of March, 2018, before me a Notary Public of the State of New Jersey, the undersigned officer, personally appeared ROBERT M. KAYE, who acknowledged himself to be the Chairman and CEO of **GOLDEN AGE DEVELOPMENT GROUP, LLC**, a New Jersey limited liability company, and that he as such officer, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the limited liability company by himself as such officer.

Although the instrument transferring the easement interest herein is to be recorded in a deed book, the instrument or interest transferred is not a "deed" as defined in N.J.S.A. 46:15-5, and no realty transfer fee is applicable.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Laurie DeLong
Notary Public

Printed Name

LAURIE DELONG
Commission # 2211775
Notary Public, State of New Jersey
My Commission Expires
April 03, 2023

My Commission Expires: _____

After recording please return to:
Williams - Transco Pipeline
99 Farber Road
Princeton, New Jersey 08540

Line #: 11-207
R/W #: 5A-5
Tax #: 451/1.08
Municipality: Sayreville
County: Middlesex
State: New Jersey

Prepared by: _____

SUPPLEMENTAL RIGHT OF WAY AGREEMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

This Supplemental Right of Way Agreement (this "Agreement"), made the 22nd day of January, 2018 by and between **HARBOUR CLUB CONDOMINIUM ASSOCIATION, INC.,** a New Jersey non-profit corporation, having an address at 900 Harbour Club Drive, Parlin, New Jersey 08859 (hereinafter called GRANTOR whether one or more) and **TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC,** a Delaware limited liability company having an office at 2800 Post Oak Boulevard, Houston, TX 77056-6106 it successors and assigns (hereinafter called GRANTEE).

WHEREAS, by agreement dated March 22, 1967 and recorded in the County Clerk's Office, in Deed Book 2577 at Page 132 as the same may have been heretofore supplemented and amended (herein individually and collectively referred to as the "Original Agreement") the Grantor or Grantor's predecessor in title granted, bargained, sold and conveyed unto the Grantee's predecessor in interest, its successors and assigns, a right of way and easement therein more particularly described or referred to for the purpose, among other things, of laying, constructing, maintaining, inspecting, operating, repairing, altering, replacing, changing the size of, and removing one or more of its pipelines and appurtenant facilities for the transportation of gas, oil, petroleum and petroleum products or other liquids, gases or substances of any kind which can be transported through pipelines, under, upon, over, through and across those certain lands located in the Borough of Sayreville, Middlesex County, New Jersey, and described as follows:

Block 451, Lot 1.08 as described in deed dated October 10, 1984 and recorded in the Middlesex County Clerk's Office on October 11, 1984 in Deed Book 3384, Page 585.

WHEREAS, at the request of the Grantee, the Grantor has consented and agreed to further modify, amend, supplement and enlarge said Original Agreement in the manner hereinafter set forth:

NOW, THEREFORE, in consideration of the sum of [redacted] and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said Grantor does hereby by general warranty grant, bargain, sell, convey, ratify and confirm unto the Grantee, its successors and assigns, all that right of way and easement with the appurtenant rights and privileges and subject to the duties and obligations, all as described or referred to in the Original Agreement, except that the said right of way and easement is hereby modified, amended, supplemented and enlarged as follows:

1. Grantee's existing pipeline is constructed within the permanent right of way and easement hereinafter described. One or more additional pipelines, facilities or improvements may be constructed under the provisions of this Agreement and shall be located within the permanent right of way and easement hereinafter described. In addition, and without limiting the generality of the foregoing, Grantor acknowledges that Grantee shall also have the right to use (and survey), without any further payment to Grantor, the permanent right of way and easement hereinafter described during the course of planning and construction of any additional pipelines, facilities or improvements. For purposes of this Agreement, the term "facilities" includes, by way of illustration and without limitation, valves, regulators, meters, cathodic protection equipment and facilities, electronic and

communications equipment for pipeline facilities, piping and fittings, pipeline markers and vent pipes.

2. The permanent right of way and easement shall be a strip of land identified as "Existing Right of Way" and "Area of Right of Way", all as shown on a drawing marked "Exhibit A," attached hereto and made a part hereof.

3. During the course of construction of the first of the additional pipelines, facilities or improvements authorized above, Grantee shall have the right to enter upon, clear off, and use an additional strip (or strips) of land contiguous to the right of way described above, such strip (or strips) of land being identified on the attached "Exhibit A" as "Area of Temporary Work Space Outside Existing Right of Way."

4. Grantor acknowledges that Grantee shall have the option of making reasonable adjustments to the location and area of the permanent right of way and easement, as well as any temporary workspace, based upon issues that may arise after execution of this Agreement, including, but not limited to, design, constructability or field conditions. Upon request of Grantee, Grantor will promptly execute any necessary documents to be recorded. Grantor will be compensated at fair market value for any further expansion of the right of way and easements granted.

5. Grantee shall have all other rights and benefits necessary or convenient for the full enjoyment or use of the rights herein granted, including, but without limiting same to, the free and full right of ingress, and egress over and across the land of Grantor to and from the described right of way and easement, by means of roads or other access areas utilized by Grantor, and the right, from time to time as it may find convenient, to cut or remove all trees, undergrowth and other obstructions from the permanent right of way, without liability for damages naturally resulting from the proper exercise of the rights granted herein.

Grantor specifically covenants and agrees:

(a) The strip of land, first above described, is the permanent right of way granted.

(b) Without Grantee's prior written consent, Grantor will not, and will not permit any other person to, (i) build or place any structures or other encroachments on said permanent right of way or any part thereof, (ii) change the grade of said permanent right of way or any part thereof, (iii) plant trees or shrubs on said permanent right of way or any part thereof, (iv) pave longitudinally along and upon said permanent right of way or any part thereof, (v) use said permanent right of way or any part thereof in such a way as to interfere with Grantee's immediate and unimpeded access to said permanent right of way, or (vi) otherwise interfere with Grantee's lawful exercise of any of the rights herein granted.

(c) Following construction of any additional pipelines, facilities or improvements, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property and access the right of way and easements granted, at all times and as needed, to perform any and all restoration activities in connection with the construction of the additional pipeline, facilities or improvements, or in accordance with any federal, state or local restoration requirements, including but not limited to, any requirements set forth by the Federal Energy Regulatory Commission.

(d) Upon 3 days' notice to Grantor, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property from time to time to conduct certain investigations and inspections in the immediate area adjacent to Grantee's existing pipeline right of way and easement, including but not limited to, civil surveys, topographical surveys, archeological and cultural resources surveys, biological surveys, environmental surveys, or any other inspections that may be required by any federal, state or local governmental agency. Grantee shall restore or repair Grantor's property, as nearly as practicable and permissible, to its condition prior to the commencement of the survey work.

TO HAVE AND TO HOLD said right of way and easement unto said Grantee, its successors and assigns, for so long as a pipeline is maintained thereon.

Grantor acknowledges that part of the consideration above recited is payment in full for any damages caused or to be caused by the construction of the first additional pipeline, facilities or improvements hereunder.

Grantee, by its acceptance hereof, covenants and agrees:

(a) Except for the damages caused by the construction of the existing pipeline(s) and the first additional pipeline, facilities or improvements authorized hereunder, Grantee will reimburse the Grantor for any loss or damage to property which Grantor may suffer as a consequence of the laying, constructing, altering, repairing, removing, changing the size of, or replacing any pipelines, facilities or improvements, in the exercise of the rights herein granted except that neither the Grantor nor any persons or firms holding under the Grantor shall assert any claims for severance or consequential damages.

(b) It will defend and save harmless the Grantor from any claims or suits which may be asserted against the Grantor arising out of any negligent acts of Grantee, its agents or employees, in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor.

Except as herein modified and amended, the Original Agreement is hereby ratified and confirmed in all respects.

It is agreed that the Original Agreement and this Agreement, cover all the agreements between the parties with respect to the subject matter and no representations or statements, verbal or written, have been made, modifying, adding to, or changing the terms thereof.

It is further agreed that if any term of this Agreement is found to be void or invalid, such provision shall be fully severable herefrom and such invalidity shall not affect the remaining terms of this Agreement, which shall continue in full force and effect, and this Agreement shall be reformed and construed as if such invalid provision had never been contained herein, and if possible, such provision shall be reformed to the maximum extent permitted under applicable law to render same valid, operative and enforceable to reflect the intent of Grantor and Grantee as expressed herein.

It is further agreed that the several terms, covenants, conditions and agreements herein contained shall in every case be binding upon and inure to the benefit of the respective parties hereto, their respective heirs, executors, successors and assigns, with the same force and effect as if specifically mentioned in each instance where a party is named.

IN WITNESS WHEREOF, the Grantor has hereunto set their hand this 22 day of January, 2018.

ATTEST / WITNESS:

HARBOUR CLUB CONDOMINIUM ASSOCIATION, INC.

By: Joseph McDermott

Print Name

Joseph McDermott

Print Name

ACKNOWLEDGMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

On this 22 day of ~~February~~ January 19, 2018, before me a Notary Public of the State of New Jersey, the undersigned officer, personally appeared Joseph McDermott, who acknowledged him/herself to be the President of **HARBOUR CLUB CONDOMINIUM ASSOCIATION, INC.**, a New Jersey non-profit corporation, and that he/she as such officer, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by him/herself as such officer.

Although the instrument transferring the easement interest herein is to be recorded in a deed book, the instrument or interest transferred is not a "deed" as defined in N.J.S.A. 46:15-5, and no realty transfer fee is applicable.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Dawn M Myers
Notary Public

Dawn M Myers
Printed Name

My Commission Expires: July 18, 2018

DAWN M. MYERS
A Notary Public of New Jersey
My Commission Expires July 18, 2018

After recording please return to:
Williams - Transco Pipeline
99 Farber Road
Princeton, New Jersey 08540

Prepared by: _____

Line #: 11-207
R/W #: 5A-9
Tax #: 538/13
Municipality: Sayreville
County: Middlesex
State: New Jersey

SUPPLEMENTAL RIGHT OF WAY AGREEMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

This Supplemental Right of Way Agreement (this "Agreement"), made the 16th day of May, 2018 by and between **LOCKWOOD MARINA, LLC**, a New Jersey limited liability company, having an address at 1825 Highway 35, South Amboy, NJ 08879 (hereinafter called GRANTOR whether one or more) and **TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC**, a Delaware limited liability company having an office at 2800 Post Oak Boulevard, Houston, TX 77056-6106 it successors and assigns (hereinafter called GRANTEE).

WHEREAS, by agreement dated March 21, 1967 and recorded in the County Clerk's Office, in Deed Book 2577 at Page 127 as the same may have been heretofore supplemented and amended (herein individually and collectively referred to as the "Original Agreement") the Grantor or Grantor's predecessor in title granted, bargained, sold and conveyed unto the Grantee's predecessor in interest, its successors and assigns, a right of way and easement therein more particularly described or referred to for the purpose, among other things, of laying, constructing, maintaining, inspecting, operating, repairing, altering, replacing, changing the size of, and removing one or more of its pipelines and appurtenant facilities for the transportation of gas, oil, petroleum and petroleum products or other liquids, gases or substances of any kind which can be transported through pipelines, under, upon, over, through and across those certain lands located in the Borough of Sayreville, Middlesex County, New Jersey, and described as follows:

Block 538, Lot 13 as described in deed dated December 3, 2002 and recorded in the Middlesex County Clerk's Office on February 6, 2003 in Deed Book 5144, Page 368

WHEREAS, at the request of the Grantee, the Grantor has consented and agreed to further modify, amend, supplement and enlarge said Original Agreement in the manner hereinafter set forth:

NOW, THEREFORE, in consideration of the sum of [redacted] and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said Grantor does hereby by general warranty grant, bargain, sell, convey, ratify and confirm unto the Grantee, its successors and assigns, all that right of way and easement with the appurtenant rights and privileges and subject to the duties and obligations, all as described or referred to in the Original Agreement, except that the said right of way and easement is hereby modified, amended, supplemented and enlarged as follows:

1. Grantee's existing pipeline(s) is/are constructed within the permanent right of way and easement hereinafter described. One or more additional pipelines, facilities or improvements may be constructed under the provisions of this Agreement and shall be located within the permanent right of way and easement hereinafter described. In addition, and without limiting the generality of the foregoing, Grantor acknowledges that Grantee shall also have the right to use (and survey), without any further payment to Grantor, the permanent right of way and easement hereinafter described during the course of planning and construction of any additional pipelines, facilities or improvements. For purposes of this Agreement, the term "facilities" includes, by way of illustration and without limitation, valves, regulators, meters, cathodic protection equipment and facilities, electronic and

communications equipment for pipeline facilities, piping and fittings, pipeline markers and vent pipes.

2. The permanent right of way and easement shall be a strip of land identified as "Existing Right of Way" and "Proposed Right of Way", all as shown on a drawing marked "Exhibit A," attached hereto and made a part hereof.

3. During the course of construction of the first of the additional pipelines, facilities or improvements authorized above, Grantee shall have the right to enter upon, clear off, and use an additional strip (or strips) of land contiguous to the right of way described above, such strip (or strips) of land being identified on the attached "Exhibit A" as "Temporary Work Space."

4. Grantor acknowledges that Grantee shall have the option of making reasonable adjustments to the location and area of the permanent right of way and easement, as well as any temporary workspace, based upon issues that may arise after execution of this Agreement, including, but not limited to, design, constructability or field conditions. Upon request of Grantee, Grantor will promptly execute any necessary documents to be recorded. Grantor will be compensated at fair market value for any further expansion of the right of way and easements granted.

5. Grantee shall have all other rights and benefits necessary or convenient for the full enjoyment or use of the rights herein granted, including, but without limiting same to, the free and full right of ingress, and egress over and across the land of Grantor to and from the described right of way and easement, by means of roads or other access areas utilized by Grantor, and the right, from time to time as it may find convenient, to cut or remove all trees, undergrowth and other obstructions from the permanent right of way, without liability for damages naturally resulting from the proper exercise of the rights granted herein.

Grantor specifically covenants and agrees:

(a) The strip of land, first above described, is the permanent right of way granted.

(b) Without Grantee's prior written consent, Grantor will not, and will not permit any other person to, (i) build or place any structures or other encroachments on said permanent right of way or any part thereof, (ii) change the grade of said permanent right of way or any part thereof, (iii) plant trees or shrubs on said permanent right of way or any part thereof, (iv) pave longitudinally along and upon said permanent right of way or any part thereof, (v) use said permanent right of way or any part thereof in such a way as to interfere with Grantee's immediate and unimpeded access to said permanent right of way, or (vi) otherwise interfere with Grantee's lawful exercise of any of the rights herein granted.

(c) Following construction of any additional pipelines, facilities or improvements, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property and access the right of way and easements granted, at all times and as needed, to perform any and all restoration activities in connection with the construction of the additional pipeline, facilities or improvements, or in accordance with any federal, state or local restoration requirements, including but not limited to, any requirements set forth by the Federal Energy Regulatory Commission.

(d) Upon 3 days' notice to Grantor, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property from time to time to conduct certain investigations and inspections in the immediate area adjacent to Grantee's existing pipeline right of way and easement, including but not limited to, civil surveys, topographical surveys, archeological and cultural resources surveys, biological surveys, environmental surveys, or any other inspections that may be required by any federal, state or local governmental agency. Grantee shall restore or repair Grantor's property, as nearly as practicable and permissible, to its condition prior to the commencement of the survey work.

TO HAVE AND TO HOLD said right of way and easement unto said Grantee, its successors and assigns, for so long as a pipeline is maintained thereon.

Grantor acknowledges that part of the consideration above recited is payment in full for any damages caused or to be caused by the construction of the first additional pipeline, facilities or improvements hereunder.

Grantee, by its acceptance hereof, covenants and agrees:

(a) Except for the damages caused by the construction of the existing pipeline(s) and the first additional pipeline, facilities or improvements authorized hereunder, Grantee will reimburse the Grantor for any loss or damage to property which Grantor may suffer as a consequence of the laying, constructing, altering, repairing, removing, changing the size of, or replacing any pipelines, facilities or improvements, in the exercise of the rights herein granted except that neither the Grantor nor any persons or firms holding under the Grantor shall assert any claims for severance or consequential damages.

(b) It will defend and save harmless the Grantor from any claims or suits which may be asserted against the Grantor arising out of any negligent acts of Grantee, its agents or employees, in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor.

Except as herein modified and amended, the Original Agreement is hereby ratified and confirmed in all respects.

It is agreed that the Original Agreement and this Agreement, cover all the agreements between the parties with respect to the subject matter and no representations or statements, verbal or written, have been made, modifying, adding to, or changing the terms thereof.

It is further agreed that if any term of this Agreement is found to be void or invalid, such provision shall be fully severable herefrom and such invalidity shall not affect the remaining terms of this Agreement, which shall continue in full force and effect, and this Agreement shall be reformed and construed as if such invalid provision had never been contained herein, and if possible, such provision shall be reformed to the maximum extent permitted under applicable law to render same valid, operative and enforceable to reflect the intent of Grantor and Grantee as expressed herein.

It is further agreed that the several terms, covenants, conditions and agreements herein contained shall in every case be binding upon and inure to the benefit of the respective parties hereto, their respective heirs, executors, successors and assigns, with the same force and effect as if specifically mentioned in each instance where a party is named.

IN WITNESS WHEREOF, the Grantor has hereunto set their hand this 16th day of May, 2018.

ATTEST / WITNESS:

LOCKWOOD MARINA, LLC

By: William Lockwood

ACKNOWLEDGMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

On this 16th day of May, 2018, before me a Notary Public of the State of New Jersey, the undersigned officer, personally appeared William Lockwood, who acknowledged him/herself to be the President of **LOCKWOOD MARINA, LLC**, a limited liability company, and that he as such officer, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the limited liability company by himself as such officer.

Although the instrument transferring the easement interest herein is to be recorded in a deed book, the instrument or interest transferred is not a "deed" as defined in N.J.S.A. 46:15-5, and no realty transfer fee is applicable.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Catherine Wisneski
Notary Public

Catherine Wisneski
Printed Name

My Commission Expires: CATHERINE WISNESKI NOTARY PUBLIC OF NEW JERSEY My Commission Expires 4/16/2019

After recording please return to:
Williams - Transco Pipeline
99 Farber Road
Princeton, New Jersey 08540

Prepared by: _____

Line #: 11-207
R/W #: 5A-10
Tax #: 538/9.02
Municipality: Sayreville
County: Middlesex
State: New Jersey

SUPPLEMENTAL RIGHT OF WAY AND EXCLUSIVE EASEMENT AGREEMENT

STATE OF NEW JERSEY

COUNTY OF MIDDLESEX

This Supplemental Right of Way and Exclusive Easement Agreement (this "Agreement"), made the 28th day of December, 2017 by and between **HIGHVIEW PROPERTIES AT SAYREVILLE URBAN RENEWAL LLC**, a New Jersey limited liability company, having an address at c/o John Giunco, Esq., 125 Half Mile Road – Suite 300, Red Bank, NJ 07701 (hereinafter called GRANTOR whether one or more) and **TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC**, a Delaware limited liability company having an office at 2800 Post Oak Boulevard, Houston, TX 77056-6106 it successors and assigns (hereinafter called GRANTEE).

WHEREAS, by agreement dated April 10, 1968 and recorded in the Middlesex County Clerk's Office, in Deed Book 2617 at Page 599 as the same may have been heretofore supplemented and amended (herein individually and collectively referred to as the "Original Agreement") the Grantor or Grantor's predecessor in title granted, bargained, sold and conveyed unto the Grantee's predecessor in interest, its successors and assigns, a right of way and easement therein more particularly described or referred to for the purpose, among other things, of laying, constructing, maintaining, operating, repairing, altering, replacing, and removing one or more of its pipelines and appurtenant facilities for the transportation of gas, oil, petroleum and petroleum products, upon, under, or across those certain lands located in the Borough of Sayreville, Middlesex County, New Jersey, and described as follows:

Block 538, Lot 9.02 as described in deed daled September 23, 2014 and recorded in the Middlesex County Clerk's Office on October 2, 2014 in Deed Book 6620, Page 305

WHEREAS, at the request of the Grantee, the Grantor has consented and agreed to further modify, amend, supplement and enlarge said Original Agreement in the manner hereinafter set forth:

NOW, THEREFORE, in consideration of the sum of [redacted] and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, said Grantor does hereby by general warranty grant, bargain, sell, convey, ratify and confirm unto the Grantee, its successors and assigns, all that right of way and easement with the appurtenant rights and privileges and subject to the duties and obligations, all as described or referred to in the Original Agreement, except that the said right of way and easement is hereby modified, amended, supplemented and enlarged as follows:

1. Grantee's existing pipeline(s) is/are constructed within the permanent right of way and easement hereinafter described. One or more additional pipelines, facilities or improvements may be constructed under the provisions of this Agreement and shall be located within the permanent right of way and easement hereinafter described. In addition, and without limiting the generality of the foregoing, Grantor acknowledges that Grantee shall also have the right to use (and survey), without any further payment to Grantor, the permanent right of way and easement hereinafter described during the course of planning and construction of any additional pipelines, facilities or improvements. For purposes of this Agreement, the term "facilities" includes, by way of illustration and without limitation, valves, regulators, meters, cathodic protection equipment and facilities, electronic and communications equipment for pipeline facilities, piping and fittings, pipeline markers and vent pipes.

2. The permanent right of way and easement shall be a strip of land identified as "Area of Existing Right of Way" and "Area of Right of Way", all as shown on a drawing marked "Exhibit A," attached hereto and made a part hereof.

3. Grantor also grants to Grantee an exclusive easement for the purposes of constructing, maintaining, operating, repairing, altering and replacing pipe lines, valves, regulators, fences, poles, wire lines, meters, meter runs, houses, compressors, drips, tanks, radio towers and communications equipment and any and all other devices, equipment and structures incident, necessary or convenient to the regulation, control, measurement, transportation and distribution of gas, oil, petroleum and petroleum products under, upon, over, through and across the lands of Grantor.

4. The exclusive easement shall be the area of land identified as "Area of Exclusive Easement within Existing Right of Way", all as shown on the drawing marked "Exhibit A" attached hereto and made a part hereof.

5. The Grantor also grants to Grantee a right of way and easement for the purpose of locating, opening, constructing, repairing, maintaining and using a roadway for access to the above described exclusive easement as identified as "Area of Permanent Access Road within Existing Right of Way", all as shown on the drawing marked "Exhibit A" attached hereto and made a part hereof.

5. During the course of construction of the first of the additional pipelines, facilities or improvements authorized above, Grantee shall have the right to enter upon, clear off, and use an additional strip (or strips) of land contiguous to the right of way described above, such strip (or strips) of land being identified on the attached "Exhibit A" as "Area of Temporary Work Space Outside Existing Right of Way."

6. Grantor acknowledges that Grantee shall have the option of making reasonable adjustments to the location and area of the permanent rights of way and exclusive easement, as well as any temporary workspace, based upon issues that may arise after execution of this Agreement, including, but not limited to, design, constructability or field conditions. Upon request of Grantee, Grantor will promptly execute any necessary documents to be recorded. Grantor will be compensated at fair market value for any further expansion of the right of way and easements granted.

7. Grantee shall have all other rights and benefits necessary or convenient for the full enjoyment or use of the rights herein granted, including, but without limiting same to, the free and full right of ingress, and egress over and across the land of Grantor to and from the described rights of way and exclusive easement, by means of roads or other access areas utilized by Grantor, and the right, from time to time as it may find convenient, to cut or remove all trees, undergrowth and other obstructions from the permanent rights of way and exclusive easement, without liability for damages naturally resulting from the proper exercise of the rights granted herein. Grantee shall also have all other rights and benefits necessary or convenient for the full enjoyment or use of the exclusive easement herein granted, including the right to fence in said land so as to exclude other persons and animals therefrom.

Grantor specifically covenants and agrees:

(a) The areas of land, first above described, are the permanent right of way and exclusive easements granted.

(b) Without Grantee's prior written consent, Grantor will not, and will not permit any other person to, (i) build or place any structures or other encroachments on said permanent rights of way, exclusive easement or any part thereof, (ii) change the grade of said permanent rights of way, exclusive easement or any part thereof, (iii) plant trees or shrubs on said permanent rights of way, exclusive easement or any part thereof, (iv) pave longitudinally along and upon said permanent rights of way, exclusive easement or any part thereof, (v) use said permanent rights of way, exclusive easement or any part thereof in such a way as to interfere with Grantee's immediate and unimpeded access to said permanent rights of way or exclusive easement, or (vi) otherwise interfere with Grantee's lawful exercise of any of the rights herein granted.

(c) Following construction of any additional pipelines, facilities or improvements, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property and access the right of way and easements granted, at all times and as needed, to perform any and all restoration activities in connection with the construction of the additional pipeline, facilities or improvements, or in accordance with any federal, state or local restoration requirements, including but not limited to, any requirements set forth by the Federal Energy Regulatory Commission.

(d) Upon 3 days' notice to Grantor, Grantee, its agents, employees and contractors, shall have the right to enter Grantor's property from time to time to conduct certain investigations and inspections in the immediate area adjacent to Grantee's existing pipeline right of way and easement, including but not limited to, civil surveys, topographical surveys, archeological and cultural resources surveys, biological surveys, environmental surveys, or any other inspections that may be required by any federal, state or local governmental agency. Grantee shall restore or repair Grantor's property, as nearly as practicable and permissible, to its condition prior to the commencement of the survey work.

TO HAVE AND TO HOLD said right of way and easement unto said Grantee, its successors and assigns, for so long as a pipeline is maintained thereon.

Grantor acknowledges that part of the consideration above recited is payment in full for any damages caused or to be caused by the construction of the first additional pipeline, facilities or improvements hereunder.

Grantee, by its acceptance hereof, covenants and agrees:

(a) Except for the damages caused by the construction of the existing pipeline(s) and the first additional pipeline, facilities or improvements authorized hereunder, Grantee will reimburse the Grantor for any loss or damage to property which Grantor may suffer as a consequence of the laying, constructing, altering, repairing, removing, changing the size of, or replacing any pipelines, facilities or improvements, in the exercise of the rights herein granted except that neither the Grantor nor any persons or firms holding under the Grantor shall assert any claims for severance or consequential damages.

(b) It will defend and save harmless the Grantor from any claims or suits which may be asserted against the Grantor arising out of any negligent acts of Grantee, its agents or employees, in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor.

(c) It will indemnify the Grantor from any claims or suits which may be asserted by the Borough of Sayreville against the Grantor arising out of the use and restoration of the firehouse parking lot by Grantee in its exercise of the rights herein granted, except to the extent and in proportion that such claims or suits are attributable, in whole or in part, to the fault, failure or negligence of Grantor or a third party other than Grantee, its agents or employees.

During the course of construction of the first of the additional pipelines, facilities or improvements authorized above, Grantee further covenants and agrees to install safety fencing along each side of the work area that is adjacent to the apartments on Grantor's property, which fencing shall be removed at any time as determined by Grantee in its sole discretion. Such fencing will consist of the type and size to be determined by Grantee in its sole discretion.

Except as herein modified and amended, the Original Agreement is hereby ratified and confirmed in all respects.

It is agreed that the Original Agreement and this Agreement, cover all the agreements between the parties with respect to the subject matter and no representations or statements, verbal or written, have been made, modifying, adding to, or changing the terms thereof.

It is further agreed that if any term of this Agreement is found to be void or invalid, such provision shall be fully severable herefrom and such invalidity shall not affect the remaining terms of this Agreement, which shall continue in full force and effect, and this Agreement shall be reformed and construed as if such invalid provision had never been

contained herein, and if possible, such provision shall be reformed to the maximum extent permitted under applicable law to render same valid, operative and enforceable to reflect the intent of Grantor and Grantee as expressed herein.

It is further agreed that the several terms, covenants, conditions and agreements herein contained shall in every case be binding upon and inure to the benefit of the respective parties hereto, their respective heirs, executors, successors and assigns, with the same force and effect as if specifically mentioned in each instance where a party is named.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Grantor has hereunto set their hand this 28th day of December, 2017.

ATTEST / WITNESS:

Nadine Carter

HIGHVIEW PROPERTIES AT SAYREVILLE URBAN RENEWAL LLC

By: John A. Giunco, Managing Member

ACKNOWLEDGMENT

STATE OF NEW JERSEY

COUNTY OF ~~MIDDLESEX~~ MONMOUTH

On this 28th day of December, 2017, before me a Notary Public of the State of New Jersey, the undersigned officer, personally appeared John A. Giunco, who acknowledged him/herself to be the Co-Manager of **HIGHVIEW PROPERTIES AT SAYREVILLE URBAN RENEWAL LLC**, a limited liability company, and that he/she as such officer, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the limited liability company by him/herself as such officer.

Although the instrument transferring the easement interest herein is to be recorded in a deed book, the instrument or interest transferred is not a "deed" as defined in N.J.S.A. 46:15-5, and no realty transfer fee is applicable.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Denise M. Wegryniak
Notary Public

DENISE M. WEGRYNIAK
NOTARY PUBLIC STATE OF NEW JERSEY
MY COMMISSION EXPIRES 8/30/19

Denise M. Wegryniak
Printed Name

My Commission Expires: 8/30/19

After recording please return to:
Williams - Transco Pipeline
99 Farber Road
Princeton, New Jersey 08540

Rubin
Ehrlich &
Buckley

Rubin, Ehrlich & Buckley
A Professional Corporation

Crossroads Corporate Center
3150 Brunswick Pike, Suite 310
Lawrenceville, NJ 08648
Tel: (609) 637-9500
Fax: (609) 637-0001

lawreb.com

August 11, 2017
via email

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
NJDEP Division of Land Use Regulation
501 East State Street
Station Plaza 5, 2nd Floor
Trenton, New Jersey, 08609

Re: Transcontinental Gas Pipe Line Company LLC
Northeast Supply Enhancement Project ("Project")
Proposed Compressor Station 206

Dear Mr. Jones:

This office represents Trap Rock Industries, LLC and Trap Rock Industries, Inc. (collectively "Trap Rock"), which own Block 5.02, Lots 9, 10, 11.02, 12, 16, and 17 in the Township of Franklin, Somerset County, New Jersey, across which Transcontinental Gas Pipe Line Company, LLC ("Transco") proposes to construct a permanent access road to reach its proposed Compressor Station 206. Transco entered into an agreement on April 11, 2017 with Trap Rock for an option to acquire an exclusive permanent easement across these properties.

Please accept this letter as Trap Rock's acknowledgment that, assuming Transco exercises its option to acquire the easement, Trap Rock consents to Transco's use of portions of the properties listed above as a permanent access road to reach its proposed compressor station to be located on Block 5.02, Lot 25. Please note that, to best of my knowledge, no portion of the proposed permanent easement will be located within property belonging to the State of New Jersey or on any property owned by a public agency that would be encumbered by Green Acres. To my knowledge, based upon representations from Transco's attorneys, Transco's Project does not require a Section 106 (National Register of Historic Places) Determination as part of a federal approval.

Very truly yours,
RUBIN, EHRLICH & BUCKLEY, P.C.

By: Bruce Lubitz /klt
Bruce Lubitz, Esq.

BL/klt
cc Mark Stevens, Esq. via email

Rubin, Ehrlich & Buckley
A Professional Corporation

731 Alexander Road
Princeton, New Jersey 08540
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DIRECT CORRESPONDENCE TO:
BRUCE LUBITZ
E-MAIL: BLUBITZ@LAWREB.COM

***Via* Email**

April 27, 2018

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
NJDEP Division of Land Use Regulation
501 East State Street
Station Plaza 5, 2nd Floor
Trenton, New Jersey, 08609

Re: Transcontinental Gas Pipe Line Company LLC
Northeast Supply Enhancement Project ("Project")
Proposed Compressor Station 206

Dear Mr. Jones:

This office represents Trap Rock Industries, LLC ("Trap Rock"), which owns Block 5.02, Lot 23 ("Property") in the Township of Franklin, Somerset County, New Jersey, across which Transcontinental Gas Pipe Line Company, LLC ("Transco") proposes to expand its existing permanent right of way for purposes of constructing a valve site and suction and discharge piping ("Proposed Activity") to serve proposed Compressor Station 206.

Please accept this letter as Trap Rock's acknowledgment that, with the understanding that Trap Rock and Transco will enter into an agreement for the Proposed Activity on the Property which, among other matters, specifies the terms and conditions under which Transco may use the Property for the Proposed Activity, as well as the compensation to be paid by Transco for such use, Trap Rock consents to Transco's Proposed Activity which will serve Transco's proposed compressor station to be located on Block 5.02, Lot 25. Trap Rock's consent does not constitute a present grant of any property rights to Transco. Track Rock reserves its right to negotiate with Transco for the permanent and

temporary easements needed for the Project and the compensation to ultimately be paid for such easements.

Very truly yours,

RUBIN, EHRLICH & BUCKLEY, P.C.

By: _____
Bruce Lubitz, Esq.

cc: Mark Stevens, Esq. (via email)
Michael Crowley (via email)

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT 2

MEETING SUMMARIES FROM USACE NYD MEETINGS

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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Northeast Supply Enhancement Project (NESE)

Project Meeting Summary

Meeting Date: January 26, 2017
RE: USACE Permitting and Dredged Material Considerations
Compiled By: Steven MacLeod and Sara Mochrie

Participants

USACE: Naomi Handell, Ronald Pinzon, Oksana Yaremko
Williams/Transco: Blake Clements, Jim Gavelek, Scott Horner, Steve Kellogg, Chris Martinez
E&E: Sara Mochrie, Dave Albers, Steven MacLeod

Meeting Summary

1) Transco and E & E met with U.S. Army Corps of Engineers (USACE) New York District (NYD) staff to discuss wetland jurisdiction and potential options for both offshore placement/disposal of dredged material as well as in-water sources of backfill material.

2) USACE staff indicated that impacts to wetlands within 1,000 feet of the mean high water line should be included as part of the permit application to the USACE NYD, along with offshore dredge/fill activites. This would pertain to certain sections of the Madison Loop, as well as the Raritan Bay Loop. Ms. Handell said she would be willing review a draft figure showing an interpretation of the affected wetlands and waterbodies under USACE NYD jurisdiction in advance of the application.

3) Transco and E & E staff summarized the status of the Project's offshore sampling survey, noting that core boring was completed in November 2016, and vibracoring was completed in December 2016. The boring analysis was recently completed, and vibracore analysis was underway. The analysis was being phased to prioritize the examination of two route alternatives near Staten Island, one that avoids a designated anchorage area and one that was proposed by New York State Dept. of Environmental Conservation (NYSDEC) to avoid areas reported to have higher hard clam densities.

4) The group discussed sediment placement/disposal options for material dredged to form the trench using certain equipment (e.g., a clamshell dredge).
    a. Side-casting material would be ideal for reclaiming/re-using the sediment to backfill the trench, but E & E reported that this was not viewed favorably by NOAA Fisheries or NJDEP staff due to potential for additional impact, at least within Raritan Bay and Lower NY Bay.

b. Placing the dredged material in a rehandling location could facilitate re-use as backfill. USACE staff could not offer a definitive in-water location that would be acceptable, but suggested that Transco consider an area that would not cause a navigational conflict, such as an historic borrow pit. The USACE also suggested considering an onshore rehandling area.
c. Material may be placed in the Historic Area Remediation Site (HARS) following appropriate testing, which would include bioassay/bioaccumulation. Ms. Yaremko confirmed that the USACE group responsible for the Section 103 permit would prepare a sampling plan upon receipt of site maps identifying the route. Transco would need to execute the sampling plan and perform the analysis using an approved laboratory (preferably in New York), then data would be reviewed by the USACE and the U.S. Environmental Protection Agency (EPA). The process typically takes 8 months. USACE staff confirmed that they could provide a list of previously approved laboratories.
d. Ms. Yaremko indicated that samples would likely be composited for an entire dredge "prism", which the USACE would consider in a single analysis for HARS suitability, but the route can be sectioned into separate prisms, and sediment layers could be segregated vertically. She confirmed that submittal of bulk sediment chemistry results from Transco's 2016 sediment survey could be helpful in preparing the HARS sampling plan. To help Transco determine how to segregate the offshore route sections for testing, Ms. Yaremko suggested reviewing previous public notices for determinations on recent projects that used the HARS, and compare the characteristics of the recently approved areas to the NESE survey sample results.
e. Ms. Yaremko noted that there was not a formal application form for Section 103 approval, but Mr. Pinzon indicated that the final approval would likely be combined as part of the Section 10/404 permit, so the letter request for HARS use should be submitted to Mr. Rob Youhas and copied to Ms. Handell as well. The request should be clear about what sections of the route are intended for HARS disposal.
f. Mr. Kellogg asked if there were any in-water placement option for material that was not HARS-suitable but was not clearly contaminated. USACE staff could not offer an immediate answer.

5) The group also discussed potential in-water sources for backfill material.
   a. E & E noted that they were trying to identify sections of maintained navigation channels near the Project area that would be suitable for backfill. E & E submitted a FOIA request to the USACE asking for previous maintenance dredging information that would aid in determining these areas, and is awaiting a response.

b. Transco had considered approaching Amboy Aggregates, which was issued a permit to mine sand from areas such as Ambrose Channel and Sandy Hook Channel. Mr. Pinzon indicated that Amboy Aggregates transferred their permit to Great Lakes Dredge and Dock (GLDD), which was currently only authorized to dredge sand from a specific section of Ambrose Channel. Weeks Marine has also obtained a permit to dredge sand from the same section of Ambrose Channel. These permits have an annual cap on the amount of material that can be dredged. Ms. Handell said she could provide copies of these permits to Transco.
c. USACE staff said it is possible for Transco to receive material from GLDD or Weeks Marine, or obtain its own permit to dredge Ambrose Channel if a separate dredge contractor is used. It is also possible for a dredge contractor to obtain a permit (or permit modification) to dredge other channels with historically suitable material, such as Sandy Hook Channel or the Naval Station Earl Pier and access channel in Sandy Hook Bay. Ms. Handell offered to provide a copy of the permit for the recent Navy pier dredging event.
d. Permits (or modifications) for newly approved channels would likely require a beneficial used determination (BUD) and/or additional testing. A review by NOAA Fisheries would also be necessary (e.g., for EFH and T&E aspects)
e. A new offshore borrow area (BA) could be considered, and Transco has identified several BAs proposed by the USACE as suitable for certain beach replenishment projects in the area. Transco was initially considering the use of material adjacent to these BAs that might not be considered coarse enough for beach nourishment (i.e., mean diameter less than 0.3 mm), but would still serve as a clean, compatible source for trench backfill. Transco would need to make the case that a selected backfill source would be suitable.
f. USACE staff said it may also be possible to use material within the USACE-proposed BAs depending on the amount of sand available in the BA, the volume required for the NESE Project, and the timing for the beach replenishment projects. USACE staff said they would consult with the Civil Works branch on this issue.
g. The group considered the feasibility of Transco coordinating with the USACE to obtain backfill material from a USACE-funded maintenance dredging activity. USACE staff noted that such projects typically have a BUD for pre-designated placement areas. Further, past partnerships have occurred with the state, but USACE staff were not certain if the USACE would even be able to partner with a private entity.

6) E & E noted that NOAA Fisheries staff recently identified winter flounder spawning restrictions that would apply to much of the route in waters shallower than -20 feet. The restriction would prohibit dredge/fill activities between January 1 and May 31. While Transco may be able to perform trenching and installation of the pipeline outside this period, it is unlikely that all backfill would also be completed within a single work season. This may leave the trench only partially filled for five

months, though it is unlikely that the pipeline would be in service at that stage (i.e., carrying natural gas).

a. USACE staff suggested considering the possibility of splitting installation into sections within the shallow area, such that each section could be installed and backfilled in a single work season. Transco observed that this might be difficult, particularly given the need to hydrostatically test the entire line before service, making it undesirable to backfill until the tests are complete.
b. USACE staff also suggested considering the placement of protective mattresses along unfilled portions of the trench. Transco did not immediately comment on the feasibility of this option.
c. USACE agreed to discuss the issue directly with NOAA Fisheries.

-End Summary-

Northeast Supply Enhancement Project (NESE)

Project Meeting Summary

Date: July 25, 2017
RE: USACE meeting on HARS disposal and potential offshore backfill sources
Location: U.S. Army Corps of Engineers office, New York City

Participants

Williams: Blake Clements, Scott Horner, Chris Martinez
E&E: Sara Mochrie, Dave Albers, Steven MacLeod, Max Martin
USACE: Naomi Handell, Stephen Knowles, Kelly Vega, Oksana Yaremko, Christina Rasmussen

Meeting Summary

1) A meeting was held with the U.S. Army Corps of Engineers (USACE) New York District staff to discuss the potential use of the Historic Area Remediation Site (HARS) for disposal of clamshell-dredged material, and a proposal to use federally designated navigation channels as a source of backfill material for the Project.
    a. Dr. Knowles will serve as the main point of contact for the Section 103 request to use the HARS. Ms. Vega, joined later in the meeting by Ms. Yaremko, was also present to address HARS-related issues.
    b. Ms. Rasmussen was present to discuss dredging within the navigation channels.
    c. Ms. Yaremko joined part way through the meeting, as noted below.

2) Mr. Clements provided an overview of the entire Project, including components in Pennsylvania, New York and New Jersey, with an emphasis on the offshore component (Raritan Bay Loop), which is entirely within the USACE New York District's jurisdiction. Ms. Mochrie briefly explained the inputs from the Transco engineering team, regulators, and marine stakeholders that lead to the selection of the proposed offshore route. Ms. Mochrie also noted that the proposed burial depths for the offshore pipeline varied based on input from USACE staff in summer 2016.

3) Mr. MacLeod discussed major Project milestones, particularly those related to review of the Project by the Federal Energy Regulatory Commission (FERC), which serves as the lead federal agency under the National Environmental Policy Act (NEPA). Mr. MacLeod noted that the USACE New York District is a cooperating agency for the NEPA review.

4) Mr. MacLeod summarized the Project-specific offshore sediment sampling campaign to describe the conditions along the proposed offshore route for the Raritan Bay Loop.
    a. Transco collected sediment samples from October through December 2016 under USACE Nationwide Permit 6, following state and federal agency review of the sampling plan. The sampling plan was updated in November 2016 to include sediment chemistry analyses outlined in the USACE/EPA 2016 regional guidance document for offshore disposal.
    b. An Offshore Environmental Sampling Report was submitted to the USACE in late June 2017 as part of the Joint Permit Application for the Project. The sampling report includes grain size data, sediment chemistry analysis results, and a benthic community analysis.
    c. Supplemental sampling was performed in the spring of 2017 near the Morgan Shore HDD exit pit to better define the sediment characteristics in this area. Results will be submitted in August 2017.
    d. The sampling campaign provided a comprehensive characterization of sediment along the entire offshore route, which has supported the Project siting and impact/alternatives analysis, and forms the basis for Transco's dredged material disposal and backfill plans.

5) The group discussed Transco's pending Section 103 request to use the HARS, which applies only to areas that would potentially be excavated using a clamshell dredge (approximately 150,000 cy).
    a. Ms. Mochrie emphasized that Transco was considering use of the HARS because side-casting and re-use of the clamshell-dredged material may not be acceptable to one or more state and federal agencies, e.g., due to navigational concerns and/or benthic impacts.
    b. Mr. MacLeod noted the logistical difficulties that made it impractical to wet-store the clamshell-dredged material for later backfill, e.g., the number of barges that would be necessary and the timing for installing several miles of pipeline prior to backfill.

6) Mr. Martin presented Transco's evaluation of sediment that is proposed for potential disposal in the HARS.
    a. Mr. Martin described the process used to conservatively determine which sections of the Raritan Bay Loop route are likely to be suitable for HARS disposal based on HARS-related testing performed at several maintenance dredged channels in the vicinity of the Project. In particular, Mr. Martin compared the ranges of sediment contaminant levels along the proposed Project route with sediment contaminant levels of USACE-maintained channel areas that both passed and failed HARS testing. Sections of the Project route are only considered to likely have HARS-suitable sediment if the contaminant concentrations are predominantly below the ranges of previously tested USACE channel areas that were not approved for HARS disposal.

b. Several dredge prisms were defined based on Mr. Martin's analysis. One dredge prism includes all the separate segments of the route that are NOT likely to be HARS suitable. Transco expects all other prisms to be HARS-suitable.

7) E & E staff asked USACE staff to confirm if the dredge prism boundaries were acceptable for the Section 103 request to use the HARS, and if the comparative contaminant analysis was sufficient for approval of HARS use without further sampling and testing.
   a. Ms. Vega brought Ms. Yaremko into the meeting at this time to consider the request.
   b. Ms. Yaremko indicated that dredge prisms tested for HARS suitability were usually continuous, but that the proposed prisms could be discontinuous (segregated both vertically and horizontally), if an appropriate material separation plan was developed to avoid cross-contamination from adjacent unsuitable material.
   c. Ms. Yaremko indicated that the USACE and EPA do not consider bulk sediment chemistry levels when determining HARS suitability; rather, they consider the results of sediment/elutriate bioassays and tissue testing.
   d. Ms. Yaremko indicated that the only previously approved exclusions to toxicity testing related to material that had less than 10% fines (passing the #200 sieve), or geological layers such as undisturbed red clay and Pleistocene-era glacial till. She noted that there was some recent HARS toxicity/tissue testing for a nearby maintenance dredging project (Ward Point), but that those results would not be sufficient to characterize the areas along the Project route.
   e. Ms. Yaremko instructed Transco to submit all testing data as part of the Section 103 request, which would assist the USACE and EPA in determining the plan for additional testing. The USACE and EPA do not have a set formula for the number of additional samples, but a minimum of 40 to 50 gallons of sediment is necessary for the bioassays for each distinct prism (i.e. a "reach"). Therefore, a minimum of 6 vibracores would likely be required for each prism.

8) Ms. Mochrie asked about the timing and process for the Section 103 review.
   a. Ms. Yaremko stated that the EPA typically takes 2 weeks to evaluate and concur with the USACE, and the total time to review a request and develop a testing plan is a few weeks. Mr. Charles LoBue is the EPA contact for the testing plan development. Once the testing is complete, the agencies' QA review of the data will typically take about 30 days.
   b. Ms. Yaremko noted that the entire review process from time of request to issuance of a public notice is typically about 8 months, the longest interval being related to the sample collection and lab analyses. Ms. Mochrie acknowledged that this was consistent with the 6 to 9 month period that Ms. Yaremko had noted during a January 2017 meeting.

c. Ms. Yaremko said that she and Ms. Vega would be available to answer further questions after the meeting, but that such questions and the Section 103 request itself should be routed through Dr. Knowles.

9) Meeting discussion then moved to offshore borrow sites.
   a. Mr. Martinez reviewed the map of the potential borrow sites with the USACE team and what had been considered viable locations for offshore borrow sites as backfill source material following pipeline construction. Mr. Martin and Mr. Martinez explained the source data from USACE that was used in the review of the potential sites, volume of material available at each location, grain size profile and timing.
   b. Ms. Vega indicated that sites with less fines are better and more stable. The Sea Bright area has a lot of gravel, which has been an equipment issue for USACE dredges in the past and also has UXO but may be useable if proper equipment is deployed.
   c. Ms. Vega also provided background on the Earle Area and the dredging schedule of every 4-5 years may align with the project schedule and make that a viable source area.
   d. The NESE team inquired about a contact within Dredge Material Management Program to find out about the dredging schedule. Ms. Vega will try to provide.
   e. Other areas discussed that might be compatible are Union Beach from Sea Bright and Raritan Bay Shore. Robert Vohden is the Project Manager for USACE NY District, which Transco can contact. Jamaica Bay site was identified as a sandy source we see as viable.
   f. Ms. Vega and NESE team agreed that Ambrose channel is an excellent source for NESE to consider and data from past dredging activities is available for us to use. Any beneficial reuse of material is considered a good opportunity to keep material in the system
   g. For permitting Transco could consider multiple paths and move forward with options while Transco completes the work description for borrow sites and engages with NYSDEC and NJDEP about a beneficial use determination. Overall, the sites presented as preferred options for backfill source material appear to be viable to USACE based on grain size, dredging schedule, and volume of material needed in comparison to volume of material available.

-End Summary-

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT 3

STORMWATER MANAGEMENT REPORT

PROVIDED SEPARATELY

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT 4

POST CONSTRUCTION STORMWATER MANAGEMENT PLANS

PROVIDED SEPARATELY

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT 5

DRAFT SEDIMENT SAMPLING AND ANALYSIS PLAN

PROVIDED SEPARATELY

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT 6

TIME-OF-YEAR RESTRICTION FLEXIBILITY REQUEST

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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Table A: Species-related Time-of-year Restriction (TOYR) Flexibility Requests – revised August 16, 2018
Northeast Supply Enhancement Project

Activity	Location	Request	Requested Flexibility Start Date[1]	Requested Flexibility End date[1]	Applicable Species TOYR	Justification	Potential Impact on Species
All Construction Activity	New Jersey - Nearshore (MP12.5 to MP14.0)	Allow construction activities near Morgan shore during Horseshoe Crab TOYR.	5/1/2020	9/15/2020	Horseshoe Crab (4/15 – 9/15)	Period of May to September is only feasible construction window given other TOYR	Sediment disturbance, suspended sediment and deposition
Clamshell Dredging	New York - Chapel Hill crossing through Anchorage Area (MP25.0)	Allow dredging during winter flounder TOYR.	5/1/2020 *TOYR alt. 6/1/2020*	5/31/2020	Winter flounder (12/15 – 5/31)	Increases buffer period for construction activity before fall sturgeon TOYR	Sediment disturbance, suspended sediment and deposition
Clamshell Dredging	New York and New Jersey -MP12.5 to MP15.3	Allow dredging to overlap with river herring and Atlantic sturgeon TOYR in May, or based on temperature threshold.	6/1/2020 *TOYR alt. 7/1/2020*	6/30/2020	River herring (and Atlantic sturgeon in NJ) (3/1 – 6/30)	Adherence to the current TOYR would push construction campaign into fall sturgeon TOYR	Sediment disturbance, suspended sediment and deposition
Platform pile and goal post installation	New Jersey -Morgan HDD Pit (MP12.5)	Allow pile/platform installation during river herring and Atlantic sturgeon TOYR in May, or based on temperature threshold.	6/9/2020 *TOYR alt. 7/1/2020*	6/30/2020	River herring (and Atlantic sturgeon in NJ) (3/1 – 6/30)	Adherence to the current TOYR would push construction campaign into fall sturgeon TOYR	Noise from pile driving/ vibratory hammer
Clamshell dredging	New Jersey -Ambrose East HDD Pit (MP30.4)	Allow dredging immediately east of Ambrose during Atlantic sturgeon spring TOYR.	6/8/2020 *TOYR alt. 7/1/2020*	6/30/2020	Atlantic sturgeon (3/1 – 6/30)	Adherence to the current spring TOYR would push construction campaign into fall sturgeon TOYR and/or winter flounder TOYR.	Sediment disturbance, suspended sediment and deposition
Pile installation	New Jersey -Ambrose East HDD Pit (MP30.4)	Allow pile installation activities immediately east of Ambrose during Atlantic sturgeon spring TOYR.	6/8/2020 *TOYR alt. 7/1/2020*	6/30/2020	Atlantic sturgeon (3/1 – 6/30)	Increases buffer period for construction activity before fall sturgeon TOYR	Noise from pile driving/ vibratory hammer
Hand jet/ submersible pump at manifold	New York -Rockaway Transfer Point (MP35.49)	Allow low-impact sediment disturbing activities during Atlantic sturgeon TOYR in spring (preferred) and/or fall.	6/15/2020 OR 10/1/2020 *TOYR alt. 7/9/2020*	6/30/2020 OR 11/10/2020	Atlantic sturgeon (3/1 – 6/30)	Allowance of low impact activities would minimize the overall duration of construction activities.	Sediment disturbance, suspended sediment and deposition
HDD	New Jersey -Ambrose East HDD Pit (MP30.4)	Allow HDD activities and pile removal (18 days) to extend into Atlantic sturgeon fall TOYR if major delays occur.	10/1/2020 *TOYR alt. 12/1/2020*	10/30/2020	Atlantic sturgeon (10/1 – 11/31)	HDD activity cannot stop once begun; Piles left in water after HDD pose navigation hazard.	Localized sediment disturbance; Noise from vibratory hammer
Spool installation, hydrotest and drying	New York -Rockaway Transfer Point (MP35.49)	Allow low-impact installation activities during Atlantic sturgeon fall TOYR	10/1/2020 *TOYR alt. 12/1/2020* Duration of activity: <30 days	11/30/2020	Atlantic sturgeon (10/1 – 11/31)	Allowance of low impact activities would minimize the overall duration of construction activities.	Limited impacts; no sediment disturbance

Table A: Species-related Time-of-year Restriction (TOYR) Flexibility Requests – revised August 16, 2018
Northeast Supply Enhancement Project

Activity	Location	Request	Requested Flexibility Start Date[1]	Requested Flexibility End date[1]	Applicable Species TOYR	Justification	Potential Impact on Species
Spool installation	New Jersey - Ambrose East HDD Pit (MP30.4)	Allow low-impact installation activities within Atlantic sturgeon fall TOYR.	10/1/2020 *TOYR alt. 12/1/2020* Duration of activity: ~7 days	10/31/2020	Atlantic Sturgeon (10/1 – 11/31)	Allowance of low impact activities would minimize the overall duration of construction activities.	Limited impacts; no sediment disturbance
Reinstatement of Ambrose HDD Pits	New Jersey - Ambrose East and West HDD Pit (MP29.5 and MP30.4)	Allow backfilling and reinstatement during Blue Crab TOYR.	12/1/2020 *TOYR alt. 6/1/2021* **Activity is also restricted by Sturgeon TOYR* Duration of activity: ~7 days	12/10/2020	Blue Crab (12/1 – 4/30)	Allowance of activity would minimize the overall duration of construction and help avoid risk of exposed pipeline during winter flounder TOYR (6+ months).	Sediment disturbance, suspended sediment and deposition
Reinstatement of Channel Crossings	New York - Raritan Bay Channel (MP17.6) and Chapel Hill Channel (MP25.0)	Allow backfilling and reinstatement during Winter Flounder TOYR.	12/15/2020 *TOYR alt. 6/1/2021* Duration of activity: Raritan ~42 days Chapel Hill ~27 days	1/30/2020	Winter Flounder (12/15 – 5/31)	Allowance of activity would minimize the overall duration of construction and help avoid risk of damage to exposed pipeline from traffic in channels during winter flounder TOYR (6+ months).	Sediment disturbance, suspended sediment and deposition
Reinstatement of Chapel Hill Crossing	New York - Chapel Hill Channel (MP25.0)	Allow backfilling and reinstatement during Blue Crab TOYR.	12/1/2020 *TOYR alt. 6/1/2021* **Activity is also restricted by Winter Flounder TOYR*	1/30/2020	Blue Crab (12/1 – 4/30)	Allowance of activity would minimize the overall duration of construction and help avoid risk of damage to exposed pipeline from traffic in channels during blue crab and winter flounder TOYR (6+ months).	Sediment disturbance, suspended sediment and deposition
Pipeline lowering with Jet Trencher	New York and New Jersey - Ambrose East HDD Pit to RDL (MP30.4 to MP 35.49)	Allow jet trenching of pipeline segment from Ambrose East to RDL during Atlantic sturgeon fall TOYR.	10/1/2020 *TOYR alt. 12/1/2020* Duration of activity: ~5 days	10/31/2020	Atlantic Sturgeon (10/1 – 11/31)	Help avoid risk of damage to pipeline while exposed on seafloor during fall sturgeon TOYR (up to 2 months)	Sediment disturbance, suspended sediment and deposition

[1] Initially listed start/end dates are those being requested that overlap with a species time-of-year restriction. The italicized "TOYR alt." dates indicate the start dates that would likely be applied if the flexibility request is not approved by the permitting agencies.

Key:
HDD = Horizontal Directional Drill
MP = Milepost
TOYR = Time-of-year restriction

From: Horner, Scott <Scott.Horner@williams.com>
Sent: Friday, August 31, 2018 2:43 PM
To: Foster, Ruth <Ruth.Foster@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>; Clements, Blake <Blake.Clements@williams.com>; Ham, Brian <Brian.Ham@Williams.com>; Kellogg, Stephen <Stephen.Kellogg@Williams.com>; Merz, Dan <Dan.Merz@Williams.com>; Mochrie, Sara <SMochrie@ene.com>; Jaaskelainen, Su-Lin <SuLin.Jaaskelainen@williams.com>; Eakin,Megan <MEakin@ene.com>; MacLeod, Steven <SMacLeod@ene.com>; Christopher Jones (Christopher.Jones@dep.nj.gov) <Christopher.Jones@dep.nj.gov>; Matthew Resnick (Matthew.Resnick@dep.nj.gov) <Matthew.Resnick@dep.nj.gov>
Subject: Northeast Supply Enhancement Project - Response to NJDEP Comment Letter

Good Afternoon Ruth,

Please see the attachment containing Transcontinental Gas Pipe Line, LLC's responses to the New Jersey Department of Environmental Protection Office of Permit Coordination and Environmental Review comment letter to the Federal Energy Regulatory Commission dated July 18, 2018 for the Northeast Supply Enhancement Project. A hard-copy of this document should be delivered to your attention next Tuesday (09/04).

Kind regards,
Scott Horner

Scott Horner | Williams | Senior Environmental Scientist | Atlantic – Gulf| Engineering and Construction |Environmental Permitting
Office: 713-215-4953 | Cell: 832-954-4916 | Fax: 713-215-2222 | 2800 Post Oak Blvd., Level 11| Houston, TX 77056

If you have received this message in error, please reply to advise the sender of the error and then immediately delete this message.

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

August 31, 2018

Ruth Foster, Acting Director
New Jersey Department of Environmental Protection
Office of Permit Coordination and Environmental Review
401 East State Street
P.O. Box 420
Trenton, New Jersey 08625

Reference: Transcontinental Gas Pipe Line Company, LLC
Proposed Northeast Supply Enhancement Project
Middlesex, Monmouth, and Somerset Counties
FERC Docket #PF 16-5; CP-17-101-000
Comments on Supplemental Reports to Draft EIR

Dear Ms. Foster:

On June 23, 2017, Transcontinental Gas Pipe Line, LLC (Transco) submitted an application to the New Jersey Department of Environmental Protection (NJDEP) requesting a Flood Hazard Area Individual Permit & Verification and a Freshwater Wetlands (FWW) Individual Permit. On July 10, 2017, Transco submitted an application requesting a Waterfront Development Individual Permit & Wetlands Act of 1970 Permit for its proposed Northeast Supply Enhancement Project (Project). In order to provide NJDEP with additional time to comply with the timeframes by which it must act on Transco's request for a Water Quality Certification pursuant to Section 401(a)(1) of the Clean Water Act, 33 U.S.C §1341(a)(1), on June 15, 2018, Transco withdrew these applications from NJDEP review and submitted new permit applications on June 20, 2018.

On July 18, 2018, the NJDEP Office of Permit Coordination and Environmental Review filed comments with the Federal Energy Regulatory Commission (FERC) on Transco's Supplemental Reports to the Draft Environmental Impact Statement (EIS). These comments also identified deficiencies within Transco's June 20, 2018 new permit applications and referenced a forthcoming formal deficiency letter from the NJDEP Division of Land Use Regulation (DLUR or Division) on Transco's new permit applications. This referenced formal deficiency letter from the NJDEP DLUR was issued on July 18, 2018.

Land Use Regulation Program Comments

Transco notes that comment numbers 2, 3, and 7 included in the NJDEP Office of Permit Coordination and Environmental Review letter were not included in the NJDEP DLUR formal deficiency letter on Transco's permit applications. Transco has provided a response to comment number 2 below. Based on correspondence to date with NJDEP DLUR, it is Transco's understanding that comment numbers 3 and 7 have been adequately addressed. Therefore, at this time, Transco does not consider these items to be formal deficiencies on Transco's permit applications currently under review by the NJDEP.

The comments from the NJDEP Office of Permit Coordination and Environmental Review dated July 18, 2018 are similar to comments Transco received from the NJDEP DLUR in a formal deficiency letter also dated July 18, 2018. Responses to these comments (comment numbers 1, 4, 5, 6, 8, 9, 10, and 11 included in the NJDEP Office of Permit Coordination and Environmental Review comment letter) are included in Transco's response to the NJDEP DLUR formal deficiency letter on Transco's permit applications. See Attachment 1 for a copy of these responses.

Comment #2 – Public Interest/Public Need

Although Transco has not yet obtained a Certificate of Public Convenience and Necessity from FERC, Transco respectfully submits that it has established that the Project is in the public interest consistent with the requirements of the Freshwater Wetlands Protection Act Rules (FWPA). As noted by NJDEP Office of Permit Coordination and Environmental Review in its letter, the NJDEP must make a determination as to whether the proposed regulated activity is in the public interest when determining whether to issue a Freshwater Wetlands permit (N.J.S.A. 13:9B-11; N.J.A.C. 7:7A-10.2(b)12). The FWPA rules provide seven factors that the NJDEP must consider when making the public interest determination:

i. The public interest in preservation of natural resources and the interest of the property owners in reasonable economic development;
ii. The relative extent of the public and private need for the proposed regulated activity;
iii. Where there are unresolved conflicts as to resource use, the practicability of using reasonable alternative locations and methods, to accomplish the purpose of the proposed regulated activity;
iv. The extent and permanence of the beneficial or detrimental effects which the proposed regulated activity may have on the public and private uses for which the property is suited;
v. The quality and resource value classification pursuant to N.J.A.C. 7:7A-3.3 of the wetland, which may be affected and the amount of freshwater wetlands to be disturbed;
vi. The economic value, both public and private, of the proposed regulated activity to the general area; and

vii. The functions and values provided by the freshwater wetlands and probable individual and cumulative impacts of the regulated activity on public health and fish and wildlife; N.J.A.C. 7:7A-10.2(b)12i-vii.

While Transco agrees that the FERC Certificate would (and typically does) satisfy the regulatory requirement that the Project is in the public interest, it is not the only way. The public interest factors can also be satisfied without the Certificate since the FWPA Rules set forth above do not require an overarching federal order for a development to be in the public interest, they merely require the NJDEP to consider certain factors in making that determination. Transco's current applications set forth, in great detail, information that addresses each of the above public interest factors and is sufficient for the NJDEP to determine that the Project is in the public interest.

Lastly, FWPA Rules provide that all permits are subject to the condition that "the permittee shall obtain all applicable Federal, State, and local approvals prior to commencement of regulated activities authorized under a permit." N.J.A.C. 7:7A-20.2(c)3. In other words, even in satisfying the NJDEP's public interest factors, any regulated activities authorized by the permit issued to Transco would be conditioned on Transco obtaining the FERC Certificate. As a practical matter, Transco cannot act upon the permit until an Order and Notice to Proceed are issued by FERC. For the reasons set forth below, Transco contends that it satisfies the FWPA public interest factors and that the NJDEP's issuance of the permits to Transco prior to the issuance of the FERC Certificate is well within its statutory and regulatory authority and consistent with Third Circuit precedent.

i. The public interest in preservation of natural resources and the interest of the property owners in reasonable economic development…

Specifically, as to the first factor, which deals with balancing the public's interest in preservation of natural resources and the applicant's interest in reasonable economic development, the NJDEP has found on past projects that the property chosen by the pipeline company for its proposed facilities "holds high economic value" when it is in close proximity to the company's existing pipeline system. Here, the location of Transco's proposed facilities, including proposed Compressor Station 206, Madison Loop, and Raritan Bay Loop were selected, in part, due to their proximity to Transco's existing pipeline system and their ability to transport the needed quantity of gas to National Grid at the Rockaway Transfer point. As to the impacts on natural resources, the Project was designed to avoid impacts to wetlands and other regulated features. Where Transco could not reasonably avoid impacts to regulated features, Transco minimized impacts to the greatest extent practicable.

For instance, in connection with the Madison Loop, Transco started from the position that co-location of the new pipeline with its existing pipeline would reduce environmental impacts when compared to a route that would deviate around regulated features. To that end, Transco minimized impacts by co-locating the pipeline facilities with Transco's existing right-of-way to the maximum extent practicable. Transco also analyzed the use of trenchless construction methodologies, including Horizontal Directional Drilling (HDD) and conventional bore, along the route of the Madison Loop in order to avoid or minimize direct impacts to regulated areas, including wetlands

and transition areas. Transco also reduced the width of its workspace at wetlands crossings from 90 feet to 75 feet where practicable.

In addition, Transco continued to refine its Project design to further minimize impacts where impacts could not be avoided. By way of example, Transco was able to shift the location of the suction and discharge piping for Compressor Station 206 to minimize impacts to the wetland and transition area. Transco also designed the access road to incorporate stormwater controls, thereby decreasing the road width from 120 feet to less than 100 feet, thereby minimizing impacts to the wetlands leading to the compressor station site.

Moreover, Transco's customer, National Grid, has been working to convert fuel oil-based building heating systems to natural gas, a process which is anticipated to have significant beneficial environmental impacts. For instance, National Grid estimates that "[t]hese conversions displace 900,000 barrels of oil per year and lower CO_2 emissions by 200,000 tons per year", and "lower other local emissions by 300 tons per year, including smog, acid rain and particulates that have negative health and environmental effects." See Comment of National Grid on Draft EIS, p. 3 May 14, 2018.

Given the significant lengths that Transco has taken to avoid and minimize impacts, and the significant public and private need for the natural gas to be conveyed by the Project (discussed below), Transco respectfully submits that it has addressed the first public interest factor.

ii. The relative extent of the public and private need for the proposed regulated activity;

As to the second factor, pertaining to the relative extent of the public and private need for the Project, Transco explained in its permit applications that it has executed long-term, fully binding precedent agreements with National Grid for 100% of the Project capacity. National Grid has forecasted a need for additional natural gas supply to meet residential and commercial demands due to population and market growth within its service territory, and that this additional supply is needed for the 2019/2020 heating season. Furthermore, as noted above and in Transco's application, the Project will assist National Grid in continuing its fuel oil-to-natural gas conversion program in New York City in order to meet the increased need for natural gas as fuel oil No. 4 is phased out by 2030. Accordingly, there is significant public and private need for the additional supply of natural gas and the Project facilities.

iii. Where there are unresolved conflicts as to resource use, the practicability of using reasonable alternative locations and methods, to accomplish the purpose of the proposed regulated activity;

In addressing the practicality of reasonable alternative locations and methods, as required by the third factor, Transco provided the NJDEP with a robust alternatives analysis (Appendix A of Transco's FWW permit application) that analyzed different options for avoiding and minimizing impacts to regulated features. Transco provided the NJDEP with a detailed discussion of Transco's

interstate natural gas pipeline system, and how the existing system and hydraulic constraints informed the basis for the design of the Project and meeting the Project's purpose of delivering 400,000 Dth/d of natural gas to National Grid at the Rockaway Transfer Point. Transco analyzed the use of various system alternatives, including a pipeline looping-intensive alternative that would have obviated the need for Compressor Station 206, but would have resulted in greater environmental impacts; the expansion of Transco's existing compressor station facilities; and even the use of electric motors at Compressor Station 206, as opposed to gas turbines.

In addition to system alternatives, Transco performed a comprehensive analysis of alternate sites for Compressor Station 206, using a multi-tiered approach that focused on parcel configuration and logistical constraints, availability, and the presence of wetlands and transition areas. See Application, pp. 4-4 through 4-14. Given that the majority of impacts to regulated features are associated with the Compressor Station 206 access road and suction and discharge piping area, Transco considered, and, where practicable, implemented alternatives that would avoid or minimize these impacts. Specifically, Transco analyzed an alternate site for the access road, but ultimately determined that certain environmental and legal constraints on the property rendered the alternate site impracticable. See Application, p. 4-14 through 4-16. As noted above, Transco also considered and implemented certain minimization measures to reduce impacts, including incorporating stormwater controls into the design of the access road, and reduction in the width and length of the suction and discharge piping right-of-way, thereby reducing the impacts of these facilities on regulated features. See Application, p. 4-16 through 4-19.

Lastly, Transco minimized impacts caused by the Madison Loop by co-locating the pipeline facilities with Transco's existing right-of-way to the maximum extent practicable. Transco also analyzed the use of HDD and conventional bore along the route of the Madison Loop in order to avoid or minimize direct impacts to regulated areas, including wetlands and transition areas. Transco also reduced the width of its workspace at wetlands crossings from 90 feet to 75 feet where practicable.

Transco has sufficiently addressed the practicability of using other alternative locations and methods in connection with the construction of the Project.

iv. The extent and permanence of the beneficial or detrimental effects which the proposed regulated activity may have on the public and private uses for which the property is suited;

Transco's application also sufficiently addresses the "extent and permanence of the beneficial or detrimental effects of the Project on public and private uses for which the propert[ies] [are] situated." N.J.A.C. 7:7A-10.2(b)12iv. Transco considered both the temporary and permanent impacts of the Project, and, based on extensive discussions between Transco and the NJDEP, both permanent the temporary impacts to freshwater wetlands have been substantially reduced to the greatest extent practicable. Transco noted in its application that disturbances to wetlands and wetland transition areas include both temporary and permanent impacts, and that state open water will only be temporarily impacted by the Project. Impacts to these regulated areas have been

avoided and/or minimized to the greatest degree practicable to allow for the successful construction of the proposed Project. Transco's commitment to implementing best management practices (BMPs), such as soil erosion and sediment control measures and the timely restoration of vegetated areas following construction activities, are anticipated to reduce the potential for significant short or long term adverse impacts resulting from the Project. See Del. Riverkeeper Network v. Sec'y, Pa. Dep't of Envntl. Prot., 833 F.3d at 382 (holding that the NJDEP appropriately considered this factor where the pipeline company was required to implement BMPs during construction and restoration).

v. The quality and resource value classification pursuant to N.J.A.C. 7:7A-3.3 of the wetland, which may be affected and the amount of freshwater wetlands to be disturbed;

Pursuant to the fifth factor, Transco's application addresses the resource value classification of the impacted wetlands. Transco identified each wetland impacted by the Project, and indicated the location, wetland type, and the resource classification required under the FWPA Rules. Transco determined that six wetlands are considered "exceptional" due to the presence of documented habitat of threatened or endangered species. Two wetlands were identified as "ordinary", and the remaining 12 (two of which are impacted by Compressor Station 206) were identified as "intermediate". See Application, Section 3. These wetlands were identified and thoroughly documented as part of Transco's permit application. See Sections 8 and 9 of Transco's Wetland Delineation Report submitted as part of Transco's new permit applications filed June 20, 2018.

vi. The economic value, both public and private, of the proposed regulated activity to the general area; and

As to the sixth factor, Transco highlighted several reasons why the Project would have both public and private economic value. For one, the Project would provide additional natural gas supply during periods of increased peak demand resulting from increased residential and commercial usage related to population and market growth and the phase-out of fuel oil in New York City. In addition, the Project would add to the reliability of the New York City area's natural gas system by diversifying the transportation pathways used to supply New York City with natural gas. See Del. Riverkeeper Network v. Sec'y, Pa. Dep't of Envntl. Prot., 833 F.3d at 382 (holding that the NJDEP appropriately "found that the project would provide public and private economic value by expanding Transco's pipeline system capacity and serving end-users").

vii. The functions and values provided by the freshwater wetlands and probable individual and cumulative impacts of the regulated activity on public health and fish and wildlife;

Transco thoroughly addressed the functions and values of the wetlands impacted by the Project, and any impacts on the public health and fish and wildlife. As noted by Transco, given the actively managed nature of the areas along the Project, certain habitat functions and values would be expected to be somewhat diminished in these areas, when compared to the extent provided by the

surrounding, undisturbed, successional emergent, scrub/shrub, or forested communities. As there will be no permanent vegetation community conversion of these currently disturbed areas, loss of wetland functions and values in these areas will be temporary in nature, and restored following construction. See Application, p. 4-19.

In addition, Transco identified the possible plants, fish, and wildlife that may use the freshwater wetland habitat and adjacent transition areas for resting, feeding, cover or breeding. See Application, Section 8. Impacts to wetlands and transition areas have been minimized by reducing disturbance areas to the greatest extent practicable. While Transco noted that the disturbance of wetlands during construction of the Project may have negative impacts on wetland functions and other secondary impacts, Transco has demonstrated that it designed the Project to avoid and minimize these impacts to the greatest extent practicable. Transco will implement BMPs such as soil erosion and sediment control measures and the timely restoration of vegetated area following construction activities, which are anticipated to reduce the potential for significant short or long term adverse impacts resulting from the Project. See Application, Section 7.

As to impacts on fish and wildlife, Transco consulted with NJDEP and U.S. Fish and Wildlife Service (USFWS) to determine potential impacts to certain threatened and endangered species. These impacts and any timing restrictions are discussed within Transco's application. See Application, p. 4-10 through 4-12.

For the reasons set forth above, Transco respectfully submits that the Project is in the public interest.

Natural and Historic Resources Comments

With regard to the comments received from the Endangered and Non-game Species Program (ENSP), Transco offers the following additional responses:

- **Tree or shrub/scrub removal** - Regarding comment 2a, Transco would like to clarify that the vegetation clearing restriction shall be applied to tree or shrub/scrub removal per the USFWS New Jersey Field Office guidance provided April 17, 2017. Regarding comment 2b, Transco would like to clarify that the period in which vegetation clearing would be restricted is from April 1 through August 31 for the Madison Loop and March 1 through September 30 for Compressor Station 206.

- **Harbor Seal** - Regarding comment 3c, Transco notes that although the harbor seal is not a listed species in New Jersey, the proposed time-of-year (TOY) restriction for the seal coincides with the North Atlantic right whale TOY restriction that Transco anticipates would apply to pile driving, such that Transco would likely observe both restrictions.

- **Horseshoe Crab** – Regarding comment 4, Transco does not agree with the ENSP suggestion that the TOY restriction for general dredging activities from April 15 to September 15 is appropriate for the Project. Transco is currently in negotiations with New

Jersey Division of Fish and Wildlife regarding TOY restrictions for sensitive marine species in the Project area, including horseshoe crab.

Transco is attempting to observe all agency recommended TOY restrictions while optimizing the offshore construction schedule. Transco is continuing to consult with the NJDEP and National Oceanic Atmospheric Administration Fisheries regarding the multiple TOY restrictions and is seeking flexibility with conflicting windows. This request for flexibility is essential to optimize the offshore schedule and to maintain continuity and proper sequencing of the Project construction activities.

If you have any questions regarding this response, or require additional Project information, please do not hesitate to contact Karen Olson at (713) 215-4232 or via email at Karen.Olson@williams.com or Scott Horner at (713) 215-4953 or via email at Scott.Horner@williams.com. Alternatively, you can contact Ms. Sara Mochrie, Project Manager at Ecology and Environment, Inc. at (716) 684-8060 or via email at smochrie@ene.com.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Joseph Dean
Manager, Environmental Health and Safety

cc (via e-mail): Stephen Kellogg, Transco
Blake Clements, Transco
Scott Horner, Transco
Karen Olson, Transco
Brian Ham, Transco
Su-Lin Jaaskelainen, Transco
Christine Allen, FERC
Sara Mochrie, E & E
Megan Eakin, E & E
Steven MacLeod, E & E
Chris Jones, NJDEP (DLUR)
Matt Resnick, NJDEP (PCER)

Enclosures

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT 1

RESPONSES TO NJDEP COMMENTS ON APPLICATIONS FOR FRESHWATER WETLANDS INDIVIDUAL PERMIT, FLOOD HAZARD AREA INDIVIDUAL PERMIT AND VERIFICATION, WATERFRONT DEVELOPMENT (UPLAND & IN-WATER), AND COASTAL WETLANDS PERMIT

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

August 31, 2018

Christopher Jones, Manager
New Jersey Department of Environmental Protection
Division of Land Use Regulation
Bureau of Urban Growth and Redevelopment
Mail Code 501-02A
P.O. Box 420
Trenton, NJ 08625

Reference: Transcontinental Gas Pipe Line Company, LLC
Proposed Northeast Supply Enhancement Project
Response to Deficiency Letter for Freshwater Wetlands Individual Permit, Flood Hazard Area Individual Permit, Flood Hazard Area Verification, Waterfront Development (Upland & In-water) Individual Permit, Coastal Wetlands Permit
DLUR File No. 0000-01-1001.3: FWW170001, FHA 170001, FHA 170002, CSW170001, WFD170001, WFD170002

Dear Mr. Jones:

On June 23, 2017, Transcontinental Gas Pipe Line, LLC (Transco) submitted an application to the New Jersey Department of Environmental Protection (NJDEP) Division of Land Use Regulation (DLUR) requesting a Flood Hazard Area Individual Permit & Verification and a Freshwater Wetlands Individual Permit. On July 10, 2017, Transco submitted an application requesting a Waterfront Development Individual Permit & Wetlands Act of 1970 Permit for the Northeast Supply Enhancement Project (Project). In order to provide NJDEP with additional time to comply with the timeframes by which it must act on Transco's request for a Water Quality Certification pursuant to Section 401(a)(1) of the Clean Water Act, 33 U.S.C §1341(a)(1), Transco withdrew these applications from NJDEP review on June 15, 2018. Transco resubmitted its request for the aforementioned permits and corresponding permit applications June 20, 2018.

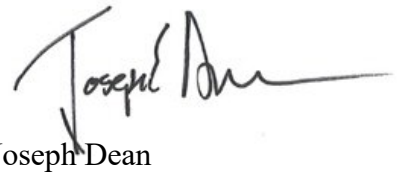
On July 18, 2018, the NJDEP DLUR issued a deficiency letter on Transco's June 20, 2018 permit applications. On August 1, 2018, Transco held a meeting with the NJDEP DLUR to review and discuss Transco's permit applications and the deficiency items. Transco's response to the deficiency letter is attached.

Transco has also included herein a list of time-of-year (TOY) restriction associated with sensitive marine species. Based on the TOY restriction recommendations from multiple resource protection agencies (NJDEP, New York State Department of Environmental Conservation, and National Oceanic and Atmospheric Administration National Marine Fisheries Service), and the currently proposed construction schedule, flexibility is requested on certain TOY restriction dates as discussed in the meeting July 18, 2018 (see attached).

If you have any questions regarding this response, or require additional Project information, please do not hesitate to contact Karen Olson at (713) 215-4232 or via email at Karen.Olson@williams.com or Scott Horner at (713) 215-4953 or via email at Scott.Horner@williams.com. Alternatively, you can contact Ms. Sara Mochrie, Project Manager at Ecology and Environment, Inc. at (716) 684-8060 or via email at smochrie@ene.com.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC



Joseph Dean
Manager, Environmental Health and Safety

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Megan Eakin, E & E
Steven MacLeod, E & E
Matt Resnick, NJDEP (DLUR)
Ruth Foster, NJDEP (PCER)

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

RESPONSES TO NJDEP COMMENTS ON APPLICATIONS FOR FRESHWATER WETLANDS INDIVIDUAL PERMIT, FLOOD HAZARD AREA INDIVIDUAL PERMIT AND VERIFICATION, WATERFRONT DEVELOPMENT (UPLAND & IN-WATER), AND COASTAL WETLANDS PERMIT

DATED JULY 18, 2018

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
DOCKET NO. CP17-101-000

Responses to NJDEP Comments on the Northeast Supply Enhancement Project
dated July 18, 2018

1. The submitted project plans and tax maps for the Madison Loops show construction, temporary access roads, staging areas, easement expansion, and new pipe line alignment outside of Transco's existing right-of-way on at least three (3) properties not owned by Transco. Please provide written property owner consent for the affected properties.

Response:

There is now only one property owner with two parcels (out of 23 properties), not owned by Transco, within regulated features for which Transco is seeking consent. Transco has reached an agreement in principle with the fee owner of the remaining two parcels and anticipates obtaining the executed agreements by the end of September 2018. Copies of the easement obtained for the construction of the Northeast Supply Enhancement Project (Project) or consent letters, are enclosed (see Attachment 1) evidencing property owner consent. A copy of the easement for the remaining parcels will be provided to NJDEP upon receipt. Note land plat drawings have been removed from the easements in Attachment 1, however, the relevant lot and block information is described within the easements.

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2. Transco has provided sediment testing and analysis of the proposed dredge material for raw bulk sediment chemistry and a geotechnical analysis. However, additional testing is required if the material is to be processed and placed at an upland placement site. This additional testing is referred to as the structural fill protocol and/or processed dredged material product testing as per the Department's Dredging Technical Manual. The Department notes that while a letter of acceptance from Clean Earth demonstrates that the facility has the capacity to process the proposed amount of material, it did not identify a beneficial use site for the material because the additional analyses mentioned above are necessary to evaluate the placement of the material at a given site. Therefore, it is necessary for Transco to resample the dredged material to be removed from the locations within the exit pit area and clamshell bucket dredging areas using the structural fill protocol. Transco should submit a new sediment and analysis plan to the NJDEP for review and approval prior to proceeding with the additional sampling event.

Response:

Transco has developed a draft Sediment Sampling and Analysis Plan (SSAP) for upland disposal of dredged materials (see Attachment 5). On August 28, 2018, Transco met with the NJDEP Division of Land Use (DLUR) to review the draft sampling protocol and proposed campaign schedule. Transco will finalize the draft SSAP based upon comments received during that meeting and submit the final SSAP to the NJDEP DLUR on September 14, 2018.

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3. Transco proposed to take dredged material to the Historic Area Remediation Site (HARS) and all dredged material not accepted by HARS to an alternate upland placement site. However, Transco has not received an approval from the Army Corps of Engineers to place the dredged material at the HARS site and has not provided an appropriate letter of acceptance from any other acceptable dredge placement site for the dredged material that indicated the material meets their analytical requirements.

Response:

Transco has conducted a survey campaign to characterize the chemical composition of offshore sediments for which disposal at the HARS is a proposed option. Laboratory analysis of these sediments, required as part of Transco's Marine Protection, Research, and Sanctuaries Act (MPRSA) Section 103 permit application to dispose of materials at the HARS, is anticipated to be complete in September 2018. Transco intends to submit a complete analysis report to the United States Army Corps of Engineers (USACE) for review in October 2018.

Based on communications with the USACE (Knowles 2018), Transco anticipates that the USACE will issue a decision regarding Transco's Section 103 Application by January 2019. Transco will provide a copy of the approval once received.

REFERENCE:

Knowles, Stephen C. 2018. Personal communication, USACE New York District, Regulatory Branch, Eastern Permits Section. E-mail to Sara Mochrie, Ecology and Environment, Inc. March 29, 2016.

4. Please provide any letters or communication with the US Army Corps of Engineers that the agency is aware and in agreement on removal of sediment from the Ambrose Channel and the Jamaica Bay Entrance Channel to be used as backfill material in the dredge areas and exit pits. Please note that due to fine-grained nature of the material identified in the U.S. Navy Earle Entrance Channel or the Sandy Hook Channel, it does not appear that material from these channels would be appropriate for the use of this material as backfill in the dredge areas.

Response:

Transco is coordinating with the U.S. Army Corps of Engineers (USACE) New York District (NYD) on proposed channels as sources of backfill material.

Transco met with the USACE NYD staff on January 26, 2017 to discuss potential in-water sources of backfill material. In this meeting, USACE stated that it could be possible for Transco to obtain a permit to dredge Ambrose Channel, or other channels with historically suitable material, such as Sandy Hook Channel or the Naval Station Earle Pier access channel in Sandy Hook Bay. Transco met with the USACE NYD staff again on July 25, 2017 to further discuss in-water backfill sources. During this meeting, the USACE stated that the Jamaica Bay Entrance Channel may also be a viable site. Meeting summaries from both meetings are attached (Attachment 2).

In September 2017, Transco provided the USACE with supplemental information that formally updated the joint permit application for the Project (USACE File No. NAN-2016-00908-EHA) to identify the following three channel areas as potential sources for backfill:

- Ambrose Channel (seaward of Lower New York Bay Lateral)
- Jamaica Bay Entrance Channel (Rockaway Inlet)
- Naval Station Earle Entrance Channel/Sandy Hook Channel

Transco indicated in the September 2017 supplement to the USACE that selection of the specific channel and area where supplemental backfill is placed would depend on conditions at time of construction, e.g., available volume, vessel traffic patterns, and timing of federal maintenance dredging activities.

These three channel areas were identified in the USACE's Public Notice of Transco's application for a permit, issued March 27, 2018. Therefore, based on communications with the USACE to date, Transco anticipates that the use of the proposed channel backfill sources will be approved by the USACE.

Transco acknowledges that an area of the Naval Station Earle Entrance Channel west of the Sandy Hook Peninsula, contained silt and clay content that exceed 10% during recent testing by the U.S. Navy, as reported in USACE Public Notice No. NAN-2011-00278-WMI (issued February 27, 2015). Transco understands that the NJDEP would require additional chemical testing prior to use of material from this channel area, identified as "Area C1" in the referenced notice. Therefore,

since sufficient amount of suitable material with less than 10% silt/clay is expected to be available in the other identified channel areas, Transco will no longer seek approval to use Area C1 as a supplemental backfill source. However, other proposed areas of Naval Station Earle Entrance Channel/Sandy Hook Channel previously identified as having less than 10% fines will still be considered for use as backfill material.

5. Pursuant to N.J.A.C. 7:13-12.1(g)2, concentrated overland flow that causes erosion to property not owned by the applicant is considered as adverse impact to that property. Transco is proposing to construct two (2) swales adjacent to the proposed Compressor Station access road. These swales would receive runoff from the access road, concentrate that flow, and then ultimately discharge the runoff onto the adjacent property not owned by the applicant. This discharge has the potential to cause erosion on property not owned by the applicant. Transo must demonstrate that this runoff will not result in erosion or adverse impact to the offsite property. Additionally, Transco must submit information that demonstrates that it has consent to discharge the stormwater onto the adjacent property, or that is has obtained an easement or entered into an agreement to purchase the property pursuant to N.J.A.C. 7:13-12.1(f).

Response:

Per discussions with NJDEP on August 1, 2018, the two (2) swales referenced in this comment were labeled as "Swale 1" and Swale 2" on the previously submitted stormwater management plan drawings, and were located on either side of the proposed crowned access road to capture runoff from the roadway and convey it down to an existing low point. The concern related to these swales was that they could potentially direct concentrated flow off-site to an area that was not previously receiving concentrated flow. The existing topography in this area drains from north to south, such that no discharge will be directed to the off-site property to the north. To address discharge to the property to the south, Swale 1 has been revised to extend the length of the road from the high point to Culvert 2 which conveys an existing stream. Swale 2 has been relocated to the northern side of the access road to Culvert 7 which convey an existing drainage way. The access road grading has been revised from a crowned configuration to a cross-slope configuration to direct runoff from the road to these swales. In doing so, all runoff from the proposed access road will be directed to culverts which are conveying existing streams or drainage ways, such that no new concentrated off-site discharges will be created in this area and no increase in runoff will be generated (this is discussed further in response to Comment #7). Additionally, riprap conduit outlet protection has been designed in accordance with the State of New Jersey Standards for Soil Erosion and Sediment Control and will be installed at the exits of the proposed culverts to provide velocity dissipation and mitigate erosion, which have been reviewed and approved by the Somerset-Union Soil Conservation District in their certification of the Soil Erosion and Sediment Controls plans. As such, this runoff will not create adverse impacts in accordance with N.J.A.C. 7:13-12.1(g)2., and requirements pursuant to N.J.A.C. 7:13-12.1(f) would not apply. See Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans.

6. Transco must analyze the pervious and impervious surfaces separately to accurately compute the stormwater runoff rates and volumes of the existing and proposed site conditions. The submitted calculations cannot be relied upon to demonstrate compliance with the water quality standards set forth at N.J.A.C. 7:8-5.5, and the water quantity and recharge standards set forth at N.J.A.C. 7:8-5.4 because the analysis was not done in this manner. Please revise the calculations to analyze the pervious and impervious surfaces separately.

Response:

The previously submitted calculations computed stormwater runoff volumes by analyzing surface types separately; however the runoff rates were computed using weighed curve numbers. A revised routing analysis has been performed which analyzes the surface types (pervious and impervious) separately (see Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans).

7. The stormwater runoff from the proposed compressor station and access road is conveyed to two distinct analysis points, the freshwater wetlands complex near Georgetown-Franklin Turnpike and the Tributary to Carters brook. As such, Transco must demonstrate compliance with the water quantity standards for each distinct analysis point.

Response:

The stormwater calculations have been revised to breakdown the site for the two (2) analysis points: the Tributary to Carters Brook (designated as Point-of-Interest, or POI #1), and the freshwater wetlands complex near Georgetown-Franklin Turnpike (designated as POI #2). POI #1 is located to the east and contains the majority of the site (approximately 93% of the limit of disturbance). Runoff in this area is captured via a series of swales and culverts and conveyed to a Bio-Retention Basin located east of the compressor station, which will provide rate control via volumetric storage and an outlet structure. POI #2 is located to the west and contains a small portion of the access road which drains towards existing wetlands, streams and drainage ways. Since most of this area consists of wetlands/streams/steep slopes, and the limit of disturbance has been narrowed in efforts to minimize impacts to these features, the available space for proposed stormwater best management practices (BMPs) is limited. Pursuant to discussions held with NJDEP on August 1, 2018, two (2) shallow detention basins have been added within upland areas to capture runoff and restrict flow rates, and the proposed surface of the access road has been changed from asphalt to gravel to lessen the quantity of runoff. Additionally, a dense "brush" type of vegetation is being proposed to be established within the pervious areas of this POI to further reduce post-development runoff rates to be less than pre-development rates. See Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans.

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8. Transco has designed the proposed access road, such that stormwater runoff from approximately 72,000 square feet of pavement will bypass the proposed bioretention facility and not receive any water quality treatment. Transco intends to compensate for said bypass by capturing and treating runoff from the compressor station area. However, most of the compressor station area does not receive vehicular traffic (i.e. buildings, gravel area beneath the proposed compressor station equipment) and thus is considered clean. Therefore, capturing and treating runoff from these areas cannot be used to compensate for not treating runoff from the proposed access road. Additionally, please note the project must be designed to provide 80 percent TSS removal rate for two distinct analysis points, the freshwater wetlands complex near Georgetown-Franklin Turnpike and the Tributary to Carters Brook. Please submit a revised Stormwater management design that treats the 72,000 square feet of access road.

Response:

The entire access road surface, as well as the compressor station loop road and parking area has been revised from asphalt to gravel, which reduces runoff rates and improves the water quality of runoff. Additionally, proposed curb has been provided along the southern edge of the access road to capture all runoff from the access road within POI #1 and convey it to the Bio-Retention Basin located to the east of the site which will provide additional water quality treatment. See Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans. It should also be noted that the facility will typically be staffed with only two (2) employees, thus the amount of vehicular traffic to the site will be minimal.

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9. Transco has assumed the proposed bioretention facility will receive 90% TSS removal credit. However, to receive said credit, the proposed bioretention facility must be designed to have at least two feet of soil bed media and the basin must be planted as a terrestrial forested community (average of 1,000 stems per acre). Please provide Landscape Plan which illustrates the proposed number of plantings for each species and planting density. Additionally, please provide a Section View of the proposed bioretention facility, which illustrates the basin, depth of planting bed, and seasonal high groundwater table.

Response:

As discussed within the response to Comment #8, most of the impervious areas associated with the site (access road, loop road, parking area) have been replaced with gravel to reduce pollutants and promote water quality. The remaining impervious areas (buildings, equipment pads, etc.) will not receive vehicular traffic. As such, the Bio-Retention Basin has been revised to the parameters associated with an 80% TSS removal credit, including two feet of soil bed media and site tolerant grasses. See Attachment 3 Stormwater Management Report and Attachment 4 Post Construction Stormwater Management Plans.

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10. As per the Coastal Zone Management Act Federal Consistency Regulations, specifically Part 930.60, it should be noted that DLUR's review has not yet begun and a response to the above listed deficiencies must be submitted before the State's review of the requested Consistency Certification can commence.

Response:

Transco acknowledges that per the Coastal Zone Management Act Federal Consistency Regulations, the DLUR's review of Transco's Coastal Zone Consistency Assessment has not yet begun. During a meeting between Transco and the DLUR on August 1, 2018, the DLUR noted that Transco's complete responses to the above listed deficiencies and the issuance of the FEIS will commence the State's review of Transco's Coastal Zone Consistency Assessment. DLUR noted that the above listed deficiencies included items associated with Transco's Waterfront Development Permit Application, which will be used to review and approve the Project's consistency with enforceable policies of New Jersey's Coastal Zone Management Program. The DLUR did not anticipate issuing any new technical deficiencies on any of Transco's permit applications currently under review by the DLUR.

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT 2

TIME-OF-YEAR RESTRICTION FLEXIBILITY REQUEST

NORTHEAST SUPPLY ENHANCEMENT PROJECT

AUGUST 2018

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Table A: Species-related Time-of-year Restriction (TOYR) Flexibility Requests – revised August 16, 2018
Northeast Supply Enhancement Project

Activity	Location	Request	Requested Flexibility Start Date[1]	Requested Flexibility End date[1]	Applicable Species TOYR	Justification	Potential Impact on Species
All Construction Activity	New Jersey - Nearshore (MP12.5 to MP14.0)	Allow construction activities near Morgan shore during Horseshoe Crab TOYR.	5/1/2020	9/15/2020	Horseshoe Crab (4/15 – 9/15)	Period of May to September is only feasible construction window given other TOYR	Sediment disturbance, suspended sediment and deposition
Clamshell Dredging	New York - Chapel Hill crossing through Anchorage Area (MP25.0)	Allow dredging during winter flounder TOYR.	5/1/2020 *TOYR alt. 6/1/2020*	5/31/2020	Winter flounder (12/15 – 5/31)	Increases buffer period for construction activity before fall sturgeon TOYR	Sediment disturbance, suspended sediment and deposition
Clamshell Dredging	New York and New Jersey -MP12.5 to MP15.3	Allow dredging to overlap with river herring and Atlantic sturgeon TOYR in May, or based on temperature threshold.	6/1/2020 *TOYR alt. 7/1/2020*	6/30/2020	River herring (and Atlantic sturgeon in NJ) (3/1 – 6/30)	Adherence to the current TOYR would push construction campaign into fall sturgeon TOYR	Sediment disturbance, suspended sediment and deposition
Platform pile and goal post installation	New Jersey -Morgan HDD Pit (MP12.5)	Allow pile/platform installation during river herring and Atlantic sturgeon TOYR in May, or based on temperature threshold.	6/9/2020 *TOYR alt. 7/1/2020*	6/30/2020	River herring (and Atlantic sturgeon in NJ) (3/1 – 6/30)	Adherence to the current TOYR would push construction campaign into fall sturgeon TOYR	Noise from pile driving/ vibratory hammer
Clamshell dredging	New Jersey -Ambrose East HDD Pit (MP30.4)	Allow dredging immediately east of Ambrose during Atlantic sturgeon spring TOYR.	6/8/2020 *TOYR alt. 7/1/2020*	6/30/2020	Atlantic sturgeon (3/1 – 6/30)	Adherence to the current spring TOYR would push construction campaign into fall sturgeon TOYR and/or winter flounder TOYR.	Sediment disturbance, suspended sediment and deposition
Pile installation	New Jersey -Ambrose East HDD Pit (MP30.4)	Allow pile installation activities immediately east of Ambrose during Atlantic sturgeon spring TOYR.	6/8/2020 *TOYR alt. 7/1/2020*	6/30/2020	Atlantic sturgeon (3/1 – 6/30)	Increases buffer period for construction activity before fall sturgeon TOYR	Noise from pile driving/ vibratory hammer
Hand jet/ submersible pump at manifold	New York -Rockaway Transfer Point (MP35.49)	Allow low-impact sediment disturbing activities during Atlantic sturgeon TOYR in spring (preferred) and/or fall.	6/15/2020 OR 10/1/2020 *TOYR alt. 7/9/2020*	6/30/2020 OR 11/10/2020	Atlantic sturgeon (3/1 – 6/30)	Allowance of low impact activities would minimize the overall duration of construction activities.	Sediment disturbance, suspended sediment and deposition
HDD	New Jersey -Ambrose East HDD Pit (MP30.4)	Allow HDD activities and pile removal (18 days) to extend into Atlantic sturgeon fall TOYR if major delays occur.	10/1/2020 *TOYR alt. 12/1/2020*	10/30/2020	Atlantic sturgeon (10/1 – 11/31)	HDD activity cannot stop once begun; Piles left in water after HDD pose navigation hazard.	Localized sediment disturbance; Noise from vibratory hammer
Spool installation, hydrotest and drying	New York -Rockaway Transfer Point (MP35.49)	Allow low-impact installation activities during Atlantic sturgeon fall TOYR	10/1/2020 *TOYR alt. 12/1/2020* Duration of activity: <30 days	11/30/2020	Atlantic sturgeon (10/1 – 11/31)	Allowance of low impact activities would minimize the overall duration of construction activities.	Limited impacts; no sediment disturbance

Table A: Species-related Time-of-year Restriction (TOYR) Flexibility Requests – revised August 16, 2018
Northeast Supply Enhancement Project

Activity	Location	Request	Requested Flexibility Start Date[1]	Requested Flexibility End date[1]	Applicable Species TOYR	Justification	Potential Impact on Species
Spool installation	New Jersey - Ambrose East HDD Pit (MP30.4)	Allow low-impact installation activities within Atlantic sturgeon fall TOYR.	10/1/2020 *TOYR alt. 12/1/2020* Duration of activity: ~7 days	10/31/2020	Atlantic Sturgeon (10/1 – 11/31)	Allowance of low impact activities would minimize the overall duration of construction activities.	Limited impacts; no sediment disturbance
Reinstatement of Ambrose HDD Pits	New Jersey - Ambrose East and West HDD Pit (MP29.5 and MP30.4)	Allow backfilling and reinstatement during Blue Crab TOYR.	12/1/2020 *TOYR alt. 6/1/2021* **Activity is also restricted by Sturgeon TOYR* Duration of activity: ~7 days	12/10/2020	Blue Crab (12/1 – 4/30)	Allowance of activity would minimize the overall duration of construction and help avoid risk of exposed pipeline during winter flounder TOYR (6+ months).	Sediment disturbance, suspended sediment and deposition
Reinstatement of Channel Crossings	New York - Raritan Bay Channel (MP17.6) and Chapel Hill Channel (MP25.0)	Allow backfilling and reinstatement during Winter Flounder TOYR.	12/15/2020 *TOYR alt. 6/1/2021* Duration of activity: Raritan ~42 days Chapel Hill ~27 days	1/30/2020	Winter Flounder (12/15 – 5/31)	Allowance of activity would minimize the overall duration of construction and help avoid risk of damage to exposed pipeline from traffic in channels during winter flounder TOYR (6+ months).	Sediment disturbance, suspended sediment and deposition
Reinstatement of Chapel Hill Crossing	New York - Chapel Hill Channel (MP25.0)	Allow backfilling and reinstatement during Blue Crab TOYR.	12/1/2020 *TOYR alt. 6/1/2021* **Activity is also restricted by Winter Flounder TOYR*	1/30/2020	Blue Crab (12/1 – 4/30)	Allowance of activity would minimize the overall duration of construction and help avoid risk of damage to exposed pipeline from traffic in channels during blue crab and winter flounder TOYR (6+ months).	Sediment disturbance, suspended sediment and deposition
Pipeline lowering with Jet Trencher	New York and New Jersey - Ambrose East HDD Pit to RDL (MP30.4 to MP 35.49)	Allow jet trenching of pipeline segment from Ambrose East to RDL during Atlantic sturgeon fall TOYR.	10/1/2020 *TOYR alt. 12/1/2020* Duration of activity: ~5 days	10/31/2020	Atlantic Sturgeon (10/1 – 11/31)	Help avoid risk of damage to pipeline while exposed on seafloor during fall sturgeon TOYR (up to 2 months)	Sediment disturbance, suspended sediment and deposition

[1] Initially listed start/end dates are those being requested that overlap with a species time-of-year restriction. The italicized "TOYR alt." dates indicate the start dates that would likely be applied if the flexibility request is not approved by the permitting agencies.

Key:
HDD = Horizontal Directional Drill
MP = Milepost
TOYR = Time-of-year restriction

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16-1743-43 JWR
HPO-J2018-043

September 5, 2018

Katherine J. Marcopul,
Deputy State Historic Preservation Officer
Historic Preservation Office
501 East State Street, Building 5, 4th Floor
Mail Code 501-04B
PO Box 420
Trenton, New Jersey 08625-0420

Re: Consideration of Twenty-Four (24) Additional Geotechnical Sampling Locations along the Offshore Raritan Bay Loop in New Jersey State Waters, NJHPO Project No. 16-1743, FERC Docket No. CP17-101

Dear Ms. Marcopul:

Transco is providing information regarding the collection of additional geotechnical data at twenty-four (24) sampling sites along the centerline of the proposed Offshore Raritan Bay Loop (Table 1). This sampling will be conducted within the previously established area of potential effect (APE) as indicated in maps 1 through 5 (attached).

As with previous sampling locations, the content of each core will be subject to a comprehensive cultural resource analysis by a qualified archaeologist and/or geoarchaeologist (R.C. Goodwin and Associates, Inc.). Following the completion of sampling, an addendum to the original offshore cultural resource report will be provided for your review. All work will be conducted in accordance with the Northeast Supply Enhancement Project's *Soil Boring and Sediment Sampling Program Scope of Work and Specification* (2016). Note that each vibracore sample will measure approximately 4-inches in diameter and penetrate an additional 2-feet below current channel depths, no more than 7-feet along the centerline outside of channels, and no more than 7.5-feet in anchorage areas.

Please note that Transco has sited the geotechnical sampling locations to avoid any previously identified targets that may have historical significance within the APE. Additionally, 100-foot buffers have been placed around each sampling location. Also, in the unlikely event an artifact and/or human remains are unearthed during the sampling process, all work will be halted until all agencies are informed and a qualified archaeologist has evaluated the find in accordance with state and federal requirements, and the Project's Unanticipated Discovery Plan.

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HPO-USG PRESERVATION OFC

If you have any questions or concerns about the proposed sampling process please do not hesitate to contact Scott Horner at (713) 215-4953 (scott.horner@williams.com) regarding offshore resources. Additionally, you may contact me at (716) 684-8060, ext. 2132 (owright@ene.com).

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Owen Wright,
Maritime Archaeologist & Chief Cultural Resource Specialist

CC: Scott Horner, Transco
Sara Mochrie, Ecology & Environment, Inc.

Attachment

CONCUR

Katherine J. Marcopul 10/4/2018
Katherine J. Marcopul Date
Deputy State Historic Preservation Officer

From: Olson, Karen <Karen.Olson@williams.com>
Sent: Wednesday, September 12, 2018 5:01 PM
To: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>; Ham, Brian <Brian.Ham@Williams.com>; Kellogg, Stephen <Stephen.Kellogg@Williams.com>; Albers, Meghan <MAlbers@ene.com>; Eakin,Megan <MEakin@ene.com>; Merz, Dan <Dan.Merz@Williams.com>
Subject: Transco NESE Higgins Superfund Access Road Supplemental Alternatives Analysis

Hi Chris and Matt,

As discussed last week, Transco is submitting for your review and information a supplemental alternatives analysis related to the Compressor Station 206 EPA access road for the proposed Northeast Supply Enhancement Project.

Please let me know if you require any additional information, have any questions, and/or would like a hard copy of this package.

Thanks,
Karen

Karen Olson | Environmental Scientist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

Transcontinental Pipe Line Company, LLC Proposed Northeast Supply Enhancement Project (DLUR File No. 0000-01-1001.3)

Supplemental Alternatives Analysis for the EPA Road across Higgins Farm Superfund Site

September 12, 2018

Executive Summary

As described below and in Transco's Freshwater Wetlands ("FWW") Individual Permit application, given the logistical constraints surrounding Transco's potential use of the Higgins Farm Superfund Site access road, Transco respectfully submits that the Higgins Farm Superfund Site access road is not a practicable alternative to the proposed Trap Rock access road for the reasons briefly described below:

- Historically, Franklin Township has opposed the Project by submitting several comments to the Federal Energy Regulatory Commission ("FERC") and passing several resolutions in opposition to the Project, the most recent resolution being passed on April 24, 2018.
- Neither the Higgins nor Franklin Township can legally convey non-agricultural development rights to Transco for use and expansion of the existing road due to a Deed of Easement dated October 11, 2017 (Exhibit A).
- The Deed of Easement provides that "any development of the Premises for nonagricultural purposes is expressly prohibited". The use and expansion of the existing road for the proposed compressor station is therefore prohibited under the existing Deed of Easement.
- The Environmental Protection Agency ("EPA") has stated that "Transco must take all reasonable measures to honor the agricultural deed of easement to be recorded on the Site property by the Higginses." It would be impossible for Transco to honor the agricultural deed of easement as Transco's use and expansion of the Higgins access road would be for purposes other than farming.

- The use and expansion of the Higgins access road could pose a risk of interfering with the integrity of the EPA's remedy at the Superfund Site.
- As a federal agency, the EPA can claim sovereign immunity in a condemnation filing, thus preventing Transco from condemning an easement in the property.
- A condemnation action against the State of New Jersey (Department of Agriculture, State Agriculture Development Committee) could also be unsuccessful as the State has taken the position in pending federal litigation related to another interstate pipeline project that interstate pipeline companies cannot condemn property where the State holds an interest.
- The use of the Higgins access road is not a practicable alternative since it is not available or capable of being carried out due to the Deed of Easement preserving the property, and Transco cannot reasonably obtain the necessary rights, whether through negotiation or through condemnation.

Supplemental Alternatives Analysis for the EPA Road across Higgins Farm Superfund Site

During the August 1, 2018 meeting between Transco and the New Jersey Department of Environmental Protection ("NJDEP" or "Department") representatives, the NJDEP inquired about the use of a portion of an existing road utilized by the Environmental Protection Agency ("EPA") that crosses the Higgins Farm Superfund Site as an access road to Compressor Station 206 ("Higgins access road"). In order to reach the station, the existing road would have to be extended approximately 700 feet and widened in specific areas. Additionally, trenching for underground water line and excavation for poles to support above-ground power would be required. The road extension, road widening, and water line and power pole installation would result in approximately 1.5 acres of disturbance on the Higgins Farm Superfund Site. The practicability of using the Higgins access road was specifically addressed in the Alternatives Analysis portion of Transco's application requesting a Freshwater Wetlands ("FWW") Individual Permit (DLUR File No. 0000-01-1001.3), and while Transco has not received a formal deficiency, Transco submits the following supplemental information to address the concerns raised by the NJDEP as to the Higgins access road.

The regulations implementing the Freshwater Wetlands Protection Act provide, in relevant part, that "[t]he Department shall issue an individual freshwater wetlands or open water fill permit only if the regulated activity...[h]as no practicable alternative which would…have a less adverse impact on the aquatic ecosystem or would not involve a freshwater wetland or State open water; and [t]he alternative would not have other significant adverse consequences, that is, it shall not merely substitute other significant environmental consequences for those attendant to the original proposal". N.J.A.C. 7:7A-10.2(b). Furthermore, an alternative is practicable if it is "available and capable of being carried out after taking into consideration cost, existing technology, and logistics in light of overall project purposes". N.J.A.C. 7:7A-10.2(c)1. "An alternative shall not be excluded from consideration … merely because it includes or requires an area not owned by the applicant which could reasonably have been or be obtained, utilized, expanded, or managed in order to fulfill the basic purpose of the proposed activity." N.J.A.C. 7:7A-10.2(c)2.

As noted in its application, Transco considered two permanent access road alternatives for Compressor Station 206. The proposed access road is located on Trap Rock property and would be connected to the Georgetown Franklin Turnpike (Highway 518). The alternative road would also be connected to Georgetown Franklin Turnpike, but located on an adjacent property, identified as the Higgins Farm Superfund Site. There are several legal and logistical constraints associated with the Higgins access road. For one, the Higgins cannot voluntarily convey a permanent access road easement since they conveyed all of their non-agricultural development rights to Franklin Township by virtue of a Deed of Easement dated October 11, 2017. See Deed of Easement, attached hereto as Exhibit A. Additionally, since the property is now preserved farmland, there is no legal mechanism by which Franklin Township can grant a permanent access road easement across the Higgins property under the Agriculture Retention and Development Act, N.J.S.A. 4:1C-11 et seq.

Before the deed of easement was executed, Transco, through its local counsel, sent the Franklin Township attorney a letter, dated May 26, 2017, requesting the opportunity to discuss the proposed access road with the Township. In the letter, Transco also asked whether the Township would consider temporarily delaying the adoption of any ordinance or resolution in order to allow time for negotiations to take place with Transco and the Higgins. The Township attorney never responded to the letter. Furthermore, the Township has been extremely vocal in its opposition to the Project. Over the past several years, the Township has submitted several comments to the

FERC and passed several resolutions in opposition to the Project, the most recent resolution being passed on April 24, 2018.

Historically, Transco (and other interstate natural gas pipeline companies) have been able to acquire easements across preserved farmland in New Jersey by condemnation once the FERC has issued a Certificate of Public Convenience and Necessity. Thus, Transco could seek to acquire a permanent access road across the Higgins property by condemnation naming the Higgins, Franklin Township, the State of New Jersey (Department of Agriculture, State Agriculture Development Committee) and the EPA. However, in this instance, there is no guarantee that Transco would be successful. First, the State of New Jersey (Department of Agriculture, State Agriculture Development Committee), in defense of a condemnation action filed by PennEast Pipeline, has taken the position that the pipeline company cannot acquire the rights by condemnation. The federal district court has not yet ruled on this (and other issues). Second, the EPA could assert sovereign immunity which would essentially prevent Transco from condemning an easement in the property. Thus, use of the Higgins access road is not a practicable alternative since it is not available or capable of being carried out due to the Deed of Easement preserving the property, and Transco cannot reasonably obtain the necessary rights, whether through negotiation or through condemnation.

Furthermore, the Higgins access road is part of the Higgins Farm Superfund Site, which the EPA, pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9605, placed on the National Priorities List, by publication in the Federal Register on March 30, 1989. On or about January 25, 2017, Transco informed the EPA of its interest in using the Higgins access road. By letter dated March 8, 2017, the EPA recommended a series of measures to be undertaken by Transco in the event that Transco was able to acquire a property interest in the access road on the Higgins Farm property. Specifically, the EPA recommended that, "Transco must comply with any land use restrictions established in connection with the remedial action for the Site, and must not impede the effectiveness or integrity of any future institutional or engineering controls established by EPA in connection with the remedial action." Further, the EPA stated that, "Transco must take all reasonable measures to honor the agricultural deed of easement to be recorded on the Site property by the Higginses." However, the Deed of Easement with the Township provides that "any development of the Premises for nonagricultural purposes is expressly prohibited". It would be

impossible for Transco to honor the agricultural deed of easement as Transco's use and expansion of the existing road would be for purposes other than farming.

The EPA also cautioned Transco that disruption and disturbance of the soil as a result of construction of the access road could negatively impact the remedial action at the Superfund Site. The EPA further noted that it has the authority under CERCLA to address any release or threat of release of hazardous substances that could occur as a result of Transco's use and expansion of the access road, and that "CERCLA establishes a broad liability scheme that holds both past and current owners and operators financially responsible for the costs of the cleanup where release of hazardous substances occur." Id. citing 42 U.S.C. §9607.

Accordingly, the development of an access road on this property would violate the Deed of Easement and the EPA's recommended measures, and could pose a risk of interfering with the integrity of the EPA's remedy at the Superfund Site. Given the legal and logistical constraints associated with the potential use of the Higgins access road, Transco submits that the road is not a practicable alternative for access to Compressor Station 206.

Exhibit A

DEED OF EASEMENT

This Deed is made _____ ___, 20__

BETWEEN Clifford Higgins, Jr. and Julie Higgins, H/W, whose address is 79 CR 518, Princeton, New Jersey 08540, and are referred to as the Grantors;

AND Township of Franklin, a municipal corporation of the State of New Jersey, whose address is 475 DeMott Lane, Somerset, New Jersey 08873 and is referred to as the Grantee.

The Grantors, Grantors' heirs, executors, administrators, personal or legal representatives, successors and assigns grants and conveys to the Grantee a development easement and all of the nonagricultural development rights and credits on the Premises, located in the Township of Franklin, County of Somerset, described in the attached Schedule A, and which includes a nonagricultural use indicated in Schedule (C) and Schedule D, which schedules are incorporated by reference in this Deed of Easement, for and in consideration of the sum of $1.00 Dollar.

Any reference in this Deed of Easement to "Premises" refers to the property described in Schedule A.

The tax map reference for the Premises is:

Township of Franklin

Block 5, Lot 26.01

WHEREAS, the United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA") in 1998 filed a Complaint, naming Lisbeth Higgins as a defendant, Civil Action Number 98-5268 (SDW) pursuant to Section 107 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. Section 9607, seeking reimbursement of costs incurred by EPA and the U.S. Department of Justice for response actions at the Higgins Farm Superfund Site ("Higgins Farm Site") together with accrued interest pursuant to Section 107 of CERCLA and a declaration of liability for future response costs to be incurred concerning the Higgins Farm Site located on Route 518 in Franklin Township, Somerset County, and identified as Block 5, Lot 26.01; and

Prepared by: _____
Louis N. Rainone, Esq.

WHEREAS, on August 8, 2007, the United States on behalf of the EPA entered into a Consent Decree with Lisbeth Higgins in the matter of United States v. NCH Corporation, et al., Civil Action No. 98-5268 (SDW), and United States v. FMC Corporation and Lisbeth Higgins, Civil Action No. 01-0476 (JCL), relating to the Higgins Farm Site and the Higgins Disposal Superfund Site ("Higgins Disposal Site"); and

WHEREAS, Grantors as part of the Consent Decree agree to donate an Agricultural Easement and Restrictions on the Higgins Farm Site and on the Higgins Disposal Site to the Grantee; and

WHEREAS, a Deed of Easement donating an Agricultural Easement and Restrictions was recorded on the Higgins Disposal Site on April 23, 2015 in Book 6787, Page 3194-3219; and

WHEREAS, the legislature of the State of New Jersey has declared that the development of agriculture and the retention of farmlands are important to the present and future economy of the State and the welfare of the citizens of the State; and

WHEREAS, the Grantors are the record owners of the Premises; and

WHEREAS, the Grantee believes that the retention and preservation of agricultural lands is beneficial to the public health, safety and welfare of the citizens of Franklin Township; and

WHEREAS, Franklin Township has endorsed the aforesaid declaration of policy by the State legislature and has established an Agriculture Retention and Development Program in a manner entirely consistent with State statutes, State administrative regulations and the policies and practices of the State Agriculture Development Committee; and

WHEREAS, it is the intention of Franklin Township to acquire a development easement from Grantors in a fashion consistent with, and pursuant to, terms which will reserve a right and opportunity on the part of the Grantee to enroll the development easement in the State of New Jersey Agriculture Retention and Development Program at some future time according to rules, regulations and policies of the State Agriculture Development Committee then appertaining; and

WHEREAS, this Deed of Easement presently recites that the Grantee may exercise certain rights and prerogatives with respect to the within easement.

NOW THEREFORE, THE GRANTORS, GRANTORS' HEIRS, EXECUTORS, ADMINISTRATORS, PERSONAL OR LEGAL REPRESENTATIVES, SUCCESSORS AND ASSIGNS PROMISE that the Premises will be owned, used and conveyed subject to, and not in violation of the following restrictions:

1. Any development of the Premises for nonagricultural purposes is expressly prohibited.

2. The Premises shall be retained for agricultural use and production in compliance with N.J.S.A. 4:1C-11 et seq., P.L. 1983, c.32, and all other rules promulgated by the State Agriculture Development Committee, (hereinafter Committee). Agricultural use shall mean the use of the Premises for common farmsite activities including, but not limited to: production, harvesting, storage, grading, packaging, processing and the wholesale and retail marketing of crops, plants, animals and other related commodities and the use and application of techniques and methods of soil preparation and management, fertilization, weed, disease and pest control, disposal of farm waste, irrigation, drainage and water management and grazing.

3. Grantors certify that at the time of the donation of the development easement to the Grantee and at the time of the execution of this Deed of Easement the nonagricultural uses indicated on attached Schedule (B) existed on the Premises. All other uses are prohibited except as expressly provided in this Deed of Easement.

Prepared by: _____
Anthony J. Arnone, Esq.
Print name and title

4. With the exception of the "water treatment building" indicated on attached Schedule (B), all nonagricultural uses, if any, existing on the Premises at the time of the landowner's donation to the Grantee as set forth in Section 3 above, may be continued and any structure may be restored or repaired in the event of partial destruction thereof, subject to the following:

i. No new structures or the expansion of pre-existing structures for nonagricultural use are permitted;

ii. No change in the pre-existing nonagricultural use is permitted;

iii. No expansion of the pre-existing nonagricultural use is permitted; and

iv. In the event that the Grantors abandon the pre-existing nonagricultural use, the right of the Grantors to continue the use is extinguished.

The nonagricultural use indicated on attached Schedule (B), which is indicated as the "water treatment building" is operating pursuant to a federal judicial consent decree, Civil Action Number 98-5268 (DMC), filed 10/26/2006, and is not subject to the restrictions of this Paragraph.

5. No sand, gravel, loam, rock, or other minerals shall be deposited on or removed from the Premises excepting only those materials required for the agricultural purpose for which the land is being used.

6. No dumping or placing of trash or waste material shall be permitted on the Premises unless expressly recommended by the Grantee as an agricultural management practice.

7. No activity shall be permitted on the Premises which would be detrimental to drainage, flood control, water conservation, erosion control, or soil conservation, nor shall any other activity be permitted which would be detrimental to the continued agricultural use of the Premises.

i. Grantors shall obtain within one year of the date of this Deed of Easement, a farm conservation plan approved by the local soil conservation district.

ii. Grantors' long term objectives shall conform with the provisions of the farm conservation plan.

8. Grantee and its agents and the EPA shall be permitted access to, and to enter upon, the Premises at all reasonable times, but solely for the purpose of inspection in order to enforce and assure compliance with the terms and conditions of this Deed of Easement. Grantee agrees to give Grantors, at least 24 hours advance notice of its intention to enter the Premises, and further, to limit such times of entry to the daylight hours on regular business days of the week. Nothing in this Deed of Easement shall be deemed to restrict EPA's existing rights of access pursuant to the Consent Decrees referenced herein.

9. Grantors may use the Premises to derive income from certain recreational activities such as hunting, fishing, cross country skiing and ecological tours, only if such activities do not interfere with the actual use of the land for agricultural production and that the activities only utilize the Premises in its existing condition. Other recreational activities from which income is derived and which alter the Premises, such as golf courses and athletic fields, are prohibited.

10. Nothing shall be construed to convey a right to the public of access to or use of the Premises except as stated in this Deed of Easement or as otherwise provided by law.

11. Nothing shall impose upon the Grantors any duty to maintain the Premises in any particular state, or condition, except as provided for in this Deed of Easement.

12. Nothing in this Deed of Easement shall be deemed to restrict the right of Grantors to maintain all roads and trails existing upon the Premises as of the date of this Deed of Easement. Grantors shall be permitted to construct, improve or reconstruct any roadway necessary to service crops, bogs, agricultural buildings, or reservoirs as may be necessary.

13(a). At the time of this conveyance, Grantors have zero (0) existing single family residential building on the Premises and zero (0) residential buildings used for agricultural labor purposes. Grantors may use, maintain, and improve existing buildings on the Premises for agricultural, residential and recreational uses subject to the following conditions:

i. Improvements to agricultural buildings shall be consistent with agricultural uses;

ii. Improvements to residential buildings shall be consistent with agricultural or single and extended family residential uses. Improvements to residential buildings for the purpose of housing agricultural labor are permitted only if the housed agricultural labor is employed on the Premises; and

iii. Improvements to recreational buildings shall be consistent with agricultural or recreational uses.

13(b). Grantors, their heirs, executors, administrators, personal or legal representatives, successors and assigns may use and maintain Non Severable Exception Area, subject to the following conditions:

i. The Exception Area shall not be severed or subdivided from the Premises and shall not exceed three (3) acres;

ii. The Exception Area shall be limited to one (1) residential unit; and

iii. In the event that a residence is constructed the Grantors shall cause to be prepared and filed with the Grantee an updated survey and a corrective deed showing the location of the residence and the defined exception area. Grantor shall comply with all applicable Township Ordinances and State Laws concerning the approval, planning and construction of the residence.

iv. It is the intent of the parties to permit the construction of one single family residence on the property for the use of the property owner. This residential structure shall not be sold or subdivided from the subject property.

14. Grantors may construct any new buildings for agricultural purposes. The construction of any new buildings for residential use, regardless of its purpose, shall be prohibited except as follows:

i. To provide structures for housing of agricultural labor employed on the Premises but only with the approval of the Grantee. If Grantee grants approval for the construction of agricultural labor housing, such housing shall not be used as a residence for Grantors, Grantors' parents, Grantors' lineal descendants, adopted or biological; and

ii. One residual dwelling site opportunity has been allocated pursuant to the provisions of N.J.A.C. 2:76-6.17. No residential buildings are permitted on the Premises except as provided in this Deed of Easement.

For the purpose of this Deed of Easement:

"Residual dwelling site opportunity" means the potential to construct a residential unit and other appurtenant structures on the Premises in accordance with N.J.A.C. 2:76-6.17.

"Residual dwelling site" means the location of the residential unit and other appurtenant structures within the Non Severable Exception Area.

"Residential unit" means the residential building to be used for single family residential housing and its appurtenant uses. The construction and use of the residential unit shall be for agricultural purposes.

"Use for agricultural purposes" as related to the exercise of a residual dwelling site opportunity and the continued use of the residential unit constructed thereto, means at least one person residing in the residential unit shall be regularly engaged in common farmsite activities on the Premises including, but not limited to: production, harvesting, storage, grading, packaging, processing and the wholesale and retail marketing of crops, plants, animals and other related commodities and the use and application of techniques and methods of soil preparation and management, fertilization, weed, disease and pest control, disposal of farm waste, irrigation, drainage, water management and grazing.

15. In the event of any violation of the terms and conditions of this Deed of Easement, the Grantee may institute, any proceedings to enforce these terms and conditions including the institution of suit to enjoin such violations and to require restoration of the Premises to its prior condition. Grantee does not waive or forfeit the right to take any other legal action necessary to insure compliance with the terms, conditions, and purpose of this Deed of Easement by a prior failure to act. In the event that Grantee must institute any proceeding to enforce the terms and conditions of this Deed of Easement, Grantors shall be responsible to pay the Grantee's attorney fees and costs.

16. This Deed of Easement imposes no obligation or restriction on the Grantors' use of the Premises except as specifically set forth in this Deed of Easement.

17. This Deed of Easement is binding upon the Grantors, the Grantors' heirs, executors, administrators, personal or legal representatives, successors and assigns and the Grantee; it shall be construed as a restriction running with the land and shall be binding upon any person to whom title to the Premises is transferred as well as upon the heirs, executors, administrators, personal or legal representatives, successors, and assigns of all such persons.

18. Throughout this Deed of Easement, the singular shall include the plural, and the masculine shall include the feminine, unless the text indicates otherwise.

19. The word 'Grantor' shall mean any and all persons who lawfully succeed to the rights and responsibilities of the Grantors, including but not limited to the Grantors' heirs, executors, administrators, personal or legal representatives, successors and assigns.

20. Wherever in this Deed of Easement any party shall be designated or referred to by name or general reference, such designation shall have the same effect as if the words, "heirs, executors, administrators, personal or legal representatives, successors and assigns" have been inserted after each and every designation.

21. Grantors, Grantors' heirs, executors, administrators, personal or legal representatives, successors and assigns further transfers and conveys to Grantee all of the nonagricultural development rights and development credits appurtenant to the lands and Premises described herein. Nothing contained herein shall preclude the conveyance or retention of said rights by the Grantee as may be permitted by the laws of the State of New Jersey in the future.

22. Grantors shall be solely responsible and liable for and shall fully protect, indemnify, defend and hold harmless Grantee, its officers, directors, agents, employees, and representatives from and against any and all causes of action, claims, charges, costs, damages, enforcement actions, directives, fines, injuries, judgments, liabilities, losses, penalties, and all costs and expenses incidental thereto, including, without limitation, reasonable attorneys' fees, expert and consultant fees and laboratory costs, arising at law or in equity, of every kind or nature whatsoever, whether direct or indirect, known or unknown, which the Grantee may hereafter incur, become responsible for or pay out as a result of hazardous substances existing at the Site, whether known or unknown, which may be discovered by Grantee or any third parties after the close of this Deed of Easement. The indemnity contained in this Section shall survive closing.

23. Grantors understand and accept that Grantee may, at its sole option, apply to the State Agriculture Development Committee to have this easement enrolled for participation in the State of New Jersey Agriculture Retention and Development Program as administered by the State Agriculture Development Committee. It is the intention of Grantors to convey to Grantee, by this present instrument, all of the rights which would have to be conveyed under N.J.S.A. 4:1C-11, et seq., N.J.S.A. 13:8C-1 et seq., and under N.J.A.C. 2:76-1.1, et seq. in order to qualify this easement for participation in the State Program. Grantors hereby agree and undertakes to cooperate with Grantee in any appropriate aspect of the State application process and to execute any necessary papers presented by the State or by Grantee in connection therewith. Grantors hereby consent to the assignment of any of Grantee's rights, title, interest and obligations hereunder to the State Agriculture Development Committee. Grantee stipulates that any rights and prerogatives which this Deed of Easement may extend to the Committee (which entity is neither a party to this conveyance nor to any of the negotiations and agreements leading up to same) are inchoate and shall not be exercised unless and until the Grantee makes such assignment or conveyance to the Committee.

24. No historic building or structure located on the Premises may be demolished by the Grantors or any other person without the prior approval of the State Agriculture Development Committee. Historic building or structure is a building or structure that, as of the date of this Deed of Easement, has been included in the New Jersey Register of Historic Places established pursuant to N.J.S.A. 13:1B-15.128 et seq.

25. The Grantors are granting this Deed of Easement pursuant to the terms of the Consent Decree which Lisbeth Higgins executed to settle Civil Action No. 98-5268 (SDW) and Civil Action No. 01-0476 (DMC), which were filed by the United States, on behalf of the U.S. Environmental Protection Agency (EPA), in the U.S. District Court (D.N.J.) against Lisbeth Higgins. The Grantors and Grantee hereby agree that the EPA may initiate proceedings to ensure compliance with the terms of this Deed of Easement. This right by EPA to enforce the terms of the easement commences on the date the Deed of Easement is fully executed.

The Grantors sign this Deed of Easement as of the date of the top of the first page. If the Grantor is a corporation, this Deed of Easement is signed and attested to by its proper corporate officers, and its corporate seal, if any, is affixed.

WITNESS:

Harlanda Diaz

Clifford G. Higgins Jr.
Clifford G. Higgins, Jr.

Julie Higgins
Julie Higgins

STATE OF NEW JERSEY, COUNTY OF SOMERSET SS.:

I CERTIFY that on Oct 2, 2017, Clifford G. Higgins Jr and Julie Higgins, personally came before me and acknowledged under oath, to my satisfaction, this that person (or if more than one, each person):

(a) is named in and personally signed this DEED OF EASEMENT;
(b) signed, sealed and delivered this DEED OF EASEMENT as his or her act and deed;
(c) made this DEED OF EASEMENT for and in consideration of mutual obligations and benefits to each party; and
(d) the actual and true consideration paid for this instrument is $1.00.

Cynthia L LaPenna
Print name and title below signature
CYNTHIA L. LAPENNA
NOTARY PUBLIC
STATE OF NEW JERSEY
MY COMMISSION EXPIRES DEC. 6, 2021

THE UNDERSIGNED, being Mayor of the Township of Franklin and acting on the authority of the governing body of the Township of Franklin does hereby make, accept and approve the foregoing Deed of Easement.

ACCEPTED AND APPROVED this 11th day of Oct., 2017

Phillip Kramer, Mayor

STATE OF NEW JERSEY

SS:

COUNTY OF SOMERSET

I CERTIFY that on Oct. 11, 2017 Personally came before me and this person acknowledged under oath, to my satisfaction, that: (a) this person is the Clerk of the Township of Franklin, a municipal corporation and body politic, named in the attached **DEED OF EASEMENT**; (b) this person is the attesting witness to the signing of this **DEED OF EASEMENT** by the proper officer who is Mayor of Franklin Township; (c) this **DEED OF EASEMENT** was signed and delivered by the Township as its voluntary act duly authorized by a proper resolution of the Township Committee; (d) this person knows the proper seal of the Township which was affixed to this **DEED OF EASEMENT**; and (e) this person signed this proof to attest to the truth of these facts.

Ann Marie McCarthy

Ann Marie McCarthy, Township Clerk

Signed and sworn to before me on

October 11, 2017

Christine J. Burke

Notary Public (Seal)

Christine Jean Burke
Notary Public of New Jersey
ID No. 2333159
My Commission Expires August 24, 2020

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Friday, September 14, 2018 11:16 AM
To: Mochrie, Sara <SMochrie@ene.com>
Subject: RE: Package submission dates

Much appreciated. It doesn't need to be complicated or overly indepth. Bullets are fine.

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Friday, September 14, 2018 11:08 AM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Sundar, Nischint <NSundar@ene.com>; Olson, Karen <Karen.Olson@williams.com>; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Eakin,Megan <MEakin@ene.com>
Subject: [EXTERNAL] RE: Package submission dates

Matt,

I will put a summary together and have this over to you early next week. To facilitate review.

Thanks,
Sara

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Thursday, September 13, 2018 1:23 PM
To: Mochrie, Sara <SMochrie@ene.com>
Subject: Package submission dates

Sara,

I'm beginning work on my report and analysis for Transco. Part of my report includes an administrative history of the entire package. Given the number of documents, meetings, and phone calls we've had over the course of the review, I'd like to double check my history vrs what you have a record of to make sure the administrative history is complete.

From: Jones, Christopher [mailto:Christopher.Jones@dep.nj.gov]
Sent: Friday, September 21, 2018 10:02 AM
To: Horner, Scott <Scott.Horner@williams.com>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov>; Foster, Ruth <Ruth.Foster@dep.nj.gov>; Olson, Karen <Karen.Olson@williams.com>; Dow, Diane <Diane.Dow@dep.nj.gov>; Dietrick, Suzanne <Suzanne.Dietrick@dep.nj.gov>; Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov>
Subject: [EXTERNAL] RE: NESE Project - Deficiency Letter Status Update

Scott,

Thank you for your response. In your email you acknowledged that a more formal response will be provided shortly and that your email below was intended to be a brief status report on the remaining four deficiency items. To summarize, the status of the 4 items are:

1. It appears that Transco has now secured the necessary written consents for all the properties.
2. The NJDEP is receipt of the finalized sediment sampling and analysis plan (SSAP). A conference call was held on 9/18 with our staff and Transco representatives to discuss the SSAP. The SSAP did not adequately address the requirements for upland disposal and our staff discussed with you the needed changes. In addition, our staff offered to assist you with making those changes. Because the SSAP has not been finalized and approved, this item remains deficient.
3. Transco has informed the department of its intention to take all of the dredged material to an upland location. But again, there were some deficiencies in the submitted SSAP as stated at 2 above. Our staff remain committed to assisting you with making the necessary changes. With regard to HARS, you have noted that Transco will modify the permit in the future if the USCOE provides Transco with authorization to utilize the HARS site in the future. Thank for you that update. The department notes however, that Transco has not yet received an appropriate letter of acceptance from any facility and the SSAP remains deficient.
4. It appears that this item has been satisfied.

We have set up a conference call for 9/25 with Assistant Commissioner Kopkash to

discuss project status further.

From: Horner, Scott <Scott.Horner@williams.com>
Sent: Monday, September 17, 2018 5:07 PM
To: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov>; Foster, Ruth <Ruth.Foster@dep.nj.gov>; Olson, Karen <Karen.Olson@williams.com>
Subject: [EXTERNAL] NESE Project - Deficiency Letter Status Update

Good Afternoon Chris,

On September 12, 2018, the NJDEP DLUR issued a deficiency letter stating that four items of the July 18, 2018 deficiency letter (items 1, 2, 3, and 4) had not been satisfied and therefore the Division has determined that the referenced application remains deficient. Although Transco will be providing a formal response shortly, I wanted to provide you with a brief status report specific to those four deficiency items addressed below.

1. *Because Transco has not obtained all necessary property owners consents, this deficiency item remains outstanding.*

Update: Transco has obtained a signed Supplemental Right of Way Agreement (attached) from the owner of the two remaining properties. Accordingly, Transco has obtained written consent from all owners of land with regulated features impacted by the Project.

2. *Transco submitted a draft SSAP (Version 3) to the Division and it is currently under review. Therefore, Transco has not submitted a final SSAP to the Division which would allow the applicant to then perform the necessary sediment and analysis of the sediments for processing and upland placement. This data is necessary for the applicant to obtain a letter of acceptance from a proposed upland beneficial use site. Therefore, this item remains deficient.*

Update: Transco's finalized sediment sampling and analysis plan (SSAP) is attached for the NJDEP DLURs review.

3. *As indicated in the response, Transco has not yet received approval from the USACE to place the dredged material at the HARS site and has not provided an appropriate letter of acceptance from any other acceptable dredge placement site for the dredged material that indicates the material meets their analytical requirements. Therefore, this item remains deficient.*

Update: Transco intends to take all of the dredged material upland as reflected in its application. However, if U.S. Army Corps of Engineers (USACE) provides authorization for Transco to utilize the Historic Area Remediation Site in the future, Transco would seek to modify the NJDEP permit accordingly, with guidance provided by the NJDEP DLUR.

4. *Transco has not provided documentation from the USACE that the agency is in agreement on the removal of sediment from the Ambrose Channel and/or the Jamaica Bay Entrance*

Channel for use as backfill in the dredge and exit pit areas. Therefore, this item remains deficient.

Update: The USACE has agreed to the removal of sediment from the Ambrose Channel and/or the Jamaica Bay Entrance Channel for use as backfill as outlined in the minutes from the January 26, 2017 and July 25, 2017 meetings that were included in the August 31, 2018 deficiency response. In addition, the three channel areas were identified in the USACE's Public Notice of Transco's application for a permit, issued March 27, 2018. Transco respectfully requests that the NJDEP indicate if additional or alternative documentation of USACE approval is required.

Also, the September 12, 2018 letter indicates that the information Transco provided to address items 5 through 8 is still under review. When do you anticipate providing comments on those items?

Lastly, would you available for a telephone call sometime this Wednesday (09/19)? If so, then when would be a convenient time?

Thank you once again Chris.

Kind regards,
Scott Horner

Scott Horner | Williams | Senior Environmental Scientist | Atlantic – Gulf| Engineering and Construction |Environmental Permitting
Office: 713-215-4953 | Cell: 832-954-4916 | Fax: 713-215-2222 | 2800 Post Oak Blvd., Level 11| Houston, TX 77056

If you have received this message in error, please reply to advise the sender of the error and then immediately delete this message.

From: Horner, Scott <Scott.Horner@williams.com>
Sent: Monday, September 24, 2018 2:51 PM
To: Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Foster, Ruth <Ruth.Foster@dep.nj.gov>; Dietrick, Suzanne <Suzanne.Dietrick@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>; Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>; Nickerson, Gary (gary.nickerson@dep.nj.gov) <gary.nickerson@dep.nj.gov>
Subject: RE: Transco's Letter Response to NJDEP DLUR Deficiency Letter (09/12/18)

Hi Magda,

As requested, please see the two attachments containing shapefiles of the proposed pipeline route and vibracore locations.

Let me know if have questions or require any additional information.

Regards,
Scott

Scott Horner | Williams | Senior Environmental Scientist | Atlantic – Gulf| Engineering and Construction |Environmental Permitting

Office: 713-215-4953 | Cell: 832-954-4916 | Fax: 713-215-2222 | 2800 Post Oak Blvd., Level 11| Houston, TX 77056

If you have received this message in error, please reply to advise the sender of the error and then immediately delete this message.

From: Horner, Scott
Sent: Monday, September 24, 2018 11:37 AM
To: Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Foster, Ruth <Ruth.Foster@dep.nj.gov>; Dietrick, Suzanne <Suzanne.Dietrick@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>; Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>
Subject: RE: Transco's Letter Response to NJDEP DLUR Deficiency Letter (09/12/18)

Hi Magda,

Yes, I have requested those files and will send them to you shortly.

Regards,
Scott

Scott Horner | Williams | Senior Environmental Scientist | Atlantic – Gulf| Engineering and Construction |Environmental Permitting
Office: 713-215-4953 | Cell: 832-954-4916 | Fax: 713-215-2222 | 2800 Post Oak Blvd., Level 11| Houston, TX 77056

If you have received this message in error, please reply to advise the sender of the error and then immediately delete this message.

From: Usarek-Witek, Magda [mailto:Magda.Usarek-Witek@dep.nj.gov]
Sent: Monday, September 24, 2018 10:59 AM
To: Horner, Scott <Scott.Horner@williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Foster, Ruth <Ruth.Foster@dep.nj.gov>; Dietrick, Suzanne <Suzanne.Dietrick@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>; Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>
Subject: RE: Transco's Letter Response to NJDEP DLUR Deficiency Letter (09/12/18)

Hi Scott,

Gary and I have are working on preparing the sampling locations and the composite scheme for the SSAP. Can someone from your team provide us with a GIS or CAD file of the proposed pipeline and the currently proposed locations of the sampling points? We would like to plot out the new locations.

Thank you,

Magda

Magda Usarek-Witek

Environmental Specialist II
Office of Dredging and Sediment Technology
New Jersey Department of Environmental Protection
Magda.Usarek-Witek@dep.nj.gov | (609) 777-1866

Mailing address:

Attn: Magda Usarek-Witek
DEP, Division of Land Use
501 East State Street
Mail Code 501-02A
PO Box 420
Trenton NJ 08625
(609)984-0921

From: Horner, Scott <Scott.Horner@williams.com>
Sent: Friday, September 21, 2018 6:04 PM
To: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov>; Foster, Ruth <Ruth.Foster@dep.nj.gov>; Dietrick, Suzanne <Suzanne.Dietrick@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>; Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>
Subject: [EXTERNAL] Transco's Letter Response to NJDEP DLUR Deficiency Letter (09/12/18)

Good Afternoon Chris,

Please see the attachment containing Transco's response to the NJDEP DLUR deficiency letter dated September 12, 2018 and your email response provided earlier today.

Kind regards,
Scott Horner

Scott Horner | Williams | Senior Environmental Scientist | Atlantic – Gulf| Engineering and Construction |Environmental Permitting
Office: 713-215-4953 | Cell: 832-954-4916 | Fax: 713-215-2222 | 2800 Post Oak Blvd., Level 11| Houston, TX 77056

If you have received this message in error, please reply to advise the sender of the error and then immediately delete this message.

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

September 21, 2018

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
NJDEP Division of Land Use Regulation
501 East State Street
Station Plaza 5, 2nd Floor
Trenton, New Jersey, 08609

RE: Request for Freshwater Wetlands Individual Permit with 401 WQC; Flood Hazard Area Individual Permit and Verification; and Waterfront Development Individual Permit with 401 WQC and Coastal Zone Consistency Determination
Transcontinental Gas Pipe Line Company LLC
Northeast Supply Enhancement Project
Compressor Station 206 – Franklin Township, Somerset County, NJ
Madison Loop – Old Bridge Township and Sayreville Borough, Middlesex County, NJ
Raritan Bay Loop – Sayreville Borough, Middlesex County, NJ

Dear Mr. Jones,

On June 23, 2017, Transcontinental Gas Pipe Line, LLC (Transco) submitted an application to the New Jersey Department of Environmental Protection (NJDEP) Division of Land Use Regulation (DLUR) requesting a Flood Hazard Area Individual Permit & Verification and a Freshwater Wetlands Individual Permit. On July 10, 2017, Transco submitted an application requesting a Waterfront Development Individual Permit & Wetlands Act of 1970 Permit for the Northeast Supply Enhancement Project (Project). In order to provide NJDEP with additional time to comply with the timeframes by which it must act on Transco's request for a Water Quality Certification pursuant to Section 401(a)(1) of the Clean Water Act, 33 U.S.C §1341(a)(1), Transco withdrew these applications from NJDEP review on June 15, 2018. Transco resubmitted its request for the aforementioned permits and corresponding permit applications June 20, 2018.

On July 18, 2018, the NJDEP DLUR issued a deficiency letter on Transco's June 20, 2018 permit applications. On August 1, 2018, Transco held a meeting with the NJDEP DLUR to review and discuss Transco's permit applications and submitted a response to the deficiency items on August 31, 2018. On September 12, 2018, the Division issued a deficiency letter

stating that four items of the July 18, 2018 deficiency letter (items 1, 2, 3, and 4) had not been satisfied and therefore the Division has determined that the referenced application remains deficient. On September 14, 2018, Transco provided the following responses to the NJDEP:

1. *Because Transco has not obtained all necessary property owners consents, this deficiency item remains outstanding.*

Response: Transco has obtained a signed Supplemental Right of Way Agreement (attached) from the owner of the two remaining properties. Accordingly, Transco has obtained written consent from all owners of land with regulated features impacted by the Project.

On September 21, 2018, the NJDEP issued an email response confirming that the necessary written consents had been secured for all of the properties. Based on this response, Transco understands that item 1 is no longer considered deficient.

2. *Transco submitted a draft SSAP (Version 3) to the Division and it is currently under review. Therefore, Transco has not submitted a final SSAP to the Division which would allow the applicant to then perform the necessary sediment and analysis of the sediments for processing and upland placement. This data is necessary for the applicant to obtain a letter of acceptance from a proposed upland beneficial use site. Therefore, this item remains deficient.*

Response: Transco has finalized its sediment sampling and analysis plan (SSAP) based on comments received from NJDEP during two conference calls held on August 28 and September 18, 2018. Transco's finalized SSAP is attached for the NJDEP DLURs review.

3. *As indicated in the response, Transco has not yet received approval from the USACE to place the dredged material at the HARS site and has not provided an appropriate letter of acceptance from any other acceptable dredge placement site for the dredged material that indicates the material meets their analytical requirements. Therefore, this item remains deficient.*

Response: Transco intends to take all of the dredged material upland as reflected in its application. However, if U.S. Army Corps of Engineers (USACE) provides authorization for Transco to utilize the Historic Area Remediation Site in the future, Transco would seek to modify the NJDEP permit accordingly, with guidance provided by the NJDEP DLUR.

4. *Transco has not provided documentation from the USACE that the agency is in agreement on the removal of sediment from the Ambrose Channel and/or the Jamaica Bay Entrance Channel for use as backfill in the dredge and exit pit areas. Therefore, this item remains deficient.*

Response: The USACE has agreed to the removal of sediment from the Ambrose Channel and/or the Jamaica Bay Entrance Channel for use as backfill as outlined in the minutes from the January 26, 2017 and July 25, 2017 meetings that were included in the August 31, 2018 deficiency response. In addition, the three channel areas were identified in the USACE's Public Notice of Transco's application for a permit, issued March 27, 2018. Transco respectfully requests that the NJDEP indicate if additional or alternative documentation of USACE approval is required.

On September 21, 2018, the NJDEP issued an email response confirming that item 4 had been satisfied.

If you have any questions regarding this response, or require additional Project information, please do not hesitate to contact Karen Olson at (713) 215-4232 or via email at Karen.Olson@williams.com or Scott Horner at (713) 215-4953 or via email at Scott.Horner@williams.com. Alternatively, you can contact Ms. Sara Mochrie, Project Manager at Ecology and Environment, Inc. at (716) 684-8060 or via email at smochrie@ene.com.

Sincerely,

Joseph Dean
Manager, Environmental Health and Safety

cc (via e-mail): Stephen Kellogg, Transco
Scott Horner, Transco
Karen Olson, Transco
Daniel Merz, J.D., Transco
Sara Mochrie, E & E
Megan Eakin, E & E

Enclosures

From: MacLeod, Steven
Sent: Thursday, September 27, 2018 1:48 PM
To: Kelly, Megan <megan.kelly@dep.nj.gov>
Cc: Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Clements, Blake <Blake.Clements@williams.com>
Subject: NJDEP WDP 0000-16-0010.01 - Notice of Commencement - Sep 2018

Hi Megan,

Transco will be conducting additional sediment sampling for the Northeast Supply Enhancement Project this October in support of an evaluation for upland disposal of dredged material.

For your records, attached is a copy of the Notice of Commencement that is scheduled for delivery tomorrow morning at the NJDEP Bureau of Coastal and Land Use Enforcement office in Toms River.

Feel free to contact me if you have any questions.

Sincerely,
Steve

ecology and environment, inc.

Steven MacLeod, *Environmental Scientist*
368 Pleasant View Drive, Lancaster, NY 14086
Office Phone: 716-684-8060 x3907 • Work Cell: 716-462-0845
smacleod@ene.com • www.ene.com

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF LAND USE REGULATION
P.O. Box 420, Mail Code 501-02A
Trenton, NJ 08625-0420
FAX # (609) 292-5399
www.state.nj.us/dep/landuse

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

JAN 17 2018

Tim Powell
Transcontinental Gas Pipeline Company, LLC
2800 Post Oak Boulevard, Level 11
Houston, Texas 77056

Re: Modification to Waterfront Development Individual Permit #0000-16-0010.1 WFD160001
DLUR File No.: 0000-16-0010.1 WFD170001
Applicant: Transcontinental Gas Pipeline Company
Project Location: Raritan Bay
Block: N/A Lot: N/A
Carteret Borough, Middlesex County

Dear Mr. Powell:

In response to your request on December 11, 2017 and in accordance with the Coastal Permit Program Rules, specifically N.J.A.C. 7:7-4.10, you are hereby granted a modification of Waterfront Development Permit #0000-16-0010.1 WFD160001 to authorize additional supplemental sediment sampling for geotechnical, chemical, and biological analysis as necessary within the previously approved study area located within Raritan Bay and Lower New York Bay. Samples will be collected using rotary core borer, vibracorer, or grab sampler.

The general location of the approved offshore study site can be shown in one (1) sheet entitled: "Figure 1: Raritan Bay and Lower New York Bay Vicinity Map New Jersey, New York," dated December 19, 2017, unrevised, prepared by Ecology and Environment, Inc.

A copy of this permit modification shall be appended to the original permit. Please be advised all other conditions of the original Waterfront Development permit #0000-16-0010.1 WFD160001 are to remain in force unless otherwise noted in this approval. In addition to the conditions noted in the original permit, the activities allowed by this authorization shall comply with the following conditions. Failure to comply with these conditions shall constitute a violation of the Waterfront Development Law (N.J.S.A. 12:5-3).

1. All conditions of the original Waterfront Development permit #0000-16-0010.1 WFD160001 are to remain in force unless otherwise noted in this approval.

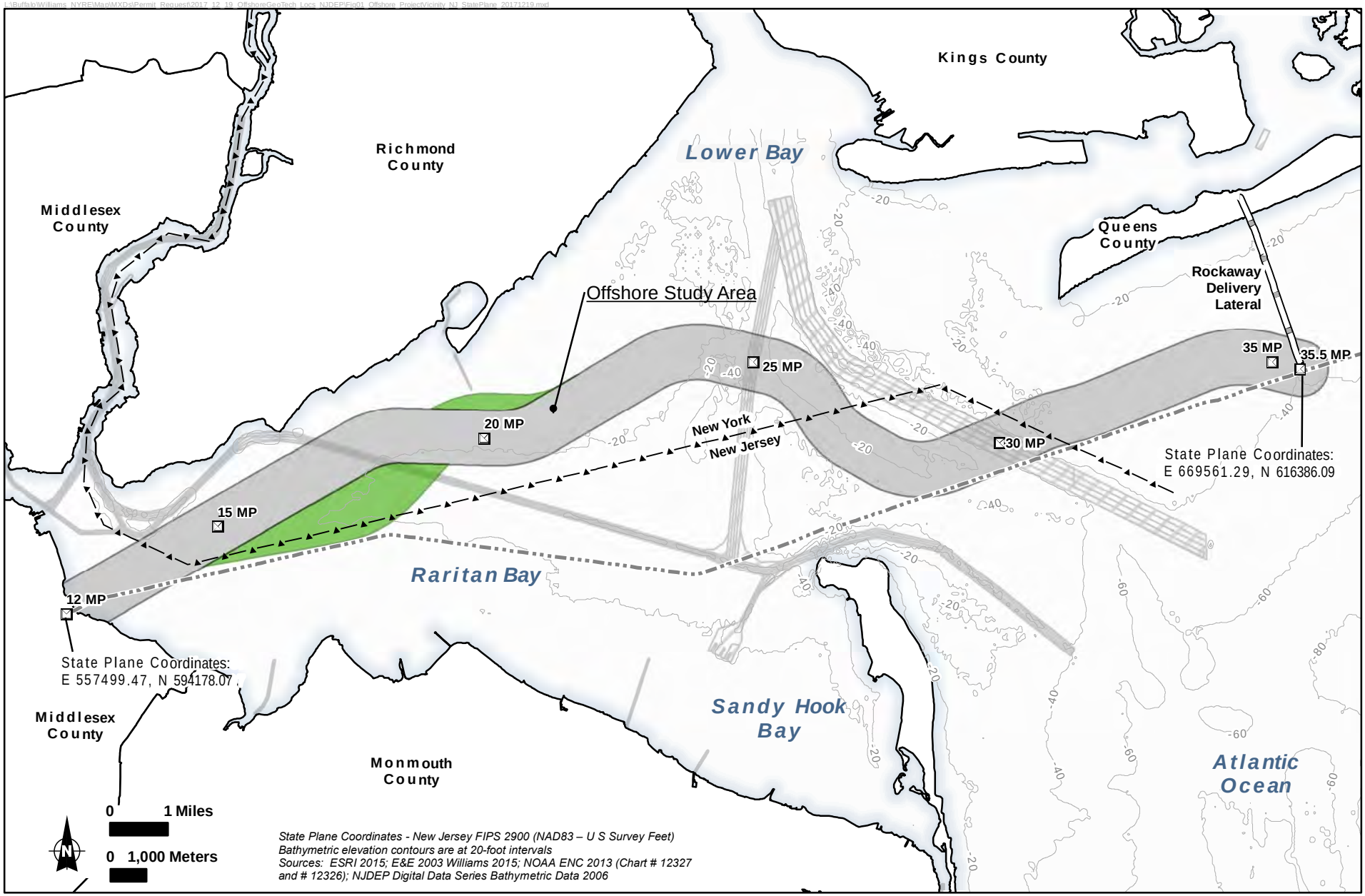
The expiration date of this Waterfront Development Permit Modification authorization shall be the same expiration date as stamped on the original Waterfront Development permit #0000-16-0010.1 WFD160001. If you have any questions concerning this Waterfront Development Permit Modification, please do not hesitate to contact Megan Kelly of our office in writing at the above address, by email at Megan.Kelly@dep.nj.gov, or by telephone at (609) 633-2212.

Sincerely,

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
Division of Land Use Regulation

C. NJDEP Bureau of Coastal and Land Use Enforcement, Toms River
Applicant (original mailed to agent)
Agent: Sara Mochrie, Ecology and Environment, Inc. Buffalo Corporate Center, 368 Pleasant View Drive, Lancaster, New York 14086

L:\Buffalo\Williams_NYRE\Map\MXDs\Permit_Request\2017_12_19_OffshoreGeoTech_Locs_NJDEP\Fig01_Offshore_Project\Vicinity_NJ_StatePlane_20171219.mxd



Milepost for Offshore Study Area

Offshore Study Area (5,000-ft)

Study Area Extension

NY/NJ Boundary

Lower NY Bay Lateral

Rockaway Delivery Lateral

Maintained Navigation Channel

NOTE: All sampling will remain within the depicted study area.

Figure 1: Raritan Bay and Lower New York Bay Vicinity Map
New Jersey, New York

Revision Date: 12/19/2017

ecology and environment, inc.
Global Environmental Specialists
BUFFALO CORPORATE CENTER
368 Pleasant View Drive, Lancaster, New York 14086
Tel: (716) 684-8060, Fax: (716) 684-0844

September 27, 2018

New Jersey Department of Environmental Protection
Bureau of Coastal and Land Use Compliance and Enforcement
1510 Hooper Avenue
Toms River, New Jersey 08753

Re: Notice of Commencement – Raritan Bay and Lower New York Bay Sediment Study (DLUR Permit Nos.: 0000-16-0010.1 WFD 160001 and WFD170001)

To Whom It May Concern:

In compliance with Special Condition 8 of Waterfront Development Individual Permit No. 0000-16-0010.1 WFD 160001, as modified on January 17, 2018 (attached), please be advised that Transcontinental Gas Pipe Line Company, LLC (Transco) intends to begin collection of additional sediment samples on or soon after Monday, October 8, 2018. Attached is a copy of Figure 1 that shows the offshore study area, which was referenced in the Waterfront Development Individual Permit modification application.

If you have any questions regarding this notice, please feel free to contact me at (716) 624-8060 or by e-mail at SMochrie@ene.com. Alternatively, you may contact Mr. Scott Horner (Transco) at (713) 215-4953 or by email at Scott.Horner@williams.com.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Sara Mochrie
Project Manager

Attachments: Figure 1: Vicinity Map with Offshore Study Area
Permit Modification No. 0000-16-0010.1 WFD170001
Permit No. 0000-16-0010.1 WFD160001

CC (via e-mail):
NJDEP – Megan Kelly
Transco – Scott Horner, Blake Clements

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF LAND USE REGULATION
Mail Code 501-02A, P.O. Box 420, Trenton, New Jersey 08625-0420
Telephone: (609) 777-0454 or Fax: (609) 777-3656
www.state.nj.us/dep/landuse

PERMIT

In accordance with the laws and regulations of the State of New Jersey, the Department of Environmental Protection hereby grants this permit to perform the activities described below. This permit is revocable with due cause and is subject to the limitations, terms and conditions listed below and on the attached pages. For the purpose of this document, "permit" means "approval, certification, registration, authorization, waiver, etc." Violation of any term, condition or limitation of this permit is a violation of the implementing rules and may subject the permittee to enforcement action.

Approval Date
SEP 19 2016

Expiration Date
SEP 18 2021

Permit Number(s):	Type of Approval(s):	Enabling Statute(s):
0000-16-0010.1 WFD160001	Waterfront Development Individual Permit In-Water	NJSA 12:5-3

Permittee:
Tim L Powell
2800 Post Oak Blvd. Level 11
Houston, TX 77056

Site Location:
Block(s) & Lot(s): N/A
Municipality: Carteret Boro
County: Middlesex

Description of Authorized Activities:

To conduct offshore in-water core borings at seventeen (17) sites using rotary drilling, and to conduct additional offshore in-water vibracore and surface sediment grab samples at seventeen (17) sites located in Raritan Bay.

This project is authorized under, and in compliance with, the applicable Coastal Zone Management Rules (N.J.A.C. 7:7:1.1 et seq.), as amended, provided that all conditions to follow are met.

Issuance of this permit in no way relinquishes, and shall not be construed as a relinquishment by the State of NJ of any Tidelands right, title ownership/interest in the subject property or in any land surrounding the same.

Prepared by:
Megan Kelly
Megan Kelly

THIS PERMIT IS NOT EFFECTIVE AND NO CONSTRUCTION APPROVED BY THIS PERMIT, OR OTHER REGULATED ACTIVITY, MAY BE UNDERTAKEN UNTIL THE APPLICANT HAS SATISFIED ALL PRE-CONSTRUCTION CONDITIONS AS SET FORTH HEREIN.

Received and/or Recorded by County Clerk:

This permit is not valid unless authorizing signature appears on the last page.

PRE-CONSTRUCTION CONDITIONS:

1. **Timing:** If this permit contains a condition that must be satisfied prior to the commencement of construction, the permittee must comply with such condition(s) within the time required by the permit or, if no time specific requirement is imposed, then within six months of the effective date of the permit, or provide evidence satisfactory to the Division that such condition(s) cannot be satisfied.

SPECIAL CONDITIONS:

2. **Recording of Permit:** This permit shall be recorded in its entirety in the office of the County Clerk or the Registrar of Deeds and Mortgages for each county where this project is located. Verified notice of this action shall be forwarded to the Division immediately thereafter.

3. **Material Disposal:** All excavated material and dredge material shall be disposed of in a lawful manner. The material shall be placed outside of any flood hazard area, riparian zone, regulated water, freshwater/coastal wetlands and adjacent transition area, and in such a way as to not interfere with the positive drainage of the receiving area.

4. Upon completion of the project, all temporarily disturbed areas must be restored to their original conditions using native soils.

5. Bore holes shall be backfilled to the original surface level with appropriate, non-contaminated, soil material.

6. By the issuance of this permit, the State of New Jersey does not relinquish tidelands ownership or claim to any portion of the subject property or adjacent properties.

7. This permit is issued subject to compliance with N.J.A.C. 7:7-27.2 Conditions that apply to all coastal permits.

8. You must notify the NJDEP, Bureau of Coastal and Land Use Compliance and Enforcement, in writing, at 1510 Hooper Avenue, Toms River, NJ 08753,(or 100 North Road, Chester, NJ 07930) at least three working days prior to beginning any construction on the site or any site preparation.

9. No project ground disturbing activities will commence on the project site until the permittee completes the required archaeological program to identify, evaluate, avoid, and/or mitigate project impacts on archaeological resources.

10. The permittee shall conduct a Phase I underwater archaeological survey within all areas of proposed ground disturbance to identify the presence or absence of archaeological deposits.

11. The permittee shall consult with the Historic Preservation Office upon completion of the Phase I underwater archaeological survey to assess the presence or absence of archaeological resources within the project's area of potential effects and to determine if a Phase II underwater archaeological survey is necessary to assess the eligibility of archaeological resources for listing on the New Jersey and National Registers of Historic Places.

12. The permittee shall submit a Phase II underwater archaeological survey to the Historic Preservation Office for review, if archaeological resources were identified during Phase I underwater archaeological survey and cannot be avoided. The Phase II archeological survey work plan shall be submitted to the Historic Preservation Office for review and approval prior to the commencement of the Phase II fieldwork.

13. The permittee shall consult with the Historic Preservation Office upon completion of the Phase II underwater archaeological survey to assess the effects of the proposed project on any resources identified as eligible for listing on the New Jersey and National Registers of Historic Places.

14. The permittee shall submit an avoidance-plan to the Historic Preservation Office and the Division of Land Use Regulation within 30 days of completion of the Phase II underwater archaeological survey if resources eligible for inclusion on the New Jersey and National Registers of Historic Places are identified.

15. The permittee shall submit a minimization and/or mitigation plan to the Historic Preservation Office if impacts to resources eligible for listing on the New Jersey and National Registers of Historic Places cannot be avoided. The minimization and/or mitigation plan(s) must be approved by the Historic Preservation Office prior to the commencement of on-site construction activities or any data recovery activities to ensure that the research designs, work plans, proposed archaeological buffer zones, data recovery plans and public outreach components are acceptable to the Historic Preservation Office.

16. The permittee shall ensure the Historic Preservation Office approved archaeological work plans for the Phase II and Phase III data recovery surveys are implemented.

17. The permittee shall not commence with any on-site construction activities until the Division of Land Use Regulation, in consultation with the Historic Preservation Office, has released the data recovery project site for construction once the fieldwork component of the data recovery is completed and the Historic Preservation Office has received A) an approved data recovery work plan; B) notification of the completion of the data recovery fieldwork; and C) a Historic Preservation Office approved data recovery management summary of the data recovery field work.

18. The permittee shall ensure complete draft Phase II reports shall be submitted to the Historic Preservation Office for review and approval within six months after respective phases of fieldwork are completed. The project permittee shall ensure a complete draft Phase III report shall be submitted to the Historic Preservation Office for review and approval within one year after fieldwork is completed. Final reports for each phase of survey shall be submitted to the Historic Preservation Office within two months after comments are received on the respective draft reports. Other timelines (for example, for public outreach) shall be established in consultation with the Historic Preservation Office, as necessary, based on the findings of the underwater archaeological survey.

19. The permittee shall notify the Historic Preservation Office within three days of the completing of each phase of archaeological fieldwork.

20. The Permittee shall ensure that all phases of the underwater archaeological survey and reporting shall be in keeping with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation and the underwater archaeological survey and report rules at N.J.A.C. 7:4-8.4 through 8.5. Evaluations to determine the National Register eligibility of archaeological sites should be in keeping with the National Park Service's 2000 National Register Bulletin, Guidelines for Evaluating and Registering Archaeological Properties. The Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation are available on the National Park Services web site:
http://www.nps.gov/history/local-law/arch_stnds_0.htm)

21. The Permittee shall ensure that the individual(s) conducting the work shall meet the Secretary of the Interior's Professional Qualifications Standards for archaeology (48 FR 44738-9).

22. The permittee shall ensure that all artifacts from State and National Register eligible archaeological sites will be analyzed, catalogued, and curated in accordance with the National Park Service Standards, codified as 36 CFR Part79.

23. The permittee shall ensure that within two months of the submission of the final Phase II report and any final Phase III data recovery report to Division of Land Use Regulation and the Historic Preservation Office, the artifacts, field records (including the artifact catalogue), and copies of all phases of survey from National Register eligible sites shall have been turned over to the New Jersey State Museum or other institution meeting the Secretary of the Interior's Standards for Curation. A copy of the New Jersey State Museum Deed of Gift Form (or a Deed of Gift Form from another suitable curation facility) shall be submitted to the Historic Preservation Office at that time as an indicator of the final transmission of the artifact collection. All archaeological reports shall identify the repository where the project records and artifacts will be located.

24. The project permittee shall ensure that work that does not meet the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation and the requirements of the Freshwater Wetlands Protection Act Rules as determined by the Historic Preservation Office in consultation with Division of Land Use Regulation, will be rectified by the project archaeological consultant(s).

25. The permittee shall immediately cease all ground disturbing activities and contact the Historic Preservation Office if potential human burials or human skeletal remains are encountered. The potential burials and/or human skeletal remains shall be left in place unless imminently threatened by human or natural displacement.

26. If, for any reason the Phase I, and any required Phase II evaluation and/or Phase III data recovery, fieldwork is not accomplished prior to construction within the defined project area site limits, the project permittee shall be responsible for all investigation, evaluation, survey, salvage, and/or stabilization deemed necessary by the Historic Preservation Office, in consultation the Division Of Land Use Regulation, pursuant to the implementing regulations. Information gathered from such investigation, evaluation, or survey shall be used by the Historic Preservation Office, in consultation with Division of

Land Use Regulation, to determine the extent of damage, evaluate the resource, and direct any measures to mitigate impacts from project-related activities, including any actions on the part of the permittee's contractors. Should any archaeological site be entirely destroyed by project-related activities before completion of any of the required phases of archaeological fieldwork are completed, the Historic Preservation Office, in consultation with Division of Land Use Regulation, shall determine other appropriate mitigation (e.g., alternative site excavation, alternative analysis, and/or public outreach activities) and enforcement, commensurate with the impacts which occurred.

27. The permittee shall provide a copy of these cultural resource conditions to the archaeological consultant(s) for the proposed project.

28. In order to protect the Federally listed species Atlantic Loggerhead, no blasting in-water shall occur between June 1 through October 31.

29. The permittee shall be aware of turtles within the work area between June 1 and October 31. If a turtle is spotted during that time frame all work shall stop until the turtle is safely out of the work area. In addition, the turtle shall be reported to National Marine Fisheries Service.

STANDARD CONDITIONS:

1. **Responsibilities:**
   a. The permittee, its contractors and subcontractors shall comply with all conditions of this permit, authorizing and/or supporting documents and approved plans and drawings.

   b. A copy of this permit, other authorizing documents, records and information including all approved plans and drawings shall be maintained at the authorized site at all times and made available to Department representatives or their designated agents upon request.

2. **Permit modification:** Plans and specifications in the application and conditions imposed by this permit shall remain in full force and effect so long as the proposed development or any portion thereof is in existence, unless modified by the Department. No change in plans or specifications upon which this permit is issued shall be made except with the prior written permission of the Department. The filing of a request to modify an issued permit by the permittee, or a notification of planned changes or anticipated noncompliance does not stay any condition of this permit.

3. **Duty to minimize environmental impacts:** The permittee shall take all reasonable steps to prevent, minimize or correct any adverse impact on the environment resulting from activities conducted pursuant to the permit, or from noncompliance with the permit. The permittee shall immediately inform the Department of any unanticipated adverse effects on the environment not described in the application or in the conditions of this permit. The Department may, upon discovery of such unanticipated adverse effects, and upon the failure of the permittee to submit a report thereon, notify the permittee of its intent to suspend the permit

4. **Proper site maintenance:** While the regulated activities are being undertaken, neither the permittee, its contractors nor subcontractors shall cause or permit any unreasonable interference with the free flow of a regulated feature by placing or dumping any materials, equipment, debris or structures within or adjacent to the regulated area. Upon completion or abandonment of the work, the permittee, its contractors or subcontractors shall remove and dispose of in a lawful manner all excess materials, debris, equipment, silt fences and other temporary soil erosion and sediment control devices from all regulated areas. Only clean non-toxic fill shall be used where necessary.

5. **Sediment control:** Development which requires soil disturbance, creation of drainage structures, or changes in natural contours shall conduct operations in accordance with the latest revised version of "Standards for Soil Erosion Sediment Control in New Jersey," promulgated by the New Jersey State Soil Conservation Committee, pursuant to the Soil Erosion and Sediment Control Act of 1975, N.J.S.A. 4:24-42 et seq. and N.J.A.C. 2:90-1.3-1.14.

6. **Rights of the State:**
   a. This permit does not convey any property rights of any sort, or any exclusive privilege.

   b. Upon notification and presentation of credentials, the permittee shall allow Department representatives or their designated agents, to enter upon the project site and/or where records must be kept under the conditions of this permit, inspect at reasonable times any facilities, equipment, practices or operations regulated or required under the permit, and sample or monitor for the purposes of determining compliance. Failure to allow reasonable access shall be considered a violation of this permit and subject the permittee to enforcement action.

   c. The issuance of this permit shall in no way expose the State of New Jersey or the Department to liability for the sufficiency or correctness of the design of any construction, structure or structures. Neither the State nor the Department shall, in any way, be liable for the loss of life or property which may occur by virtue of the activity of development resulting from any permit.

7. **Duty to Reapply:** If the permittee wishes to continue an activity covered by the permit after the expiration date of the permit authorization, the permittee must apply for and obtain a new permit authorization.

8. **Transfer of Permit:** This permit may not be transferable to any person unless the transfer is approved by the Department. Please refer to the applicable rules for more information.

9. **Other Approvals:** The permittee must obtain any and all other Federal, State and/or Local approvals. Authorization to undertake a regulated activity under this permit does not indicate that the activity also meets the requirements of any other rule, plan or ordinance.

10. **Noncompliance:**

a. Any noncompliance with this permit constitutes a violation, and is grounds for enforcement action, as well as modification, suspension and/or termination of the permit.

b. The permittee shall immediately report to the Department by telephone at (877) 927-6337 any noncompliance that may endanger health or the environment. In addition, the permittee shall report all noncompliance to Bureau of Coastal and Land Use Compliance and Enforcement, 401 E. State Street, 4th Floor, P.O. Box 420, Mail Code: 401-04C, Trenton, NJ 08625, in writing within five business days of the time the permittee becomes aware of the noncompliance. The written notice shall include: a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and, if the noncompliance has not been corrected, the anticipated length of time it is expected to continue; and steps taken or planned to reduce, eliminate and prevent recurrence of the noncompliance. Such notice shall not, however, serve as a defense to enforcement action if the project is found to be in violation of this chapter.

11. **Appeal of Permit**: In accordance with the applicable regulations, any person who is aggrieved by this decision or any of the conditions of this permit may request a hearing within 30 days after notice of the decision is published in the DEP Bulletin. This request must include a completed copy of the Administrative Hearing Request Checklist. The DEP Bulletin is available through the Department's website at http://www.nj.gov/dep/bulletin and the Checklist is available through the Division's website at http://www.nj.gov/dep/landuse/download/lur_024.pdf. In addition to your hearing request, you may file a request with the Office of Dispute Resolution to engage in alternative dispute resolution. Please see the website www.nj.gov/dep/odr for more information about this process.

If you need clarification on any section of this permit or conditions, please contact the Division of Land Use Regulation's Technical Support Call Center at (609) 777-0454.

The general location of the approved offshore study sites can be shown in 4 sheets entitled:

"Figure 2: Sample Site Map New Jersey, New York." Undated, prepared by Ecology & Environment, Inc.

Approved By:

Christopher Jones, Manager
Division of Land Use Regulation

Date 9/19/16

Original sent to Agent to record
c: Permittee
NJDEP Bureau of Coastal and Land Use Enforcement, Toms River
Agent: Sara Mochrie, Ecology and Environment, Inc. Buffalo Corporate Center, 368 Pleasant View Drive, Lancaster, New York 14086

Northeast Supply Enhancement (NESE) Project

NJDEP Upland Disposal Sampling Plan Meeting Minutes

To: Offshore Team
From: Maxwell Martin
Date: 10/11/18
RE: NJDEP Upland Disposal Sampling Plan Meeting August 28, 2018

Participants

Williams

Chris Martinez
Blake Clements
Sarah Behrends
Scott Horner (Phone)
Ken Johnson (Phone)

Haley & Aldrich
Ryan Scott
Vince Dick

E & E
Maxwell Martin
Sara Mochrie (Phone)
Megan Eakin (Phone)

NJDEP
Magda Usarek-Witek
Gary Nickerson

Meeting Summary

1) This meeting was scheduled to review the sampling plan associated with the upland disposal of dredge material. Haley & Aldrich (H&A) started the meeting with a safety moment and then presented slides on the sampling plan.
    a. Magda Usarek-Witek asked if everything dredged from New York waters were expected to be sent to placement sites in New Jersey. Ryan Scott responded that this was the intention.

Ms. Usarek-Witek asked about whether the horizontal directional drilling (HDD) pit at Morgan would be sampled to nine feet of depth, since the slide 6 list of samples with elevated contamination levels showed elevated Arsenic to nine feet at sample location VC-1B. Mr. Scott answered that they were going to discuss the sampling of the HDD pits later, and that this slide was just a summary of "hits" from previous investigations.

b. While reviewing slide 12, Gary Nickerson asked if SPLP sampling had been performed previously, and Scott answered that it had not been considered previously. Vince Dick stated that Transco would not be performing all analyses of NJAC 7:7 sampling except if needed for a Beneficial Use Determination (BUD), but could reconsider later. Ms. Usarek-Witek agreed with this approach.
c. While reviewing slide 13, discussing the use of the 2016 hydrographic survey, Mr. Nickerson stated that the permit would require an exact volume that would be used for sample quantification, which may be a reason to obtain a more recent survey. He stated that the permit might allow for 10-15% additional volume but otherwise might require additional sampling if the volume is exceeded, which could be expensive. Mr. Scott stated that the volume might be slightly overestimated, but that the approach was to use the volume in the FERC permit, which would be based on the 2016 hydrographic survey. Mr. Nickerson stated that NJDEP would want an accurate estimate of the material to be disposed. Mr. Scott and Chris Martinez stated that a pre-construction survey would be completed to determine if there was a requirement to modify the volume estimate. Mr. Martinez stated that Transco would still like to use the 2016 hydrographic survey.
d. Ms. Usarek-Witek stated that if Transco wanted to continue with the Sampling and Analysis Plan (SAP) submittal and get approval later to modify the plan due to Historical Area Remediation Site (HARS) approval or the HARS timeline, then Transco would need to show that material could go to an upland disposal facility and then modify later. Mr. Martinez stated that the SAP was sampling all proposed dredged material for upland disposal, but that the areas were broken up based on expected priorities: material being tested and considered for HARS and material that would go to upland disposal regardless.
e. Mr. Nickerson asked if the disposal facilities were accepting of the sampling frequency as provided with in-situ volumes, rather than post-amendment or post-dewatering. Mr. Dick stated that New Jersey might not be the driver for this approach, but rather Pennsylvania Department of Environmental Protection (PADEP) policy for sample:volume ratios for PA facilities. Ms. Usarek-Witek stated that NJDEP was just confirming that the facilities were comfortable with in-situ volumes, as most permittees test after amendment or dewatering. NJDEP was asking because if sampling was required after amendment or dewatering, then Transco may have to test ex-situ regardless of in-situ sampling results.
f. Mr. Scott asked whether NJDEP would accept one sample per 4,000 cubic yards (CY) dredged material with an expanded analytical suite, and Ms. Usarek-Witek confirmed that this was acceptable.

g. Ms. Usarek-Witek asked if the United States Army Corps of Engineers (USACE) were going to accept vertical segregation, and Mr. Martinez answered that USACE had indicated that they would accept the approach.
h. Ms. Usarek-Witek asked if the Raritan Crossing was trenching or HDD, and Mr. Martinez stated that the approach for Raritan Crossing was open-cut trenching.
i. While reviewing slide 17, Mr. Scott stated that the sampling frequency for the anchorage area would be closer to one sample for 3,000 CY because of the potential for deeper cover, and that Transco was proposing oversampling for the larger volume. Ms. Usarek-Witek asked whether they'd be separately sampled to avoid mixing the different cover-depth scenario samples together, and Mr. Scott confirmed that the intervals for the cores would be developed based on the cut depths.
j. Mr. Scott summarized that approximately 100 locations would be sampled, with approximately 170 to 200 samples collected, as detailed in the SAP. Mr. Scott asked if was acceptable to NJDEP that Transco could freeze samples from HARS areas for later analysis, and how long NJDEP would allow those frozen samples to be held. Mr. Nickerson answered that Transco should follow the hold times listed in the analytical methods, and Mr. Scott stated that 180-day hold times for frozen samples were acceptable based on some other guidance documents. Mr. Nickerson and Ms. Usarek-Witek stated that they could run it by another NJDEP staff member, but that for now the two-phase approach was acceptable, and that they'd try to get an answer by the time the SAP draft was provided to NJDEP.
k. Ms. Usarek-Witek stated that she would be out of the office for 20 days starting on Thursday, August 30, and that Mr. Nickerson was leading review in her absence. She asked that Transco copy Mr. Nickerson and Suzanne Dietrick in her absence.
l. Mr. Nickerson asked whether a sampling plan would be developed for upland disposal areas in New York State, and Mr. Scott answered that there were no additional areas under consideration.
m. Ms. Usarek-Witek asked about dredging material out of navigation channels, and the need to make sure that the information was included in the dredging permit application. She stated that NJDEP was requesting that Transco avoid the use of Sandy Hook. Sara Mochrie stated that Transco planned to include the navigation channel dredging in the permit with USACE. Ms. Mochrie stated that because the channels to be dredged contained greater than 90% sand, that the areas were already adequately characterized and that no additional samples would be needed.
n. Mr. Scott asked whether NJDEP provided verbal approvals, for example that the approach for the plan was acceptable. Ms. Usarek-Witek responded that approval of the plan after submission should not take much time so that verbal approval would not be necessary.
o. Mr. Nickerson asked whether Transco would be using NJDEP's form for the SAP – Ms. Usarek-Witek stated that she assumed that Transco would use their own format for the SAP. Mr. Scott answered that the plan was developed using SAP versions 1.2 and 2.0 as a base, so that some sections were the same or similar and some sections would have no changes. Ms.

Usarek-Witek asked if electronic versions of the previous SAP versions could be provided to NJDEP so that NJDEP could compare them.

p. Ms. Usarek-Witek and Mr. Nickerson stated that some specific upland sites may require a more prescribed sampling plan. For example, they listed Sayreville as a "national lead site"; NJDEP would not normally require VOC sampling, but Sayreville might require VOC sampling as a site-specific analyte. They stated that if Transco was discussing options with Don Jon that Kerri Mullins would be the contact at that facility who would know the site-specific requirements. Ms. Usarek-Witek and Mr. Nickerson stated that a more conservative analyte plan might be required so that the material could be checked for acceptance anywhere in New Jersey. Mr. Nickerson stated that NJDEP could accept as many upland placement letters as Transco could provide as long as the permit was accepted. Ms. Usarek-Witek stated that multiple locations could be listed in the Authorized Upland Disposal Permit (AUD Permit), and that it might be a good idea to list multiple upland disposal sites so that it would be easier to find sites later. Mr. Scott confirmed that both disposal facility contractors had discussed multiple disposal sites.
q. Mr. Nickerson asked whether Structural Fill Protocol Testing would be done during the testing, and Mr. Scott stated that it would not be done. Mr. Scott stated that the facilities proposed 10% Portland cement amendment.
r. Blake Clement requested Ms. Dietrick's email address for later correspondence, and Ms. Usarek-Witek provided the email address on the sign-in sheet.

HPO Project No. 16-1743-44
NJDEP SUP 17
HPO-J2018-240

ecology and environment, inc.
Global Environmental Specialists
BUFFALO CORPORATE CENTER
368 Pleasant View Drive, Lancaster, New York 14086
Tel: (716) 684-8060, Fax: (716) 684-0844

October 9, 2018

Katherine J. Marcopul,
Deputy State Historic Preservation Officer
Historic Preservation Office
501 East State Street, Building 5, 4th Floor
Mail Code 501-04B
PO Box 420
Trenton, New Jersey 08625-0420

Re: Consideration of Eighteen (18) Revised Geotechnical Sampling Locations along the Offshore Raritan Bay Loop in New Jersey State Waters, NJHPO Project No. 16-1743, FERC Docket No. CP17-101

Dear Ms. Marcopul:

Transco is providing information regarding the collection of geotechnical data at eighteen (18) revised sampling sites along the centerline and anchorage areas of the proposed Offshore Raritan Bay Loop (Table 1). Of these, ten (10) sampling sites have been previously approved by the NJHPO leaving only eight (8) sites requiring your close consideration. This sampling campaign will be conducted within the previously established area of potential effect (APE) as indicated in maps 1 through 6 (attached).

As with previous sampling locations, the content of each core will be subject to a comprehensive cultural resource analysis by a qualified archaeologist and/or geoarchaeologist (R.C. Goodwin and Associates, Inc.). Following the completion of sampling, an addendum to the original offshore cultural resource report will be provided for your review. All work will be conducted in accordance with the Northeast Supply Enhancement Project's *Soil Boring and Sediment Sampling Program Scope of Work and Specification* (2016). Note that each vibracore sample will measure approximately 4-inches in diameter and penetrate an additional 2-feet below current channel depths, no more than 7-feet along the centerline outside of channels, and no more than 7.5-feet in anchorage areas.

Please note that Transco has sited the geotechnical sampling locations to avoid any previously identified targets that may have historical significance within the APE. Additionally, 100-foot buffers have been placed around each sampling location. Also, in the unlikely event an artifact and/or human remains are unearthed during the sampling process, all work will be halted until all agencies are informed and a qualified archaeologist has evaluated the find in accordance with state and federal requirements, and the Project's Unanticipated Discovery Plan.

16-1743-44
NJDEP SUP 17
HPO-J2018-240

If you have any questions or concerns about the proposed sampling process please do not hesitate to contact Scott Horner at (713) 215-4953 (scott.horner@williams.com) regarding offshore resources. Additionally, you may contact me at (716) 684-8060, ext. 2132 (owright@ene.com).

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Owen Wright,
Maritime Archaeologist & Chief Cultural Resource Specialist

CONCUR

Katherine J. Marcopul 10/29/2018
KATHERINE J. MARCOPUL DATE
DEPUTY STATE HISTORIC
PRESERVATION OFFICER

CC: Scott Horner, Transco
Sara Mochrie, Ecology & Environment, Inc.

Attachment

From: "Olson, Karen" <Karen.Olson@williams.com>
Date: November 30, 2018 at 11:56:52 AM EST
To: "Resnick, Matthew" <Matthew.Resnick@dep.nj.gov>, "Mochrie, Sara (SMochrie@ene.com)" <SMochrie@ene.com>, "Dean, Joseph" <Joseph.Dean@Williams.com>
Cc: "Jones, Christopher" <Christopher.Jones@dep.nj.gov>
Subject: RE: Can you please address the following comments?

Hi Matt, responses to the comments below are included in the attached. Let us know if you need any additional information.

Have a great weekend!

Karen

Karen Olson | Environmental Scientist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Thursday, November 08, 2018 2:14 PM
To: Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Olson, Karen <Karen.Olson@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] Can you please address the following comments?

Good afternoon Sara, Karen and Joe,

At the public hearing on November 5th, a few of the speakers raised a couple of interesting questions. Could you please address the following comments?

1. Can you please provide the property ownership information for lot 23, block 5.02, for the suction/discharge pipe? A commenter claimed that Transco doesn't own the property and doesn't have permission to install the connection pipes.
2. Regarding the access road. Someone questioned the feasibility of using the Trap Rock ROW that we had used during out site visit to CS 206. Can you provide a full analysis of using that route into site 3 and why is was considered not practicable?
3. One of the written comments questioned why combinations of adjacent blocks and lots could not be used to create large enough areas of upland areas to construct CS 206. For example, they cited that Sites 8 and 27 could be combined to create a developable upland area further reducing impacts to wetlands.

Thank you very much.

This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.

Responses to the following questions for your review:

1. **Can you please provide the property ownership information for lot 23, block 5.02, for the suction/discharge pipe? A commenter claimed that Transco doesn't own the property and doesn't have permission to install the connection pipes.**

   Response
   Trap Rock owns Block 5.02, Lot 23 (recently merged into lot 20), which Transco proposes to expand its existing permanent ROW for purposes of constructing a valve site and suction and discharge piping to serve proposed Compressor Station 206. Attached is Trap Rock's letter consenting to Transco's proposed activities and acknowledging Trap Rock and Transco's intent to enter into an agreement regarding this property. This consent letter was also attached to Transco's August 31, 2018 Response to Deficiency Letter for Freshwater Wetlands Individual Permit, Flood Hazard Area Individual Permit, Flood Hazard Area Verification, Waterfront Development (Upland & In-Water) Individual Permit, and Coastal Wetlands Permit (collectively, "Application Package").

2. **Regarding the access road. Someone questioned the feasibility of using the existing SUNOCO pipeline right-of-way (ROW) [(i.e., the "Trap Rock ROW")] that we had used during our site visit to CS 206. Can you provide a full analysis of using that route into site 3 and why is was considered not practicable?**

   Response
   On April 19, 2017, Transco conducted a wetland delineation of an 85-foot wide survey corridor that paralleled the existing SUNOCO pipeline right-of-way (ROW) (i.e., the "Trap Rock ROW"), shown as the "Alternate Access Road" in Figure 1. The wetland delineation fieldwork was conducted consistent with the methods and information outlined in the 1989 Federal Interagency Wetland Delineation Manual and the New Jersey Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A).

   Assuming an 85-foot wide corridor, approximately 5.34 acres of wetland impacts would occur for the alternate access road. Comparatively, the total wetland impacts for the proposed access road is 2.85 acres (see Table 1). Of the 5.34 acres of wetland impacts associated with the alternate access road, approximately 1.91 acres would be palustrine emergent (PEM) wetland, 2.97 acres would be palustrine scrub/shrub (PSS) wetland, and 0.46 acres would be palustrine forested (PFO) wetland.

   An 85-foot wide corridor centered on the alternative access road footprint was used for this impact analysis as it represents the minimum amount of area required to site the alternative access road. Although Transco has assumed an 85-foot wide corridor, it's likely that a larger corridor would be required to accommodate the presence of utilities and storm water infrastructure.

   In comparison, the proposed access road (Figure 1), is initially 105 feet wide with neckdowns, where feasible, based on topographic conditions along the corridor. The analysis of the alternate access road based on the 85-foot wide corridor demonstrates that construction of the alternate access road would result in at least 2.49 acres of additional wetland impact as compared to the proposed access road. Accordingly, the alternative access road would not be considered a practicable alternative "which would…have a less adverse impact on the aquatic ecosystem…". N.J.A.C. 7:7A-10.2(b)(1)(i).

Table 1. Preliminary Jurisdictional Wetland Delineation Results for the Proposed and Alternate Access Roads at the Proposed Compressor Station 206 Location

Facility	Wetland Type (Cowardin, 1979)	Acreage
Alternate Access Road – Permanent Impacts	PEM	1.91
	PSS	2.97
	PFO	0.46
Alternate Access Road – Permanent Impacts Total		**5.34**
Alternate Access Road Length = 4,425 ft.		
Proposed Access Road – Permanent Impacts	PEM	0.47
	PSS	0.31
	PFO	2.07
Proposed Access Road – Permanent Impacts Total		**2.85**
Proposed Access Road Length = 3,250 ft.		

3. **One of the written comments questioned why combinations of adjacent blocks and lots could not be used to create large enough areas of upland areas to construct CS 206. For example, they cited that Sites 8 and 27 could be combined to create a developable upland area further reducing impacts to wetlands.**

Response

As detailed in Transco's Alternatives Analysis included in Transco's Application Package (June 2018), neither alternative Site 8 nor Site 27 were carried forward for consideration as the preferred alternative. For Site 8, the proposed Compressor Station 206 would have to be constructed in open water features and additional tie-in facilities (pig launcher/receiver) would be required due to the length of suction and discharge piping required to reach Transco's mainlines. For Site 27, wetland and residential impacts would be greater than for the preferred alternative (Site 3).

As done for Site 8 and 27 individually in Transco's application package, Transco applied the same temporary and permanent workspace requirements for Sites 8 and 27, combined. To the extent practicable, Transco attempted to site the Compressor Station 206 footprint on Sites 8 and 27 that would avoid open water impacts and result in the least amount of wetland and transition area impacts. Due to the shape of each of the parcels and the locations of open water features and wetlands, no configuration of permanent and temporary workspace for Sites 8 and 27, combined, would result in less impacts to open water features, wetlands, and transition areas as compared to Site 3 (see Table 2, below and Figure 2, attached).

Additionally, based on the potential configuration depicted in Figure 2, additional tie-in facilities (pig launcher/receiver) would be required due to the length of suction and discharge piping required to reach Transco's mainlines, further increasing total wetland and transition area impacts.

Lastly, siting Compressor Station 206 on Site 8 or Site 27, individually, or Sites 8 and 27, combined, would require new ROW across at least three properties to reach the existing Transco mainlines. The permanent 2-acre tie-in facility, which would include valve settings and pig launcher/receiver facilities, would impact three landowners, including an existing organic farm, potentially removing approximately 1 acre of actively cultivated farmland for use by the landowner.

Transco reiterates its conclusion in it Application Package that there is no practicable alternative to Site 3 that would have lesser impacts on freshwater wetlands or State open waters.

Table 2 Primary Distinguishing Factors for Compressor Station 206 Site Alternative Comparison

Criteria	Unit	Site Alternative[a]			
		3	8	27	Sites 8 and 27 Combined[d]
Total Temporary Impacts Wetlands[a,c]	acres	0.15	0.11	0.11	1.29
PEM	acres	0.15	0.11	0.11	0.11
PSS	acres	-	-	-	-
PFO	acres	-	-	-	1.18
Total Permanent Impacts Wetlands[a,c]	acres	3.73	1.27	5.75	4.08
PEM	acres	0.78	0.93	0.61	0.61
PSS	acres	0.31	-	-	-
PFO	acres	2.64	0.34	5.14	3.47
Temporary Impacts Waterways[a]	acres	-	-	-	-
Permanent Impacts Waterways[a]	acres	-	-	-	-
Temporary Impacts Waterbodies[a]	acres	-	-	-	-
Permanent Impacts Waterbodies[a]	acres	-	0.06	-	-
Number of Residences within 0.25 Mile of Site center	count	0	18	19	17
Number of Residences within 0.25 Mile of all Workspaces	count	13	56	47	43
Distance to Nearest Noise Sensitive Area (Residence)	feet	2,319	431	584	605
Direction to Nearest Noise Sensitive Area (Residence)	-	NNW	SSE	SSE	E

[a] Utilized the best available waters/wetland data. Site 1 utilized waters/wetland approximation data (Ecolsciences 2016d). Site 2 and Site 3 utilized waters/wetland jurisdictional delineation data (Ecolsciences 2016e and 2016a). Site 8 utilized LOI and remote sensed wetland data. Site 27 utilized remote sensed data.

[b] Assumed the maximum potential buffer for the State of New Jersey of 150 feet.

[c] Totals may not sum precisely due to rounding errors.

[d] Includes a combination of LOI and remote sensed wetland data.

Key:
E = east
ESE = east-southeast
LOI = Letter of Interpretation
NNW = north-northwest
PEM = palustrine emergent
PFO = palustrine forested
PSS = palustrine scrub/shrub
SSE = south-southeast

From:	Resnick, Matthew
To:	Mochrie, Sara
Cc:	Olson, Karen; Eakin,Megan; Dow, Diane; Jones, Christopher; Albers, Meghan; Poirrier, Alyssa
Subject:	RE: Question regarding discrepancy in reported wetland impacts
Date:	Thursday, November 29, 2018 11:18:29 AM

Thank you Sara, I'll reach out if we require more information on this particular subject.

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Thursday, November 29, 2018 1:10 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Eakin,Megan <MEakin@ene.com>; Dow, Diane <Diane.Dow@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Albers, Meghan <MAlbers@ene.com>; Poirrier, Alyssa <APoirrier@ene.com>
Subject: [EXTERNAL] RE: Question regarding discrepancy in reported wetland impacts

Matt – We don't know where the numbers in the public comments are coming from and have not been able to determine the source. We have seen many inaccurate project characterizations in the public realm that don't present information as provided in permit applications.

The footprint of the project provided to FERC was essentially frozen in time and submitted to FERC before the DEIS was published. This usually occurs well in advance of the publish date. The DEIS was published in March of this year and since that time further refinements have been made to the impacts due to engineering adjustments and consultations with your office. It's not uncommon for there to be minor discrepancies between the FERC impact calculations and what ends up being the final, permitted impacts. The footprint/impacts in front of you now from the June 2018 application package are what Transco is seeking authorization for.

In addition, FERC calculates wetland impacts between temporary and permanent differently than NJDEP. That is why you have a much lower total on the wetland plans (2.1 vs. 9.3). FERC considers the total temporary calculation as temporary and permanent together and then the permanent is a smaller piece of that. Wetland plans you have for review are depicted differently in accordance with NJDEP regulations.

Once we receive our FERC Order, we will likely have a condition that requests final alignment sheets prior to the start of construction and at that time we would provide those to FERC and they would represent the final authorized space in NJ.

Thanks,
Sara

From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Tuesday, November 27, 2018 1:23 PM

To: Mochrie, Sara <SMochrie@ene.com>
Cc: Olson, Karen <Karen.Olson@williams.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Poirrier, Alyssa <APoirrier@ene.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>
Subject: [EXTERNAL] RE: Question regarding discrepancy in reported wetland impacts

Thank you for the response Sara, I need some further clarification. See below.

Regarding wetland impacts:
Table 4.3.4-1 in the DEIS reports the impacts associated with the NESE project as a whole, including a project total of approximately 11.8 acres of temporary wetland impacts (3.8 acres of which are PFO impacts), and 5.2 acres of permanent wetland impacts (3.5 acres of which are PFO impacts). For New Jersey, the DEIS reports approximately 9.3 acres of temporary wetland impacts (3.7 acres of which are PFO impacts), and 5.2 acres of permanent wetland impacts (3.5 acres of which are PFO wetlands).

This doesn't match with what I have in front of me.

Permanent Forested Impact:
CS 206 + Madison Loop
2.637 + 0.327 = 2.964 acres < 3.5 acres of forested wets listed above. 0.536 difference

Total Permanent Impacts
CS 206 + Madison Loop
3.724 + 0.327 = 4.051 < 5.2 acres of wetlands listed above.

Total Temporary Impacts
CS 206 + Madison Loop
0.149 + 1.983 = 2.132 < 9.3 acres of temporary impacts...and I have no information regarding temporary forested wetland impacts on my copy of the site plans.

Please note I am looking at the resubmitted copy of the FWW plans for CS 206 and the Madison loop 6/8/18.

Could you clarify the discrepancies? Also, does anyone on your team have any thoughts as to where the impacts quoted in the public comment and on the flyer were coming from?

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Tuesday, November 27, 2018 12:15 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Poirrier, Alyssa <APoirrier@ene.com>
Subject: [EXTERNAL] RE: Question regarding discrepancy in reported wetland impacts

Matt,

The numbers you refer to in your email below appear to be based on a flyer that was passed out during the hearing and not based on published impact numbers in regulatory documents with FERC or NJDEP.

There are no components to the NESE project that are outstanding. All impact information has been submitted. We anticipate, as agency reviews continue, minor refinements may occur but they will not impact overall impact totals.

Let us know if you need anything else on this topic. An email response to your previous questions will also be provided this week.

Thanks,
Sara

Regarding wetland impacts:
Table 4.3.4-1 in the DEIS reports the impacts associated with the NESE project as a whole, including a project total of approximately 11.8 acres of temporary wetland impacts (3.8 acres of which are PFO impacts), and 5.2 acres of permanent wetland impacts (3.5 acres of which are PFO impacts). For New Jersey, the DEIS reports approximately 9.3 acres of temporary wetland impacts (3.7 acres of which are PFO impacts), and 5.2 acres of permanent wetland impacts (3.5 acres of which are PFO wetlands).

The impact acreage states below do represent what was included in Transco's June 2018 application re-submission package, and accurately portray the proposed project's wetland impacts in New Jersey.

Regarding upland forest impacts:
Section 4.4.2 of the DEIS reports 62.1 acres of upland vegetation impacts in New Jersey, 28.1 acres of which is comprised of upland forest.

From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Monday, November 26, 2018 9:05 AM
To: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>
Subject: [EXTERNAL] Question regarding discrepancy in reported wetland impacts

Good morning Karen and Sara, welcome back from Thanksgiving. I'm hoping you can clear up a topic that's been coming up in the public comments that we've been receiving. Specifically this one ;

"Williams/Transco's NESE Project will impact a significant amount of wetland in New Jersey – over 41 acres, including approximately 20 acres of forested wetland. In addition, the NESE

Project will remove 35.3 acres of upland forest and the impacts on forested uplands will be long term or permanent because trees would take up to 50 years or longer to become reestablished and would not be allowed to become reestablished directly over the pipeline."

I believe the wetland impact numbers that are being quoted in this comment are coming from the DEIS to FERC for the NESE project. Can you clarify where the 41 acres of wetland impacts and 20 acres of forested wetland impacts are coming from? The Madison Loop has 0.327 acres of permanent wetland impacts and 1.977 acres of temporary wetland impacts. Compressor Station 206 has 3.724 acres of permanent wetland impact and 0.149 acres of temporary wetland impacts. This is well below the numbers being referenced in the DEIS. Are there other components to the NESE that have not been submitted yet?

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From:	Resnick, Matthew
To:	Mochrie, Sara
Cc:	Olson, Karen; Eakin,Megan; Dow, Diane; Jones, Christopher; Albers, Meghan; Poirrier, Alyssa
Subject:	RE: Question regarding discrepancy in reported wetland impacts
Date:	Thursday, November 29, 2018 11:18:28 AM

Thank you Sara, I'll reach out if we require more information on this particular subject.

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Thursday, November 29, 2018 1:10 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Eakin,Megan <MEakin@ene.com>; Dow, Diane <Diane.Dow@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Albers, Meghan <MAlbers@ene.com>; Poirrier, Alyssa <APoirrier@ene.com>
Subject: [EXTERNAL] RE: Question regarding discrepancy in reported wetland impacts

Matt – We don't know where the numbers in the public comments are coming from and have not been able to determine the source. We have seen many inaccurate project characterizations in the public realm that don't present information as provided in permit applications.

The footprint of the project provided to FERC was essentially frozen in time and submitted to FERC before the DEIS was published. This usually occurs well in advance of the publish date. The DEIS was published in March of this year and since that time further refinements have been made to the impacts due to engineering adjustments and consultations with your office. It's not uncommon for there to be minor discrepancies between the FERC impact calculations and what ends up being the final, permitted impacts. The footprint/impacts in front of you now from the June 2018 application package are what Transco is seeking authorization for.

In addition, FERC calculates wetland impacts between temporary and permanent differently than NJDEP. That is why you have a much lower total on the wetland plans (2.1 vs. 9.3). FERC considers the total temporary calculation as temporary and permanent together and then the permanent is a smaller piece of that. Wetland plans you have for review are depicted differently in accordance with NJDEP regulations.

Once we receive our FERC Order, we will likely have a condition that requests final alignment sheets prior to the start of construction and at that time we would provide those to FERC and they would represent the final authorized space in NJ.

Thanks,
Sara

From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Tuesday, November 27, 2018 1:23 PM

To: Mochrie, Sara <SMochrie@ene.com>
Cc: Olson, Karen <Karen.Olson@williams.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Poirrier, Alyssa <APoirrier@ene.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>
Subject: [EXTERNAL] RE: Question regarding discrepancy in reported wetland impacts

Thank you for the response Sara, I need some further clarification. See below.

Regarding wetland impacts:
Table 4.3.4-1 in the DEIS reports the impacts associated with the NESE project as a whole, including a project total of approximately 11.8 acres of temporary wetland impacts (3.8 acres of which are PFO impacts), and 5.2 acres of permanent wetland impacts (3.5 acres of which are PFO impacts). For New Jersey, the DEIS reports approximately 9.3 acres of temporary wetland impacts (3.7 acres of which are PFO impacts), and 5.2 acres of permanent wetland impacts (3.5 acres of which are PFO wetlands).

This doesn't match with what I have in front of me.

Permanent Forested Impact:
CS 206 + Madison Loop
2.637 + 0.327 = 2.964 acres < 3.5 acres of forested wets listed above. 0.536 difference

Total Permanent Impacts
CS 206 + Madison Loop
3.724 + 0.327 = 4.051 < 5.2 acres of wetlands listed above.

Total Temporary Impacts
CS 206 + Madison Loop
0.149 + 1.983 = 2.132 < 9.3 acres of temporary impacts...and I have no information regarding temporary forested wetland impacts on my copy of the site plans.

Please note I am looking at the resubmitted copy of the FWW plans for CS 206 and the Madison loop 6/8/18.

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Cc: Olson, Karen <Karen.Olson@williams.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Poirrier, Alyssa <APoirrier@ene.com>
Subject: [EXTERNAL] RE: Question regarding discrepancy in reported wetland impacts

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Let us know if you need anything else on this topic. An email response to your previous questions will also be provided this week.

Thanks,
Sara

Regarding wetland impacts:
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The impact acreage states below do represent what was included in Transco's June 2018 application re-submission package, and accurately portray the proposed project's wetland impacts in New Jersey.

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To: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>
Subject: [EXTERNAL] Question regarding discrepancy in reported wetland impacts

Good morning Karen and Sara, welcome back from Thanksgiving. I'm hoping you can clear up a topic that's been coming up in the public comments that we've been receiving. Specifically this one ;

"Williams/Transco's NESE Project will impact a significant amount of wetland in New Jersey – over 41 acres, including approximately 20 acres of forested wetland. In addition, the NESE

Project will remove 35.3 acres of upland forest and the impacts on forested uplands will be long term or permanent because trees would take up to 50 years or longer to become reestablished and would not be allowed to become reestablished directly over the pipeline."

I believe the wetland impact numbers that are being quoted in this comment are coming from the DEIS to FERC for the NESE project. Can you clarify where the 41 acres of wetland impacts and 20 acres of forested wetland impacts are coming from? The Madison Loop has 0.327 acres of permanent wetland impacts and 1.977 acres of temporary wetland impacts. Compressor Station 206 has 3.724 acres of permanent wetland impact and 0.149 acres of temporary wetland impacts. This is well below the numbers being referenced in the DEIS. Are there other components to the NESE that have not been submitted yet?

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From: Olson, Karen <Karen.Olson@williams.com>
Sent: Wednesday, December 12, 2018 2:00 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: RE: Can you please address the following comments?

Hi Matt, apologies for the delayed response, we wanted to make sure we were providing a thorough response for your records. Responses to your other outstanding questions/comments are forthcoming.

Let me know if you have any questions.

Thanks,
Karen

Transco considered its existing ROW (the "Trap Rock ROW") (Figure 1) as an access road alternative and assessed the practicability of this access with respect to wetland and waterbody impacts, engineering considerations, construction and operational logistics, and the ability to accomplish the overall project purpose per NJAC 7:7A-10.2 and 7:7A-10.3. Transco did not consider access along the adjacent Sunoco ROW as it is unlikely that Sunoco would allow permanent access to Transco's facility utilizing their ROW. After assessing the alternate access road footprint with respect to the location of the proposed tie-in facility, the location of existing mapped wetlands and state open waters, the additional engineering considerations to construct the alternate access road situated on top of and adjacent to existing pipelines, Transco determined that the alternate access road was not a practicable alternative. Furthermore, Transco has made reasonable attempts to identify, remove, and accommodate these constraints associated with the alternate access road as summarized below.

Upon further review, the alternate access road would have to be routed around the tie-in facility, increasing overall wetland impacts to approximately 6.75 acres. The 6.75 acres of wetland impact along the alternate access road is a conservative impact estimate based on a minimum 85-foot wide corridor and assumes utilities could be placed under the road. This 6.75 acres represents an increase of nearly two and a half times the total wetland impact as compared to the proposed

access road location (Table 1).

Table 1. Revised Impact Estimates for the Alternate Access Road at the Proposed CS206 Location

Facility	Wetland Type (Cowardin, 1979)	Acreage
Alternate Access Road – Permanent Impacts	PEM	2.09
	PSS	2.97
	PFO	1.69
Alternate Access Road – Permanent Impacts Total		**6.75**
Alternate Access Road Length = 4,425ft		
Existing Access Road – Permanent Impacts	PEM	0.47
	PSS	0.31
	PFO	2.07
Existing Access Road – Permanent Impacts Total		**2.85**
Existing Access Road Length = ~ 3,250ft		

Additional detailed engineering design could result in some areas of impact reduction within that 85-foot wide corridor, but also would likely result in areas of greater impact due to site-specific conditions. As previously mentioned, Transco determined that the alternate access road would have to be routed around the tie-in facility to reach the compressor station, further increasing wetland impacts by approximately 0.70 acres. As detailed in Transco's January 16, 2018 submittal containing supplemental information related to the permit application package, Transco identified a limited milepost range along Mainlines A and C where the tie-in facility could be sited. The tie-in assembly can only be installed into straight segments of pipe; therefore siting the tie-in assembly upstream (northeast) of where currently proposed is not possible due to the presence of bends in Mainlines A and C. Siting the tie-in assembly downstream (southwest) would increase the length of suction and discharge piping and associated wetland impacts and would not eliminate the need for the alternate access road to be routed around the tie-in facility.

Additional site-specific conditions that would impact the width of the alternate access road include the presence Transco's Mainlines A and C, over which the alternate access road would have to be constructed. Additionally, a Sunoco pipeline is located adjacent to the Transco ROW. The presence of these large-diameter utilities presents a constructability consideration that would likely result in additional workspace needs beyond the assumed 85-foot corridor. Specific constructability considerations include the following:

- Underground utilities likely could not be placed under the road due to the presence of existing infrastructure (existing pipelines).
- An access road situated on top of existing large-diameter pipelines would require a larger corridor to construct a stable base between the existing pipelines and the access road, especially in wetlands.
- An access road situated on top of existing pipelines impedes access to the pipeline for routine maintenance activities such as anomaly digs or replacements. Large excavations are required for inspection of large-diameter pipeline, thus interrupting access to the facility.
- The 85-foot corridor assumption does not account for infrastructure required to meet stormwater requirements, which would be a challenge to install in this area due to the

presence of wetlands. Additionally the topography in the area slopes toward the Sunoco pipeline right-of-way and it is unlikely that Sunoco would allow stormwater controls within their ROW.

Each of these engineering and constructability considerations would expand the road corridor outside of the existing, disturbed ROW, thus increasing overall forested impacts, including forested wetland impacts.

Based on the site-specific conditions described above, field data collected along the Trap Rock ROW demonstrating much of the ROW corridor is wetland (Figure 1), and the additional length of the alternate access road (over 1,100 feet), Transco did not further pursue detailed engineering since the impacts to wetlands would be significantly greater when compared to the proposed access road and the basic project purpose cannot reasonably be accomplished if there is a reduction in the size, scope, or configuration of the alternate access road. In accordance with N.J.A.C 7:7A, Transco has taken steps to reduce wetland impacts along the proposed access road for Compressor Station 206. Based on these impact reductions and an analysis of the alternate access road wetland impacts and construction/operational constraints, Transco has determined that the alternate access road is not a practicable alternative that meets the requirements of N.J.A.C 7:7A-10.2 (b)1 i and ii.

Karen Olson | Environmental Scientist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Friday, November 30, 2018 1:22 PM
To: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] RE: Can you please address the following comments?

Karen,

Regarding the SUNOCO access ROW alternative. Was the entire rationale for selecting the preferred alternative over the SUNOCO access strictly raw impacts numbers to wetlands? IE 2.85 acres of wetland impact for the proposed access road vrs 5.34 acres of wetland impact for the SUNOCO ROW? Also, I note that the proposed access road has been refined since the original proposal, reducing some of the forested wetland impacts, have those same refinements been used when looking at the alternative? Could sidesloping be reduced further to minimize the roadside embankments? Could drainage and utilities be moved under the road?

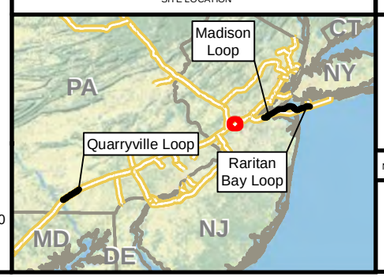
Legend

- Existing Transco Mainline
- Parcel Boundary
- Alternative and Proposed Access Road Workspace Configurations
  - Permanent Workspace
  - Temporary Workspace
- Remotely Sensed Feature
- PEM Wetland
- PFO Wetland
- PSS Wetland
- Waterway
- Waterbody

N

0 200 400 600 800 1,000
Feet

SITE LOCATION



DRAWING NO.	REFERENCE TITLE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	12/12/2018	MK	ISSUED FOR PERMITTING REFERENCE	1000891	AL	

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
ALTERNATIVE ACCESS ROAD
COMPRESSOR STATION 206 – SITE 3
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

Williams

DRAWN BY: MK	DATE: 12/12/2018	ISSUE FOR BID: N/A	SCALE:
CHECKED BY: AL	DATE: 12/12/2018	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER: 12:11 PM 12/12/2018	SHEET 1 OF 1
WO: 1000891		**FIGURE 1**	

Data Sources: NJDEP 2012; Williams 2017; E&E 2017; ESRI 2012, 2017.

L:\Buffalo\Williams_NYRE\Map\MXDs\ResourceReport\RR10\CS206_Working_Maps\Fig1_CS206_Alt3_AltAccessRd_in_ROW_rev2.mxd

From: Olson, Karen
To: Resnick, Matthew; Mochrie, Sara; Dean, Joseph
Cc: Jones, Christopher; Eakin,Megan; Ham, Brian
Subject: RE: CS 206, Further access road refinements and minimization
Date: Friday, December 21, 2018 10:05:32 AM

Hi Matt, please see response below regarding the access road corridor width. Please let us know if you have any additional questions and have a very happy holiday.

Thanks,
Karen

In regards to NJAC 7:7A-10.3(b) and (c), Transco's FWW application and subsequent submittals demonstrate that there is no practicable alternative to the access road as proposed that would avoid freshwater wetlands and have a lesser impact on the aquatic ecosystem. In addition to the road surface itself, additional workspace is needed to create the vertical/horizontal geometry of the road with earthwork (grading), install safety shoulders on each side of the road, and capture/convey runoff (drainage) in accordance with NJAC 7:8, and allow for construction equipment to perform the work. The limit of disturbance then closely follows the extent of these areas within wetlands, where it has been reduced from the previously wider corridor. Details regarding the required space needed to achieve grading, drainage, and allow for adequate workspace is included on the Erosion and Sediment Control drawings provided with the FWW application package. As depicted on the drawings, Transco has reduced the corridor width to approximately 70 feet, where practicable, however a larger corridor is required in some areas due to site-specific conditions such as changes in elevation or wetland/waterbody crossings. Approximate breakdowns of how a 70-foot-wide corridor and a 100-foot-wide corridor are utilized is included below. A 70-foot wide corridor, at a minimum, ensures a safe work corridor and is required to maintain compliance with NJAC 7:8. In general, a 100-foot-wide corridor is required at a waterbody/culverted crossing as the road needs to be elevated to provide clearance for the culvert. This elevation requires a wider area for grading to transition back down to existing grade and to install velocity dissipation end treatments at the culvert outfalls to maintain the integrity of the channel and project from adverse erosive impacts on downstream properties.

Feature	**Minimum Practicable Width (no culvert)**	**Minimum Practicable Width (crossing culvert)**
Access Road Surface	20'	20'
Safety Shoulder (2' each side)	4'	4'
North Side Grading to Achieve Road Elevation	16'	21'
North Side Area for E&S Control Installation and Equipment	5'	5'
South Side Grading to Achieve Road Elevation	20'	25'
South Side Area for E&S Control Installation and Equipment	5'	5'
South Side Area for Culvert Velocity Dissipation	NA	20'
TOTAL	**70'**	**100'**

Transco has minimized the width of the proposed access road, specifically in wetlands,

to the greatest extent practicable while addressing the design requirements of NJAC 7:8 and site-specific constructability requirements. As you noted, Transco redesigned the access road so that the utilities would be located under the paved portion of the road, thereby reducing impacts to wetlands. However, the construction of the access road to meet the design requirements of NJAC 7:8 cannot reasonably be accomplished through either an alternative design or through the further reduction in the size, scope, configuration, or density of the Project. Transco submits that it has demonstrated compliance with NJAC 7:7A-10.3(c)2 and 3.

Karen Olson | Environmental Scientist
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Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Monday, December 03, 2018 1:42 PM
To: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] CS 206, Further access road refinements and minimization

Good morning Karen,

I have some further questions regarding the access road into CS 206. Previously the access road was redesigned, narrowing the width of the road to 20 feet, and bringing the ROW from 120'-100'. The water and electrical utilities were moved under the roadway pavement.

On further review, it is not entirely clear why a 20' roadway requires a 70'-100' ROW. This does not meet the requirements of minimization of impacts under the NJAC 7:7A-10.3(b) and (c), specifically;

(*b) There shall be a rebuttable presumption that there is a practicable alternative to a non-water dependent activity in a freshwater wetland or in a special aquatic site, which alternative does not involve a freshwater wetland or special aquatic site, and that such an alternative would have less of an impact on the aquatic ecosystem.*

(c) In order to rebut the presumption established in (b) above, an applicant must demonstrate all of the following:

2. That the basic project purpose cannot reasonably be accomplished if there is a reduction in the size, scope, configuration, or density of the project as proposed;
3. That the basic project purpose cannot reasonably be accomplished by an alternative design that would avoid or reduce the adverse impact on an aquatic ecosystem;

Please consider reducing the overall width of the ROW. Also please note, that any changes made to the design of the roadway for the FWW permit, would also need to be reflected in the FHA permit.

This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.

From:	Resnick, Matthew
To:	Mochrie, Sara; Jones, Christopher
Cc:	Olson, Karen; "Dean, Joseph" (Joseph.Dean@Williams.com); Bill Macholdt; Eakin,Megan; Albers, Meghan; Sue Quackenbush (squackenbush@amygreene.com); Ham, Brian; Sundar, Nischint; Poirrier, Alyssa; Su-Lin Jaaskelainen; peter.haas@aecom.com; Schooling, Jason
Subject:	RE: Clarification of Riparian Zone Impacts
Date:	Friday, January 4, 2019 8:04:47 AM

Thank you for the clarification Sara, I believe that is how I treated it when I sent the impacts to our Mitigation Unit. I'll pass this along to them.

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Friday, January 04, 2019 10:00 AM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Bill Macholdt <bmacholdt@amygreene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Sue Quackenbush (squackenbush@amygreene.com) <squackenbush@amygreene.com>; Ham, Brian <Brian.Ham@Williams.com>; Sundar, Nischint <NSundar@ene.com>; Poirrier, Alyssa <APoirrier@ene.com>; Su-Lin Jaaskelainen <SuLin.Jaaskelainen@williams.com>; peter.haas@aecom.com; Schooling, Jason <jschooling@psands.com>
Subject: [EXTERNAL] FW: Clarification of Riparian Zone Impacts

Matt,

Per your inquiry about riparian zone impacts, Williams will restore all areas of temporary riparian zone impact following, or where possible concurrent with, project construction.

All temporarily impacted forested riparian zones will be restored to a forested condition and temporarily impacted non-forest riparian zones will be restored with wetland and/or upland seed mixtures as applicable.

All permanently impacted forested riparian zones fall within the permanent easement. It is not feasible to restore these areas to a forested condition due to pipe integrity concerns. These areas will be restored with wetland and/or upland seed mixtures as applicable. Transco will provide mitigation compensation for these permanent conversions.

If you need any further details, please let us know.

Thanks
Sara

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Monday, December 3, 2018 3:43 PM
To: Olson, Karen (Karen.Olson@williams.com) <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>

Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: Clarification of Riparian Zone Impacts

Karen, I think I may have asked this previously. On the Madison Loop riparian zone site plans, you have areas called out in green crossing hatching as impacts for access to the project under NJAC 7:13-11.2(k). These impacts appear to be to forested riparian zone. Some of the impacts are called out as temporary, some are called as a permanent. Is the intention to restore the temporary areas of impact to a forested riparian zone condition, and to provide mitigation compensation for the permanent forested impacts? Is there a reason all of the areas impacted for access cannot be restored to a fully forested condition?

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Northeast Supply Enhancement (NESE) Project

Project Meeting Minutes

To: Williams Compressor Station 206 Team
From: Megan Eakin (E&E) and Pete Haas (AECOM)
Date: December 6, 2018
RE: Stormwater Design Follow-up

Participants

Williams: Joe Dean, Brian Ham, Jason Olivier, Karen Olson
AECOM: Pete Haas
E&E: Megan Eakin
NJDEP: Stephen Olivera

Meeting Summary

1) Transco participated in a conference call to discuss the stormwater basin design revisions at Compressor Station (CS) 206. Mr. Haas began the call stating that further revisions have been taken in response to the previous discussion with New Jersey Department of Environmental Protection (NJDEP) on October 18, 2018 with respect to the technical comments issued in their review letter dated September 27, 2018, with respect to groundwater elevations at test pits TP-5 and TP-6.
2) Mr. Haas indicated that the basin was moved further away from test pits 5 and 6 due to the groundwater elevations. Revisions also included switching from a bio-retention basin to an infiltration basin, which aids in meeting the required cover above groundwater. A sketch illustrating the proposed basin revision was provided by email to the participants of the meeting on December 4, 2018, and Mr. Haas asked if this revised design was acceptable. Mr. Olivera indicated that it was.
3) NJDEP asked about also performing a mounding analysis due to the shallow bedrock in the area. Mr. Haas stated that it was still in process, but that so far it meets the manual standards. Transco indicated they would share this upon its completion.
4) Mr. Haas asked if there was anything else at this time that Transco should make sure they address. Mr. Olivera indicated there was none at this time. Items discussed on October 18, 2018, appear to have been addressed.
5) Transco indicated that based on previous discussions with NJDEP, they would not be submitting a formal package until after the new year, but that it was their preference to submit a draft package of the changes discussed today for Mr. Olivera to review prior to that formal submittal. Mr. Olivera indicated he was acceptable to that asked that the submittal also include the mounding analysis.
6) Regarding the separate and smaller detention basins alongside the CS 206 access road, Transco indicated they have proposed these to be lined. Lining the smaller detention basins provides

assurance that there will be no interference with groundwater and that runoff will be detained as proposed; however testing will be conducted after January 1 to coincide with the "wet season" when direct observation of seasonal high ground water is permitted to determine if liners are necessary. Transco plans to complete this testing as soon as possible in 2019, weather permitting.

Action Items

Action	Lead	Timeframe
Complete mounding analysis and final changes discussed above – Submit to NJDEP as draft for review.	AECOM	12/21/2018
Discuss draft submittal with S. Olivera.	AECOM	Week of 1/7/2018
Submit final package to NJDEP.	AECOM	2/15/18

From: Mochrie, Sara
To: Resnick, Matthew
Cc: Olson, Karen; Horner, Scott (Scott.Horner@williams.com); Eakin,Megan; Schooling, Jason
Subject: NESE Permit Plans and CDs
Date: Monday, December 10, 2018 10:16:58 AM
Attachments: image001.jpg

Matt,

Let us know if you received a package today of permit plans and CDs. Want to ensure you can access the pdf files on the CDs.

Thanks
Sara

Sara Mochrie, *Principal-Regional Manager*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Wednesday, December 19, 2018 8:14 AM
To: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>
Cc: Horner, Scott <Scott.Horner@williams.com>
Subject: [EXTERNAL] RE: Question regarding pipe line stream crossings

Perfect. No immediate rush, but I'll eventually need them removed from the plans.

From: Olson, Karen <Karen.Olson@williams.com>
Sent: Tuesday, December 18, 2018 4:15 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>
Cc: Horner, Scott <Scott.Horner@williams.com>
Subject: [EXTERNAL] RE: Question regarding pipe line stream crossings

Hi Matt,

Apologies for the mistake but neither the "wet minor waterbody crossing" nor the "wet intermediate waterbody crossing" should be included on the detail sheet – these crossing methods are not proposed for use for the NESE Project.

Thanks,
Karen

Karen Olson | Environmental Scientist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Tuesday, December 11, 2018 11:11 AM
To: Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Olson, Karen <Karen.Olson@williams.com>
Subject: [EXTERNAL] Question regarding pipe line stream crossings

Good morning Sara and Karen, work continues on my report and I'll be forwarding a transmittal to the mitigation unit today with the extra copies that you sent me. Thank you for that.

While working on the Channel section (11.2) and the Utility lines section (12.8), the submitted environmental report suggests dam and pump and flume methods of installation will be used to install the pipe line in dry and dewatered conditions. I'm looking over the detail sheet, and two other methods are provided, "wet minor water body crossing" for features under 10' wide, and "wet intermediate waterbody crossing" for water bodies greater than 10' feet but less than 100' wide. Neither of these methods appears to be a "work in the dry" method of installation, and they would cover the four locations where the proposed pipe line crosses a regulated feature. Could you clarify when and why these methods would be used over the dam and pump or flume methods?

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This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.

From:	Mochrie, Sara
To:	Dow, Diane; Kopkash, Ginger; christopher.jones@dep.nj.gov; Resnick, Matthew
Cc:	"Dean, Joseph" (Joseph.Dean@Williams.com); Olson, Karen; Horner, Scott (Scott.Horner@williams.com); Ham, Brian; Su-Lin Jaaskelainen; Clements, Blake (Blake.Clements@williams.com); Merz, Dan; Christine Roy; Richard Scott; Kellogg, Stephen (Stephen.Kellogg@Williams.com); Eakin,Megan; MacLeod, Steven; Albers, Meghan; Marean, Kathleen
Subject:	NESE - NJDEP Hearing Comment Response
Date:	Monday, December 17, 2018 3:10:57 PM
Attachments:	NJDEP_cover letter response to hearing comments.pdf image001.jpg

NJDEP Review Team,

As discussed following the public hearing for the NESE Project Freshwater Wetland Permit application, Transco has developed a summary of the hearing comments along with supporting responses in the attached comment response matrix ("Attachment A"). Individual comments received can be found in Attachment B.

We are providing this to assist with continued comment review and if you have any further needs or clarifications please don't hesitate to contact us.

Thanks,
Sara

Sara Mochrie, *Principal-Regional Manager*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

December 17, 2018

Matthew Resnick
New Jersey Department of Environmental Protection
Division of Land Use Regulation
Bureau of Urban Growth and Redevelopment
Mail Code 501-02A
P.O. Box 420
Trenton, NJ 08625

Re: Transcontinental Gas Pipe Line Company, LLC
Proposed Northeast Supply Enhancement Project
FWW170001

Dear Mr. Resnick:

Transcontinental Gas Pipe Line Company, LLC ("Transco") submits this letter and the enclosed documentation in support of its application for Freshwater Wetlands Protection Act Individual Permit ("FWW Permit") in connection with Transco's Proposed Northeast Supply Enhancement Project ("Project"). On November 5, 2018, the New Jersey Department of Environmental Protection ("NJDEP") held a public hearing on Transco's FWW Permit application. On November 6, 2018 a transcript of the hearing was provided to Transco.

Transco has reviewed the public comments that were placed on the record at the hearing and those that have been submitted to the NJDEP in writing. In order to assist the NJDEP with the task of responding to all comments, Transco has developed a summary of the comments along with supporting responses in the attached comment response matrix ("Attachment A"). Individual comments received can be found in Attachment B.

If you have any questions regarding this response, or require additional Project information, please do not hesitate to contact Karen Olson at (713) 215-4232 or via email at Karen.Olson@williams.com or Scott Horner at (713) 215-4953 or via email at Scott.Horner@williams.com. Alternatively, you can contact Ms. Sara Mochrie, Project Manager at Ecology and Environment, Inc. at (716) 684-8060 or via email at smochrie@ene.com.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Joseph Dean
Manager, Environmental Health and Safety

cc (via e-mail): Stephen Kellogg, Transco
Blake Clements, Transco
Scott Horner, Transco
Karen Olson, Transco
Brian Ham, Transco
Su-Lin Jaaskelainen, Transco
Dan Merz, Esq., Transco
Sara Mochrie, E & E
Megan Eakin, E & E
Steven MacLeod, E & E
Chris Jones, NJDEP
Ginger Kopkash, NJDEP
Diane Dow, NJDEP

Enclosures

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT A

NORTHEAST SUPPLY ENHANCEMENT PROJECT

DECEMBER 2018

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Transcontinental Gas Pipe Line Company, LLC NESE Project
Summary of NJDEP Freshwater Wetlands Individual Permit Application
Public Comments Received at Public Hearing November 5, 2018

COMMENTS AND RESPONSES APPLICABLE TO THE FRESHWATER WETLANDS PROTECTION ACT RULES

ALTERNATIVES

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
1	Transco has not demonstrated that the least environmentally damaging practical alternative has been met. Transco should be required to provide a more robust alternatives analysis.	In addressing the practicality of reasonable alternative locations and methods, Transco provided the NJDEP with a robust alternatives analysis (Appendix A of Transco's Freshwater Wetland (FWW) Individual Permit (IP) application) that analyzed different options for avoiding and minimizing impacts on regulated features. Transco provided the NJDEP with a detailed discussion of Transco's interstate natural gas pipeline system, and how the existing system and hydraulic constraints informed the basis for the design of the Project and meeting the Project's purpose of delivering 400,000 dekatherms per day (Dth/d) of natural gas to National Grid at the Rockaway Transfer Point. Transco analyzed the use of various system alternatives, including a pipeline Looping-Intensive Alternative that would have obviated the need for Compressor Station 206, but which would have resulted in greater environmental impacts; the expansion of Transco's existing compressor station facilities; and the use of electric motors at Compressor Station 206, as opposed to the use of gas turbines. In addition to system alternatives, Transco performed a comprehensive analysis of alternative sites for Compressor Station 206 using a multi-tiered approach that focused on parcel configuration and logistical constraints, availability, and the presence of wetlands and transition areas. (See Application, pp. 4-4 through 4-14.) Given that the majority of impacts on regulated features are associated with the Compressor Station 206 access road and suction and discharge piping area, Transco considered, and where practicable, implemented alternatives that would avoid or minimize these impacts. Specifically, Transco analyzed an alternative site for the access road, but ultimately determined that certain environmental and legal constraints on the property rendered the alternative site impracticable. (See Application, p. 4-14 through 4-16.) As noted above, Transco also considered and implemented certain minimization measures to reduce impacts, including incorporating storm water controls into the design of the access road and reducing in the width and length of the suction and discharge piping right-of-way, thereby reducing the impacts of these facilities on regulated features. (See Application, p. 4-16 through 4-19.) Lastly, Transco minimized impacts caused by the Madison Loop by co-locating the pipeline facilities with Transco's existing right-of-way to the maximum extent practicable. Transco also analyzed the use of horizontal directional drill (HDD) and conventional bore methods along the route of the Madison Loop in order to avoid or minimize direct impacts on regulated areas, including wetlands and transition areas. Transco also reduced the width of its workspace at wetlands crossings from 90 feet to 75 feet, where practicable. Transco has sufficiently addressed the practicability of using other alternative locations and methods in connection with the construction of the Project.	FWW IP, Appendix A Alternatives Analysis Response to NJDEP EIR dated July 17, 2017 Response to NJDEP EIR dated July 18, 2018	1, 28, 29, 31, 48, 74, 76, 81, 88, 97, 118, 122, 158, 177, 187, 197

Transcontinental Gas Pipe Line Company, LLC NESE Project
Summary of NJDEP Freshwater Wetlands Individual Permit Application
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ALTERNATIVES

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
2	A video of this project is on Williams/Transco's website and it shows the Compressor Station 206 in the middle of forest that stretches to the horizon. There is nothing that shows the Buddhist vihara next door or the heavy residential and commercial development half a mile away. This should tell you something. They don't know about Google satellite maps. As mentioned, site selection must be reopened and the alternative of just adding a new pipeline should be considered.	The video on the Project website (http://northeastsupplyenhancement.com) is intended to provide a general overview of Compressor Station components and operations. Transco completed on-the-ground and site-specific noise and visual surveys to assess potential impacts on the surrounding area, including the New Jersey Buddhist Vihara and Meditation Center (NJBVMC) and surrounding residential neighborhoods. Given the distance and vegetative cover between the compressor station and NJBVMC facilities, construction effects would be temporary and minor near the Samadhi Buddha statue and nearby facilities. Construction at Compressor Station 206 would be generally limited to daylight hours Monday through Saturday and, therefore, would not impact the Dhamma School, which is held on Sundays. The planned construction schedules for Compressor Station 206 and the planned meditation trail would overlap for about 3 months, with construction at Compressor Station 206 extending 6 months beyond completion of the meditation trail. Due to the intervening forested area, trail users are not expected to be significantly impacted by construction-related activity. Any impacts would also diminish with distance from the compressor station property. Also, as noted above, a visual simulation from the boundary between the NJBVMC property and Compressor Station 206 site indicated that the compressor station would not be visible from the NJBVMC property. Transco evaluated a Looping-Intensive Alternative that would eliminate the need to install Compressor Station 206. The Looping-Intensive Alternative would require 15.31 miles of looping pipeline and would result in substantially greater land requirements, as well as additional impacts on wetlands and streams; residences; and local, state, or federal lands, parklands, and recreation lands. Based on the increased environmental impacts that would result from construction of the Looping-Intensive Alternative through a densely populated area, the Looping-Intensive Alternative was not selected as the preferred alternative.	FWW IP, Appendix A Alternatives Analysis FERC Draft Environmental Impact Statement (draft EIS), Section 4.7.5	74, 122, 178, 179

PROJECT LOCATION (ENVIRONMENTAL CONCERNS)

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
3	Williams/Transco's record of accidents and hiring contractors who do not follow their procedures makes it all the more important that NJDEP hold their feet to the fire and demand that they follow all New Jersey regulations to the letter of the law. Dancing around issues should not be acceptable to the NJDEP in in their review of this application. Claiming that they will -- that their erosion and sediment control plan will ensure that the waters of New Jersey will not be degraded does not provide any factual determination for the plans in the application. They plan to go through toxic soils, toxic groundwater, dig in shallow acid-producing clay soil, and use horizontal directional drilling in an	Prior to construction, Transco will need to receive numerous permits and concurrences from federal, state, and local agencies to proceed with construction activities. Adherence to the commitments outlined in Transco's permit applications, coupled with any additional conditions required by the agencies, will ensure that potential impacts are minimized. Permits and concurrences from New Jersey state agencies include but are not limited to: • Concurrence with Applicant's Coastal Zone Management Act (CZMA) Consistency Assessment • Waterfront Development Individual Permit • Water Quality Certificate under Section 401 of the federal Clean Water Act (CWA) • Tidelands Utility License • Flood Hazard Area – Authorization, Individual Permit • Freshwater Wetlands - Transition Area Waiver • Freshwater Wetlands - Individual Permit • General Permit for Construction Activity, Storm Water (5G3) • Consultation for state-protected species • Consultation for presence of rare, threatened, and endangered species	FERC draft EIS, Sections 1.5, 2.5	5, 136

Transcontinental Gas Pipe Line Company, LLC NESE Project
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PROJECT LOCATION (ENVIRONMENTAL CONCERNS)

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
	exceptionally -- in an exceptional value wetland. They did not provide any site-specific analysis to back up their claim that they can protect our waters and our resources from construction in and near wetlands by following their generic plans.	• Consultation for state freshwater fish habitat • Consultation for state shellfish habitat • Consultation for state marine fish habitat • Section 106 National Historic Preservation Act (NHPA) cultural resources clearance/ Consultation with Native American Tribes. Site-specific New Jersey permit plans are stamped and sealed by a professional engineer licensed in the state of New Jersey. Transco would incorporate the construction, mitigation, and restoration measures identified in its permit applications and supplemental filings, as well as additional requirements of federal, state, and local agencies into its construction drawings and specifications. Transco would also provide copies of applicable environmental permits, construction drawings, and specifications to its construction contractors. If the contractor's performance is unsatisfactory, the terms of the contract would allow Transco to stop work in progress and require the contractor to begin remedial work. Additionally, FERC will require that Transco employ at least one Environmental Inspector (EI) per Project spread. At a minimum, EIs are responsible for monitoring and ensuring compliance with all mitigation measures required by the FERC Order and other grants, permits, certificates, or other authorizing documents and evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract and any other authorizing document. In addition, EIs are empowered to order correction of acts that violate the environmental conditions of the FERC Order or any other authorizing document. The EIs' role should not be mistaken for FERC abdicating its inspection authority to Transco. In addition to Transco's environmental inspection program, FERC would conduct regular, typically monthly, inspections of construction activities associated with the Project and post summary reports from the inspections into the docket. As appropriate, FERC would coordinate inspections with other agencies.		
4	CS 206 construction goes through residential areas in South Brunswick and Franklin TWP and affects acres of preserved open space.	No publicly or privately held Green Acres Program properties are crossed by the Project.	FWW IP, Section 4 FERC draft EIS, Section 4.7.5.1	6
5	The applicant's scientific analysis in many cases is scientifically incomplete and inadequate. The evaluation of the impact of subsurface geology indicates that the site contains sulfitic materials, sulfitic metals. Some reference was made to the chemical oxidation of the sulfites to sulfates, sulfuric acid primarily, but the primary source of sulfuric acid in many, if not most, soils is biological oxidation of the sulfite, which occurs any time that the pyrite-containing soils are exposed to oxygen. The primary thought process associated with this sulfur oxidation by most people is the acid-mined drainage. Sulfite can result in a decline in the quality of soil and the existing plant community dies. Should the	Transco previously provided information in response to several comments made by the NJDEP's Geological and Water Survey on Transco's draft EIS related to the potential to encounter acid-producing soils during construction of some portions of the Madison Loop and onshore portion of the Raritan Bay Loop. As described in Resource Report 6 of Transco's Certificate Application, the Madison Loop and Raritan Bay Loop are underlain by sediments of the Magothy and Raritan formations, which are geologic formations associated with acid-producing soils. On July 28, 2017, for the Madison Loop, and August 1, 2017, for the Raritan Bay Loop, Transco received certification from the Freehold Soil Conservation District for its Soil Erosion and Sediment Control Plans that include an Acid Producing Soils Control Plan and the related best management practices (BMP) that Transco will implement, where necessary, to manage high acid-producing soils. The Acid Producing Soils Control Plan described in Transco's approved Soil Erosion and Sediment Control Plans that Transco will implement, where necessary, outlines steps that will be taken to manage high acid-producing soils. The NJDEP's Geological and Water Survey questioned whether acid-producing soil could adversely affect the pipeline during operation. The Madison Loop and onshore portion of the Raritan Bay Loop will be constructed adjacent to	Transco's Responses to Public Comments on the draft EIS, dated June 2018, Accession No. 20180601-5121	75 , 91, 99, 102, 150, 168, 173

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Summary of NJDEP Freshwater Wetlands Individual Permit Application
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PROJECT LOCATION (ENVIRONMENTAL CONCERNS)

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
	appropriate ecosystem properties occur in this soil site, some acid-loving plants may develop, but that outcome is not likely to occur. Therefore, the most common situation is that the highly degraded soil develops. In the extreme case, the soiled water takes on an okra color of the isles and the water and soil become highly acidic. The diagnosis of the level of damage requires ground-proofing essentially daily. There was a response from the applicant not too long ago that they felt one year flyovers would provide adequate analysis. Note that another potential outcome of soil contaminate from the managerial viewpoint is that should a green system -- i.e., green grass on the site -- be desired, the site would have to be continuously managed to keep the pH in the acceptable range. This may require daily assessment of the soil pH. The bottom line is that the applicants have glossed over a major problem involving the quality of the soil and water by failure to analyze and present the data that must be in the application. It must be noted that the plant communities, both forest and wetlands, are highly susceptible to such contamination. Once the plant community is destroyed, it could take many decades for the ecosystem to recover, if it ever does. Similar problems are associated with the organic contaminants. They create problems both in aerobic and anaerobic situations.	and overlapping the ROW of Transco's existing pipeline infrastructure (Lower New York Bay Lateral Loop C), which was largely replaced as part of Transco's Leidy to Long Island Project in 2007. During routine aerial ROW inspections, Transco has not encountered any evidence of acid-producing soils (such as dying or vegetation or bare patches of ground) along its permanent ROW. Furthermore, the results of the in-line inspections of the existing pipeline do not indicate any ongoing integrity issues related to acid-producing soils.		
6	The groundwater beneath Transco's Site 3 is known to be contaminated. The EPA maintains four testing wells on Transco's Site 3 to monitor the intensity and movement of the contamination plume in the groundwater. Concerned that disturbing the ground on the Higgins Superfund site in conjunction with the direction of the groundwater flow will dramatically increase the quantity of contaminants leaching into central NJ drinking water. It does not seem to be a suitable site for a compressor station.	No ground disturbance is planned for the Higgins Superfund site. All construction activities and disturbances will occur on properties owned by Trap Rock Quarry and Transco. Perchloroethylene (PCE) is one of the primary contaminants of concern at the Higgins Farm Superfund site and the NJDEP groundwater quality standard for PCE is 1 microgram per liter (µg/L). The 2015 data from the five multi-level bedrock monitoring wells between the Higgins Farm site and the workspace at Compressor Station 206 indicates PCE concentrations below 1 µg/L in 10 of 13 samples obtained from depths of 42.5 to 194.5 feet. In the three remaining samples, obtained from depths of 140 to 190 feet, the maximum concentration of PCE detected was 2.9 µg/L, slightly exceeding the NJDEP groundwater quality standard. Data from 2015 indicates that the PCE plume is about 400 feet from Compressor Station 206 construction workspaces and about 850 feet from the footprint of the proposed compressor building. Ground elevations at the compressor station range from about 267 to 275 feet above mean sea level. In September 2015, the highest water level elevation measured in the EPA monitoring wells on the compressor station site was 238 feet above mean sea level, or about 30 feet below the proposed facility. Transco anticipates that the maximum excavation depth at Compressor Station 206 would be 15 feet, the maximum depth at which diabase bedrock was encountered.	FERC draft EIS, Section 4.3.1.6	30, 105, 167

Transcontinental Gas Pipe Line Company, LLC NESE Project
Summary of NJDEP Freshwater Wetlands Individual Permit Application
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PROJECT LOCATION (ENVIRONMENTAL CONCERNS)

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
		Transco's construction plans were reviewed by the EPA. The EPA found, and the FERC agreed, that construction and operation of Compressor Station 206, as proposed by Transco, is unlikely to encounter contamination associated with the Higgins Farm site or affect the EPA's ongoing cleanup operations at the site (FERC draft EIS Section 4.3.1.6).		

PUBLIC BENEFIT / NEED / ENERGY RESOURCES

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
7	The need for the NESE project is not clear. New York's need for gas is not as great as the NESE plans deliver. The project normally provides more than double the gas that New York City needs, but more troubling is that this decision was based on an outdated 2011 plan. New York City is now, and as stated in a September 2017 ruling, that it is aiming for a goal of 80 percent reduction of greenhouse gasses by 2050. This will actually require reduction in the use of natural gas. And they have asked Con Edison to look at options. The NJDEP should consider all information from New York about whether or not there is a legitimate need for this project. The NJDEP must consider the relative extent of the public and private need for the proposed regulated activity as part of its public interest review.	Transco's Project is in response to a specific natural gas need identified by National Grid. Transco recognizes that renewable sources are playing an increasing role in meeting the region's energy needs. However, as detailed in Transco's FWW IP, Attachment to Item #5 of the DLUR Form, the purpose of the project is to provide 400,000 Dth/d of incremental firm natural gas transportation capacity to National Grid from Compressor Station 195 through the Rockaway Transfer Point to supply National Grid's existing service territory beginning in the 2020/2021 heating season, when the incremental natural gas supply will be needed. National Grid has experienced significant growth in the need for natural gas across its service area in New York City and Long Island and that growth is expected to continue by more than 10 percent over the next 10 years. The growth is due to continued conversion of oil heat to natural gas as well as increased demand from existing and new construction. Benefits of the project ensures that newly-constructed homes and businesses continue to have the option of heating with natural gas, and continued support for economic development projects like the Belmont Park Redevelopment Project and LaGuardia International Airport Redevelopment Project. The project also has environmental benefits that contribute to NY's clean air goal of reducing emissions 80% by 2050. NESE will allow National Grid to continue its planned oil to gas conversion program: • Approximately 8,000 residential and commercial customers each year. • Displaces 900,000 barrels of oil per year. • Reduces CO2 emissions by 200,000 tons per year, equal to removing nearly 500,000 cars from the road for one year. • Reduces other local emissions by 300 tons per year, including smog, acid rain and particulates that have negative health and environmental effects.	FWW IP, Attachment to Item #5 of the DLUR Form, Detailed Project Description	68, 87, 123, 189

Transcontinental Gas Pipe Line Company, LLC NESE Project
Summary of NJDEP Freshwater Wetlands Individual Permit Application
Public Comments Received at Public Hearing November 5, 2018

PUBLIC BENEFIT / NEED / ENERGY RESOURCES

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
8	No need for project. The statement of purpose outlined in the draft EIS done by FERC indicates that New York will receive an expanded delivery of gas. This is untrue. Transco's lower New York Bay lateral is the end of a system designed to provide 15 million dekatherms of natural gas per day, where the lateral itself can only have a capacity of 625,000 dekatherms per day. This project does nothing to expand that capacity and will, therefore, not increase capacity to New York. It seems wholly unnecessary to build a new pipeline when the capacity of the lateral serving New York is not being expanded first. The cart is clearly before the horse. One possible explanation for increasing this pipeline capacity without the capacity of the lateral is to provide a natural gas export facility. Rather than service New York customers, the Raritan Loop would serve to facilitate New York -- not facilitate New York with natural resources, but to give them to the highest bidder abroad. The Raritan Loop is currently terminating at a point closest to the Atlantic Ocean, further suggesting that the intention is for offshore LNG exports.	Transco's Project is in response to a specific natural gas need identified by National Grid. The purpose and need for the NESE Project is to provide 400,000 Dth/d of incremental firm natural gas transportation capacity to National Grid from Compressor Station 195 through the Rockaway Transfer Point to supply National Grid's existing service territory beginning in the 2020/2021 heating season, when the incremental natural gas supply will be needed. Transco has executed long-term, fully binding precedent agreements with National Grid for 100% of the Project capacity. National Grid's precedent agreement describes its intention to utilize the capacity provided by the Project to serve its retail customers across its existing service territory. The existing 26" pipeline across Raritan Bay, which currently provides gas to the Rockaway M&R as well as the Long Beach M&R, is at capacity and cannot take full advantage of the capacity of both facilities. As such, the NESE Project, which makes final connection to the Rockaway Delivery Lateral at the Rockaway Transfer Point, is necessary to deliver the 400,000 Dth/d of incremental capacity to National Grid. Additionally, Transco is not aware of and does not have any agreements to connect the Project to any liquefied natural gas export facilities.	FWW IP, Attachment to Item #5 of the DLUR Form, Detailed Project Description	49, 51, 68, 72, 83, 87, 119, 123, 128, 142, 160, 161, 183, 191
9	If jobs are needed, Williams can definitely generate those jobs by upgrading the existing antiquated pipelines that go for hundreds of miles within the New Jersey territory.	Additional jobs within the Project area would be considered a project benefit. Job creation is not part of the purpose or need for the NESE Project.	FWW IP, Attachment to Item #5 of the DLUR Form, Detailed Project Description	52, 69
10	For Rockaway Project, Williams did not use local labor, brought in labor from OK, ND, and TX- they were unfamiliar with construction methods for in-water placement.	Transco utilized local unions to construct the Rockaway Delivery Lateral Project and engaged non-local exerts to supplement the local labor where specific expertise was needed.		42
11	Law shows us that the New York Department of Environmental Conservation rejected Williams Company's permit application for the Northeast Supply Enhancement pipeline because it was incomplete, so why is there a hearing about an incomplete application permit. New York State elected officials throughout region are signing on with Sane Energy Project to urge lawmakers to reject the Williams pipeline. The New York City Comptroller, Scott Stringer, said that this is a monumental step backwards in New York's goal. New York State is the end game for this pipeline and doesn't need this.	This public hearing was regarding Transco's pending Freshwater Wetland Individual Permit application to the New Jersey Department of Environmental Protection, Division of Land Use Regulation. No decision has been made to date on this permit application. Transco has pending permit applications in New York State, which New York will review pursuant to applicable state law.		40

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12	In the past, Transco had mentioned they would install a new pipeline, which would be a far more reasonable prospect for the community because a pipe doesn't pollute. Transco doesn't want to because it is just more expensive to lay a third pipe and the compressor station is a cheap alternative to a third pipe. Williams Corporation did, in its initial resource report, include a pipeline alternative instead of the compressor station simply to lay the third pipe as they had originally intended. So there is no reason for this compressor station. It is not necessary. It's only a dangerous cost-saving measure for Williams Corporation.	As stated above in response to Item #3, Transco evaluated a Looping-Intensive Alternative that would eliminate the need to install Compressor Station 206. The Looping-Intensive Alternative would require 15.31 miles of looping pipeline and would result in substantially greater land requirements, as well as additional impacts on wetlands and streams; residences; and local, state, or federal lands, parklands, and recreation lands. Based on the increased environmental impacts that would result from construction of the Looping-Intensive Alternative through a densely populated area, the Looping-Intensive Alternative was not selected as the preferred alternative.	FWW IP, Appendix A Alternatives Analysis	74
13	Need to keep the big picture in mind with regards to Climate Change, need to cut greenhouse gas emissions over next 12 years to avoid climate issues. This project would perpetuate dependence on usage of fossil fuels, which drives up gas prices and puts communities at risk. Transco has no data for methane emissions	Within its application to FERC, Transco estimated potential emissions from the Project during both construction and operation; this assessment included an estimate of greenhouse gas (GHG) emissions. FERC will determine whether emissions of GHGs from the proposed project will or will not have a direct impact on the environment in the area. 40 CFR Part 60 Subpart OOOOa regulates GHGs (e.g., methane), and VOC emissions at transmission and storage facilities that commenced construction, reconstruction, or modification after September 18, 2015. Subpart OOOOa includes provisions for storage tanks, centrifugal and reciprocating compressors, pneumatic controllers, and equipment leaks. Transco anticipates that emission sources at Compressor Station 206 and Compressor Station 200 will be subject to Subpart OOOOa. Methane emissions are included in the GHG emissions provided in the Transco's application for a FERC Certificate, Resource Report 9, Appendix 9B.	Transco's Application for a FERC Certificate, Resource Report 9, Appendix 9B	39, 46, 70, 71, 94, 109, 111, 130, 139, 189, 191
14	This project has been compartmentalized, and we're not looking at secondary and cumulative impacts. We're not looking at the other projects that this is connecting with, not only into New York and impact to the bay, but Rivervale South, the Leidy Loop, the Garden State expansion, all the other transfer projects. They're really all part of one system and they all have the same purpose, which is to bring gas either to New York or offshore. We're also not looking at the secondary impacts because -- for the new proposed CPV power plant in Woodbridge, as well as the Sewaren 7 plant. And we're going to get pollution and water pollution from them as well.	The NESE Project is not dependent upon any other interstate pipeline project, nor are there facilities constructed under this Project that are directly connected with any other interstate pipeline project. Cumulative impacts are thoroughly analyzed in Transco's application to FERC, and cumulative impacts are included in the draft EIS for the Project. The NESE Project is a standalone project that will enable Transco to provide 400,000 Dth/d of incremental firm transportation capacity to National Grid from Compressor Station 195 through the Rockaway Transfer Point to supply National Grid's existing service territory beginning in the 2020/2021 heating season. Transco has executed long-term, fully binding precedent agreements with National Grid for 100% of the Project capacity. Transco held an open season for the Project from May 16 to June 9, 2016, to allow other shippers to receive service under the Project, but no other shippers participated in the Binding Open Season. Therefore, National Grid will utilize 100% of the Project's capacity. National Grid's precedent agreement describes its intention to utilize the capacity provided by the Project to serve its retail customers across its existing service territory.	FWW IP, Attachment to Item #5 of the DLUR Form, Detailed Project Description	78

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15	Those in favor of the project don't live near the compressor station and will not suffer negative effects, and many stand to benefit financially. Those opposed to the project live in the vicinity of the station and are concerned about safety and the destruction of their quality of life.	The Transco pipeline system crosses 13 states and currently provides more than half of the natural gas consumed in the state of New Jersey. Over the course of its history, the company has executed many projects in other states to ensure reliable service to New Jersey natural gas consumers. The NESE project is not designed to provide service to New Jersey. However, there will be ancillary economic benefits in the areas where the facilities will be constructed and operated. Transco has independently developed a formal economic impact study to better articulate those short-term and long-term economic benefits.	FWW IP, Northeast Supply Enhancement Project Factsheet	182
16	Transco has tried to rushed through approval process using incomplete and often wrong data, downplaying the risks and amplifying the benefits.	Transco's NESE Project has been under review by the NJDEP for over 18 months. Transco withdrew its initial permit application to provide the NJDEP with additional time for review.	Not applicable	162

THREATENED, ENDANGERED, AND VULNERABLE SPECIES

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
17	The proposed Compressor Station 206 is located near habitats of two vulnerable bird populations, the American kestrel and bald eagle. The Raritan and Sandy Hook bays have 23 species of birds and marine life that are federally listed as endangered or threatened and 18 that are state listed endangered or threatened. Asking NJDEP to say no to a pipeline and compressor station project that's going to threaten endangered species like the bald eagle, osprey and the black-crown night heron. As far as we know, Williams/Transco has not completed the requested nesting survey for any area where they plan to cut down trees or destroy habitat or threatened or endangered species.	Transco has completed consultations with the New Jersey Natural Heritage Program, New Jersey Division of Fish and Wildlife, the U.S. Fish and Wildlife Service (USFWS) New Jersey Field Office (NJFO), and the National Oceanographic and Atmospheric Administration's National Marine Fisheries Service. In addition, Transco has reviewed the New Jersey Landscape Project Mapping data and will employ the following measures to avoid and minimize impacts on migratory bird species and other listed resources: • To the maximum extent practicable, Transco will not conduct any maintenance clearing activities during the migratory bird nesting season. • Transco will provide environmental compliance training for all construction and operations personnel, which includes specific information related to migratory birds. • Within New Jersey, the USFWS has recommended that trees and scrub-shrub clearing be conducted from September 1 through March 31 (September 1 through February 28, if nesting raptors are present). • For onshore Project components in New Jersey, if tree and/or shrub-scrub clearing will be necessary during the month of March, Transco will conduct raptor nest surveys in late spring or early summer of the previous year before clearing, rather than during the month of March immediately prior to clearing. If raptor nests are documented within the clearing area, Transco will coordinate with the USFWS NJFO regarding appropriate nest protection measures. • If an active Bald Eagle nest is identified, protection buffers will be placed around the nest to avoid adverse impacts on the individual pair from construction activities. These buffers include: a 330-foot buffer if the construction activity will not be visible from the nest; a 660-foot buffer if the construction activity will be visible from the nest; and 0.5-mile buffer from blasting activities. Based on current information, no active Bald Eagle nests, or nest buffers, occur within the Project area. Transco does not anticipate any blasting as part of the Project but will work closely with the USFWS and New Jersey Division of Fish and Wildlife and take appropriate actions if any new nests are documented near the construction area, especially if blasting becomes necessary. If new nests are documented near the construction area, Transco will also complete a Bald Eagle Project Screening Form, as recommended by the USFWS. • Clearing or mowing of herbaceous vegetation along the Madison Loop ROW will not occur between April 1 and August 31 to avoid impacts on Upland Sandpipers that may be nesting in the	FWW IP, Section 4 Transco's Final Migratory Bird Plan, November 6, 2018, Accession No. 20181106-5038	43, 59, 126, 140, 174

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		Madison Loop ROW. If Upland Sandpiper breeding activity is documented within the mowing area, Transco will coordinate with the USFWS NJFO regarding appropriate nest protection measures. • To minimize impacts on federally listed bats, Transco will clear forested lands at the Compressor Station 206 site between October 1 and March 31 per USFWS recommendation. • To minimize impacts on the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), Transco will avoid pile installation during peak spring and fall migration periods in the vicinity of the Rockaway Transfer Point, where Atlantic sturgeon aggregate. This measure will also minimize noise impacts on migratory birds. • Soft-start procedures will be implemented before the start of each pile-driving session, with the goal of deterring federally listed marine species from entering the potential impact area. This measure will also minimize noise impacts on migratory birds. In addition, adherence to the commitments outlined in Transco's permit applications, coupled with any additional conditions required by federal and state agencies, will ensure that potential impacts on onshore and offshore resources are minimized.		

WETLAND / WATERBODY / STORMWATER IMPACTS

Item #	Summary of Comments by Issue	Response	Location Where Issue Previously Evaluated within Application(s)	Individual Comments Reflected
18	Transco's stormwater management facility's design for compressor 206 fails to meet NJDEP's minimum stormwater standards. The stormwater basin design contains numerous errors and does not comply with the New Jersey dam safety regulations and will result in flooding of Carters Brook and Heathcote Brook, that will threaten downstream properties. Downstream area already has issues with saturated soils/flooding. In Transco's NESE project, perched water is a serious threat as it will exit the natural grade at a lower point and cause additional local flooding; i.e., in addition to the chronic flooding we already have. In particular, perched water is now already repeatedly over-topping Carters Brook earthen retention dam, at Promenade Boulevard in the Princeton Walk. Bottom line, we already have a real serious surface and perched water problem in this area. We cannot afford adding water from the Transco's Northeast Supply Project to our existing perched water problems	Transco is currently consulting with the Division of Land Use Regulation at NJDEP to address any potentially outstanding items related to stormwater design.	Not applicable.	38, 54, 55, 63, 64, 66, 80, 92, 93, 98, 101, 120, 132, 133, 143, 153, 180, 186

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19	There is no way that surface water quality standards can be met for runoff water from CS206. There will be hydrocarbons and silt, there will be even chromium, all kinds of metals, oil, lubricants and everything else. And filling in those wetlands, since you have a high groundwater in that area, will lead to more water pollution as well. Under the New Jersey Freshwater Wetlands Act, under the Surface Water Quality Standard Act regulations, Transco cannot have an impact to water quality if that water is already impaired. Carter Brook, Heathcote Brook, the Raritan basin is all impaired. The TMDL for the Raritan Basin requires a reduction in pollution in existing sites. This site is going to increase at least TSS, if not other pollution, and they have not met the requirements.	It is anticipated that the proposed Project will not contribute to a violation of any State water quality standards. In order to avoid temporary impacts on water quality, a Soil Erosion and Sediment Control (SESC) Plan will be adopted and BMPs will be implemented during construction of the proposed Project. The local county conservation districts, in conjunction with the NJDEP, will review and issue permit approval for the Project's SESC Plan prior to construction. There should be no significant impacts on water quality during construction or following completion of the Project. The proposed Project will not result in the release of toxic effluent. BMPs, along with SESC measures, will be utilized to minimize the potential introduction of sediment, petroleum products, and other pollutants into the adjacent environmentally sensitive areas, including regulated waters and wetlands. All equipment will be properly maintained and staged outside of regulated areas. Additionally, Transco will develop a site-specific Spill Plan prior to construction, which will describe measures that will be implemented by Transco personnel and its contractors to prevent and, if necessary, control any inadvertent spill of hazardous materials that could affect water quality. Hazardous materials, lubricating oils, and fuels used during construction will be stored in upland areas at least 100 feet from waterbodies, and refueling of construction equipment will take place at least 100 feet from waterbodies. Additional precautions include continual monitoring of fuel transfer and use of spill kits. Disposal of hazardous materials will also be conducted in accordance with applicable regulations. All SESC practices will be constructed in accordance with the New Jersey Standards for Soil Erosion and Sediment Control, dated July 2017. These measures will be installed prior to any major soil disturbance or in their proper sequence and maintained until permanent protection is established. The following techniques will be employed during construction to minimize the potential for soil erosion and sediment migration: • Erosion and sediment control BMP measures will be installed prior to commencement of earthwork and will not be removed until after the up-gradient areas are stabilized. • Stabilized construction entrances will be installed along points of access to the pipeline alignment to mitigate the potential for construction vehicles to transport sediment onto public roadways. • Silt fence will be installed along the down-gradient perimeter of the work areas. • At areas of concentrated flow in natural drainage ways, diversion berms will be installed to intercept and convey up-slope stormwater runoff around the work corridor without contacting disturbed surfaces. • Diversion terraces will be installed to mitigate the potential for stormwater to erode soils on steep slopes by diverting water away from the pipeline alignment. Diversion terraces will discharge to a well-vegetated area or an outlet structure to limit the potential for sediment-laden water to flow down-gradient from the terrace. • Trench plugs will be installed intermittently within the pipeline trench to control and allow for managing the flow of sediment-laden stormwater within the trench. Stormwater pooling within the excavation behind a trench plug will be removed and discharged through a pumped water filter bag over stable, undisturbed earth.	FWW IP, Sections 4 and 7. FHA IP Section 4	44, 77, 101, 103, 104, 151, 165, 188, 194, 196

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		• Removal of the erosion and sediment control BMP measures will occur only after the disturbed areas have been stabilized by uniform perennial vegetative coverage (density) of seventy percent (70%) or greater, or by other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding and other movements. • Diligent maintenance of the erosion and sediment control BMP measures will be conducted throughout the duration of the Project.		
20	Not studying or modeling the potential for construction of the Madison Loop to create conditions that exacerbate algal blooms is not something that should be acceptable to the NJDEP.	Algal blooms are the result of a combination of factors, of which eutrophication (nutrient enrichment) of waterbodies is generally the factor affected by human activity. Nutrient enrichment of waterbodies results from erosion and sediment transport from farmland and developed land or from sewage discharge. Avoidance of impacts on water quality through the use of erosion and sediment control BMPs will prevent the Project from having any effect on potential algal blooms. In order to avoid temporary impacts on water quality, an SESC Plan will be adopted and BMPs will be implemented during construction of the proposed Project. Transco anticipates no significant impacts on water quality during construction or following completion of the Project. Refer to the response to item 19 for additional discussion of erosion and sediment control BMPs.	FWW IP Section 7	138, 166
21	The Freshwater Wetlands Protection Act and rules dictates that a prudent environmental decision should always do three things: avoid wetlands, use the least environmental damaging options, and investigate damages that would be done to the wetlands and mitigate as a last resort after steps one and two have been followed. Williams/Transco unfortunately has been negligent on all three of these mandates and have already minimized to their own satisfaction. Transco's analysis did not identify a nonwetlands site for Compressor Station 206, but instead, after reviewing 41 sites selected a short list of five, all of which included substantial forested wetlands and all five will result in significant wetland impact. Williams/Transco has selected a site which will negatively impact over 41 acres of wetlands. The NESE project does not meet the standards of New Jersey stormwater management rules. Additionally, Transco has not complied with federal and state senators to show that the compressor could not be situated in another location to completely avoid impact to freshwater wetlands.	The Project has been designed to minimize impacts to the greatest extent practicable while still achieving the Project goals and objectives. Reduction of wetland and transition area impacts makes the current proposed plan the most environmentally responsible alternative. Impacts on wetlands and transition areas have been minimized by reducing disturbance areas to the greatest extent practicable while still allowing for activities required for successful implementation of the proposed Project. Transco has evaluated avoidance measures to reduce wetland impacts along the proposed access road for Compressor Station 206. In doing so, Transco has designed the access road to incorporate its stormwater controls into the design of the road. This has decreased the road width from approximately 120 to less than 100 feet along most of the length of the access road. Transco has also minimized, to the maximum extent practicable, the overall wetland impacts associated with the suction and discharge piping and tie-in. Typically, the ROW width to install suction and discharge piping ranges from 100 to 120 feet. At Compressor Station 206, Transco has reduced the construction ROW width for Utility Crossing D to 80 feet. Additionally, in response to NJDEP comments, Transco has reduced the impacts of Utility Crossing D by redesigning the suction and discharge piping workspaces to reduce the length from approximately 700 to 550 feet. Locating the tie-in entirely outside of wetlands is infeasible due to the proximity requirements of the tie-in to the compressor station and milepost (MP) range where the tie-in must be sited, as described further in the Alternatives Analysis included as Appendix A. However, although the tie-in was sited within a wetland, the associated workspace was sited in an adjacent upland area, to the maximum extent practicable. There are no practicable alternate designs that would avoid or reduce the adverse impact on regulated areas while still accomplishing the basic needs and purpose of the proposed Project. Impacts on wetlands, wetland transition areas, and State open waters are unavoidable due to the required location, configuration, and size of the proposed Project and its related elements.	FWW IP Sections 4 and 5	20, 31, 48, 53, 54, 67, 85, 117, 118, 137, 147, 156, 177, 192, 197, 198

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		The size, scope and configuration of the proposed Project is designed in such a way that it meets the needs of the Project while minimizing impacts to regulated areas to the greatest extent practicable. Through Transco's evaluation of the Project and its alternatives, it has been determined that there are no suitable, alternative configurations for the Project or related elements that would result in less impact on regulated areas and still allow for successful Project implementation. Reductions to the size and/or configuration of current Project components would be such that the basic purpose of the Project could not be reasonably accomplished. Measures to avoid, reduce, and/or minimize impacts on regulated areas have been employed to the greatest degree practicable while still allowing for successful Project implementation.		
22	The wetlands permit for the access road. The access road is run almost entirely through wetlands. Williams/Transco has asserted that they should be able to use this route because there's no other feasible route. There is a feasible route which will not involve wetlands from the EPA driveway. They have asserted that it's not legally possible to use this route. That's their position. This has not been tested legally by either the township or the EPA. And another possibility will be to come in from Route 27 along the pipeline right-of-way. This has never been discussed.	Transco is currently consulting with the Division of Land Use Regulation at NJDEP to address any potentially outstanding items related to the design of the Compressor Station 206 access road. Refer to email submittal dated December 12, 2018 regarding EPA access road and Route 27 access road.	Email to Matthew Resnick (NJDEP DLUR) dated December 12, 2018	16
23	For each of the wetlands, the application is missing a thorough, factually based analysis of the value of each wetlands, as well as their specific avoidance of the minimization efforts that they would minimize the impacts.	Transco has conducted a detailed review and analysis of available information, as well as on-the-ground field surveys to determine the resources within the Project area; a summary and discussion was provided in the FWW IP applications. Transco determined the nature and location of wetlands within the Project area by consulting with appropriate agencies and performing field surveys. The nature and location of all water resources were additionally confirmed during agency site inspections. Transco also proposes to reduce the construction ROW from 90 feet to 75 feet at wetland and waterbody crossings where open-cut construction is proposed.		58, 134, 198
24	Transco is disregarding the Clean Water Act. Based upon findings under the Federal Clean Water Act, one can make the argument that the current environmental impact of this project negates the proposal and does not meet the statutory requirements to consider granting the certificate of compliance.	In accordance with N.J.A.C. 7:7A-2.1(d), a permit issued pursuant to the Freshwater Wetlands Protection Act (FWPA) Rules constitutes the water quality certificate required under Section 401 of the CWA, 33 U.S.C. 1341(a). In other words, an applicant that satisfies the FWPA Rules and obtains a permit under those rules also satisfies its obligation to obtain a water quality certificate. Transco's application and supplemental submittals establish that the proposed Project activities would comply with the FWPA Rules and that Transco is entitled to a Freshwater Wetlands Individual Permit and, therefore, a water quality certificate.		4, 22, 29, 47, 48, 90, 125, 147
25	The requirements to fulfill the Freshwater Protection Act and the Clean Water act must be based on factual determination, evaluation and tests. Transco in their application has failed to satisfy the standard, instead using rhetoric all the time that it will seek to minimize impact to the greatest extent possible within the parameters of their project.	In 1994, New Jersey assumed authority under Section 404 of the CWA, 33 U.S.C. 1344(g), to administer the Federal wetlands program in delegable waters within New Jersey. The NJDEP administers the Section 404 permitting program through the FWPA and its implementing rules. Pursuant to the FWPA Rules, "the level of detail and documentation required for an application shall be commensurate with the size and impact of the proposed regulated activity or project, its proximity to critical areas, and its potential for impacts to freshwater wetlands, transition areas, and/or State open waters." N.J.A.C. 7:7A-16.2(b). Transco's permit application contains the necessary information for the NJDEP to make a determination that the application satisfies the requirements of the FWPA and implementing rules.		29, 90, 125

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		For instance, Transco's application thoroughly analyzed each wetland impacted by the Project. Specifically, Transco identified each impacted wetland and indicated the location, wetland type, and the resource classification required under the FWPA Rules. Transco determined that six wetlands are considered "exceptional" due to the presence of documented habitat of threatened or endangered species. Two wetlands were identified as "ordinary," and the remaining 12 (two of which are impacted by Compressor Station 206) were identified as "intermediate." (See Application, Section 3.) These wetlands were identified and thoroughly documented as part of Transco's permit application. (See Sections 8 and 9 of Transco's Wetland Delineation Report submitted as part of Transco's permit applications filed June 20, 2018.) Furthermore, as noted by the FWPA Rules, an applicant may rely on the implementation of BMPs to establish compliance with various state and federal environmental laws and regulations, including the CWA Section 404(b)(1) guidelines (40 CFR Part 230). (See N.J.A.C. 7:7A-1.3.) Transco detailed within its Application the BMPs it intends to implement during construction, including soil erosion and sediment control measures and the timely restoration of vegetated areas following construction activities. (See Application, Section 7.) Lastly, it is unclear what the commenter means by "rhetoric" regarding minimization of impacts. The FWPA requires that an applicant first seek to avoid impacts on regulated areas. When regulated areas cannot be avoided, an applicant must minimize those impacts to the greatest extent practicable. Transco provided the NJDEP with a robust alternatives analysis (Appendix A of Transco's FWW permit application) that analyzed different options for avoiding and minimizing impacts on regulated features, including system alternatives, alternative construction methods, and alternate sites for Compressor Station 206. In addition, Transco analyzed on-site alternatives for Compressor Station 206 to minimize impacts on regulated features on the preferred site, including the reduction in width of the proposed access road and reduction in the size of the suction and discharge piping area. Transco has established that it has avoided and minimized impacts on regulated areas to the greatest extent practicable.		
26	Negative impacts on over 41 acres of wetlands, including 20 acres of forested wetlands. Will involve permanent conversion of upland forest and forested wetlands.	Transco is currently consulting with the Division of Land Use Regulation at NJDEP to address discrepancy in reported wetland impacts. Refer to email sent on November 29, 2018 regarding wetland impact acreages.	Email to Matthew Resnick (NJDEP DLUR) dated November 29, 2018	26
27	Transco needs to be required to be in full compliance with all of New Jersey rules and regulations.	Transco has applied for several permits from the NJDEP and, if issued, Transco will comply with all permit conditions.	Not applicable	96, 144

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OTHER COMMENT CATEGORIES
AIR QUALITY PERMIT

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28	Transco asserted in March of 2017 that hazardous air pollutant emissions at the compressor station would be below NJDEP's thresholds. This is no longer correct. Transco's position on the health impact of hazardous air pollution was based on compliance with the old NJDEP threshold developed 25 years ago, and the minimum standards have changed. As the Project is still in permitting stages, it should be permitted under the new air quality standards.	On February 12, 2018, the New Jersey Department of Environmental Protection's (NJDEP or Department) amendment to its Control and Prohibition of Air Pollution by Toxic Substances and Hazardous Air Pollutants regulations at Title 7, Chapter 27, Subchapter 17 of the New Jersey Administrative Code became effective, lowering the reporting threshold for numerous hazardous air pollutants (HAPs) and establishing operation and recordkeeping requirements for certain emission sources. The reporting thresholds contained in N.J.A.C. 7:27-17 (Subchapter 17) do not apply to Compressor Station 206. The permit to construct and operate (PCP170001) was issued on September 7, 2017, prior to the effective date of this regulatory amendment. The currently permitted emission sources at Compressor Station 206 would only become subject to these reporting thresholds if an application to modify the emission sources is submitted in the future. The Subchapter 17 rule decreases the reporting threshold for 106 listed HAPs and increases the reporting threshold for another 15 listed HAPs. The rule became effective on January 16, 2018, with an operative date of February 12, 2018, more than 5 months after the permit was issued for Compressor Station 206. The new rules and amendments do not include any new or additional monitoring, recordkeeping, reporting, or testing requirements beyond those already established in the regulations. **Applicability of HAP Reporting Thresholds for New Sources of Emissions** When evaluating air permit applications for new sources of air emissions, the NJDEP applies the rules that are operative at the time that the application is submitted. Transco submitted its preconstruction permit application for the Compressor Station 206 turbines in January 2017, approximately 1 year prior to the operative date of the new rule(s). As such, the potential HAP emissions listed in the application were reviewed by the NJDEP under the currently enforceable reporting thresholds, contained in N.J.A.C 7:27-8, which remain in effect for all other existing permits. **Phase-in of the New N.J.A.C. 7:27-17 Reporting Thresholds** The applicability of the amended HAP reporting thresholds to existing preconstruction permits is discussed in the "Phase-in of the proposed HAP reporting thresholds" section of the NJDEP's notice of proposal Summary (49 N.J.R. at 2381) and in its response to comments to the Rule Adoption (49 N.J.R. 2373(a). **As noted in the Rule Adoption referenced above:** "The Department will not require updated HAP emission rates for existing preconstruction permits, unless an application for a modification is filed. In an application for a modification to an existing preconstruction permit, the HAP reporting thresholds apply only to those source operations that are being modified, for purposes of determining the source's potential to emit. This is consistent with adopted N.J.A.C. 7:27-8.4(k)1, which refers only to a source operation's potential to emit."	Response to FERC EIR dated July 10, 2018, Accession No. 20180725-5235	2, 8, 21, 36, 89, 100, 110, 124, 145, 154

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OTHER COMMENT CATEGORIES
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		While the N.J.A.C. 7:27-17 reporting thresholds do not apply to the permitted sources at Compressor Station 206, Transco included Table 2 in its response to a Federal Energy Regulatory Commission (FERC) Environmental Impact Report dated July 10, 2018, to detail the current applicable thresholds against the Department's new regulation.		

OTHER COMMENT CATEGORIES
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29	A recent fire in North Brunswick led to pollutants staying in two mile radius for months- doesn't matter how close one is to CS 206, the gasses it will be emitting, the pollution to the water, is not just going to happen within a mile or two. It's going to happen along this whole site. Whole area, if there is an accident will have pollutants in area for generations.	The new compressor station will be manned by personnel during normal business hours. Remote monitoring is conducted 24 hours a day, 7 days a week, with 24/7 on-call support provided by local operations personnel. After business hours, local operations personnel are available on-call in case of emergency. In the event of an emergency, local personnel would be notified immediately. Transco will install emergency shutdown systems at the new compressor station per 49 Code of Federal Regulations (CFR) Part 192. Transco tests these safety and emergency systems routinely to ensure they are operating properly. The emergency shutdown system design forces a shutdown. The emergency shutdown system isolates areas of the compressor station in the event of a fire before a flammable mixture of gas can develop. The systems also include sensors for detecting natural gas concentrations and ultraviolet sensors for detecting potential ignition sources. The most effective and immediate way to begin to address a gas pipeline fire is to shut off the gas source. In addition, the compressor station equipment will shut down automatically if a mechanical failure poses risks to the equipment or otherwise constitutes a hazard. Transco equips its compressor stations with multiple pressure transmitters and pressure switches with alarms and shutdowns to protect the piping from over-pressurization. In the event of an emergency, the compressor units will shut down and blowdown through a controlled venting system through charcoal filters that will remove the methyl mercaptan "smell" as the small amount of compressor unit gas safely dissipates into the atmosphere. The compressor station piping can only be vented by a Transco employee and will be conducted though a silencer to minimize noise levels typically associated with venting.	FWW IP, Northeast Supply Enhancement Project Factsheet	10, 15, 36, 95
30	Concerned about safety issues of increasing the pressure in these old level-one pipelines. A higher velocity in these pipelines can accelerate corrosion and result in cracks that would let the gas escape and cause a fire or explosion, similar to those near Boston. Today's USA analysis of federal data shows that 264 people have died and more than 1600 injured in natural gas leaks, fires and explosions since 1990. Please seriously consider the risks of adding a compressor in this densely populated area of New Jersey with over 1,300 people plus square	While FERC has oversight in ensuring that the facilities are designed according to the latest U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) safety standards and are safely constructed, once the natural gas is flowing through the new facilities, the USDOT-PHMSA assumes oversight responsibility during the operational life of the pipeline and supporting appurtenances such as compressor stations. Transco meets or exceeds existing safety standards of the USDOT-PHMSA and the Occupational Safety and Health Administration (OSHA), and the guidelines of industry organizations such as the Interstate Natural Gas Association of America. Construction and operation of the facilities will include compliance with applicable design standards and codes, construction provisions as mandated, and operation procedures and standards, such as participation with the New Jersey one-call system.	FWW IP, Northeast Supply Enhancement Project Factsheet	25, 50, 57, 73, 84, 108, 121, 141, 148, 185

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	mile. It is imperative that Transco be required to declare and execute a comprehensive plan for checking the thickness of pipes and all pipe welds using the latest and most reliable techniques.	49 CFR Part 192 prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Under 49 CFR Part 192.615, operators must establish and maintain a liaison with appropriate fire, police, and other public officials to understand the resources and responsibilities of each public organization that may respond to a natural gas pipeline emergency and coordinate mutual assistance in responding to emergencies. The existing pipelines that proposed Compressor Station 206 will connect to were initially installed in 1950 (Mainline "A") and 1969 (Mainline "C") and were relocated and replaced in 1987. The lines have had various pressures throughout the years based on flow and demand but have never exceeded the maximum operating pressure (MAOP) of 800 pounds per square inch (psi). Mainlines "A" and "C" have operated safely at 800 psi, and the MAOP will remain at 800 psi after construction of proposed Compressor Station 206. Maintenance of Mainlines "A" and "C" incorporates Transco's Integrity Management Program (IMP), which includes an internal inspection program and low-voltage cathodic protection. This low-voltage cathodic protection along with the pipe's coating is designed to prevent corrosion of the steel pipeline. Company personnel check the voltage and amperage every two months, as well as the pipe-to-soil potentials and rectifiers. Any time a pipeline is excavated, company personnel inspect the pipeline and coating for evidence of damage or corrosion. Internal electronic inspection devices, called smart pigs, are also used to detect any anomalies. Although the pipeline safety regulations focus on high-consequence and/or high-risk areas, Transco's overall pipeline integrity plan covers rigorous inspections for our entire pipeline system. Transco has been smart pigging its pipeline system since 1987.		
31	Because CS 206 would be located near an active quarry, it could easily cause a serious explosion or fire.	Transco conducted a Blast Vibration Analysis to determine whether blasting would have any impact on the compressor station. Blast vibration monitoring was conducted by Transco on November 10 and December 2, 2016, during scheduled blasting events at Trap Rock Industries, Inc. The vibration due to the blasting activities was measured with vibration-monitoring sensors placed at designated locations on the Compressor Station 206 property prior to blasting. The monitoring sensors measured the peak particle velocity, sound pressure, and dominant frequency induced by the vibration source (i.e., the mine blasting activity). Measurements were collected every two seconds with a trigger level of 0.05 inches per second (in/sec), which provided a full histogram of peak particle velocity once the system was triggered by a particle velocity greater than 0.05 in/sec. In addition to the data retrieved from the monitoring sensors, previous blast vibration data collected by the mine operator were provided to Transco. The historical data were compared with the data collected to establish historical context for the anticipated design loads for the compressor station foundations. The results indicated that blast-induced ground vibration will not exceed the maximum measured values. In addition, 16 vibration sensors will be installed on each Solar Mars® 100 unit. The lower detection limit of the sensors is 200 millivolts/mil. The vibration limit requirements on the unit bearings that would initiate a unit shutdown range from 3.2 mils peak-to-peak to 4.0 mils peak-to-peak.	FWW IP, Northeast Supply Enhancement Project Factsheet FERC draft EIS, Sections 4.11.2 and 4.11.4 Transco's Application for a FERC Certificate, Resource Report 6, Appendix 6D, Geotechnical and Vibration Analysis Report for Compressor Station 206, dated March 2017 Attachment A3-6 to the Response to the May 11, 2017 FERC Data Request, dated June 1, 2017	7, 25, 62, 73, 107, 129, 131, 170, 193

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		Based on the analysis conducted, the blasting events initiate a displacement of 0.011 millimeters; 0.011 millimeters converts to 0.43 mils. Thus, a blasting event would not trip the Solar Mars® 100 vibration sensors. The peak blast-induced displacement of the compressor unit skid was compared to the lower detection limit of the vibration sensors on the Solar Mars® 100 units; the estimated 0.007-millimeter displacement (0.28 mils peak to peak) is less than the vibration limit requirements on the unit bearings. Compressor stations with this type of unit (turbine) are designed to produce almost zero vibration. Negligible vibration from equipment operation and movement of gas through the suction and discharge piping does occur; however, this negligible vibration in combination with a blast will not exceed the vibration limit requirements on the unit bearings. Therefore, the blast-induced vibration would not adversely affect the operation of the compressor or cause long-term maintenance issues. In the event that the vibration sensors were to trip, the Mars® 100 turbine would enter into shutdown mode. During shutdown, the unit valves would close in order to isolate the unit from the compressor station. To date, no operational or maintenance issues have been attributed to nearby mining operations on any portion of Transco's pipeline system. Trap Rock Industries, Inc., conducts all blasting operations in accordance with the New Jersey Administrative Code 12:190-7:26, which states that the peak particle velocity (PPV) associated with blasting activities may not exceed 2 in/sec for aboveground structures (buildings, residences, etc.). Multiple structures and residences are closer to the active Trap Rock mining area than the proposed Compressor Station 206; therefore, a PPV of 2 in/sec would not be experienced at Compressor Station 206. A PPV of 2 in/sec would not trip the vibration sensors on the Mars® 100 units. Additionally, the foundations of Compressor Station 206 will be designed with a safety factor to prevent displacement if future blast intensity increases. Additionally, Chapter 278 of the Franklin Township Code regulates quarries and blasting within the township limits. The Franklin Township Zoning Map, issued by the Franklin Township Department of Planning and Zoning, depicts boundaries for mining districts with the designation "M-3". The northernmost boundary of the Trap Rock "M-3" zone ends at the property line of Block 5.02, lots 11.02, 12, and 16. Blasting along the northern face of the quarry may not extend past this boundary and will, therefore, not extend north toward the proposed compressor station site.		
32	Safety resources, specifically fire departments, are not equipped for potential accident related to CS 206. Don't have the infrastructure, personnel, or training. There is no water available along Route 27 and since it will be unoccupied 80 percent of the time, the fire extinguishers Williams/Transco will be providing will be of no use if a fire breaks out. Reminder of what happened during the 2013 fire at the Branchburg Compressor Station.	Safety standards specified in 49 CFR Part 192 require that each operator establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance in responding to emergencies. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. As required by the U.S. Department of Transportation (USDOT), Transco would coordinate with local first responders, including the local fire department, to review the emergency response plan and provide mapping of the Northeast Supply Enhancement (NESE) Project facilities. Transco would work with local emergency officials to determine response procedures for remote residential areas with limited entry and exit routes. Transco would also conduct site-specific training and operator-simulated	FWW IP, Northeast Supply Enhancement Project Factsheet Transco's Response to the draft EIS, dated May 2018, Accession No. 20180511-5170 and 20180511-5171 FERC draft EIS, Sections 4.11.1 , 4.8.4	3, 11, 95, 107

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		emergency exercises for local first responders. Finally, Transco would use all available and relevant means to support local emergency personnel in the event of an incident involving any of the Project facilities. Transco is proposing to install a potable water system with the capacity to meet the water needs of Station 206. This will include a connection to the sprinkler system that will be present in the office building. All other buildings on the property will be constructed from non-combustible materials, and will not require sprinkler systems. The most effective and immediate way to begin to address a natural gas fire is to shut off the gas source. This will be accomplished by an automated emergency shutdown system. Thus, no fire hydrant will be necessary to address a fire on location. Compressor station employees are trained to fight minor fires with station extinguishers. Additionally, a large, maintained area will surround the facility, which acts as a fire break in the event of an incident. In the unlikely event of an emergency, local first responders will address any fire outside of the operational footprint of Compressor Station 206. Also, Franklin Township is currently performing upgrades to their existing municipal water system that will ensure adequate water service to customers along Route 27 and County Road 518, including Compressor Station 206. These upgrades are scheduled to be completed prior to the proposed construction start date for Compressor Station 206.		
33	Concerned with the quality of the pipe being connected to, as the pipe is 30 years old and connects to other pipes downstream that are about 50-60 years old. In 2013 two MIT professors migrated to Washington, D.C. and they walked 1,500 miles inside Washington, D.C. and they checked every single natural gas manifold and they found that six thousand of them were leaking. Of the six thousand, 19 were explosive. Five hundred thousand parts per million was detected in 19 of them. They told the utility company. And three months later, when they were supposed to come back and check, and they did, 9 of the 19 were still explosive.	Transco is required to construct, operate, and maintain its interstate natural gas transmission facilities in accordance with the USDOT-PHMSA safety standards at 49 CFR Part 192. These federal safety standards, together with pipeline integrity management programs and recent advances in pipeline manufacturing, construction, and inspection techniques, minimize the potential for pipeline failure. Transco operates on a no-leak basis, meaning if there is a leak, it will be addressed immediately.	Transco's Application for a FERC Certificate, Resource Report 11, Section 11.2	141
34	So the NESE project is part of a large Williams expansion. In about a 50-mile radius of where we're standing now, central New Jersey, there's the equivalent of five new or proposed compressor stations. And these would stress the safety dynamics of the pipeline system, our existing system. All this new infrastructure would increase the volume of gas and in some cases operating	The purpose and need for the NESE Project is to provide 400,000 Dth/d of incremental firm transportation capacity to National Grid from Compressor Station 195 through the Rockaway Transfer Point to supply National Grid's existing service territory beginning in the 2020/2021 heating season. Transco has executed long-term, fully binding precedent agreements with National Grid for 100% of the Project capacity. National Grid's precedent agreement describes its intention to utilize the capacity provided by the Project to serve its retail customers across its existing service territory.	FWW IP, Attachment to Item #5 of the DLUR Form, Detailed Project Description	148

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	pressures and velocities through our existing system. Simply put, we'd be pushing more gas faster and hotter through old lines. We know the pipelines are most vulnerable to explosion in the first five years of being built and that they age. Unfortunately, New Jersey has the perfect storm: new and proposed pipelines and compressor stations like NESE, PennEast, the Roseland compressor station, and older aging pipelines at the 500 miles or so of the Williams/Transco system.	Transco's existing natural gas transportation system currently supplies natural gas to the New York City metropolitan region via National Grid's existing receipt points. However, National Grid is experiencing incremental firm demand and anticipating system growth. The subsequent incremental supplies will be provided through the NESE Project. Since National Grid approached Transco to inquire about available pipeline transportation options that may be developed to meet the need described above, the NESE Project as proposed will operate independent of existing natural gas infrastructure projects in New Jersey. Transco is required to construct, operate, and maintain its interstate natural gas transmission facilities in accordance with the USDOT-PHMSA 49 CFR Part 192. These federal safety standards, together with pipeline integrity management programs and recent advances in pipeline manufacturing, construction, and inspection techniques, minimize the potential for pipeline failure.		
35	Williams just this summer has been issued a recommended fine of $400,000 by PHMSA. It's an open case for missing plans, missing reports, not following their own plans, lack of inspections and, most scary, running lines at overly high pressure through our communities. And interstate pipelines are already allowed to operate at safety standards lower than New Jersey allows for in-state pipelines.	On January 18, 2018, Transco was issued a Notice of Probable Violation, Proposed Civil Penalty, and Proposed Compliance Order by the USDOT-PHMSA. The issuance was in response to a 5-month-long inspection of Transco's Princeton and Charlottesville Divisions. There were no violations associated with exceeding Transco's established and validated maximum operating pressure (MAOP). The majority of the inspection findings were administrative in nature. Subsequent follow up with the PHMSA indicates PHMSA's agreement of Transco's compliance with federal regulations, though formal dismissal has yet to be received.		149
36	The project area's air quality is already unhealthy. Construction of the pipeline will emit nitrogen oxides in quantities that is well above acceptable limits. Transco states that mitigation will occur through offsets elsewhere, but does not supply details. Additionally, the compressor station turbines will exceed the thresholds for seven hazardous air pollutants. It is anticipated that the Compressor Station 206 will emit toxins, including ammonia, formaldehyde, acetaldehyde, benzene, toluene, ethyl benzene, naphthalene and Xylenes, as well as others in addition to particulate matter and greenhouse gasses. Chemicals released by compressor stations are known to cause cancer, childhood leukemia, birth defects, developmental delays, immunological disorders, increased risk of heart attacks.	An air quality impacts analysis was conducted for the compressor turbines at Compressor Station 206. The analysis determined that the air quality impacts from Compressor Station 206 are less than the concentration value of the primary and secondary standards under the National Ambient Air Quality Standards (NAAQS), which provide public health and welfare protection. Therefore, residents and resources in the vicinity of Compressor Station 206 are not expected to be adversely affected by air emissions from the facility. The permit to construct and operate (PCP170001) was issued on September 7, 2017. Compressor Station 206 will require a NJDEP permit prior to operating the facility. The permit will include specific conditions and requirements to ensure that emissions from the compressor station do not result in adverse environmental or human health impacts. Details and discussion on construction emissions and proposed mitigation measures are voluminous and have been previously provided in the Air Quality Technical Report and Mitigation Plan submitted in response to NJDEP's comments, most recently dated November 29 2018, and posted to the FERC docket on November 30, 2018. The Compressor Station 206-portion of the Project was evaluated in accordance with the NJDEP's risk management guidelines for new or modified source operations. Based on the NJDEP guidelines outlined in Technical Manual 1003, cancer risks as well as Long-and Short-Term Non-Cancer risks for the project are considered negligible."	Air Quality Technical Report and Mitigation Plan, Accession No. 20181130-5006, dated November 29, 2018	2, 8, 21, 33, 36, 37, 56, 65, 89, 100, 106, 110, 112, 124, 127, 145, 154, 159, 164, 171, 176, 181, 184, 194

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	Some compounds released by compressor stations are also flammable, and can result in massive explosions further contaminating the air and water.	The U.S. Environmental Protection Agency (EPA) has established accidental release prevention and RMP requirements as part of 40 CFR Part 68, Chemical Accident Prevention Provisions, implementing section 112(r) of the CAA. The Risk Management Program is about reducing chemical risk at the local level. The RMP information helps local fire, police, and emergency response personnel (who must prepare for and respond to chemical accidents), and is useful to citizens in understanding the chemical hazards in communities (EPA, 2009). Part 68 specifically lists regulated flammable and toxic substances and their "thresholds quantities" for determining applicability. New Jersey's Toxic Catastrophe Prevention Act Program (TCPA) Program rules apply when a threshold quantity of an Extraordinarily Hazardous Substance (EHS) are present at a facility. The threshold quantities for each EHS is listed at N.J.A.C 7:31-6.1 et seq. Compressor Station 206 is not subject to requirements under 40 CFR 68 or N.J.A.C. 7:31. Further, Compressor Station 206 is subject to 49 CFR Part 192, and Transco is required to maintain the integrity of transmission pipelines under that rule to assure that accidental releases of gasses are minimized		
37	In normal running, there is a low level of emissions that are toxic, but not toxic enough to cause human suffering. However, when there is venting, the toxicity is high and, if we have rainfall, then the water will be contaminated by methane and other hydrocarbons.	Compressor station blowdowns are rare, potentially occurring once per year, if that often. Transco uses blind flanges to prevent the escape of gas only in the event of a major equipment failure or emergency, both of which are extremely rare. Small volume unit blowdowns may happen several times per year, and they are associated with planned maintenance of a compressor unit and/or associated piping. In both cases, these blowdowns are planned and controlled, with gas flowing through a blowdown stack, which consist of a deodorizer and a blowdown silencer and generally are very quiet. Transco would not conduct planned unit blowdowns during inclement weather. An air quality impacts analysis was conducted for the compressor turbines at Compressor Station 206. The analysis determined that the air quality impacts from Compressor Station 206 are less than the concentration value of the primary and secondary standards under the National Ambient Air Quality Standards (NAAQS), which provide public health and welfare protection. Therefore, residents in the vicinity of Compressor Station 206 are not expected to be adversely affected by air emissions from the facility.	RR9 and Appendix 9B Preconstruction Permit Application Compressor Station 206 Franklin Township, Somerset County, NJ submitted January 4, 2017 FWW IP, Northeast Supply Enhancement Project Factsheet	14, 61
38	Just a few months ago, on a Williams' construction of their Atlantic Sunrise pipeline, equal to the NESE pipeline, Williams temporarily bulldozed a stormwater detention basin where the runaway water gathered against a township's declaration that refused to approve Williams' removal of their stormwater barrier. In an area never before flooded, Williams' construction zone destroyed six homes and damaged 18 others, leaving two girls that had to be hand-plucked through a window by a human chain as water rose 4 feet inside the homes to the tops of vehicles. Not by Williams, but by local first responders.	The commenter's statement concerning the status of Transco's permitting and construction activities associated with the Atlantic Sunrise Project (ASR) is inaccurate. No Township approvals were required to disturb the drainage basin in question for that project, and all applicable federal authorizations, including those issued by the Pennsylvania Department of Environmental Protection, were obtained. An accurate statement of the facts would reveal that, during a 500-year storm event, a mobile home park located in Mount Joy, Pennsylvania, was flooded and trailers were damaged as a result. In accordance with federally authorized permits issued to ASR, a drainage basin was disturbed at the time of the storm event. At Transco's direction, an independent hydrologist investigated the situation and concluded that the disturbed drainage basin did not substantially contribute to the flooding. He determined that the mobile home park would have flooded due to the topography and record rainfalls regardless of whether the drainage basin was intact. The independent hydrologist further concluded that the disturbed drainage basin did not cause a material increase in the volume or velocity of the floodwaters and thus was not a significant factor in the damages sustained by the mobile home park or its residents. The Township likewise did not conclude that the disturbed basin was the cause of the flooding. Although there was nothing indicating that Transco was responsible for	Not applicable	41, 135

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<tr><td></td><td></td><td>the flooding, it voluntarily entered into prompt settlements with all of the affected landowners, compensating them for damages they incurred due to the storm. Transco also provided temporary housing stipends and necessities to those affected immediately after the storm.</td><td></td><td></td></tr>
<tr><td>39</td><td>The New Jersey Buddhist Vihara and Meditation Center is concerned about the adverse effects that an adjacent industrial complex would have on the serenity and natural beauty of the vihara and the safety issues posed by the potential hazards of fires, leaks and explosions (from the compressor station and the aging pipelines). Noise from the compressor station turbines will disrupt meditation and other religious practices, which are often performed outdoors during the warmer months.</td><td>FERC requires that the noise attributable to a new natural gas compressor station with all equipment operating not exceed a day-night average A-weighted (A-wt.) sound level (i.e., Ldn) 55 dBA (decibels on the A-weighted scale) at any noise sensitive area (NSA)/residence, noting that an Ldn of 55 dBA is equivalent to an A-wt. sound level (Leq) of 49 dBA. For proposed Compressor Station 206, it is anticipated that the maximum-wt. sound level contribution of the compressor station during full load operation will be equal to or lower than 55 dBA at nearby NSAs. Thus, the proposed Compressor Station 206 will be designed to generate sound levels that are lower than the FERC sound level requirement and state/local noise regulations (e.g., State of New Jersey noise level limits).

As presented in Table 9.3-9, the results of the acoustical analysis indicate that the total sound level resulting from the operation of Compressor Station 206 (operating at full capacity) at the nearby NSAs would not exceed the Ldn of 55 dBA, as required by FERC.

Table 9.3-9
Estimated Sound Pressure Levels for the Closest NSA for Compressor Station 206 Operation
<table><tr><th rowspan="2">Location/ Receptor</th><th rowspan="2">Distance to Site Center[a]</th><th rowspan="2">NSA Type</th><th colspan="4">Sound Pressure Levels (dBA)</th></tr><tr><th>Ambient Sound Level (L_{dn})</th><th>Estimated New Station Contribution (L_{dn})</th><th>Estimated Total Sound Level[b] (L_{dn})</th><th>Potential SPL Increase</th></tr><tr><td>NSA No. 1</td><td>2,500</td><td>Residence</td><td>46.4</td><td>39.0</td><td>47.1</td><td>0.7</td></tr><tr><td>NSA No. 2</td><td>2,560</td><td>Residences</td><td>46.4</td><td>38.7</td><td>47.1</td><td>0.7</td></tr><tr><td>NSA No. 3</td><td>2,610</td><td>Meditation Center & Residences</td><td>48.2</td><td>38.5</td><td>48.6</td><td>0.4</td></tr></table>Key:
L_{dn} = day-night sound level
NSA = noise sensitive area

Notes:
[a] Distance from compressor station in feet.
[b] Ambient plus station sound level combined

The acoustical analysis indicates that, if noise control mitigation measures described in Appendix 9G of Resource Report 9 of Transco’s Certificate Application filed with FERC on March 27, 2017, are successfully employed, the noise attributable to the compressor station at nearby NSAs, including the NJBVMC, during full-load operation should be lower than 55 dBA (Ldn), which is the FERC sound level requirement for a new compressor station. In addition, the noise contribution of the compressor station will meet federal state and local noise regulations. Furthermore, FERC recommended in their DEIS that Transco complete a noise survey and file the results with FERC no later than 60 days after placing Compressor Station 206 in service.</td><td>FWW IP, Northeast Supply Enhancement Project Factsheet</td><td>178, 179</td></tr>
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40	Project would also excavate portions of the sea floor, redistributing settled toxins like PCB's. These impacts would not only harm aquatic species, but also the health of our communities.	Transco predicts that there is a low risk of adverse effects on ecological receptors from exposure to metals and organic contaminants in sediment that will be suspended in the water column and redeposited during Project-related dredging/jetting activities. Throughout the offshore Project area, overall surficial and at-depth concentrations of both metals and organic compounds are relatively low compared to contaminated sediments in harbors across the U.S. More specifically, comparison to both New York and New Jersey sediment screening criteria resulted in moderate exceedances of upper-level thresholds, and exceedances were never more than one order-of-magnitude greater than either state's thresholds. Also, fate characteristics for released metals and organics during dredging/jetting activities are expected to result in only short-term water quality changes near the point of disturbance, as most contaminants will be adsorbed to organic material and fine-grained sediment, and redeposited as bound compounds. Furthermore, sediment with higher contaminant levels will be mixed with adjacent less-contaminated material and dispersed away from the point of sediment disturbance, resulting in dilution of the contaminants. The diluted contaminant levels in the redeposited material are expected to be similar to ambient contaminant concentrations in surface sediments at the depositional locations. The results of Theoretical Bioaccumulation Potential (TBP) modeling using maximum PCB concentrations measured along the offshore route in 2016 suggest that the entrainment and redeposition of even the most contaminated sediments along the route will not adversely affect local biota or food webs. TBP has been described as a useful screening tool for eliminating sediments having a negligible likelihood of causing unacceptable effects because of bioaccumulation from further testing and the model tended to generally overestimate hydrophobic organic contaminants' bioaccumulation from sediment. Considering the conservative nature of the TBP model used and the expected fate of compounds currently present in the sediment along the route, Transco expects the redistribution of sediments disturbed during the Project will not result in effects on local biota. Additionally, the 2016 sediment sampling results indicate that the redistributed sediments will be generally consistent with the composition of surface sediments near the dredged/jetted sites. In addition, adherence to the commitments outlined in Transco's permit applications, coupled with any additional conditions imparted by federal and state agencies, will ensure that potential impacts on offshore resources are minimized.	WFD IP, Appendix I Evaluation of Risks to Ecological Receptors Due to Resuspended Contaminants	45
41	Some of the pipes in the loop around the quarry were replaced 30 years ago, but most of the pipe downstream of the compressor station (which will suffer the highest pressure) is over 50 years old. Increased pressure and mass flow in that line will increase the risk of a catastrophic failure through corrosion and fatigue line and vibration. A rupture could release up to a thousand tons of gas, which is what is contained in a section of pipeline between shutoff valves in normal operation. A resulting fire and likely explosion will produce a huge amount of pollution, which will affect the air and water resources and supplies, including the D & R Canal, a	The existing pipelines that proposed Compressor Station 206 will connect to were initially installed in 1950 (Mainline "A") and 1969 (Mainline "C") and were relocated and replaced in 1987. The lines have had various pressures throughout the years based on flow and demand but have never exceeded the maximum operating pressure (MAOP) of 800 pounds per square inch (psi). Mainlines "A" and "C" have operated safely at 800 psi, and the MAOP will remain at 800 psi after construction of proposed Compressor Station 206. Maintenance of Mainlines "A" and "C" incorporates Transco's Integrity Management Program (IMP), which includes an internal inspection program and low-voltage cathodic protection. This low-voltage cathodic protection, along with the pipe's coating, is designed to prevent corrosion of the steel pipeline. Company personnel check the voltage and amperage every two months as well as the pipe-to-soil potentials and rectifiers. Any time a pipeline is excavated, company personnel inspect the pipeline and coating for evidence of damage or corrosion. Internal electronic inspection devices, called smart pigs, are also used to detect	FWW IP, Northeast Supply Enhancement Project Factsheet Transco's Application for a FERC Certificate, Resource Report 11, Sections 11.3.4 and 11.6	185

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	source of drinking water for millions of New Jersey residents.	any anomalies. Although the pipeline safety regulations focus on high-consequence and/or high-risk areas, Transco's overall pipeline integrity plan covers rigorous inspections for our entire pipeline system. Transco has been smart pigging its pipeline system since 1987. Transco will install remotely operated valves at each new mainline valve (MLV) site; the MLV sites will be monitored and controlled by Pipeline Control through Transco's Supervisory Control and Data Acquisition (SCADA) system. SCADA systems monitor and control facilities or equipment in industries such as telecommunications, water and waste control, energy, oil and gas refining, and transportation. SCADA systems gather information, transfer the information back to a control center, carry out necessary analysis and control, and display the information in a logical and organized fashion. SCADA systems include pressure monitoring and provide alerts to the pipeline control center personnel, who in turn activate the controls, as necessary, and provide the information needed for an appropriate response. The Pipeline Control Center for the Project facilities is located in Houston, Texas. Pipeline pressure and valve status will be transmitted from each MLV site to Transco Pipeline Control in regular intervals to monitor the overall condition of the pipelines. In the event of an upset condition, Pipeline Control will have the ability to isolate a segment by sending commands to close the remotely operated MLVs.		
42	Client owns the area of the former Morgan Arsenal. Previously USACE wanted to conduct an investigation to determine if there were still buried ordnances but did not have the funding. Madison loop plans to cross the area and there have been no plans to make any determination as to whether the buried ordnance is an issue and whether there will be further explosions.	The U.S. Army Corps of Engineers (USACE) previously conducted a study in 1994, *Ordnance and Explosive Waste Archives Search Report for Former T.A. Gillespie Co., Morgan, New Jersey*, which aimed to identify potentially hazardous areas of ordnance and explosives within a 3,920 acre former shell-loading complex. The study found that much of the area had been mined for construction fill and that development (residential and commercial) encompassed most of the former industrial complex. The study did recommend ordnance sweeps for specific areas and development of community management plans. Transco conducted shovel tests throughout the area of potential effect during archaeological surveys for the Project and no debris related to this facility was encountered. However, Transco will follow its Unanticipated Discovery Plan for Onshore Cultural Resources during construction of the Project and will notify the New Jersey State Historic Preservation Officer, other involved agencies, and local authorities in the event related debris in encountered.		190

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ATTACHMENT B

NORTHEAST SUPPLY ENHANCEMENT PROJECT

DECEMBER 2018

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Transcontinental Gas Pipe Line Company, LLC Gateway Expansion Project
Summary of NJDEP Freshwater Wetlands Individual Permit Application
Public Comments Received at Public Hearing November 6, 2018

Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
1	Mayor Phillip Kramer	Mayor of Franklin TWP	8-9	Onshore	Alternatives	Does not minimize impact to wetlands, does not try to avoid wetlands. Only alternative path proposed is through a Superfund site. Therefore, does not believe application is adequate.
2	Mayor Phillip Kramer	Mayor of Franklin TWP	8-9	Onshore	Air Quality Permit	Even though NJDEP has already issued air permit, the minimum standards have changed, and Project is still in permitting stages, so should go with new air quality standards.
3	Assemblyman Joe Danielson	Assemblyman for 17th District	10-14	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Safety resources, specifically fire departments, are not equipped for potential accident related to CS 206. Don't have the infrastructure, personnel, or training.
4	Assemblyman Joe Danielson	Assemblyman for 17th District	10-14	Onshore	Wetland / Waterbody Impacts	Based upon findings under the Federal Clean Water Act, one can make the argument that the current environmental impact of this project negates the proposal and does not meet the statutory requirements to consider granting the certificate of compliance.
5	Assemblyman Joe Danielson	Assemblyman for 17th District	10-14	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Track record of Williams/Transco is less than stellar in terms of both safety and maintaining the environment, and the integrity of land.
6	Roseann Brown	Chief of Staff for Senator Bateman	14-17	Onshore	Project Location (Safety, Health, and Environmental Concerns)	CS 206 construction goes through residential areas in South Brunswick and Franklin TWP and affects acres of preserved open space.
7	Roseann Brown	Chief of Staff for Senator Bateman	14-17	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Because CS 206 would be located near an active quarry, it could easily cause a serious explosion or fire. The station would emit a high volume of methane and greenhouse gasses.
8	Roseann Brown	Chief of Staff for Senator Bateman	14-17	Onshore	Project Location (Safety, Health, and Environmental Concerns)	New Jersey is the most densely populated state in the nation. We have enough trouble maintaining our air quality without this compressor station. Compressor stations also emit toxic chemicals that can cause cancer, asthma, birth defects and other illnesses. As the League of Conservation Voters noted in a recent editorial, that is a high price to pay for gas that we don't need.
9	Roseann Brown	Chief of Staff for Senator Bateman	14-17	Onshore	Public Benefit / Need / Energy Resources	Believes that there are other ways to explore energy production without constructing CSs or pipelines that pose a threat to health and safety.
10	Councilwoman Jo Hochman	Councilwoman from South Brunswick	17-20	Onshore	Project Location (Safety, Health, and Environmental Concerns)	References a recent fire in North Brunswick that lead to pollutants staying in two mile radius for months- doesn't matter how close one is to CS 206, the gasses it will be emitting, the pollution to the water, is not just going to happen within a mile or two. It's going to happen along this whole site. Whole area, if there is an accident will have pollutants in area for generations.
11	Councilwoman Jo Hochman	Councilwoman from South Brunswick	17-20	Onshore	Project Location (Safety, Health, and Environmental Concerns)	There is no water along that strip of Route 27 to combat a fire in the woods if there is an accident.
12	Ciro Scalera	Director in gov relations for NJ Laborers Union	20-23	Onshore	Support	Supports project.
13	Edith Nolan	resident	24-25	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Asks how low hum from CS 206 will affect hearing aids, kids, pets (cats/dogs), and wildlife?
14	Edith Nolan	resident	24-25	Onshore		How will Williams control what happens to vented gas given varying weather conditions?
15	Councilman Theodore Chase	Councilman from Franklin TWP 1st Ward	26-27	Onshore	Project Location (Safety, Health, and Environmental Concerns)	If there was a fire at the compressor station, feels that it will set the woods on fire with serious effects to anybody who lives downwind from the fire.
16	Councilman Theodore Chase	Councilman from Franklin TWP 1st Ward	26-27	Onshore	Wetland / Waterbody / Stormwater Impacts	The wetlands permit for the access road. The access road is run almost entirely through wetlands. Williams/Transco has asserted that they should be able to use this route because there's no other feasible route. There is a feasible route which will not involve wetlands from the EPA driveway. They have asserted that it's not legally possible to use this route. That's their position. This has not been tested legally by either the township or the EPA. And another possibility will be to come in from Route 27 along the pipeline right-of-way. This has never been discussed.

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Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
17	Michael Markski	Engineers Labor Employer Cooperative	28-29	Onshore	Support	Supports project.
18	Chris Hartman	VP of the NJ Alliance for Action	29-32	Onshore	Support	Supports project.
19	Dan Kennedy	Dir. Of environmental and utility operations for the Utility and Transportation Contractors Association of NJ	32-35	Onshore	Support	Supports project.
20	Jagdish Vasudev	member of NJDOH Advisory Council on Population Health	35-38	Onshore	Wetland / Waterbody / Stormwater Impacts	Transco's Freshwater Wetlands Permit application does not satisfy the minimum requirements set out in New Jersey's Freshwater Wetlands Protection Act, which seeks to first award it and then minimize the residents, the impacts, before engaging in mitigation. Transco has not addressed compliance with state and federal standards due to its failure to demonstrate that the site of the Compressor Station 206 could not be situated at a location that would completely avoid impact of freshwater wetlands.
21	Jagdish Vasudev	member of NJDOH Advisory Council on Population Health	35-38	Onshore	Air Quality Permit	Transco asserted in March of 2017 that hazardous air pollutant emissions at the compressor station would be below NJDEP's thresholds. This is no longer correct. Transco's position on the health impact of hazardous air pollution was based on compliance with the old NJDEP threshold developed 25 years ago. The project area's air quality is already unhealthy. Construction of the pipeline will emit nitrogen oxides in quantities that is well above acceptable limits. Transco states that mitigation will occur through offsets elsewhere, but does not supply details.
22	Jagdish Vasudev	member of NJDOH Advisory Council on Population Health	35-38	Onshore	Wetland / Waterbody Impacts	Transco also impose the requirement of the Clean Water Act using a single sentence: "The project will employ a soil and sedimentation control plan and best management practices," instead of evaluation and tests. In other words, Transco is saying "Trust us" while disregarding the Clean Water Act.
23	Gabe Spiler	Resident	39-42	Onshore	Wetland / Waterbody / Stormwater Impacts	Has issues with wetlands on personal property- applied for permit to regrade as the wetlands are leading to water running into house and destroying patio. NJDEP denied permit, yet appears ready to approve permit for regrading almost 3 acres of wetlands for this project.
24	Gabe Spiler	Resident	39-42	Onshore	Wetland / Waterbody / Stormwater Impacts	Transco has made no attempts to follow LEDPA law, has not attempted to avoid wetlands.
25	Jeff Eisenberg	resident	43-45	Onshore	Project Location (Safety, Health, and Environmental Concerns)	CS 206 comes with many hazards including leakage of toxic gasses, noise pollution during blowouts, old and insufficient piping under increased pressure. Site selected is adjacent to active quarry.
26	Jeff Eisenberg	resident	43-45	Onshore	Wetland / Waterbody / Stormwater Impacts	Negative impacts on over 41 acres of wetlands, including 20 acres of forested wetlands. Will involve permanent conversion of upland forest and forested wetlands.
27	David Carol	not identified	45-48	Onshore	Public Benefit / Need / Energy Resources	Commenting in regards to Subsection 12 of Section 10.2B (public interest requirement). Project will not provide benefit to NJ or NJ residents. Detrimental impacts will fall almost exclusively on NJ land and NJ residents.
28	David Carol	not identified	45-48	Onshore		Another consideration of a wetlands application is the interest of the property owner in developing this land. Not dealing here with a farmer who's trying to convert his land. The applicant here decided to acquire this property with one purpose in mind. They did so at their own risk with no guarantees of obtaining the wetlands permit. Their speculation cannot inform a property right nor can it exempt them from the wetlands approval process.

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Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
29	Jeff Howell	resident	49-52	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Filling in the two wetlands will result in a significant increase in stormwater runoff, much of which will flow downhill into the nearby headwaters of Carters Brook, a tributary which then flows into the Millstone watershed, a major water source for people in this region. NJDEP knows that Site 3 does not comply with many requirements of the Clean Water Act, Section 202. And the New Jersey Freshwater Protection Act rules Administrative Code 7:7A. Based on these known deficiencies, NJDEP should reject Transco's wetlands permit application for Site 3. Transco should reconsider the 41 potential compressor station sites which they initially identified and subject these sites to a more rigorous alternative site analysis, placing a high priority on preserving valuable forested freshwater wetlands. Transco's selection of Site 3, Compressor Station 206, is problematic due to its very close proximity to the Higgins Farm Superfund site, a hazardous waste site which has been under remediation for 31 years to remove extensive chemical contamination. Removing forested wetlands near the perimeter of Site 3, located very near the Higgins Superfund site, may have unanticipated and unpredictable negative environmental impacts to the changes of the groundwater and hydrology of the earth.
30	Jeff Howell	resident	49-52	Onshore	Project Location (Safety, Health, and Environmental Concerns)	The groundwater beneath Transco's Site 3 is known to be contaminated. The EPA maintains four testing wells on Transco's Site 3 to monitor the intensity and movement of the contamination plume in the groundwater. It does not seem to be a suitable site for a compressor station.
31	Eileen Balaban-Eisenberg	resident	53-56	Onshore	Wetland / Waterbody / Stormwater Impacts	Transco's Freshwater Wetlands Permit application does not satisfy the minimum requirements set out in New Jersey Freshwater Wetlands Protection Act which seems to first avoid wetlands. Transco has failed to demonstrate that the site of Compressor Station 206 could not be situated at a location that would completely avoid impacts to freshwater wetlands. Rather than truly seeking to identify the least environmentally damaging alternative, Transco's final site selection was made for their cost-saving benefits.
32	Eileen Balaban-Eisenberg	resident	53-56	Onshore	Wetland / Waterbody / Stormwater Impacts	Transco's stormwater management facility's design for compressor 206 fails to meet NJDEP's minimum stormwater standards. The stormwater basin design contains numerous errors and does not comply with the New Jersey dam safety regulations.
33	Eileen Balaban-Eisenberg	resident	53-56	Onshore	Project Location (Safety, Health, and Environmental Concerns)	CS206 only has to report averages, but commenter has asthma and will have to suffer through peak output of emissions
34	Lu Zhang	resident	56-58	Onshore		Project will negatively impact fundamental rights to life and property.
35	Yun-Po Zhang	resident	56-60	Onshore	Wetland / Waterbody / Stormwater Impacts	CS206 will aggravate existing problems with wetlands in areas- will make wetlands on residential properties wetter.
36	Yun-Po Zhang	resident	56-60	Onshore	Project Location (Safety, Health, and Environmental Concerns)	CS206 will introduce toxins into air and water. It has been shown that this kind of pollution and these kinds of pollutants lead to diseases, and will impact generations.
37	Kevin Aspell	resident	60-62	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Immunocompromised and is concerned about health impacts on air and drinking water.
38	Susan London	resident	63-64	Onshore	Wetland / Waterbody / Stormwater Impacts	Current proposal will lead to flooding of adjacent and downstream communities due to previously mentioned factors and removal of forested wetlands and upland forests. The stormwater management plan is inadequate, it is currently calling for a bioretention basin located on the site where there's a high water table and that the bedrock is too close to the surface. Important since rainfall will continue to increase.
39	Kim Fraszek	Director of Sane Energy Project	64-68	Onshore	Public Benefit / Need / Energy Resources	References need to cut GHG emissions over next 12 years to avoid climate issues.

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Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
40	Kim Fraszek	Director of Sane Energy Project	64-68	Onshore	Public Benefit / Need / Energy Resources	Law shows us that the New York Department of Environmental Conservation rejected Williams Company's permit application for the Northeast Supply Enhancement pipeline because it was incomplete, so I am at a loss why we are here even having a hearing about an incomplete application permit. I can assure you that New York State elected officials throughout our region are signing on with us to urge our lawmakers to reject the Williams pipeline. Our comptroller, Scott Stringer, said that this is a monumental step backwards in New York's goal. We know that New York State is the end game for this pipeline and we don't need this.
41	Kim Fraszek	Director of Sane Energy Project	64-68	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Just a few months ago, on a Williams' construction of their Atlantic Sunrise pipeline, equal to the NESE pipeline, Williams temporarily bulldozed a stormwater detention basin where the runaway water gathered against a township's declaration that refused to approve Williams' removal of their stormwater barrier. In an area never before flooded, Williams' construction zone destroyed six homes and damaged 18 others, leaving two girls that had to be hand-plucked through a window by a human chain as water rose 4 feet inside the homes to the tops of vehicles. Not by Williams, but by local first responders.
42	Judith Canepa	Sane Energy Project	69-72	Onshore	Public Benefit / Need / Energy Resources	For Rockaway Project, Williams did not use local labor, brought in labor from OK, ND, and TX- they were unfamiliar with construction methods for in-water placement.
43	Jhena Vigrass	staff member of NRDC	72-75	Both	Threatened, Endangered, and Vulnerable Species	The proposed Compressor Station 206 is located near habitats of two vulnerable bird populations, the American kestrel and bald eagle. The Raritan and Sandy Hook bays have 23 species of birds and marine life that are federally listed as endangered or threatened and 18 that are state listed endangered or threatened.
44	Jhena Vigrass	staff member of NRDC	72-75	Onshore	Wetland / Waterbody / Stormwater Impacts	As proposed, this pipeline would press six aquifers, one of which provides drinking water for approximately three million residents in New Jersey. Specifically, Compressor Station 206 is located near New Jersey's second largest aquifer. The Northeast Supply Enhancement Project's construction processes could also harm water quality in New Jersey. The on- and offshore construction would remove important vegetation from forests and wetlands and compact soil, increasing erosion and stormwater runoff leading to sedimentation and turbidity in nearby water bodies.
45	Jhena Vigrass	staff member of NRDC	72-75	Offshore	Project Location (Safety, Health, and Environmental Concerns)	Project would also excavate portions of the sea floor, redistributing settled toxins like PCB's. These impacts would not only harm aquatic species, but also the health of our communities.
46	Jhena Vigrass	staff member of NRDC	72-75	Onshore	Public Benefit / Need / Energy Resources	This project would also perpetuate our dependence on usage of fossil fuels, which drives up gas prices and puts our communities at risk.
47	Jhena Vigrass	staff member of NRDC	72-75	Both		It would be wholly appropriate for New Jersey to exercise its power to stop the pipeline under Section 401 of the Clean Water Act and we urge New Jersey DEP to take a close look at this option.

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Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
48	Nancy Moirano	resident	75-78	Onshore	Wetland / Waterbody / Stormwater Impacts	Concerned that Transco's Freshwater Wetlands Permit does not satisfy the minimum requirements sent out in New Jersey Freshwater Wetlands Protection Act. This act first seeks to avoid and then minimize wetland impacts before engaging in mitigation. Transco's requirements to satisfy the Freshwater Wetlands Protection Act are far more rigorous than those presented to FERC. Transco must first demonstrate the least environmentally damaging practical alternative that they have chosen for the proposed site and project. Transco's analysis did not identify a nonwetlands site for Compressor Station 206, but instead, after reviewing 41 sites selected a short list of five, all of which included substantial forested wetlands and all five will result in significant wetland impact. Under no circumstances can this site be considered the least environmentally damaging practical alternative and, thus, it is not consistent with the requirements of the Freshwater Wetlands Protection Act or the Clean Water Act.
49	Charles Moirano	resident	78-80	Onshore	Public Benefit / Need / Energy Resources	There will be no benefit derived by New Jersey for any aspect of the NESE project. The methane leaking during the production, delivery and use of natural gas offsets any climate change benefit expected due to the conversion of fossil fuels.
50	Charles Moirano	resident	78-80	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Mention of the health risk caused by methane and safety issues of increasing the pressure in these old level-one pipelines.
51	Charles Moirano	resident	78-80	Both	Public Benefit / Need / Energy Resources	NESE intends to deliver approximately ten times as much natural gas that is needed by New York City even if they get the 100 percent conversion that they anticipate, which we know is unrealistic. All this excess is going offshore (to be sold?).
52	Charles Moirano	resident	78-80	Onshore	Public Benefit / Need / Energy Resources	If jobs are needed, Williams can definitely generate those jobs by upgrading the existing antiquated pipelines that go for hundreds of miles within the New Jersey territory.
53	Charles Moirano	resident	78-80	Onshore	Wetland / Waterbody / Stormwater Impacts	The Freshwater Wetlands Protection Act and rules dictates that a prudent environmental decision should always do three things: avoid wetlands, use the least environmental damaging options, and investigate damages that would be done to the wetlands and mitigate as a last resort after steps one and two have been followed. Williams/Transco unfortunately has been negligent on all three of these mandates and have already minimized to their own satisfaction.
54	Jeffrey Yang	resident	80-82	Onshore	Wetland / Waterbody / Stormwater Impacts	Williams/Transco has selected a site which will negatively impact over 41 acres of wetlands. The NESE project does not meet the standards of New Jersey stormwater management rules. Additionally, Transco has not complied with federal and state senators to show that the compressor could not be situated in another location to completely avoid impact to freshwater wetlands.
55	Emerlee Simons	resident	82-85	Onshore	wetland / waterbody / stormwater impacts	Residential area already suffers from high water tables and stormwater issues. Properties are already at saturation point.
56	Emerlee Simons	resident	82-85	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Concerned about chemicals that will be released from CS206.
57	Emerlee Simons	resident	82-85	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Concerned about increasing gas through 50 year old pipelines, and increased risk for accidents.
58	Ed Potosnak	Executive Director of NJ League of Conservation Voters	85-87	Onshore	Wetland / Waterbody / Stormwater Impacts	Asks NJDEP to say no to the dangerous plan that Transco has put together to cross 18 wetlands areas, six of which are classified as exceptional resources, which are critical to NJ and the future and the future generations.
59	Ed Potosnak	Executive Director of NJ League of Conservation Voters	85-87	Onshore	Threatened, Endangered, and Vulnerable Species	Asking NJDEP to say no to a pipeline and compressor station project that's going to threaten endangered species like the bald eagle, osprey and the black-crown night heron.

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Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
60	Barrington Cross	resident	88-90	Onshore	Wetland / Waterbody / Stormwater Impacts	Violation to place CS206 in forested and forested wetland area.
61	Barrington Cross	resident	88-90	Onshore	Project Location (Safety, Health, and Environmental Concerns)	In normal running, there is a low level of emissions that are toxic, but not toxic enough to cause human suffering. However, when there is venting, the toxicity is high and, if we have rainfall, then the water will be contaminated by methane and other hydrocarbons.
62	Barrington Cross	resident	88-90	Onshore	Project Location (Safety, Health, and Environmental Concerns)	But the greatest issue to me is a catastrophic disaster and that would mean explosion and fire. Now, of course, Transco will say, well, that rarely happens. But Transco has never put such a compressor station right near a blasting site used by Trap Rock. And I lived in Rocky Hill, where houses shook after each blast and the houses were cracked
63	Patricia Cross	resident	90-91	Onshore	wetland / waterbody / stormwater impacts	Stormwater basin and CS206 have not been designed to meet NJ DAM safety regulations, will result in flooding of Carters Brook and Heathcote Brook that will threaten downstream properties. Downstream area already has issues with saturated soils/flooding.
64	Robert Shapiro	Resident	92-94	Onshore	wetland / waterbody / stormwater impacts	Property always has standing water after rainfall, CS206 will lead to increase of water coming to his property.
65	Robert Shapiro	Resident	92-94	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Concerned about impacts of decrease in air quality on personal health. Area is filled with older residents who will be impacted.
66	Linda Powell	Resident	94-97	Onshore	wetland / waterbody / stormwater impacts	The application does not comply with stormwater management rules. Both Compressor Station 206 and Madison Loop are considered to be major development under stormwater management rules. Thus, Freshwater Wetlands Permit cannot be issued until the entire NESE project complies with the stormwater management rules.
67	Linda Powell	Resident	94-97	Onshore	wetland / waterbody / stormwater impacts	Constructing the Madison Loop and Compressor Station 206 would have indirect impacts on the public water supply, propagation and fish and wildlife, recreation and businesses. The integrity of the aquatic resources and degradation is at risk from potential discharges into the wetlands from construction, as well as leaks if NESE becomes operational. The overall NESE project is expected to impact a significant amount of wetlands in New Jersey, over 41 acres, including approximately 20 acres of forested wetlands. In addition, the NESE project will remove 3.35 acres of upland forest and the impact on the forested wetlands will be long term or permanent because these trees will take up to 50 years or longer to become reestablished and would not be allowed to become reestablished directly over the pipeline. Construction could reduce the capacity of the wetlands to buffer flood flow and control erosion. There was no factual determination by Williams/Transco that their erosion and sediment control plan would ensure that the ground or surface water would not be degraded.
68	Linda Powell	Resident	94-97	Onshore	Public Benefit / Need / Energy Resources	The need for the NESE project is not clear. New York's need for gas is not as great as the NESE plans deliver. The NJDEP should consider all information from New York about whether or not there is a legitimate need for this project. The NJDEP must consider the relative extent of the public and private need for the proposed regulated activity as part of its public interest review.
69	Linda Powell	Resident	94-97	Onshore	Public Benefit / Need / Energy Resources	Williams/Transco can spend some of their billions of dollars of profit on upgrading the old fossil fuel infrastructure which was put in in the '50s and the '60s.
70	Ed Power	not identified	98-99	Onshore	Public Benefit / Need / Energy Resources	can make more jobs through alternative energy, will be locking into decades long commitment involving GHG
71	Peter Blair	Clean Ocean Action attorney	100-103	Both	Public Benefit / Need / Energy Resources	No benefit to NJ, not in public interest. Will impact climate change. Allowing the combustion of fossil fuels elsewhere not only undermines this work, but puts millions of New Jersey residents at risk for increased flooding, storm damages and displacement.

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Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
72	Peter Blair	Clean Ocean Action attorney	100-103	Both	Public Benefit / Need / Energy Resources	No need for project. The statement of purpose outlined in the draft EIS done by FERC indicates that New York will receive an expanded delivery of gas. This is untrue. Transco's lower New York Bay lateral is the end of a system designed to provide 15 million dekatherms of natural gas per day, where the lateral itself can only have a capacity of 625,000 dekatherms per day. This project does nothing to expand that capacity and will, therefore, not increase capacity to New York. It seems wholly unnecessary to build a new pipeline when the capacity of the lateral serving New York is not being expanded first. The cart is clearly before the horse. One possible explanation for increasing this pipeline capacity without the capacity of the lateral is to provide a natural gas export facility. Rather than service New York customers, the Raritan Loop would serve to facilitate New York -- not facilitate New York with natural resources, but to give them to the highest bidder abroad. The Raritan Loop is currently terminating at a point closest to the Atlantic Ocean, further suggesting that the intention is for offshore LNG exports.
73	Aniko Somogyi	own's Theresa's Farm	104-105	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Concerns with future failure of Class 1 pipeline from 1960's, which has been already stressed by quarry. If the two pipes that cross her property explode, will leave a large crater behind.
74	Aniko Somogyi	own's Theresa's Farm	104-105	Onshore	Public Benefit / Need / Energy Resources	Twenty-five years ago they informed my mother, when she was still alive, that they were going to put in a third pipe for increased capacity. Certainly that would be a far more reasonable prospect for our community because a pipe doesn't pollute. It is just more expensive to lay a third pipe. The compressor station is a cheap alternative to a third pipe. Williams Corporation did, in its initial resource report, include a pipeline alternative instead of the compressor station simply to lay the third pipe as they had originally intended. So there is no reason for this compressor station. It is not necessary. It's only a dangerous cost-saving measure for Williams Corporation.
75	Avelene Jacobs	resident	105-107	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Transco has failed to identify and analyze the subsurface geology. Plants cannot grow in the acidic soil that will become affected and this complicates restoration efforts and slope stability. Transco's failure to even mention these acidic-producing clays is a major oversight.
76	Avelene Jacobs	resident	105-107	Onshore	alternatives	Wants NJDEP to require Transco to provide a more robust alternatives analysis.
77	Jeff Tittel	Director of Sierra Club	108-112	Onshore	Wetland / Waterbody / Stormwater Impacts	Does not believe there is any way that surface water quality standards can be met for runoff water from CS206. There will be hydrocarbons and silt, there will be even chromium, all kinds of metals, oil, lubricants and everything else. And filling in those wetlands, since you have a high groundwater in that area, will lead to more water pollution as well. Included chromium because it was a compressor station in Hinckley, California that led to the contamination of those wells. And for those -- it's the movie Erin Brockovich.
78	Jeff Tittel	Director of Sierra Club	108-112	Onshore	Public Benefit / Need / Energy Resources	This project has been compartmentalized. It's been -- we're not looking at secondary and cumulative impacts. We're not looking at the other projects that this is connecting with, not only into New York and impact to the bay, but Rivervale South, the Lady Loop, the Garden State expansion, all the other transfer projects. They're really all part of one system and they all have the same purpose, which is to bring gas either to New York or offshore. We're also not looking at the secondary impacts because -- for the new proposed CPV power plant in Woodbridge, as well as the Sewaren 7 plant. And we're going to get pollution and water pollution from them as well. References Kinder Morgan project, Ringwood, West Milford, and Roseland which have had issues with runoff/pollution.
79	Karen Paffendorf	resident	112-114	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Very concerned about the possibility of a tragedy, of a fire that burns until the gas is gone and it doesn't burn anymore.
80	Karen Paffendorf	resident	112-114	Onshore	wetland / waterbody / stormwater impacts	Concerned about long-term flooding due to climate. Already have issues with drainage in area and around home

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81	Rupali Chakravarti	resident	115-117	Onshore	Wetland / Waterbody / Stormwater Impacts	Concerned that Williams/Transco did not avoid the wetlands and it had a list of 41 sites, but they only chose the ones that were in the wetlands. They did an incomplete analysis of the alternative sites and they only considered the cost benefits to be gained from using the Trap Rock site that they had already purchased.
82	Rupali Chakravarti	resident	115-117	Onshore	Wetland / Waterbody / Stormwater Impacts	The NESE project will negatively impact a lot of wetlands. And by Transco's own estimate, recovery of forested wetlands can take over 30 years. So did they mitigate it? I don't think so. We foresee that in this area with the high water table, the flooding would increase significantly, especially during heavy rain and storms that are becoming more frequent. Our backyard drainage is poor, so additional water could damage the homes in my community significantly. Transco's stormwater management plan is not sound even though they claim it is. Please ask them ask them to revise it and provide factual data supporting their case.
83	Rupali Chakravarti	resident	115-117	Onshore	Public Benefit / Need / Energy Resources	Please consider, also, whether there is a legitimate need for the Compressor 206 in view of the significant risk to the wetlands and the communities. As people have mentioned, maybe New York does not need all this gas.
84	Rupali Chakravarti	resident	115-117	Onshore	Project Location (Safety, Health, and Environmental Concerns)	A higher velocity in these pipelines can accelerate corrosion and result in cracks that would let the gas escape and cause a fire or explosion, similar to those near Boston. Today's USA analysis of federal data shows that 264 people have died and more than 1600 injured in natural gas leaks, fires and explosions since 1990. Please seriously consider the risks of adding a compressor in this densely populated area of New Jersey with over 1,300 people plus square mile. I think it is imperative that Transco be required to declare and execute a comprehensive plan for checking the thickness of pipes and all pipe welds using the latest and most reliable techniques.
85	Sue Stein	resident	118-119	Onshore	Wetland / Waterbody / Stormwater Impacts	One, it impacts 41 acres of forested woodlands which will disturb the environment for many years to come.
86	Sue Stein	resident	118-119	Onshore	Public Benefit / Need / Energy Resources	Two, New Jersey will not benefit from this project aside from a few negligible jobs.
87	Sue Stein	resident	118-119	Onshore	Public Benefit / Need / Energy Resources	Three, New York has a current goal of a reduction in greenhouse gasses by 80 percent by 2050. The NESE project will send twice as much gas to New York than it needs or wants.
88	Sue Stein	resident	118-119	Onshore	Alternatives	Four, Transco has not demonstrated that the least environmentally damaging practical alternative has been met.
89	Sue Stein	resident	118-119	Onshore	Air Quality Permit	Five, the turbines will exceed the thresholds for seven hazardous air pollutants.
90	Sue Stein	resident	118-119	Onshore	Wetland / Waterbody / Stormwater Impacts	Six, Transco wants us to trust them while they disregard the Clean Water Act.
91	Sue Stein	resident	118-119	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Seven, Transco failed to analyze the subsurface geology of the area and will send pipes through acid-producing clay.
92	Sue Stein	resident	118-119	Onshore	wetland / waterbody / stormwater impacts	Eight, Transco has not met the stormwater management rules of New Jersey and even received a letter from NJDEP on 10/27/18 to that effect.
93	Sue Stein	resident	118-119	Onshore	Wetland / Waterbody / Stormwater Impacts	Nine, the site does not comply with dam safety requirements.
94	Sue Stein	resident	118-119	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Ten, Transco has no data for methane emissions.
95	Sue Stein	resident	118-119	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Eleven, since it will be unoccupied 80 percent of the time, the fire extinguishers they will be providing will be of no use if a fire breaks out.
96	Sue Stein	resident	118-119	Onshore	Wetland / Waterbody / Stormwater impacts	Twelve, Transco needs to be required to be in full compliance with all of New Jersey rules and regulations.
97	Sue Stein	resident	118-119	Onshore	Alternatives	Thirteen, we are requesting an analysis of alternative sites, or deny the permit altogether.

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98	Jaya Subramoni	resident	120-121	Onshore	wetland / waterbody / stormwater impacts	Transco has not properly designed the basin of the Compressor 206 to satisfy the requirements of New Jersey's dam safety regulations. That means, you know, this can lead to flooding in the surrounding areas and definitely, including my community, flooding can be pretty bad. To begin with, the water table in this place is really very high. And so we are very worried about the additional flooding which could destroy the homes.
99	Jaya Subramoni	resident	120-121	Onshore	Project Location (Safety, Health, and Environmental Concerns)	And the other issue was Transco has failed to identify and analyze the subsurface geology which has acid-producing clay. Earth-moving activities like construction can expose the sulfite minerals in the clay to air and sulfuric acid is produced. And Transco's failure to even mention acid-producing clay is a major oversight that undermines the analysis of environmental impacts.
100	Ellen Wijesinghe	resident	121-123	Onshore	Project Location (Safety, Health, and Environmental Concerns)	The danger of the carcinogenic toxins both in the air and in the water. Aside from a new compressor station, hearing about Transco's already existing aging pipeline which releases toxins through pipeline connections through our neighborhoods is disturbing enough.
101	Ellen Wijesinghe	resident	121-123	Onshore	wetland / waterbody / stormwater impacts	Issues of flooding in surrounding residential area. Concerned about increase due to stormwater runoff and toxins collecting in the mud.
102	Robert Tate	Rutgers University?	123-127	Onshore	Project Location (Safety, Health, and Environmental Concerns)	As will be shown by the presentation of the data provided by the applicant and from -- by laboratories, the scientific analysis in many cases is scientifically incomplete and inadequate. The basis for this involves many years at Rutgers University. The evaluation of the impact of subsurface geology, the applicant's term for the topic, indicates that the site contains sulfitic materials, sulfitic metals. Some reference was made to the chemical oxidation of the sulfites to sulfates, sulfuric acid primarily, but the primary source of sulfuric acid in many, if not most, soils is biological oxidation of the sulfite, which occurs any time that the pyrite-containing soils are exposed to oxygen. The primary thought process associated with this sulfur oxidation by most people is the acid-mined drainage that we, a few years ago, read a lot about. So it can be quite spectacular. In the last environmental impact statement, sulfite can result in a decline in the quality of soil and the existing plant community dies. And should the appropriate ecosystem properties occur in this soil site, some acid-loving plants may develop, but the outcome is not that -- that outcome is not likely to occur. Therefore, the most common situation is that the highly degraded soil develops. In the extreme case, the water -- soiled water takes on an okra color of the isles and the water and soil become highly acidic. The diagnosis of the level of damage requires ground-proofing essentially daily. There was a response from the applicant not too long ago that they felt one year flyovers would provide adequate analysis. Note that another potential outcome of soil contaminate from the managerial viewpoint is that should a green system -- i.e., green grass on the site -- be desired, the site would have to be continuously managed to keep the pH in the acceptable range. This may require daily assessment of the soil pH. This would require more assessment than is allowed by someone -- by the sometime-used assessments of the annual flyovers. The bottom line is that the applicants have glossed over a major problem involving the quality of the soil and water by failure to analyze and present the data that must be in the application. It must be noted that the plant communities, both forest and wetlands, are highly susceptible to such contamination. Once the plant community is destroyed, it could take many decades for the ecosystem to recover, if it ever does. Similar problems are associated with the organic contaminants. They create problems both in aerobic and anaerobic situations.
103	Abdel Ramadan	resident	127-128	Onshore	wetland / waterbody / stormwater impacts	Area has high water table, concern is with any emissions or leak impacting surrounding area.
104	Steve Schulman	resident	128-131	Onshore	wetland / waterbody / stormwater impacts	Water table in area steadily rising, ponding for extended periods of time. Have noticed permanent structures are sinking. CS 206 will add to water runoff issues, with industrial runoff.

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105	Steve Schulman	resident	128-131	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Concerned that disturbing the ground on the Higgins Superfund site in conjunction with the direction of the groundwater flow will dramatically increase the quantity of contaminants leaching into central NJ drinking water.
106	Rozalyn Sherman	resident	131-133	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Health issues. You've heard many of these before, but it can't be said often enough. Compressor stations release toxic chemicals known to cause cancer, childhood leukemia, birth defects, developmental delays, immunological disorders, increased risk of heart attacks, which are a few of the horrors that are awaiting Franklin residents and our neighbors.
107	Rozalyn Sherman	resident	131-133	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Fires and explosions are real threats since Trap Rock will be blasting with dynamite until 2040. Should there be a fire, our local responders are not equipped to address any major disaster. I'm sure you've heard of the 2013 fire at the Branchburg Compressor Station. No one can ever say never, never will that happen here.
108	Rozalyn Sherman	resident	131-133	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Pipelines and corrosion of pipelines. It is exacerbated due to the increased speed and heat levels of the gas that's going through the pipes which can lead to explosions. Aging pipelines are particularly vulnerable. The recent explosion in Massachusetts where many homes were destroyed is a deeply concerning reminder of what can happen when pipelines explode.
109	Donal Hoffler	resident	134-136	Onshore	Public Benefit / Need / Energy Resources	We really need to keep the big environmental picture in mind regarding what is causing global warming, climate change, rising oceans, gigantic storms.
110	Madu Prasa	resident	136-139	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Suffers from allergies, is concerned about changes in air quality.
111	Madu Prasa	resident	136-139	Onshore	Public Benefit / Need / Energy Resources	Is an engineer who has worked in oil and gas industry for over 40 years, believes that there are alternative technological projects that can be implemented to meet the needs.
112	Patricia Lone	resident	139-140	Onshore	Project Location (Safety, Health, and Environmental Concerns)	The noise, the poisons that it's going to release do not belong in our area water, anywhere near where people live and children play. I really urge the department to please reject this application.
113	Salim Lone	resident	141-143	Onshore		Think it is absolutely vital that we make it clear to Governor Murphy and all other elected representatives that if they approve this terrible project, there will be a very heavy political price for them to pay.
114	Salim Lone	resident	141-143	Onshore		Was not allowed to build patio onto house because of wetlands.
115	Donald Schneider	not identified	143-145	Onshore	Public Benefit / Need / Energy Resources	Concerns about release of methane and climate change from fracking.
116	Donald Schneider	not identified	143-145	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Why should we run the risk of leaks and explosions? I remember the Edison explosion and these people running in their pajamas and birthday suits from this firewall that was coming down on their apartments. The people that have been talking, they can't run that fast. If there's an explosion, that fireball is going to consume them.
117	Pradip Chakravarti	Resident	146-148	Onshore	Wetland / Waterbody / Stormwater Impacts	Under the Freshwater Wetlands Protection Act, Transco is required to first avoid wetlands, then minimize. And if those approaches failed, then and only then, engage in mitigation. But Transco paid no heed to this requirement. In the short list of sites acceptable to Transco, all are in the wetlands. Over 41 acres of wetlands in New Jersey, including 20 acres of forested wetlands, will be negatively impacted. By Transco's own estimate, recovery of forested wetlands could take 30 years or more.
118	Pradip Chakravarti	Resident	146-148	Onshore	Wetland / Waterbody / Stormwater Impacts	Under the Freshwater Protection rules, NJDEP must consider whether the project serves the public interest in the preservation of national resources. Transco's analysis of alternative sites that are not in the wetlands is incomplete. It's clear that they have only considered the cost of the project, how it can be minimized, while ignoring the protection of natural resources.
119	Pradip Chakravarti	Resident	146-148	Onshore	Public Benefit / Need / Energy Resources	Reports indicate that New York does not need this amount of additional gas. Even if all residential and commercial heating units were converted from oil to gas, NESE would deliver twice as much gas as needed.

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120	Pradip Chakravarti	Resident	146-148	Onshore	wetland / waterbody / stormwater impacts	Transco has yet to show that the NESE project is in compliance with New Jersey stormwater management rules. In fact, the stormwater basin design at Compressor Station 206 has numerous errors. In its technical deficiency letter of September 27th, NJDEP has required Transco to consider relocating and/or redesigning portions of the project related to stormwater management.
121	Pradip Chakravarti	Resident	146-148	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Sections of the existing pipelines that will carry the increased gas load are 50 to 60 years old and some pass through densely populated areas. Higher pressure, higher velocity in these lines could accelerate corrosion and result in cracks that could lead to a fire or explosion. The risks are very high, but Transco has yet to submit any plans to test the integrity of these old pipes.
122	Tara Lamont	resident	148-151	Onshore	Alternatives	A video of this project is on Williams/Transco's website and it shows the Compressor Station 206 in the middle of forest that stretches to the horizon. There is nothing that shows the Buddhist vihara next door or the heavy residential and commercial development half a mile away. This should tell you something. They don't know about Google satellite maps. As mentioned, site selection must be reopened and the alternative of just adding a new pipeline should be considered.
123	Tara Lamont	resident	148-151	Onshore	Public Benefit / Need / Energy Resources	The project normally provides more than double the gas that New York City needs, but more troubling is that this decision was based on an outdated 2011 plan. New York City is now, and as stated in a September 2017 ruling, that it is aiming for a goal of 80 percent reduction of greenhouse gasses by 2050. This will actually require reduction in the use of natural gas. And they have asked Con Edison to look at options.
124	Tara Lamont	resident	148-151	Onshore	Air Quality Permit	Point two, rubber stamp the air protection permit that was based on 25-year-old thresholds. The newest hazardous air pollution thresholds that NJ DEP submitted -- I mean developed, is -- in February 2018 has completely different numbers. It is criminal to let this permit not be challenged because things like formaldehyde with 440 pounds per year in the old threshold and the current threshold is 3 and 1/2 pounds per year. And guess what the two turbines at Compressor Station 206 is emitting? The 668 pounds per year. This is true for benzene, it's true for seven hazardous air pollutants. And it's really up to NJDEP to look at this and open this issue up.
125	Tara Lamont	resident	148-151	Onshore	Wetland / Waterbody Impacts	The requirements to fulfill the Freshwater Protection Act and the Clean Water act must be based on factual determination, evaluation and tests. Transco in their application has failed to satisfy the standard, instead using rhetoric all the time that it will seek to minimize impact to the greatest extent possible within the parameters of their project.
126	Elizabeth Roedell	resident	151-154	Onshore	Threatened, Endangered, and Vulnerable Species	In a densely populated state, New Jersey cannot afford to lose any critical habitat that supports resident and migratory birds as well as wildlife. The loss of trees with this removal will take its toll on human health as well, increasing the pollution in an already heavily trafficked area as the toxins will no longer be absorbed by the missing trees.
127	Elizabeth Roedell	resident	151-154	Onshore	Project Location (Safety, Health, and Environmental Concerns)	The added pollution from the compressor station is sure to endanger the lives of the even now at risk children, elderly and disabled who suffer from chronic disease and respiratory ailments.
128	Elizabeth Roedell	resident	151-154	Onshore	Public Benefit / Need / Energy Resources	I ask where the benefits to New Jersey is for the Northeast Supply Enhancement Project? All of this environmental devastation and human health risk to New Jersey and its residents, in order to supply New York City with natural gas it does not need defies logic. Has Williams/Transco provided the New Jersey DEP with any factual proof of this so-called need? The New Jersey DEP has already ruled the Williams/Transco permit application in question is incomplete.
129	Elizabeth Roedell	resident	151-154	Onshore	Project Location (Safety, Health, and Environmental Concerns)	So it begs the question why Williams/Transco selected a site with freshwater wetlands to begin with, a site near an active blasting quarry, and the threat of contamination from the nearby Superfund site. The construction of this compressor station will change the dynamics of the area and could affect the current status of the bedrock and freshwater wetlands raising questions about the future safety of a Superfund site and the threat to the area's clean drinking water with the runoff from the toxins from the compressor station into Carter Brook.

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130	Sid Madison	not identified	154-156	Onshore	Public Benefit / Need / Energy Resources	Very concerned with climate change. Referenced the following: Climate Fast, Special Report 15, and Project Draw Down.
131	Dennis Washington	resident	156-158	Onshore	Project Location (Safety, Health, and Environmental Concerns)	from June 2015 to June 2017, the following incidents have been documented: February 17, 2017, a natural gas pipeline operated by Kinder-Morgan in Refugio, Texas, exploded creating a massive fire. The explosion shook homes 60 miles away. February 10th, 2017, a natural gas pipeline operated by Phillips 66 Pipeline in St. Charles Parish, Louisiana, exploded injuring three workers. February 1st, 2017, a DCP pipeline in Panola County, Texas exploded and created a crater in an airport runway, shutting down the airport for a month. January 17, 2017, a natural gas pipeline operated by DCP Midstream exploded in Spearman, Texas which led to multiple fire crews being called to the scene. August 20, 2016, ten people in New Mexico were killed when they were camping near an underground natural gas pipeline operated by El Paso Energy that suddenly exploded. April 18, 2016, two workers were killed when they struck a pipeline at the Southwest Gas processing plant in Bonnie View, Texas. April 29, 2016, a 30-inch pipeline in Salem Township, operate by Spectra, exploded, severely injuring a worker and caused the evacuation of local businesses and homes. And it goes on and on and on and on. Basically there's really no upside for New Jersey residents or New Jersey at all in this compressor station. And the risks to the current -- in the current location, which is right by the quarry, which conducts explosions and excavations, would tax the existing legacy pipelines that are in place. And by adding a compressor to increase the stress on those pipes would be just a disaster waiting to happen.
132	Jeremy Pollack	resident	159-161	Onshore	Wetland / Waterbody / Stormwater Impacts	Issues with (severe) flooding in area. In Transco's NESE project, perched water is a serious threat as it will exit 10 the natural grade at a lower point and cause additional local flooding; i.e., in addition to the chronic flooding we already have. In particular, perched water is now already repeatedly over-topping Carters Brook earthen retention dam, at Promenade Boulevard in the Princeton Walk. And I'm submitting pictures of that as well. Bottom line, we already have a real serious surface and perched water problem in this area. We cannot afford adding water from the Transco's Northeast Supply Project to our existing perched water problems.
133	Marcia Pollack	resident	162-163	Onshore	wetland / waterbody / stormwater impacts	Should consider the poor drainage in the area and the increase in severe flooding due to climate change.
134	Barbara Cuthbert	resident	163-166	Onshore	Wetland / Waterbody / Stormwater Impacts	For each of the wetlands, the application is missing a thorough, factually based analysis of the value of each wetlands, as well as their specific avoidance of the minimization efforts that they would minimize the impacts.

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135	Barbara Cuthbert	resident	163-166	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Believing that Williams/Transco will follow best practices in their plans and procedures to minimize any impacts on the freshwater wetlands without outside oversight is very worrisome. Earlier this year the Pennsylvania DEP issued notices, plural, of violations to Williams/Transco for not following their soil erosion and sediment plan, for not following their best practices two months in a row. And while they were investigating unauthorized discharge of sediment into wetlands, they saw Williams/Transco's contracted person was using HDD construction methods that were not authorized. Again, also in the Atlantic Sunrise project in Pennsylvania, Williams/Transco removed a stormwater basin over the objections of the township and, following a very heavy rainfall, a mobile home community flooded, even though they didn't flood in earlier years when the basin was there, during events like Tropical Storms Lee and Agnes.
136	Barbara Cuthbert	resident	163-166	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Williams/Transco's record of accidents and hiring contractors who do not follow their procedures makes it all the more important that NJDEP hold their feet to the fire and demand that they follow all New Jersey regulations to the letter of the law. Dancing around issues should not be acceptable to the NJDEP in in their review of this application. Claiming that they will -- that their erosion and sediment control plan will ensure that the waters of New Jersey will not be degraded does not provide any factual determination for the plans in the application. They plan to go through toxic soils, toxic groundwater, dig in shallow acid-producing clay soil, and use horizontal directional drilling in an exceptionally -- in an exceptional value wetland. They did not provide any site-specific analysis to back up their claim that they can protect our waters and our resources from construction in and near wetlands by following their generic plans.
137	Barbara Cuthbert	resident	163-166	Onshore	Wetland / Waterbody / Stormwater Impacts	Claiming that they chose the site for Compressor Station 206 to avoid wetlands as much as possible, it's not accurate since their final possible choices were all on wetlands.
138	Barbara Cuthbert	resident	163-166	Onshore	Wetland / Waterbody / Stormwater Impacts	Not studying or modeling the potential for construction of the Madison Loop to create conditions that exacerbate algal blooms is not something that should be acceptable to the NJDEP.
139	Jessie Lindsay	resident	166-168	Onshore	Public Benefit / Need / Energy Resources	U.S. needs to make serious commitments to reduce GHG emissions.
140	Jessie Lindsay	resident	166-168	Onshore	Threatened, Endangered, and Vulnerable Species	Pipeline will impact threatened and endangered species in the wetlands that will be crossed.
141	Rafael Melendez	not identified	168-171	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Concerned with the quality of the pipe being connected to, understands its 30 years old and connects to other pipes downstream that are about 50-60 years old. In 2013 two MIT professors migrated to Washington, D.C. and they walked 1,500 miles inside Washington, D.C. and they checked every single natural gas manifold and they found that six thousands of them were leaking. Now, that's just Washington, D.C. They didn't check anywhere else. Six thousands of them. Of the six thousand, 19 were explosive. Five hundred thousand parts per million was detected in 19 of them. They told the utility company. And three months later, when they were supposed to come back and check, and they did, 9 of the 19 were still explosive.
142	Rafael Melendez	not identified	168-171	Onshore	Public Benefit / Need / Energy Resources	I'll read you from the United States Energy Information Administration. They have a weekly natural gas storage report. And for this, for October 26th, for natural gas there is a decrease of 623 billion cubic feet, which is less than last year's at this time, and 638 billion cubic feet below the five-year average of 3,781 billion cubic feet. At 3,143 billion cubic feet, total working gas is below the five-year historical range. We're not using natural gas. And oil consumption this month is 3 percent less than last year, and it was 3 percent less the year before. So we're using less oil and less gas.

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143	Steven Georges	resident	171-173	Onshore	wetland / waterbody / stormwater impacts	Already have issues with ponding water in surrounding area.
144	Steven Georges	resident	171-173	Onshore	Wetland / Waterbody / Stormwater impacts	Application is deficient.
145	Dona Lisi-Fazio	resident	173-177	Onshore	Project Location (Safety, Health, and Environmental Concerns)	It is anticipated that the Compressor Station 206 will emit the following toxins, including ammonia, formaldehyde, acetaldehyde, benzene, toluene, ethyl benzene, naphthalene and Xylenes, as well as others in addition to particulate matter and greenhouse gasses. As a pharmacist, I want to share with you the effects of some of these substances that others have briefly mentioned. Based on data from New Jersey's own hazardous substance section, repeated exposure to ammonia, formaldehyde and acetaldehyde may cause an asthma-like allergy and lead to lung damage. The public health toll will be great. Formaldehyde, acetaldehyde and benzene are known carcinogens and mutagens which are substances that cause genetic mutations. Acetaldehyde's Hazardous Substance Fact Sheet, clearly states, in capital letters, that the chemicals are known teratogens, which are substances that cause birth defects. Children may be exposed to higher concentrations of toluene, since it's denser in air and its vapors stay closer to the grounds. Also, children have faster breathing rates than adults and may therefore breathe in more toluene. In older children and in adolescents, repeated exposure to toluene has been associated with the loss of muscle control, loss of memory, balance, and decreased mental abilities. Some of these changes may last for a long time after toluene has even left the body. Exposure to toluene during pregnancy has been associated with birth defects, including retardation of mental abilities and growth. Repeated exposure to benzene can cause aplastic anemia, a life-threatening blood disorder resulting in damage to the bone marrow and blood-producing -- blood-cell-producing stem cells, which leaves the individual vulnerable to sepsis and hemorrhage. Seizures and cardiac arrhythmias have been associated with high exposure to benzene. Toluene, ethyl benzene, naphthalene, these all can cause liver and/or kidney damage
146	Dona Lisi-Fazio	resident	173-177	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Also important are these compounds are flammable. And to that extent poisonous gasses are produced and can result in massive explosions further contaminating the air and water. In fact, acetaldehyde itself is spontaneously decomposed or polymerized to form explosive peroxides when heated, distilled, evaporated or even when contaminated. It's considered flammable, reactive and explosive. And this is just one compound.
147	Patty Cronheim	ReThink Energy New Jersey	177-181	Onshore	Wetland / Waterbody / Stormwater Impacts	NJDEP has the authority under the Clean Water Act to reject this permit because it does not fulfill the requirements of the Freshwater Wetlands Protection Act and New Jersey's requirement under Section 4.04 of the Clean Water Act.

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148	Patty Cronheim	ReThink Energy New Jersey	177-181	Onshore	Project Location (Safety, Health, and Environmental Concerns)	So the NESE project is part of a large Williams expansion. In about a 50-mile radius of where we're standing now, central New Jersey, there's the equivalent of five new or proposed compressor stations. And these would stress the safety dynamics of the pipeline system, our existing system. All this new infrastructure would increase the volume of gas and in some cases operating pressures and velocities through our existing system. Simply put, we'd be pushing more gas faster and hotter through old lines. We know the pipelines are most vulnerable to explosion in the first five years of being built and that they age. Unfortunately, New Jersey has the perfect storm: new and proposed pipelines and compressor stations like NESE, Penny's, the Roseland compressor station, and older aging pipelines at the 500 miles or so of the Williams/Transco system
149	Patty Cronheim	ReThink Energy New Jersey	177-181	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Williams just this summer has been issued a recommended fine of $400,000 by PHMSA. It's an open case for missing plans, missing reports, not following their own plans, lack of inspections and, most scary, running lines at overly high pressure through our communities. And interstate pipelines are already allowed to operate at safety standards lower than New Jersey allows for in-state pipelines.
150	Patty Cronheim	ReThink Energy New Jersey	177-181	Onshore	Project Location (Safety, Health, and Environmental Concerns)	So the two parts of the permit I promised I would talk about and touch on really quickly are the sulfuric acid part of the clays that everyone has mentioned which have a low pH of 3. This would jeopardize pipeline integrity. That's like a can of Coca-Cola. I mean, Coca-Cola has a pH of 3. Imagine what that does to the surface of the car. That's what it does to the linings of pipelines. And it would also increase the risk of HD failure and unstable soils from lack of vegetation
151	Patty Cronheim	ReThink Energy New Jersey	177-181	Onshore	Wetland / Waterbody / Stormwater Impacts	And also the compressor station's stormwater basin. This basin, if it fails, would increase the risk of groundwater contamination from chemical condensation that can collect and build up from the massive cooling systems; oil spills from the lube tanks. In Pennsylvania there was accidentally oil that was vented with the gas and spewed for a square mile in the area. Groundwater contamination from toxic wastewater and potential for hydrostatic hydrocarbon storage tanks.
152	Ted Glick	resident	182-185	Onshore		Need for a moratorium on fossil fuel infrastructure in New Jersey. ClimateFastNJ.com
153	Caren Wilson	resident	185-187	Onshore	wetland / waterbody / stormwater impacts	Permit application does not comply with stormwater management rules and is incomplete.
154	Caren Wilson	resident	185-187	Onshore	Air Quality Permit	Asks NJDEP to re-review the air permits since standards have changed since permits were issued.
155	Caren Wilson	resident	185-187	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Williams/Transco has an issue with poor safety management (Branchburg explosion in 2013).
156	Caren Wilson	resident	185-187	Onshore	wetland / waterbody / stormwater impacts	Have not looked in areas without wetlands from CS206. Proposed location is bad choice for many reasons.
157	Caren Wilson	resident	185-187	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Township not equipped to deal with an explosion.
158	Murthy Upmaka	resident	188-190	Onshore		Company has not presented all design parameters to public to evaluate.
159	Murthy Upmaka	resident	188-190	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Project will emit toxic gasses and spoil the soil.
160	Murthy Upmaka	resident	188-190	Onshore	Public Benefit / Need / Energy Resources	There is no public interest in NJ for project.
161	Murthy Upmaka	resident	188-190	Onshore	Public Benefit / Need / Energy Resources	No economic benefit or other benefits for state.
162	Vinod Gupta	resident	190-192	Onshore		Company has tried to rush through approval process using incomplete and often wrong data, downplaying the risks and amplifying the benefits.
163	Vinod Gupta	resident	190-192	Onshore		Elected officials have asked NJDEP to protect environment and state of NJ.

Transcontinental Gas Pipe Line Company, LLC Gateway Expansion Project
Summary of NJDEP Freshwater Wetlands Individual Permit Application
Public Comments Received at Public Hearing November 6, 2018

Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
164	Vinod Gupta	resident	190-192	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Residents are scared of health effects of living near CS206 and in fear of an accident.
165	Surendra Tiwari	resident	193-196	Onshore	wetland / waterbody / stormwater impacts	No factual determination by Williams/Transco that the erosion and sediment control plan would ensure the ground surface water would not be degraded.
166	Surendra Tiwari	resident	193-196	Onshore	Wetland / Waterbody / Stormwater Impacts	Potential sediment destruction from construction in and around Cheesequake Creek could increase the potential for growth of harmful algal blooms.
167	Surendra Tiwari	resident	193-196	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Madison loop could cross or be very close to several toxic sites with contaminated groundwater or soil- the application does not include soil/groundwater analysis in this area.
168	Surendra Tiwari	resident	193-196	Onshore	Project Location (Safety, Health, and Environmental Concerns)	The pipeline will cross acid producing soils. The compressor station would make it difficult to monitor and would destroy the area.
169	Surendra Tiwari	resident	193-196	Onshore		This Project would add seven dollars a household to Franklin Township taxes.
170	Diane Heyer	resident	196-200	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Compressor station being built in residential area and near an active quarry. Blasting at quarry is felt in residents' homes. Asks if studies have been conducted to gauge impact of dynamite explosions on the compressor station and pipeline.
171	Diane Heyer	resident	196-200	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Contaminants that will be emitted from the smoke stacks should be enough cause not to continue with the project.
172	Diane Heyer	resident	196-200	Onshore		Renewable energy would provide just as many jobs as this project.
173	Diane Heyer	resident	196-200	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Pipeline will cross acid producing soils, impacting plant growth. Will complicated slope stability and restoration efforts, which may impact wetlands and surface waters.
174	Bernadette Maher	resident	200-202	Onshore	Threatened, Endangered, and Vulnerable Species	The NESE project would harm or change habitat for threatened and endangered species. The wetlands along the Madison Loop have suitable foraging habitats for the bald eagle, osprey and black crown-night heron. The wetlands along the Madison Loop have suitable vesting habits for the bald eagle and osprey. As far as we know, Williams/Transco has not completed the requested nesting survey for any area where they plan to cut down trees or destroy habitat or threatened or endangered species. Construction would alter vegetation, increase exposure to wind, light and temperature fluctuations in fragile habitats.
175	Thersea Maturo	resident	202-204	Onshore	Public Benefit / Need / Energy Resources	Project is not infrastructure enhancement, but supply enhancement. Will increase value not safety.
176	Thersea Maturo	resident	202-204	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Concerned about safety and the excessive amounts of pollutants that will be emitted and the impact of pollution emissions on residents.
177	Thersea Maturo	resident	202-204	Onshore	wetland / waterbody / stormwater impacts	No viable alternatives to damaging-wetlands were considered in application.
178	Carol Kuehn	NJ Buddhist Vihara and Meditation Center board member	204-207	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Compressor station will be within 1/4 mile of proposed meditation trail on vihara property.
179	Carol Kuehn	NJ Buddhist Vihara and Meditation Center board member	204-207	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Concerned about environmental and health impacts from station, including air, water, noise pollution on health, and noise disrupting meditation and other religious practices often performed outdoors during warmer months.
180	Carol Kuehn	NJ Buddhist Vihara and Meditation Center board member	204-207	Onshore	Wetland / Waterbody / Stormwater impacts	However, for this hearing we'll focus on our concerns about water issues. One is that building on the proposed site would result in a permanent loss of more than 2 acres of forested wetlands and construction could result in a diminished capacity of intact wetlands to buffer flood flow and to control erosion in an area that already sees significant flooding during periods of rain. Transco has not yet delineated a stormwater management plan or a bioretention basin plan that is acceptable to NJDEP's standards and are unlikely to be able to do so given the high water table and bedrock close to the surface in the area.

Transcontinental Gas Pipe Line Company, LLC Gateway Expansion Project
Summary of NJDEP Freshwater Wetlands Individual Permit Application
Public Comments Received at Public Hearing November 6, 2018

Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
181	Siva Dhandu	resident	207-208	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Has two young kids with asthma. Concerned about impacts on their health from CS206.
182	Barry Kutch	resident, President of Central Jersey State Energy Coalition	209-212	Onshore	Public Benefit / Need / Energy Resources	Those in favor of the project don't live near the compressor station and will not suffer negative effects, and many stand to benefit financially. Those opposed to the project live in the vicinity of the station and are concerned about safety and the destruction of their quality of life.
183	Michael Bell	resident	213-215	Onshore	Public Benefit / Need / Energy Resources	Project will not benefit NJ, will marginally benefit New York, and potentially gas exports.
184	Michael Bell	resident	213-215	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Concerned about the air quality impacts, some of which will end up in waterways and wetlands.
185	Michael Bell	resident	213-215	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Some of the pipes in the loop around the quarry were replaced 30 years ago, but most of the pipe downstream of the compressor station (which will suffer the highest pressure) is over 50 years old. Increased pressure and mass flow in that line will increase the risk of a catastrophic failure through corrosion and fatigue line and vibration. A rupture could release up to a thousand tons of gas, which is what is contained in a section of pipeline between shutoff valves in normal operation. A resulting fire and likely explosion will produce a huge amount of pollution, which will affect the air and water resources and supplies, including the D & R Canal, a source of drinking water for millions of New Jersey residents.
186	Mike Pisauro	Attorney and Policy Director for the Watershed Institute	216-219	Onshore	wetland / waterbody / stormwater impacts	The stormwater management basin is deficient. It's not meeting standards. It didn't meet it in the last application around; it hasn't met it this year. It may never meet it. And that is grounds enough to deny this application.
187	Mike Pisauro	Attorney and Policy Director for the Watershed Institute	216-219	Onshore	Alternatives	The FERC EIS analysis of alternatives is not the true water quality 401 analysis. That is required to be a lot more detailed under federal and state law.
188	Mike Pisauro	Attorney and Policy Director for the Watershed Institute	216-219	Onshore	Wetland / Waterbody / Stormwater Impacts	Under our Freshwater Wetlands Act, under the Surface Water Quality Standard Act regulations, they cannot have an impact to water quality if that water is already impaired. Carter Brook, Heathcote Brook, the Raritan basin is all impaired. The TMDL for the Raritan Basin requires a reduction in pollution in existing sites. This site is going to increase at least TSS, if not other pollution, and they have not met the requirements.
189	David Pringle	Clean Water Action, resident	219-222	Onshore		Can't get to the governor's 100% clean energy commitment if projects like this are approved.
190	Marylou Delahanty	attorney representing a property owner near the Madison Loop	222-224	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Client owns the area of the former Morgan Arsenal. Previously USACE wanted to conduct an investigation to determine if there were still buried ordinances but did not have the funding. Madison loop plans to cross the area and there have been no plans to make any determination as to whether the buried ordinance is an issue and whether there will be further explosions.
191	Michael Kanarek	resident	224-229	Onshore	Public Benefit / Need / Energy Resources	Public interest: will only provide jobs in short term. There is no benefits to NJ from increased gas supply. Increased/cheaper gas goes against NJs 100% clean energy goal.
192	Michael Kanarek	resident	224-229	Onshore	wetland / waterbody / stormwater impacts	Wetlands: Transco must first avoid wetlands, which they did not- they only selected sites with wetlands on them. The wetlands at the proposed site are not isolated, and are connected to Carters Brook. The area already suffers from flooding/runoff and this project would make that worse.
193	Michael Kanarek	resident	224-229	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Safety: The proposal to build discharge and suction piping creates dozens or hundreds more points of engineering failure. Every vent, every bolt, every gasket will be shaken hard by Trap Rock blasting right next door several times a week.
194	Daniel Lima	resident	229-230	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Project will pollute the water with highly toxic chemicals and emit methane (one of the most damaging GHGs).
195	Daniel Lima	resident	229-230	Onshore	Project Location (Safety, Health, and Environmental Concerns)	Potential explosions will devastate communities around the site.

Transcontinental Gas Pipe Line Company, LLC Gateway Expansion Project
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Comment Number	Commenter	Affiliation	Transcript Page Number	Onshore/ Offshore	Topic	Comment
196	Victoria Roth	resident	230-232	Onshore	wetland / waterbody / stormwater impacts	Concerned about impact of CS206 on water resources (canal).
197	Victoria Roth	resident	230-232	Onshore	wetland / waterbody / stormwater impacts	Transco did not meet its burden of showing that alternatives would cause less harm to wetland ecosystems.
198	Victoria Roth	resident	230-232	Onshore	wetland / waterbody / stormwater impacts	Transco's application fails to provide a comprehensive analysis of wetland impacts. No meaningful analysis of wetland impacts was provided in the wetland permit application

From:	Resnick, Matthew
To:	Mochrie, Sara
Cc:	Jones, Christopher; Olson, Karen; Horner, Scott (Scott.Horner@williams.com); Eakin,Megan; Albers, Meghan; Sundar, Nischint
Subject:	RE: Clarification for WFD report. Subsection 7:7-9.13 (shipwreck and artificial reefs) vs 7:7-9.34 (Historic Resources)
Date:	Thursday, December 20, 2018 7:02:34 AM
Attachments:	image001.jpg

Perfect Sara, thank you.

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Wednesday, December 19, 2018 4:42 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Olson, Karen <Karen.Olson@williams.com>; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Sundar, Nischint <NSundar@ene.com>
Subject: [EXTERNAL] Clarification for WFD report. Subsection 7:7-9.13 (shipwreck and artificial reefs) vs 7:7-9.34 (Historic Resources)

Matt,

Here is a response to your clarification request:

Section 7:7-9.13 addresses known cultural sites, including shipwrecks that are identified in nautical charts or that are published within various supporting historic documents. Additionally, Transco used the Automated Wrecks and Obstruction Information System, Electronic Navigational Charts, the New York State Cultural Resources Information System, and restricted databases belonging to the United States Army Corps of Engineers and the Bureau of Ocean Energy Management to identify previously documented shipwreck sites within the Project area of potential effect. As such, the statement under Section 7:7-9.13 is accurate as the proposed pipeline (i.e. construction corridor) does not cross a previously identified shipwreck site.

The cultural targets described in Section 7:7-9.34, refer to the “targeted anomalies” Transco identified during the geophysical surveys associated with the Project. These anomalies exhibit unique signatures that may indicate a potential shipwreck, a submerged prehistoric site, or accumulated debris resulting from illegal dumping. However, in consultation with the New Jersey Historic Preservation Office and the New York State Historic Preservation Office, Transco has established avoidance buffers around each of these anomalies as a safety precaution for all construction activities.

Please let us know if you need anything else.

Thanks,
Sara

Sara Mochrie, *Principal-Regional Manager*
368 Pleasant View Drive Lancaster, NY 14086

Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Tuesday, December 18, 2018 10:07 AM
To: Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Olson, Karen <Karen.Olson@williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] Clarification for WFD report. Subsection 7:7-9.13 (shipwreck and artificial reefs) vs 7:7-9.34 (Historic Resources)

Hi Sara,

I just need a quick clarification for my report. Under section 7:7-9.13 Shipwrecks and Artificial Reefs, the reports says that the Raritan Bay Loop does not cross any identified Shipwrecks. However, under the Historic Resources section (7:7-9.34) it mentions 6 cultural targets within 400 ft of the loop, and 5 more in a larger search radius. It seems like these two sections are in conflict. Could you please clarify?

From:	Mochrie, Sara
To:	Resnick, Matthew; christopher.jones@dep.nj.gov
Cc:	"Dean, Joseph" (Joseph.Dean@Williams.com); Olson, Karen; Albers, Meghan; Eakin,Megan; Bill Macholdt; Sue Quackenbush (squackenbush@amygreene.com); Sheppard, Evan; Horner, Scott (Scott.Horner@williams.com); Sundar, Nischint; Poirrier, Alyssa
Subject:	FW: GIS Shape files and Digital excel list of blocks and lots
Date:	Thursday, January 3, 2019 9:44:16 AM
Attachments:	NJDEP_NESE_BlockLots_20190102.xlsx NESE_ProjectFeatures_Shapefiles_NJDEP_20181228.PIZ 080216_Sayreville Correspondence.pdf
Importance:	High

Matt,

Attached is the spreadsheet listing the parcels crossed by LODs, and a zip file with the shapefiles of LODs and centerline.

NJDEP will need to change .PIZ to .ZIP to open.

We are also including a response to comment made by NJDEP on the DEIS. This information, which may help your review, was provided with our response to comments filed with FERC in May 2018.

Let us know if you need anything else.

Take care,
Sara

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Wednesday, December 26, 2018 2:21 PM
To: Mochrie, Sara <SMochrie@ene.com>; Olson, Karen (Karen.Olson@williams.com) <Karen.Olson@williams.com>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: GIS Shape files and Digital excel list of blocks and lots

Sara,

Do you have a GIS shapefiles for the two loops and compressor station, and a excel list of the blocks and lots. Requested by the Green Acres review person to confirm no impacts to public open spaces.

McKENNA, DuPONT, HIGGINS & STONE

A PROFESSIONAL CORPORATION
ATTORNEYS AT LAW

EDWARD J. McKENNA, JR. *
MICHAEL R. DuPONT *
KERRY E. HIGGINS
JENNIFER STONE HALL [O]
EDWARD G. WASHBURNE
* Member of N.J., N.Y. & WASH D.C. Bar
[O] Member of N.J. & N.Y. Bar

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http:\\www.redbanklaw.com

William T. McGovern
Gordon N. Gemma
Of Counsel

August 2, 2016

Monica N. Stahl, Esquire
RUTTER & ROY
3 Paragon Way, Suite 300
Freehold, NJ 07728

Re: **Transcontinental Gas Pipe Line Company, LLC**
Block 451, Lot 1.09, Block 454, Lot 1 and Block 459, Lot 1
Borough of Sayreville, Middlesex County, New Jersey

Dear Ms. Stahl:

Please accept this correspondence as confirmation that the above property is not a property designated as Open Space properties.

Should you have any questions regarding this matter, please do not hesitate to contact me.

Very truly yours,

Michael R. DuPont

MICHAEL R. DuPONT
Direct email: dupont@redbanklaw.com

MAM
cc Jay Cornell, P.E.
Daniel E. Frankel, Business Administrator

Northeast Supply Enhancement (NESE) Project

Project Meeting Minutes

To: Williams Compressor Station 206 Team
From: Pete Haas (AECOM)
Date: January 8, 2019
RE: Stormwater Design Follow-up

Participants

Williams: Brian Ham
AECOM: Pete Haas
E&E: Meghan Albers, Sara Mochrie
NJDEP: Stephen Olivera

Meeting Summary

1) Transco participated in a conference call to discuss the stormwater design revisions at Compressor Station (CS) 206. Mr. Haas began the call stating that further revisions to the stormwater management plans and calculation have been made following the meeting/conference calls previously held with New Jersey Department of Environmental Protection (NJDEP) on October 18, 2018 and December 6, 2018, which were submitted via email on December 21, 2018. Mr. Olivera confirmed he had received this information. Mr. Haas inquired if Mr. Olivera had any comments based on his review that information. Mr. Olivera offered the following:
2) With respect to comparing the water quality design storm routing elevation of the infiltration basin against the outlet structure elevation, Mr. Olivera indicated that aspect looked good.
3) With respect to the Mounding Analysis:
    a. Mr. Olivera observed that the recharge rate used in the mounding analysis utilized the lowest tested field rate, and suggested re-running the analysis using the highest tested field rate for a more conservative approach as it would presumably result in a higher mounding elevation. Mr. Haas indicated that this could be done, and also noted that since the horizontal conductivity rate is directly linked to the recharge rate, that it would also be affected by this change
    b. Mr. Olivera questioned the use of 0.17 for the Specific Yield of the soil since it is based in Cape May County. Mr. Haas indicated that this is the value that is specified within the USGS/NJDEP groundwater mounding guidance document. Mr. Haas also indicated that the value of specific yield is based more on the soil type (silt, sand, clay, etc.) rather than geographic region. Mr. Olivera requested documentation be provided to support the 0.17 value, and also mentioned that in lieu of that information, a value of 0.15 could be used.

c. Mr. Olivera inquired as to why a horizontal hydraulic conductivity ratio of 10:1 was used. Mr. Haas responded that this is the value that is specified within the USGS/NJDEP groundwater mounding guidance document. Mr. Olivera requested that the location within the guidance document listing this value be provided, and also mentioned that NJDEP may be leaning towards using a lesser ratio of 5:1 in the future.

d. Mr. Olivera inquired if another mounding scenario could be run with an initial aquifer thickness of 10' with the model adjusted for half of the basin size.

4) Following discussion of the Mounding Analysis, Mr. Haas briefly ran through the remaining comments in the September 27, 2018 review letters, indicating the revisions that have been made and included within the documents provided to NJDEP on December 21, 2018.
5) With respect to the two (2) smaller detention basins adjacent to the proposed access road, Mr. Ham inquired that since the revised submission documents included a liner within the basins to provide separation from groundwater, if field test pits would still be required. Mr. Olivera indicated that NJDEP has previously approved plans with lined basins, however would still want field test pits performed.
6) Call adjourned.

Action Items

Action	Lead	Timeframe
Review/perform mounding analysis revisions based on discussion – Submit to NJDEP as draft for review.	AECOM	Week Ending 1/18/19
Perform test pits in smaller basins	AECOM	Week Ending 1/25/19 (Weather Pending)
Submit final package to NJDEP.	AECOM	2/15/19

From: Haas, Peter <Peter.Haas@aecom.com>
Sent: Friday, January 11, 2019 10:28 AM
To: 'Stephen.Olivera@dep.nj.gov' <Stephen.Olivera@dep.nj.gov>
Cc: joseph.dean@williams.com; Ham, Brian <Brian.Ham@Williams.com>; Mochrie, Sara <SMochrie@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>
Subject: CS 206 - 01/08/2019 NJDEP Meeting Minutes

Stephen –

Thanks for taking the time to talk with us earlier this week related to the stormwater revisions at CS 206. Attached are the meeting minutes for your records. If you have any comments to them, just let me know.

We're planning on updating the mounding analysis by mid next week and sending that over for you to take another look. Would you have any time towards the end of the week for another brief call?

Thanks again and have a great weekend!

Peter P. Haas, P.E.
Senior Civil Engineer
D 610.832.8832
peter.haas@aecom.com

AECOM
625 West Ridge Pike, Suite E-100
Conshohocken, PA 19428
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www.aecom.com

Before printing please consider the environment

From: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Sent: Thursday, February 7, 2019 3:03 PM
To: Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; MacLeod, Steven <SMacLeod@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Marean, Kathleen <KMarean@ene.com>; Davis, Kelly <Kelly.Davis@dep.nj.gov>; Daniels, Tim <Tim.Daniels@dep.nj.gov>
Subject: RE: NESE - Response to NJDEP Bureau of Marine Fisheries

Sara,

The timing restriction for Blue Crabs can be modified to allow backfilling and reinstatement activities associated with the 2 HDD pits from December 1 to December 14. This change is for the 2 HDD pits only. Let me know if you have any questions.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

On Feb 6, 2019, at 11:42 AM, Jones, Christopher <Christopher.Jones@dep.nj.gov> wrote:

> Sara,
>
> I've asked our Bureau of Marine Fisheries for confirmation that the timing restriction can be delayed by 2 weeks. I'm waiting for their response.
>
> ---
>
> **From:** Mochrie, Sara <SMochrie@ene.com>
> **Sent:** Tuesday, February 05, 2019 8:35 PM
> **To:** Jones, Christopher <Christopher.Jones@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
> **Cc:** Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; MacLeod, Steven <SMacLeod@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Marean, Kathleen <KMarean@ene.com>
> **Subject:** [EXTERNAL] RE: NESE - Response to NJDEP Bureau of Marine Fisheries
>
> Chris,
>
> Thank you for confirming the NJDEP-recommended TOY restriction period for blue crab.
>
> However, we still have a question relative to the response letter we provided.
>
> We ask that NJDEP to confirm the acceptability of Transco's request for flexibility to allow backfilling and reinstatement at the Ambrose HDD pits (MP29.5 and MP30.4) in early December, provided that crab harvesters are notified at least 30 days in advance.
>
> This would result in a partial overlap with the restricted period for blue crab and the harvester notification is intended to reduce any potential impact.
>
> Thanks in advance,

Sara

From: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Sent: Tuesday, February 5, 2019 11:20 AM
To: Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; MacLeod, Steven <SMacLeod@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Marean, Kathleen <KMarean@ene.com>
Subject: RE: NESE - Response to NJDEP Bureau of Marine Fisheries

Sara,

The restricted period for Blue Crab in NJ is **December 1 to March 31**

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Monday, February 04, 2019 11:48 AM
To: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; MacLeod, Steven <SMacLeod@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Marean, Kathleen <KMarean@ene.com>
Subject: [EXTERNAL] RE: NESE - Response to NJDEP Bureau of Marine Fisheries
Importance: High

Chris – Just following-up on this inquiry and time of year restriction for blue crab.

Please let me know if you heard anything back.

Thanks,
Sara

From: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Sent: Wednesday, January 23, 2019 8:25 AM
To: Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; MacLeod, Steven <SMacLeod@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Marean, Kathleen <KMarean@ene.com>
Subject: RE: NESE - Response to NJDEP Bureau of Marine Fisheries

Sara,

I will find out and get back to you.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Tuesday, January 22, 2019 2:21 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; MacLeod, Steven <SMacLeod@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Marean, Kathleen <KMarean@ene.com>
Subject: [EXTERNAL] FW: NESE - Response to NJDEP Bureau of Marine Fisheries
Importance: High

Chris and Matt,

Per the response we sent on January 14th there is one item which we need your input. This relates to the time of year restriction relative to blue crab. The information to review is on page 8 of the letter submitted on January 14 (attached here).

Please let us know if you can provide feedback on this point.

Thanks!
Sara

From: Mochrie, Sara
Sent: Monday, January 14, 2019 11:27 AM
To: christopher.jones@dep.nj.gov; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Foster, Ruth <Ruth.Foster@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Clements, Blake (Blake.Clements@williams.com) <Blake.Clements@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Kellogg, Stephen (Stephen.Kellogg@Williams.com) <Stephen.Kellogg@Williams.com>; Behrends, Sarah <sarah.behrends@williams.com>; Martinez, Chris (Chris.Martinez@williams.com) <Chris.Martinez@williams.com>; Christine Roy <croy@rutterroy.com>; Richard Scott <rscott@rutterroy.com>; Albers, Meghan <MAlbers@ene.com>; Eakin,Megan <MEakin@ene.com>; Sundar, Nischint <NSundar@ene.com>; MacLeod, Steven <SMacLeod@ene.com>; Marean, Kathleen <KMarean@ene.com>
Subject: NESE - Response to NJDEP Bureau of Marine Fisheries
Importance: High

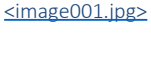
Ruth, Chris, and Matt,

Please see the attached response to comments submitted by NJDEP to FERC on the Northeast

Supply Enhancement Project (NESE) DEIS. The comments relative to marine resources have been addressed and reflect the outcome of recent discussions with NOAA Fisheries and NYSDEC.

If you have any further questions or needs, please don't hesitate to contact us.

Take care,
Sara



Sara Mochrie, *Principal-Regional Manager*
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Transcontinental Gas Pipe Line Company, LLC
Land, Permits & GIS Department
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

January 11, 2019

New Jersey Department of Environmental Protection
Office of Permit Coordination and Environmental Review
401 East State Street
P.O. Box 420
Trenton, New Jersey 08625

Attention: NJDEP, Ruth Foster, Acting Director

Reference: Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Docket No. CP17-101-000
Additional Comments on Supplemental Reports to Draft EIS

Ms. Foster:

On November 7, 2018, the NJDEP Office of Permit Coordination and Environmental Review filed comments with the Federal Energy Regulatory Commission ("Commission") on the Supplemental Reports to the Draft Environmental Impact Statement. Provided herein, are Transcontinental Gas Pipe Line Company, LLC's. ("Transco") response to those comments provided by the NJDEP Bureau of Marine Fisheries. Transco's response is attached.

Consistent with Section 385.2005(a) of the Commission's regulations, the undersigned has read this filing and knows its contents; the contents are true as stated, to the best of his knowledge and belief; and the undersigned possesses full power and authority to sign this filing.

Consistent with Section 385.2010 of the Commission's regulations, Transco is serving copies of this filing to each person whose name appears on the official service list for this proceeding.

If you have any questions regarding this filing, please contact Scott Horner at (713) 215-4953 (scott.horner@williams.com).

Respectfully,

Transcontinental Gas Pipe Line Company, LLC.

Joseph Dean
Manager, Environmental Permitting, Atlantic-Gulf Operating Area

cc:

Christopher Jones, NJDEP Land Use
Matthew Resnick, NJDEP Land Use
Kelly Davis, NJDEP DFW
Tim Davis, NJDEP BMF
Kira Dacanay, NJDEP BMF
Shawn LaTourette, NJDEP
Richard Dalton, NJGS

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

RESPONSES TO ENVIRONMENTAL INFORMATION REQUEST

DATED NOVEMBER 7, 2018

NORTHEAST SUPPLY ENHANCEMENT PROJECT

JANUARY 2019

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
Docket No. CP17-101-000 — Northeast Supply Enhancement Project
Responses to Environmental Information Requests dated November 7, 2018

Comment No. 1

The Bureau of Marine Fisheries (BMF) has several comments regarding the proposed Transco Northeast Supply Enhancement Project planned developments. The primary concern is the proposed extent of disturbance to the seafloor due to activities associated with the development of a new pipeline through the Raritan Bay.

a. The Southern New England/Mid-Atlantic winter flounder stock is near historic lows and the proposed pipeline construction location occurs within a region which has been determined to be Essential Fish Habitat for all life history stages of winter flounder. As such, the timing restrictions on dredging and development which have been established to protect the spawning and vulnerable life history stages of winter flounder should be observed. If any work is done during this time, BMF recommends any techniques or equipment that results in the least amount of turbidity.

b. Additionally, dredging and development timing restrictions which protect anadromous fish migrations (e.g. endangered populations of Atlantic and shortnose sturgeon) should also be observed.

c. Blue crab dredging and development timing restrictions should be observed so as to protect the overwintering populations along the major channels. If work is to be done during the timing restrictions, the commercial crab fishermen should be notified ahead of time.

Response:

a. Transco has committed to no dredging in waters shallower than 20 feet or within a 500-foot buffer of the 20-foot MLLW contour (winter flounder avoidance areas) during the winter flounder time of year restriction (TOYR) (December 15 through May 31) to protect winter flounder spawning, eggs and larvae. However, in a November 9, 2018 meeting, the NOAA National Marine Fisheries Service (NOAA Fisheries) and New York State Department of Environmental Conservation (NYSDEC) indicated to Transco they would be willing to allow backfilling activities in the winter flounder avoidance areas to continue from December 15 to January 1. During a December 13, 2018 conference call, NYSDEC staff further indicated that if Transco is unable to complete backfilling activities by January 1, they were agreeable to leaving portions of the trench partially backfilled during the remainder of the winter flounder TOYR. Therefore, Transco plans to backfill as necessary in the winter flounder avoidance areas until January 1, but no backfilling will take place in these areas from January 1 through May 31. Best management practices to limit turbidity during backfilling between December 15 and January 1 will include releasing the backfill material below the sea surface, approximately 5 feet above the seafloor.

b. Transco commits to adhering to TOYR in New Jersey waters for anadromous fish migrations (March 1 through June 30), allowing for flexibility in clamshell dredging activities to start June 1. In a July 26, 2018 meeting with New Jersey Department of Environmental Protection

(NJDEP) and NOAA Fisheries, staff from both agencies agreed that regarding the river herring TOYR between MP12.5 and MP14.0, dredging and pile installation would likely be allowed in June. In the November 9, 2018 meeting, NOAA Fisheries stated that they will allow flexibility for the river herring and Atlantic sturgeon timing restrictions, and construction activities may begin June 1 between MP12.5 and MP14.0.

Regarding Atlantic sturgeon time of year restrictions for clamshell dredging activities, in a November 9, 2018 meeting, NOAA Fisheries expressed that for dredging activities between MP30.0 and MP35.5 between March 1 and April 30, work could occur if Atlantic sturgeon were generally not present in the area. Atlantic sturgeon presence might be predicted through water temperature, but would need to be confirmed through acoustic monitoring. However, NOAA Fisheries indicated they still need to determine what specific abundance threshold would be used and the type of acoustic monitoring equipment that would be required. The New York State Department of Environmental Conservation (NYSDEC) was also in attendance at this meeting and concurred with the above timing restrictions for Atlantic sturgeon in New York waters.

In a November 9, 2018 meeting, NOAA Fisheries indicated that hand jetting and submersible pump activities in New Jersey waters can be allowed during the spring Atlantic sturgeon TOYR (March 1 through June 30). During the December 13, 2018 conference call, NYSDEC (in consultation with NOAA Fisheries) indicated spool installation, hydrostatic testing, and dewatering activities can be allowed during the fall Atlantic sturgeon TOYR (October 1 through November 30). Therefore, Transco will conduct these activities as necessary during this period.

NOAA Fisheries has identified the Atlantic sturgeon timing restriction for pile installation activities at MP30.4 (the Ambrose HDD east pit) is May 1 through June 30. Transco has requested flexibility from NOAA Fisheries for this timing restriction so that pile installation activities can begin June 6, 2020 in order to avoid a knock on effect to the Ambrose HDD completion, pipelay, and ultimately reinstatement. As part of this flexibility request, during the December 13, 2018 conference call, NYSDEC (in consultation with NOAA Fisheries), indicated that they would not grant the flexibility requests at MP30.4 for Atlantic sturgeon. NYSDEC also stated that they further discussed the remaining Atlantic sturgeon flexibility request with NOAA Fisheries regarding dredging at MP30.4 in June, and determined that this flexibility request will not be granted. As such, Transco is committing to not installing piles or dredging in this location during the Atlantic sturgeon timing restriction.

Reinstatement activities in New Jersey waters as proposed will not occur within Atlantic sturgeon timing restrictions outlined by NOAA Fisheries (March 1 through June 30) (Table 1[1]).

[1] Table 1 has been updated to account for the approved time of year restriction flexibility requests by NOAA Fisheries, NYSDEC, and those presented in the NJDEP BMF comment letter dated October 31, 2018 (wherein responses are being provided here).

Table 1
Construction and Restoration Schedule

Task	Start Date[a]	Completion Date[a]
New Jersey/New York		
Raritan Bay Loop[b]		
Dredge Trench for Morgan Shore Approach HDD String and Exit Pit at MP12.5	Q2 2020	Q3 2020
Lay Morgan Shore Approach HDD String	Q3 2020	Q3 2020
Morgan Shore Approach HDD Crossing (set-up, pull through, and hydrostatic test)	Q2 2020	Q3 2020
Neptune Cable Crossing Construction at MP13.9	Q2 2020	Q2 2020
Neptune Cable Crossing Construction at MP35.2	Q3 2020	Q3 2020
Dredge Ambrose HDD Crossing East and West Pits	Q2 2020	Q3 2020
Lay Ambrose HDD String	Q3 2020	Q3 2020
Ambrose HDD Crossing (set-up, pull through, and hydrostatic test)	Q3 2020	Q3 2020
Pre-lay Trench from MP12.5 to MP16.6	Q2 2020	Q3 2020
Dredge and Subsea Tie-In Skid Installation	Q3 2020[c]	Q3 2020
Valve Spool Installation on RDL Manifold	Q3 2020	Q3 2020
Pipelay from MP12.5 to MP16.6	Q3 2020	Q3 2020
Post-pipelay Burial and Backfill from MP12.5 to MP16.6	Q3 2020[c]	Q4 2020
Pipelay from Ambrose HDD East Pit, MP30.4 to MP35.5	Q3 2020c	Q3 2020
Pipelay from Ambrose HDD West Pit, MP29.5 to MP16.6	Q3 2020	Q3 2020
Post-pipelay Burial and Backfill Ambrose HDD East Pit, MP30.4 to MP35.5	Q3 2020	Q3 2020
Post-pipelay Burial and Backfill Ambrose HDD West Pit, MP29.5 to MP16.6	Q3 2020	Q4 2020
Hydrostatic Test and Pre-commissioning, MP12.0 to MP35.5	Q4 2020	Q4 2020
Complete Spool Installation from Subsea Tie-In Skid to RDL at MP35.5	Q3 2020	Q4 2020
Backfill RDL Manifold and Tie-in Skid at MP35.5	Q4 2020	Q4 2020

[a] Dates are as of December 2018.

[b] Mileposts are approximations and reported to the tenth.

[c] Indicates a change in the schedule with the adoption of the time of year restrictions and flexibility requests.

Key:
HDD = Horizontal directional drill
MP = Milepost
Q = Yearly quarter
RDL = Rockaway Delivery Lateral

c. At this time, Transco commits to adhering to the TOYR in New Jersey waters for blue crab (December 15 through May 31), but is renewing its request for flexibility to perform backfilling and reinstatement activities through December 10 at the Ambrose HDD east and west pits (MP30.4 and MP29.5). Allowance of this activity during the blue crab timing restriction would minimize the overall duration of construction and cap the HDD pits with sand to restore the habitat prior to the subsequent blue crab and winter flounder TOYR periods (through May 31). At the recommendation of the NJDEP Bureau of Marine Fisheries (BMF), Transco also commits to notifying crab fishermen at least 30 days in advance of construction activities during the blue crab timing restriction.

   In the November 9, 2018 meeting, NOAA Fisheries expressed concern with blue crab habitat near the Ambrose Channel in New Jersey waters, and recommended that Transco further consult with the BMF.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

Comment No. 2

The BMF is concerned about the potential loss of access to fishing grounds for both mobile and stationary bottom gear fisheries. The BMF believes the potential loss of access to recreational fishing grounds is limited since this region is already heavily trafficked and will only be a significant issue during the time period of construction. The main concern is loss of mobile fishing gear to entanglement with the pipeline in areas where significant scouring may be an issue. Any significant scouring may result in less than the required four feet of depth below the seafloor for the pipeline. The BMF suggests selecting a route alternative that avoids any areas where scouring may be determined to be an issue.

Response:

Construction within the offshore pipeline right-of-way (ROW) itself could discourage commercial fishers' access to fishing grounds for both mobile and stationary bottom gear fisheries. However, only portions of this area will be undergoing construction at any one time during the 9-month construction period, beginning in the second quarter of 2020. Compared with the fishing grounds available throughout Raritan Bay, Lower New York Bay, and the proximal areas of the Atlantic Ocean, the impact will be negligible. Picket boats will discourage commercial fishing vessels from entering active workspaces, but fishers will have undeterred access to the inactive portions of the construction ROW. Moreover, prior to construction in any major bottom-gear fishery areas (e.g., clam harvest areas), Transco will coordinate with NJDEP to coordinate construction timing, such that commercial fishers' have the opportunity to harvest those areas before construction begins.

As part of the siting criteria, Transco evaluated the potential for scouring along the various offshore alternative routes. Transco has selected the preferred offshore route to avoid areas where scouring has been determined to be an issue. Additionally, Transco will conduct a post-construction survey of the entire route to identify and address any areas that may require supplemental backfill, including jet-trenched segments. Similar to the Rockaway Delivery Lateral Project in New York waters, which has a 5-year post construction survey requirement, Transco will also resurvey the entire Raritan Bay Loop route at routine intervals to determine if the route requires further supplemental backfill or other maintenance.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

Comment No. 3

The BMF suggests avoiding or minimizing any disturbances to the seafloor during the pipeline construction and shoreline development phases of the project. The use of established waterfront terminals and support facilities is also encouraged to minimize disturbance to important benthic habitats across the proposed areas of development.

Response:

The offshore Project route has been designed to minimize direct impacts on the seafloor through Project siting, construction method selection (i.e. use of the jet trencher where feasible), and the adoption of construction best management practices (i.e. the use of an environmental bucket for all clamshell dredging activities). Additionally, Transco will temporarily use two waterfront contractor yards to support offshore construction activities and minimize disturbance to offshore habitats. The first contractor yard will be 5.5 acres of leased space at the existing Construction and Marine Equipment (C&ME) yard located in Elizabeth, New Jersey. The C&ME site would provide land-side access to the yard and function as the dock facility for offshore construction, with direct barge access along the Arthur Kill waterway. The second contractor yard will consist of approximately 5.8 acres of the existing Weeks Marine Contractor Yard (Weeks Yard) to stage vessels and store associated construction equipment. The Weeks Yard is located approximately 10.20 miles from the Raritan Bay Loop at the foot of Colony Road in Jersey City, New Jersey, in a highly developed industrial area within the New York/New Jersey Harbor complex. The location is near the mouth of the Hudson River and provides direct barge access to Upper New York Bay. It is currently used for construction support and vessel-loading operations. Land-side access to the Weeks Yard is available from Port Jersey Boulevard along pre-existing paved roadways.

Prepared by:

Scott Horner
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Comment No. 4

a. The proposed blue crab timing restrictions are from December 01 to April 30 (12/1 - 4/30).

b. Proposed anadromous timing restrictions are from March 01 to June 30 (3/1 - 6/30). Transco has requested to work during the month of June and National Oceanographic and Atmospheric Administration (NOAA) has said they will look into the possibility.

c. Winter flounder timing restrictions are from December 15 to May 31 (12/15 to 5/31) in waters shallower than 20 feet mean lower low water (MLLW).

Response:

a. Acknowledged, see response to Comment No. 1c, above.

b. Acknowledged, see response to Comment No. 1b, above.

c. Acknowledged, see response to Comment No. 1a, above.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

Comment No. 5

a. BMF defers to NOAA regarding sturgeon timing restrictions for clamshell dredging activities.

b. Anadromous timing restrictions can be modified to allow for clamshell dredging start dates of June 1 at MP 12.5 to 14.5, 25 and 30.4.

c. Clamshell dredging at mile post 25, located in Chapel Hill Channel, has an average depth of 30 according to the contour lines found in figure 1 of the sed mod mixing map, previously received from Transco. The proposed construction commencement of May 01, 2020 occurs during the winter flounder timing restriction. Should the dredging move into waters that have depths of 20 feet or less, winter flounder timing restrictions should be implemented.

Response:

a. Acknowledged, see response to Comment No. 1b, above.

b. Transco appreciates the anadromous fish timing restriction flexibility granted by BMF for clamshell dredging in June in New Jersey waters. However, during the December 13, 2018 conference call, NYSDEC (in consultation with NOAA Fisheries) indicated that they would not grant the flexibility requests at MP30.4 for Atlantic sturgeon. As such, Transco is committing to not dredging or installing piles in this location during the Atlantic sturgeon timing restriction.

c. Transco has consulted with NYSDEC and NOAA Fisheries on activities proposed at the Chapel Hill Channel crossing, which is entirely within New York waters. As stated in the response to Comment No. 1a, Transco has committed to not dredging in waters shallower than 20 feet or within a 500-foot buffer of the 20-foot MLLW contour during the winter flounder TOYR to protect winter flounder spawning, eggs, and larvae. However, NOAA Fisheries and NYSDEC have agreed to allow backfilling from December 15 to January 1 if necessary.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

Comment No. 6

BMF defers to New York State (NY) and NOAA regarding horseshoe crab timing restrictions. BMF does not have any timing restrictions regarding horseshoe crabs.

Response:

The NYSDEC and NOAA Fisheries confirmed in a November 9, 2018 meeting that neither agency has a timing restriction for horseshoe crabs. Therefore, there is no identified TOYR for horseshoe crabs for Project construction activities.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

Comment No. 7

a. BMF defers to NOAA regarding sturgeon timing restrictions for platform pile and goal post installation activities (PPGI).

b. PPGI is not recommended during May due to the winter flounder timing restrictions in place to protect eggs. Should the eggs be buried the chance of survival significantly decreases.

c. In June, herring will likely have made it up the rivers and out of the area of effect of PPGI activities. Regarding PPGI at MP 12.5, BMF recommends that the platform pile and goal post installations begin at the furthest MP from the shore, and to gradually work inland towards 12.5. The start date of June 08, 2020 at MP 30.4 should have little to no effect on herring.

Response:

a. As introduced above in response to Comment No. 1b, NOAA Fisheries is not concerned about timing restrictions for Atlantic sturgeon for MP12.2-MP14.0 during platform pile and goal post installation activities.

b. Transco understands the concern presented by BMF and is not currently proposing any platform pile and goal post installation activities for May.

c. Williams commits to installing the platform pile and goal posts (located between MP 12.5 and MP 12.6) starting at the furthest MP from the shore and will work inland towards MP 12.5.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

Comment No. 8

a. BMF defers to NOAA regarding sturgeon timing restrictions for hand jet, submersible pump, horizontal directional drill, spool and pipeline installation, lowering with jet trencher, hydrotest and drying, activities.

b. In June, herring will likely have made it up the rivers and out of the area of effect of these activities. BMF does not have any timing restrictions in October and November.

Response:

a. In a November 9, 2018 meeting, NOAA Fisheries indicated that hand jetting and submersible pump activities in New Jersey waters can be allowed during the spring Atlantic sturgeon TOYR (March 1 through June 30). Based on the feedback from NOAA Fisheries, Transco is no longer asking for Atlantic sturgeon TOYR flexibility in October for HDD activities at the Ambrose HDD east pit or for jet trenching activities between MP30.4 and MP35.5. During the December 13, 2018 conference call, NYSDEC (in consultation with NOAA Fisheries) indicated spool installation, hydrostatic testing, and dewatering activities can be allowed during the fall Atlantic sturgeon TOYR (October 1 through November 30). Therefore, Transco will conduct these activities as necessary during this period.

b. Through consultation with NOAA Fisheries, Transco concurs with the NJDEP comment; the offshore activities proposed in June are not expected to affect river herring migration.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

Comment No. 9

BMF defers to NOAA regarding sturgeon timing restrictions for reinstatement activities. Reinstatement of areas sounds like it will be harmful to both blue crab and winter flounder. More information on this process may give cause for adjustment of timing restrictions. At this point, BMF suggests implementing both timing restrictions: blue crab timing restrictions in areas of channels, and winter flounder restrictions in areas of water depth of 20 feet or less. The alternate dates fall in the anadromous timing restrictions. The herring will be further up into the rivers and will have little to no effect from the back-filling activities involved in reinstating areas.

Response:

Reinstatement activities in New Jersey waters as proposed will not occur within Atlantic sturgeon timing restrictions outlined by NOAA Fisheries (March 1 through June 30) (see Table 1 in response to Comment No. 1b, above).

Reinstatement activities in New Jersey waters are currently proposed for Q3 and Q4 of 2020 (Table 1), which overlaps with the New Jersey timing restrictions for blue crab and winter flounder in December. Transco's renewed request for flexibility at the start of the blue crab season is discussed above in response to Comment No. 1c.

As stated in the response to Comment No. 1a, NOAA Fisheries and NYSDEC have agreed to a flexibility request from December 15 to January 1 for backfilling activities. Additionally, Transco has committed to not conducting construction activities in waters shallower than 20 feet or within a 500-foot buffer of the 20-foot MLLW contour during the timing restriction.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

From: Haas, Peter <Peter.Haas@aecom.com>
Sent: Wednesday, January 16, 2019 11:53 AM
To: 'Stephen.Olivera@dep.nj.gov' <Stephen.Olivera@dep.nj.gov>
Cc: joseph.dean@williams.com; Ham, Brian <Brian.Ham@Williams.com>; Mochrie, Sara <SMochrie@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>
Subject: RE: CS 206 - 01/08/2019 NJDEP Meeting Minutes

Hi Stephen –

We've revised the mounding analysis for the CS 206 infiltration basin, per our discussion last week, which I have attached. The analysis has been updated to include an additional iteration (c), which includes modifying the input parameters you requested (highest recharge rate, 0.15 specific yield, 5:1 horizontal conductivity ratio, 10 ft initial saturated zone for ½ the basin). The results indicated that the groundwater mound increases from the previous iterations, but is still beneath the bottom of the basin.

If you have any questions, feel free to reach out to me. Thanks!

Peter P. Haas, P.E.
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Before printing please consider the environment

From: Haas, Peter
Sent: Friday, January 11, 2019 12:28 PM
To: 'Stephen.Olivera@dep.nj.gov'
Cc: 'joseph.dean@williams.com'; 'Ham, Brian'; 'SMochrie@ene.com'; 'Eakin,Megan'; 'Albers, Meghan'
Subject: CS 206 - 01/08/2019 NJDEP Meeting Minutes

Stephen –

Thanks for taking the time to talk with us earlier this week related to the stormwater revisions at CS

206. Attached are the meeting minutes for your records. If you have any comments to them, just let me know.

We're planning on updating the mounding analysis by mid next week and sending that over for you to take another look. Would you have any time towards the end of the week for another brief call?

Thanks again and have a great weekend!

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CLIENT: Transco **SUBJECT:** Mounding Analysis **PREPARED** PPH **DATE** 01/16/2019
PROJECT: NESE CS 206 **CHECKED** JAC **DATE** 01/16/2019
REVIEWED JAC **DATE** 01/16/201

PROJECT DESCRIPTION:

Transcontinental Gas Pipe Line Company, LLC (Transco) is proposing to construct a Compressor Station (CS 206) in Franklin Township, Somerset County, New Jersey. The project will involve the construction of small buildings, gravel access road and parking areas, gravel equipment pads, and the installation of two gas pipelines (a suction line and a gas discharge line) to connect the proposed compressor station to the existing natural gas transmission line.

ANALYSIS PURPOSE:

The standards for groundwater recharge found in the New Jersey Administrative Code (N.J.A.C.) 7:8-5.4 (a).2.i.(2) state that the design engineer shall, demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two- year storm is infiltrated. To meet this requirement, a surface infiltration basin has been proposed to capture, treat and infiltrate runoff. Pursuant to Section 9.5 of the New Jersey Stormwater Best Management Practice (NJ SW BMP) Manual, a minimum two foot (2') vertical separation is required between the bottom of the basin and the elevation of the season high water table (SHWT) or bedrock.

The purpose of this analysis is to assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts, which are defined according to N.J.A.C. 7:8-5.4 (a).2.iv as causing surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems in the vicinity of the groundwater recharge area. Since no structures, basements or sewage disposal systems are located within the vicinity of the infiltration basin; this analysis will focus on surficial ponding.

REFERENCES:

1. "Simulation of Groundwater Mounding Beneath Hypothetical Stormwater Infiltration Basins", U.S. Geological Survey Scientific Investigations Report 2010-5102, prepared in cooperation with the New Jersey Department of Environmental Protection, Carlton, G.B., 2010

2. Excel Spreadsheet "Hantush_USGS_SIR_2010-5102-1110.xlsm", Baehr, A. 2009

3. "New Jersey Stormwater Best Management Practices Manual", New Jersey Department of Environmental Protection Division of Watershed Management, 2004

4. New Jersey Administrative Code 7:8 – Stormwater Management

5. "HydroCAD", HydroCAD Software Solutions LLC, 2018

6. "Infiltration Basin Profile Plan – Compressor Station 206", AECOM, dated 12/21/2018

CALCULATIONS:

The document "Simulation of Groundwater Mounding Beneath Hypothetical Stormwater Infiltration Basins" (GWM Study) published by USGS in coordination with NJDEP (Reference 1) was utilized to perform the analysis. As part of the GWM Study, "a spreadsheet was developed to use the Hantush equation (1967) to calculate the magnitude of groundwater mounding. The required input values (aquifer thickness, horizontal hydraulic conductivity, specific yield, basin size, and recharge rate and duration) are straightforward and can be measured or estimated from published values."

This spreadsheet (Reference 2) calculates the maximum height of groundwater mounding and the mounding at user-specified distances from the center of the mound, and uses the following variables:

Input

R	Recharge (Infiltration) Rate (ft/day)
S_y	Specific Yield (dimensionless, between 0 and 1)
K	Horizontal Hydraulic Conductivity (ft/day)
x	½ Length of Basin (ft)
y	½ Width of Basin (ft)
t	Duration of Infiltration Period (days)
hi(0)	Initial Thickness of Saturated Zone (ft)

Output

h(max)	Maximum thickness of saturated zone (beneath center of basin) (ft)
Δh(max)	Maximum groundwater mounding (beneath center of basin) (ft)

Within the GWM Study, an example analysis is performed on a hypothetical basin utilizing the spreadsheet and outlining the values used for each variable. In the sections below, for each variable the example analysis is followed and then applied to the site specific parameters of the project. Once each of the variables for the project have been determined, they are then entered into the spreadsheet and used to solve for the groundwater mound height.

1. Recharge Rate (R)

For the example within the GWM Study, a recharge rate of 1.333 ft/day was modeled, which was calculated for 2 foot depth of standing water (the maximum vertical distance between the basin bottom and the Water Quality Design Storm Water surface elevation) that drains over 1.5 days (NJDEP requires basins drains within 72 hours ~ 3 days, and then a factor of safety of 2 is applied).

For the project, three (3) iterations for computing the recharge rate were performed:

a) The GWM study was followed, and the proposed infiltration basin was routed for the Water Quality Design Storm utilizing HydroCAD software (Reference 5), which resulted in a water surface elevation of 262.42', which when compared to the basin bottom elevation of 262.00' results in a depth of standing water of 0.42 feet. When calculated with a factor of safety of 2 to recharge over 1.5 days, results in a recharge rate of 0.28 ft/day.

b) A separate iteration was run using the lowest field measured recharge (infiltration) rate. Soil testing was performed within the footprint of the basin. A total of five (5) test pits with infiltration tests were performed, as summarized in the table below. Infiltration rates ranged from 1.0 – 13.3 in/hr, and the lowest result of 1.0 in/hr was utilized, and then a factor of safety of 2 applied to result in a design rate of 0.5 in/hr, which converts to a recharge rate of 1 ft/day.

c) At the request of NJDEP, an additional iteration was run using the highest field measured recharge (infiltration) rate of 13.3 in/hr, and then a factor of safety of 2 applied to result in a design rate of 6.65 in/hr, which converts to a recharge rate of 13.3 ft/day.

Soil Testing Results									
Location I.D.	Test Type [1,2]	Existing Grade Elevation (ft)	Test Pit/Bore Bottom		Bedrock		Groundwater		Infiltration Rate (in/hr)
			Depth (ft)	Elevation (ft)	Depth (ft)	Elevation (ft)	Depth (ft)	Elevation (ft)	
TP-1A	TP w/IT	261.7	6.0	255.7	N/E [3]		N/E [3]		6.75
TP-1B	TP w/IT	263.3	8.0	255.3	N/E [3]		N/E [3]		1
TP-3	B w/MW	263.0	15.0	248.0	N/E [3]		5.8	257.2	N/A [4]
TP-4	B w/MW	263.6	15.0	248.6	N/E [3]		5.3	258.3	N/A [4]
TP-5	B w/MW	261.0	15.0	246.0	15.0	246.0	2.5	258.5	N/A [4]
TP-8	TP w/IT	264.5	6.5	258.0	6.5	258.0	6.3	258.2	13.3
TP-9	TP w/IT	264.5	7.0	257.5	7.0	257.5	N/E [3]		2.9
TP-10	TP w/IT	263.6	9.5	254.1	9.5	254.1	9.5	254.1	2.3

1. TP w/IT = Test Pit with Infiltration Testing
2. B w/MW = Boring with Monitoring Well
3. N/E = Not encountered
4. N/A = Not Applicable for Borings with Monitoring Wells

2. Specific Yield (S_y)

Specific yield is a unit-less constant and for the GWM Study was estimated to be 17 percent (0.17) based on water-table aquifer data in Cape May County, New Jersey (Gill, 1962).

For the project, in conjunction with three (3) iterations described above, the value for specific yield used were as follows:

a) The GWM study was followed utilizing a value of 0.17

b) The GWM study was followed utilizing a value of 0.17

c) At the request of NJDEP, a value of 0.15 was utilized.

3. Horizontal Hydraulic Conductivity (K)

For the example within the GWM Study, horizontal hydraulic conductivity used a 10:1 ratio of the vertical hydraulic conductivity (in/hr) and converted to feet per day. The vertical rate analyzed was 0.2 in/hr, which converts to 0.4 ft/day, and then multiplied by 10 to result in a horizontal hydraulic conductivity of 4 ft/day.

For the project, in conjunction with three (3) iterations described above, the values for horizontal hydraulic conductivity were utilized:

a) Following the GWM study for the project, the lowest result of 1.0 in/hr was utilized, which converts to 2 ft/day, and then multiplied by 10 results in a horizontal hydraulic conductivity of 20 ft/day (a factor of

safety is not applied to this value since in this iteration, the factor of safety has been applied to the duration)

b) A factor of safety of 2 was applied to the lowest observed infiltration rate of 1.0 in/hr, yielding 0.5 in/hr, which converts to 1 ft/day and then multiplied by 10 results in a horizontal hydraulic conductivity of 10 ft/day.

c) At the request of NJDEP a 5:1 ratio was utilized. The highest observed infiltration rate of 13.3 in/hr, with a factor of safety of 2 applied, yields 6.55 in/hr, which converts to 13.3 ft/day and then multiplied by 5 results in a horizontal hydraulic conductivity of 66.5 ft/day.

4. ½ Length (x) and ½ Width (y) of Basin

For the example within the GWM Study, an infiltration basin with an area of about 4,500 ft^2 was modeled, which was assumed to be square with sides measuring approximately 67.1 ft each, resulting in ½ length (x) and ½ width (y) of 33.6 ft each.

For the project, in conjunction with three (3) iterations described above, dimensions used were as follows:

a) The proposed basin footprint has an area of approximately 30,400 ft2. Since it is not perfectly square, a width to length ratio of 1.2:1 was approximated and applied to the area to provide equivalent lengths and widths, which resulted in a width of 190 ft and a length of 160 ft (190 x 160 = 30,400). One half of these dimensions were then taken, resulting in ½ length (x) = 80 ft and ½ width (y) = 95 ft.

b) The same dimensions of ½ length (x) = 80 ft and ½ width (y) = 95 ft used above in iteration (a) were used.

c) At the request of NJDEP, the basin was also analyzed assuming half of its footprint with an initial thickness of saturated zone (discussed further below) of 10'. As such, ½ of the values computed above for the full basin size were used, resulting in (x) = 40 ft and (y) = 47.5 ft.

5. Duration of Infiltration Period (t)

For the example within the GWM Study, a duration of 1.5 days (36 hours) was utilized because the NJDEP requires that stormwater infiltration basins drain in 3 days or less to prevent mosquito breeding, including factor of safety of 2, also discussed in the recharge rate section above.

For the project, two (2) iterations of the infiltration period were utilized:

a) The GWM study was followed utilizing a 1.5 day duration

b) The actual duration of time it takes the basin to dewater was calculated based on the depth of ponded water in the basin and the lowest field measured infiltration rate. 0.42 feet of water at an infiltration rate of 0.5 in/hr (1.0 in/hr with a factor of safety of 2 applied) results in a duration of approximately 10 hours, or 0.42 days

c) The actual duration of time it takes the basin to dewater was calculated based on the depth of ponded water in the basin and the highest field measured infiltration rate. 0.42 feet of water at an infiltration rate of 6.55 in/hr (13.3 in/hr with a factor of safety of 2 applied) results in a duration of approximately 0.77 hours, or 0.032 days.

6. Initial Thickness of Saturated Zone (hi(0))

For the example within the GWM Study, the initial thickness of the saturated zone was assumed to be 10 feet.

For the project, each iteration outlined above (a) and (b) was run using an initial thickness of 10 feet (consistent with the GWM study) as well as an additional run using an initial thickness of the saturated zone of 0 feet since a smaller initial thickness of the saturated zone will produce higher groundwater mound heights and to analyze any potential concerns associated with a shallow water table and bedrock.

At the request of NJDEP, an additional iteration (c) was run assuming half of the basin footprint with an initial thickness of 10 feet.

RESULTS:

The variables as outlined above were entered into the spreadsheet utilizing the Hantush equation and run for iterations (a) and (b) above, for saturated zone thicknesses of 0 ft and 10 ft, and iteration (c) with a saturation zone thickness of 10 ft, for a total of five (5) trials, which are summarized below:

Iteration (a)		Iteration (b)		Iteration (c)
hi(0) = 0 ft	hi(0) = 10 ft	hi(0) = 0 ft	hi(0) = 10 ft	hi(0) = 10 ft

0.2800	R
0.170	Sy
20.00	K
80.000	x
95.000	y
1.500	t
0.000	hi(0)
2.471	h(max)
2.471	Δh(max)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.471	0
2.470	20
2.453	40
2.408	50
2.283	60
1.986	70
1.236	80
0.001	90
0.001	100
0.001	120

0.2800	R
0.170	Sy
20.00	K
80.000	x
95.000	y
1.500	t
10.000	hi(0)
12.183	h(max)
2.183	Δh(max)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.183	0
2.135	20
1.979	40
1.852	50
1.682	60
1.463	70
1.185	80
0.902	90
0.674	100
0.355	120

1.0000	R
0.170	Sy
10.00	K
80.000	x
95.000	y
0.420	t
0.000	hi(0)
2.471	h(max)
2.471	Δh(max)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.471	0
2.471	20
2.471	40
2.471	50
2.468	60
2.379	70
1.236	80
0.001	90
0.001	100
0.001	120

1.0000	R
0.170	Sy
10.00	K
80.000	x
95.000	y
0.420	t
10.000	hi(0)
12.470	h(max)
2.470	Δh(max)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.470	0
2.468	20
2.437	40
2.372	50
2.215	60
1.881	70
1.236	80
0.576	90
0.235	100
0.026	120

13.3000	R
0.150	Sy
66.50	K
40.000	x
47.500	y
0.032	t
10.000	hi(0)
12.780	h(max)
2.780	Δh(max)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.780	0
2.636	20
1.399	40
0.494	50
0.137	60
0.030	70
0.006	80
0.002	90
0.001	100
0.001	120

The results of the analysis resulted in a range of Δh(max) maximum groundwater mounding from 2.183 ft to 2.78 ft. As an additional check, the simulated runs from Table 2 of the GWM Study were also reviewed to find a simulation with similar input parameters for the project (ponding depth, basin area, permeability, and specific yield). Simulation numbers #397 and #399 were determined to have the closest similarities to the project, which produced maximum groundwater mound heights of 2.06 and 2.31 ft.

Table 2. Simulated groundwater mounding beneath hypothetical stormwater-infiltration basins on a 10-acre development.—Continued

[ft², square feet; 1 x 1, square basin (sides of equal length); 1 x 8, rectangular basin (long side eight times length of short side); in/hr, inches per hour; Max, maximum; ft², square feet; GW, groundwater; hgt, height; ft, feet; EEoB, east edge of basin]

Simulation number	Impervious cover (percent)	Design storm (inches)	Basin depth (feet)	Basin area (ft²)	Basin shape	Aquifer thick-ness (feet)	Soil permea-bility (in/hr)	Specific yield (percent)	Max GW mound height (feet)	Max extent of 0.25-foot GW mound hgt (feet)	GW mound hgt at EEoB (feet)	GW mound hgt 50 ft from EEoB (feet)	GW mound hgt 100 ft from EEoB (feet)	GW mound hgt 150 ft from EEoB (feet)	GW mound hgt 200 ft from EEoB (feet)	GW mound hgt 300 ft from EEoB (feet)	GW mound hgt 500 ft from EEoB (feet)
397	40	1.25	0.5	36,300	1 x 1	10	0.2	17.0	2.31	13	0.99	0.03	0.00	0.00	0	0	0
399	40	1.25	0.5	36,300	1 x 1	10	1	17.0	2.06	43	1.02	0.20	0.04	0.01	0	0	0

Taking the highest value from the analysis of 2.78 ft and the highest water table elevation of 258.5 (refer to the soil testing results above), results in a maximum groundwater mound elevation of 261.28 ft, which is beneath the basin bottom elevation of 262.0. As such, no adverse hydraulic impacts associated with surficial ponding are anticipated.

ATTACHMENT A

Output from Excel Spreadsheet "Hantush_USGS_SIR_2010-5102-1110.xlsm"

Iteration (a)
hi(0) = 0 ft

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

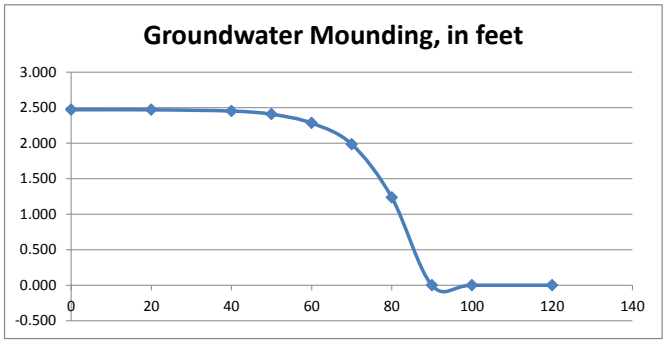
Input Values

0.2800	***R***	**Recharge (infiltration) rate (feet/day)**
0.170	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
20.00	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
80.000	**x**	**1/2 length of basin (x direction, in feet)**
95.000	**y**	**1/2 width of basin (y direction, in feet)**
1.500	**t**	**duration of infiltration period (days)**
0.000	**hi(0)**	**initial thickness of saturated zone (feet)**

2.471	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
2.471	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.471	0
2.470	20
2.453	40
2.407	50
2.283	60
1.985	70
1.236	80
0.001	90
0.001	100
0.001	120

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

Iteration (a)
hi(0) = 10 ft

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
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use consistent units (e.g. feet & days **or** inches & hours)

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

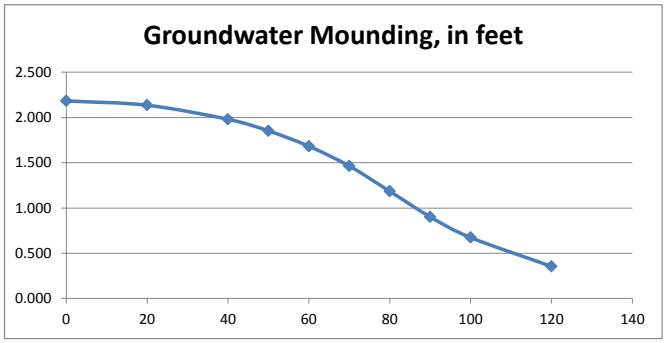
Input Values

0.2800	***R***	**Recharge (infiltration) rate (feet/day)**
0.170	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
20.00	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
80.000	**x**	**1/2 length of basin (x direction, in feet)**
95.000	**y**	**1/2 width of basin (y direction, in feet)**
1.500	**t**	**duration of infiltration period (days)**
10.000	**hi(0)**	**initial thickness of saturated zone (feet)**

12.183	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
2.183	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.183	0
2.135	20
1.979	40
1.852	50
1.682	60
1.463	70
1.185	80
0.902	90
0.674	100
0.355	120

Re-Calculate Now



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Iteration (b)
hi(0) = 0 ft

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
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use consistent units (e.g. feet & days **or** inches & hours)

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

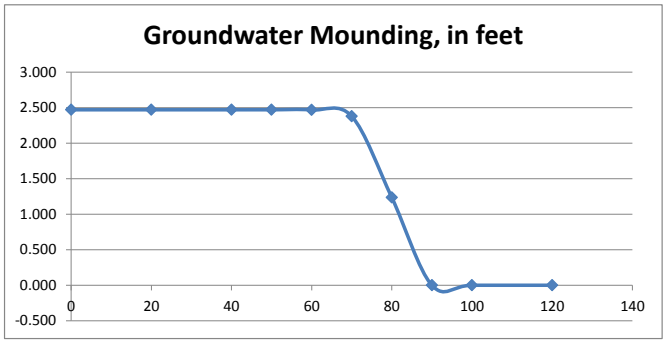
Input Values

1.0000	***R***	**Recharge (infiltration) rate (feet/day)**
0.170	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
10.00	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
80.000	**x**	**1/2 length of basin (x direction, in feet)**
95.000	**y**	**1/2 width of basin (y direction, in feet)**
0.420	**t**	**duration of infiltration period (days)**
0.000	**hi(0)**	**initial thickness of saturated zone (feet)**

2.471	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
2.471	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.471	0
2.471	20
2.471	40
2.471	50
2.468	60
2.379	70
1.236	80
0.001	90
0.001	100
0.001	120

Re-Calculate Now



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Iteration (b)
hi(0) = 10 ft

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
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use consistent units (e.g. feet & days **or** inches & hours)

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

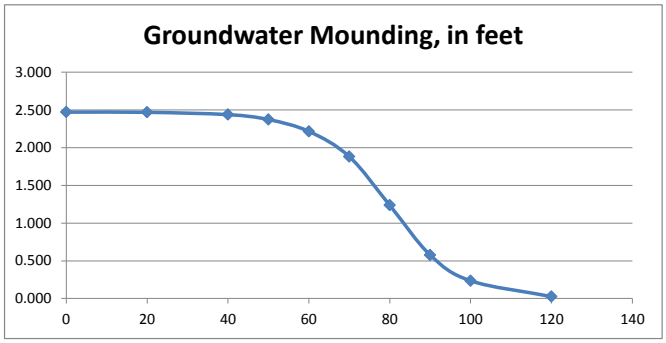
Input Values

1.0000	***R***	**Recharge (infiltration) rate (feet/day)**
0.170	**Sy**	**Specific yield, Sy (dimensionless, between 0 and 1)**
10.00	**K**	**Horizontal hydraulic conductivity, Kh (feet/day)***
80.000	**x**	**1/2 length of basin (x direction, in feet)**
95.000	**y**	**1/2 width of basin (y direction, in feet)**
0.420	**t**	**duration of infiltration period (days)**
10.000	**hi(0)**	**initial thickness of saturated zone (feet)**

12.470	**h(max)**	**maximum thickness of saturated zone (beneath center of basin at end of infiltration period)**
2.470	**Δh(max)**	**maximum groundwater mounding (beneath center of basin at end of infiltration period)**

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.470	0
2.468	20
2.437	40
2.372	50
2.215	60
1.881	70
1.236	80
0.576	90
0.235	100
0.026	120

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

Iteration (c)
hi(0) = 10 ft

This spreadsheet will calculate the height of a groundwater mound beneath a stormwater infiltration basin. More information can be found in the U.S. Geological Survey Scientific Investigations Report 2010-5102 "Simulation of groundwater mounding beneath hypothetical stormwater infiltration basins".

The user must specify infiltration rate (R), specific yield (Sy), horizontal hydraulic conductivity (Kh), basin dimensions (x, y), duration of infiltration period (t), and the initial thickness of the saturated zone (hi(0), height of the water table if the bottom of the aquifer is the datum). For a square basin the half width equals the half length (x = y). For a rectangular basin, if the user wants the water-table changes perpendicular to the long side, specify x as the short dimension and y as the long dimension. Conversely, if the user wants the values perpendicular to the short side, specify y as the short dimension, x as the long dimension. All distances are from the center of the basin. Users can change the distances from the center of the basin at which water-table aquifer thickness are calculated.
Cells highlighted in yellow are values that can be changed by the user. Cells highlighted in red are output values based on user-specified inputs. The user MUST click the blue "Re-Calculate Now" button each time ANY of the user-specified inputs are changed otherwise necessary iterations to converge on the correct solution will not be done and values shown will be incorrect. Use consistent units for all input values (for example, feet and days)

use consistent units (e.g. feet & days **or** inches & hours)

Conversion Table

inch/hour	feet/day
0.67	1.33
2.00	4.00

hours	days
36	1.50

In the report accompanying this spreadsheet (USGS SIR 2010-5102), vertical soil permeability (ft/d) is assumed to be one-tenth horizontal hydraulic conductivity (ft/d).

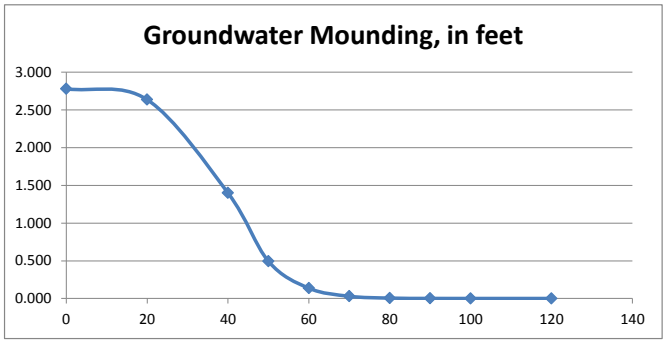
Input Values

13.3000	R	Recharge (infiltration) rate (feet/day)
0.150	Sy	Specific yield, Sy (dimensionless, between 0 and 1)
66.50	K	Horizontal hydraulic conductivity, Kh (feet/day)*
40.000	x	1/2 length of basin (x direction, in feet)
47.500	y	1/2 width of basin (y direction, in feet)
0.032	t	duration of infiltration period (days)
10.000	hi(0)	initial thickness of saturated zone (feet)

12.780	h(max)	maximum thickness of saturated zone (beneath center of basin at end of infiltration period)
2.780	Δh(max)	maximum groundwater mounding (beneath center of basin at end of infiltration period)

Ground-water Mounding, in feet	Distance from center of basin in x direction, in feet
2.780	0
2.636	20
1.399	40
0.494	50
0.137	60
0.030	70
0.006	80
0.002	90
0.001	100
0.001	120

Re-Calculate Now



Disclaimer

This spreadsheet solving the Hantush (1967) equation for ground-water mounding beneath an infiltration basin is made available to the general public as a convenience for those wishing to replicate values documented in the USGS Scientific Investigations Report 2010-5102 "Groundwater mounding beneath hypothetical stormwater infiltration basins" or to calculate values based on user-specified site conditions. Any changes made to the spreadsheet (other than values identified as user-specified) after transmission from the USGS could have unintended, undesirable consequences. These consequences could include, but may not be limited to: erroneous output, numerical instabilities, and violations of underlying assumptions that are inherent in results presented in the accompanying USGS published report. The USGS assumes no responsibility for the consequences of any changes made to the spreadsheet. If changes are made to the spreadsheet, the user is responsible for documenting the changes and justifying the results and conclusions.

ATTACHMENT B

Infiltration Basin Profile Plan – Compressor Station 206

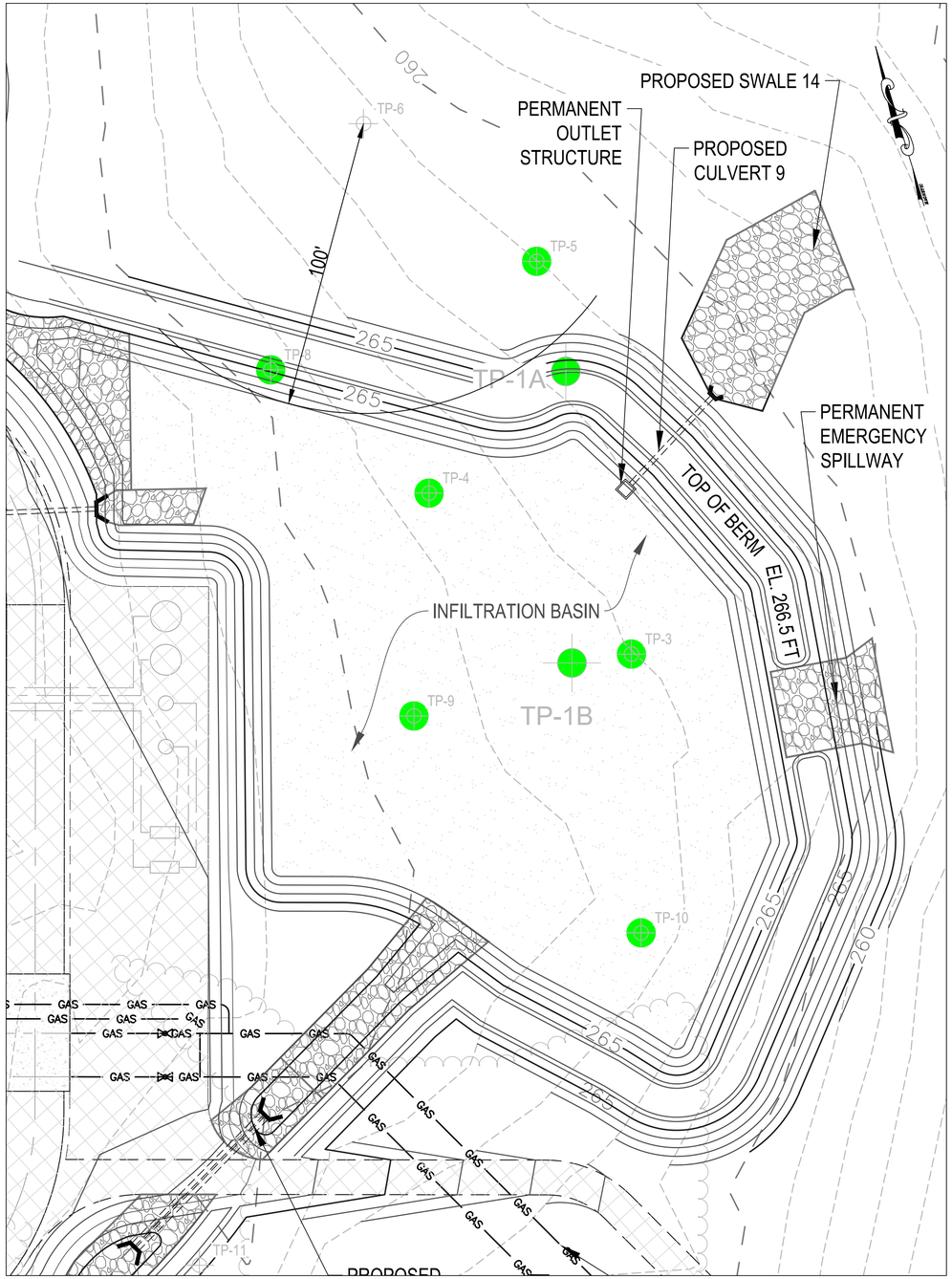
LEGEND

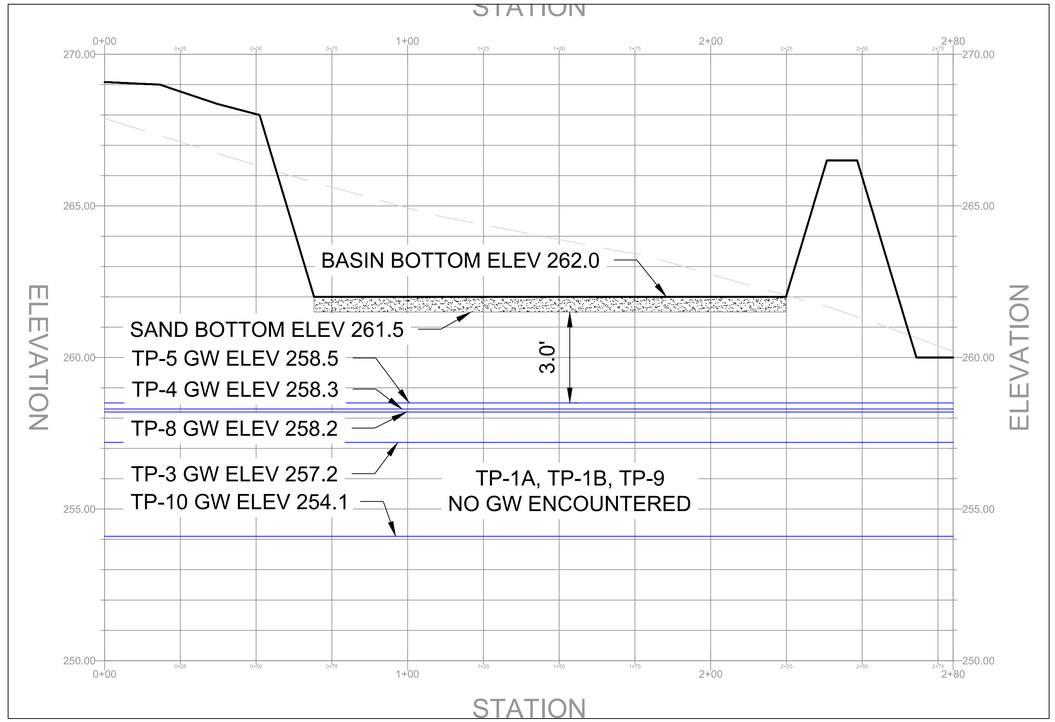
EXISTING FEATURES

- 265 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- STREAM CENTERLINE
- WETLAND
- EXISTING TREE LINE
- PARCEL LINE
- EXISTING ACCESS ROADS
- EXISTING FENCE
- OHE — EXISTING OVERHEAD POWER LINE
- EXISTING PIPELINE
- EXISTING RIGHT OF WAY
- SOIL TYPE BOUNDARY
- MopCb — SOIL TYPE

PROPOSED FEATURES

- LOD — LIMIT OF DISTURBANCE
- PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- GAS — PROPOSED PIPELINE
- CULVERT
- RIP RAP APRON
- X — PROPOSED FENCE
- PROPOSED TREE LINE
- PROPOSED GRAVEL
- PROPOSED CONCRETE
- RIPRAP SLOPE PROTECTION
- PROPOSED BRUSH SEED MIX
- TP-8 — SOIL TEST LOCATION





Soil Test Summary

Location I.D.	Test Type [1,2]	Existing Grade Elevation (ft)	Test Pit/Bore Bottom Depth (ft)	Test Pit/Bore Bottom Elevation (ft)	Bedrock Depth (ft)	Bedrock Elevation (ft)	Groundwater Depth (ft)	Groundwater Elevation (ft)
TP-1A	TP w/IT	261.7	6.0	255.7	N/E [3]		N/E [3]	
TP-1B	TP w/IT	263.3	8.0	255.3	N/E [3]		N/E [3]	
TP-3	B w/MW	263.0	15.0	248.0	N/E [3]		5.8	257.2
TP-4	B w/MW	263.6	15.0	248.6	N/E [3]		5.3	258.3
TP-5	B w/MW	261.0	15.0	246.0	15.0	246.0	2.5	258.5
TP-8	TP w/IT	264.5	6.5	258.0	6.5	258.0	6.3	258.2
TP-9	TP w/IT	264.5	7.0	257.5	7.0	257.5	N/E [3]	
TP-10	TP w/IT	263.6	9.5	254.1	9.5	254.1	9.5	254.1

1. TP w/IT = Test Pit with Infiltration Testing
2. B w/MW = Boring with Monitoring Well
3. N/E = Not encountered
4. N/A = Not Applicable for Borings with Monitoring Wells

AECOM
625 WEST RIDGE PIKE, SUITE E-100
CONSHOHOCKEN, PA 19428
(610) 832-3500

KEVIN McKEON, P.E.
NEW JERSEY
PROFESSIONAL ENGINEER NO GE32586

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
0	06/15/17	GMS	SUBMITTED TO SOMERSET-UNION SCD	1185732	PPH	KDM
1	08/11/17	GMS	REVISED NJDEP AND SCD SUBMISSION	1185732	PPH	KDM
2	01/05/18	GMS	REVISED WORKSPACE	1185732	PPH	KDM
3	02/09/18	GMS	REVISED SUBMISSION TO SOMERSET-UNION SCD	1185732	PPH	KDM
4	06/05/18	PPH	SUBMITTED TO NJDEP	1185732	TPF	KDM
5	08/24/18	GMS	SUBMITTED TO NJDEP	1185732	PPH	KDM
6	12/21/18	PPH	SUBMITTED TO NJDEP	1185732	TPF	KDM

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC.
POST CONSTUCTION STORMWATER MANAGEMENT PLAN
NORTHEAST SUPPLY ENHANCEMENT PROJECT
COMPRESSOR STATION NO. 206
INFILTRATION BASIN PROFILE PLAN
FRANKLIN TOWNSHIP, SOMERSET COUNTY, NJ

Williams GAS PIPELINE

DRAWN BY: GMS	DATE: 06/15/17	ISSUED FOR BID: TBD	SCALE: 1"=50'
CHECKED BY: PPH	DATE: 06/15/17	ISSUED FOR CONSTRUCTION: TBD	REVISION: 6
APPROVED BY: KDM	DATE: 06/15/17	DRAWING NUMBER:	SHEET 12 OF 12
WO: 1185732			

Drawn By & Date/Time: haasp Dec 21, 2018 - 9:18am
Drawing Location & Name: S:\Projects\ENV\60537393_NESE_CS206\900-CAD-GIS\910-CAD\20-PCSM SHEETS\12 - Infiltration Basin Profile Plan CS 206.dwg

ATTACHMENT C

HydroCAD Routing Summary for Water Quality Design Storm

Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 0.22" for WQ-1.25" event
Inflow = 3.94 cfs @ 1.60 hrs, Volume= 0.296 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 262.42' @ 4.50 hrs Surf.Area= 31,447 sf Storage= 12,883 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	170,349 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**15.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	264.25'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	265.50'	**30.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.00 cfs of 6.13 cfs potential flow)
  - **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
- **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

ecology and environment, inc.
Global Environmental Specialists
BUFFALO CORPORATE CENTER
368 Pleasant View Drive, Lancaster, New York 14086
Tel: (716) 684-8060, Fax: (716) 684-0844

January 24, 2019

Katherine J. Marcopul,
Deputy State Historic Preservation Officer
Historic Preservation Office
501 East State Street, Building 5, 4th Floor
Mail Code 501-04B
PO Box 420
Trenton, New Jersey 08625-0420

Re: Consideration of a Geotechnical Review of Sixteen (16) Vibracore Locations to Support Transcontinental Gas Pipe Line Company LLC's Offshore Raritan Bay Loop Natural Gas Pipeline Expansion, New Jersey and New York State Waters. NJHPO Project No. 16-1743, FERC Docket No. CP17-101-000.

Dear Ms. Marcopul:

The attached addendum provides the results of geotechnical survey investigations conducted in support of the Transcontinental Gas Pipe Line Company, LLC's Northeast Supply Enhancement Project (Project) located in New Jersey waters.

R. Christopher Goodwin & Associates, Inc. (RCG&A) conducted an archaeological assessment of marine geophysical survey data and evaluated the Project corridor for the presence of submerged cultural resources. Subsequently, a geotechnical investigation was then conducted by Alpine Ocean Seismic Survey, Inc. Sixteen (16) vibracores were collected in New Jersey waters (sixty-nine (69) vibracores in total were collected for the Project, with the remainder in New York waters, along the offshore study area in Raritan Bay off the coast of New York and New Jersey impacting subsurface depths ranging from 5.33 to 29.25 feet.

The cored sediments displayed a variety of depositional environments that were evaluated for their potential to contain in situ cultural resources. The majority of cored units were given a low probability for containing cultural material due to area's geologic history and the destructive shoreline processes that have occurred since the Pleistocene-Holocene Transition. RCG&A identified no cultural material in the extracted core samples provided. As such, no buffers or recommendations for avoidance were recommended.

If you should have any questions or concerns about the Project please do not hesitate to contact Scott Horner at (713) 215-4953 (scott.horner@williams.com) regarding offshore resources. Additionally, you may contact me at (716) 684-8060, ext. 2132 (owright@ene.com).

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Owen Wright,
Senior Cultural Resource Specialist & Maritime Archaeologist

CC: Scott Horner, Transco
Sara Mochrie, Ecology & Environment, Inc.

Attachment

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DRAFT ADDENDUM JANUARY 14, 2018

GEOTECHNICAL REVIEW TO SUPPORT TRANSCONTINENTAL GAS PIPELINE COMPANY'S OFFSHORE RARITAN BAY LOOP NATURAL GAS PIPELINE EXPANSION NEW JERSEY STATE WATERS

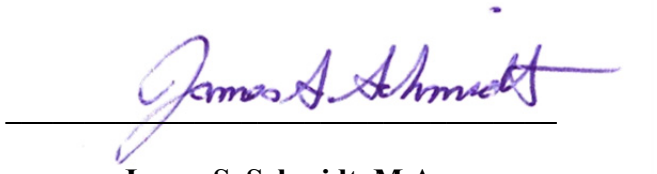
PREPARED FOR:

WILLIAMS PARTNERS LP
2800 POST OAK BLVD.
HOUSTON, TX 77056

R. CHRISTOPHER GOODWIN & ASSOCIATES, INC.
241 EAST FOURTH STREET, SUITE 100 ▪ FREDERICK, MD 21701

GEOTECHNICAL REVIEW TO SUPPORT TRANSCONTINENTAL GAS PIPE LINE COMPANY'S OFFSHORE RARITAN BAY LOOP NATURAL GAS PIPELINE EXPANSION NEW JERSEY STATE WATERS

Addendum



James S. Schmidt, M.A.
Principal Investigator

by

Christopher K. Dvorscak, M.A., Michael R. Twarog, M.S., and
R. Christopher Goodwin, Ph.D.

R. Christopher Goodwin & Associates, Inc.
241 East Fourth Street, Suite 100
Frederick, Maryland 21701

January 2019

Prepared for:

Williams Partners LP
2800 Post Oak Blvd.
Houston, TX 77056

EXECUTIVE SUMMARY

This addendum provides results of geotechnical survey investigations conducted in support of the Transcontinental Gas Pipe Line Company, LLC's Northeast Supply Enhancement Project (Project) located in New Jersey. The project's offshore pipeline facilities will consist of 23.37 miles of 26-inch diameter pipeline from the existing Transco offshore Lower New York Bay Lateral (LNYBL) located in Sayreville, Middlesex County, New Jersey, to the Rockaway Transfer Point in the Lower New York Bay, New York. The coring transect stretched from just off the mouth of Cheesequake Creek, past the bay entrance north of Sandy Hook, into the near-shore Inner Continental Shelf of the Mid-Atlantic.

This addendum was prepared for Transcontinental Gas Pipe Line Company (Transco), a subsidiary of Williams Partners L.P. (Williams), to assist compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations 36 CFR 800, entitled "Protection of Historic Properties." All work was performed in accordance with the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969, as amended; the Abandoned Shipwrecks Act of 1987 (43 U.S.C. 2101-2106); and with applicable administrative rules and guidelines pertaining to historic preservation promulgated by the New Jersey Historic Preservation Office (NJ HPO).

R. Christopher Goodwin & Associates, Inc. (RCG&A) conducted an archeological assessment of geotechnical data acquired by Alpine Ocean Seismic Survey, Inc. (Alpine) to evaluate the project corridor for the presence of submerged cultural resources that may need to be avoided during construction. The proposed Project corridor has a total area footprint of 16,074.61 acres (6505.17 hectares). The project footprint within NJ state waters totals 4,047.19 acres (1,637.84 hectares).

RCG&A's archaeological assessment of geotechnical survey data acquired from October 20 to November 20, 2018 determined that it is unlikely that the units present within the vibracores would contain *in situ* cultural material. Therefore, no buffers or recommendations for avoidance have been made.

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CHAPTER I

INTRODUCTION

This addendum provides the review of geotechnical sampling conducted in New Jersey waters of Raritan and New York bays (Figure I-1). This addendum was prepared for Transcontinental Gas Pipe Line Company (Transco), a subsidiary of Williams Partners L.P. (Williams). It was designed to assist compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations 36 CFR 800, entitled "Protection of Historic Properties." All work was performed in accordance with the National Historic Preservation Act of 1966, as amended; the National Environmental Policy Act of 1969, as amended; the Abandoned Shipwrecks Act of 1987 (43 U.S.C. 2101-2106); and with applicable administrative rules and guidelines pertaining to historic preservation promulgated by the New Jersey Historic Preservation Office (NJ HPO).

PROJECT DESCRIPTION

The following general project description is from the primary reports to which this addendum applies (Schmidt et al. 2017). Transco is proposing to expand its existing interstate natural gas pipeline system in Pennsylvania, New Jersey, and offshore New Jersey and New York. Transco's offshore Raritan Bay Loop natural gas pipeline expansion the (Project) will support National Grid's long-term supply and reliability needs for their existing natural gas transmission and distribution system through the 2020 heating season. The project capacity is fully subscribed by two entities of National Grid: Brooklyn Union Gas Company (d/b/a National Grid NY) and KeySpan Gas East Corporation (d/b/a/ National Grid), collectively referred to herein as "National Grid." The offshore pipeline facilities will consist of 23.37 miles of 26-inch diameter pipeline from MP 12.00 on the existing Transco offshore Lower New York Bay Lateral (LNYBL) located in Sayreville, Middlesex County, New Jersey, to MP 35.37 at the Rockaway Transfer Point in the Lower New York Bay, New York (Figure I-1). After the Federal Energy Regulatory Commission (FERC) issues a Certificate for the Project and Transco obtains the applicable permits and authorizations, Transco anticipates that construction of the Project will begin in the second quarter of 2020 to meet an in-service date in the fourth quarter of 2020.

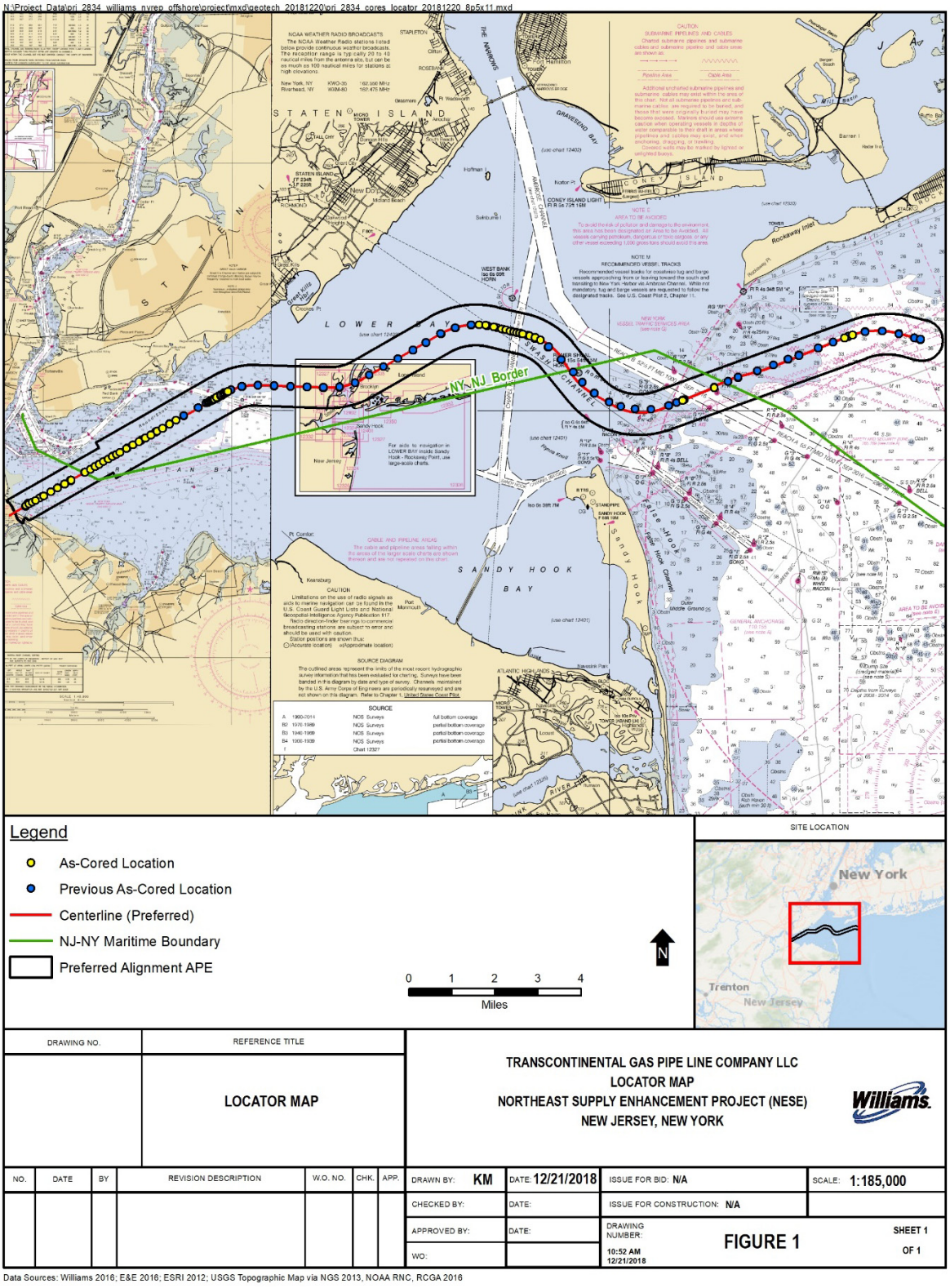


Figure I-1. Project locator map.

In New Jersey state waters, the project footprint totals 4,047.19 acres (1,637.84 hectares). The New Jersey portion of the project includes two preferred centerline corridor segments. The first corridor segment extends northeast from the connection point at South Ambrose at Milepost (MP) 12.00 and continues to MP 14.0 at the New Jersey-New York state boundary. The second corridor segment begins at MP 26.5 where the corridor re-enters New Jersey waters at Romer Shoal and crosses the Ambrose Channel before crossing the New Jersey-New York boundary at MP 30.5. The additional workspace is located north of Sandy Hook between MP 27.0 and MP 29.0. A total of six miles of the preferred centerline route run through New Jersey state waters. Only the southernmost segment of the alternative centerline corridor is located in New Jersey state waters.

The proposed 26 inch-diameter offshore pipeline will join with the existing 42 inch-diameter Lower New York Bay Lateral pipeline at the connection point at Morgan R&R Station in South Ambrose, New Jersey, which is designated as MP 12. Horizontal directional drilling (HDD) will pass under the shoreline to exit into Raritan Bay in New Jersey state waters 0.5 mi from the connection point (MP 12.50). The pipeline then will cross into New York state waters 1.52 mi out from the HDD exit (MP 14.02), before crossing back into New Jersey state waters after 12.52 mi of pipe length (MP 26.54). The pipeline will cut through the Ambrose Channel using HDD, covering a span of 0.76 mi (MP 29.50 – MP 30.26) before surfacing to cross back into New York state waters at MP 30.54. The proposed Raritan Bay Loop pipeline will end at MP 35.37, at the Rockaway Delivery Lateral pipeline. The proposed pipeline will cross the Neptune Cable, a high-voltage direct current submarine power cable that provides approximately 22 per cent of Long Island's electricity, at two locations: MP 13.88 and MP 35.05. The pipeline will be fabricated and laid on the seafloor using a pipe lay barge. The maximum construction corridor width – including anchor handling areas - measures 2,500 ft both north and south of centerline, for a total width of 5,000 ft**.**

Geotechnical investigation (i.e., seabed sampling) then was conducted by Alpine Ocean Seismic Survey, Inc. (Alpine) following completion of geophysical data acquisition. RCG&A reviewed the geophysical data prior to mobilization for the geotechnical investigations, and all data collected during the geotechnical investigations were analyzed by RCG&A as part of the geomorphic reconstruction and cultural resources analysis.

PROJECT ADMINISTRATION AND OVERVIEW

Senior Nautical Archaeologist James S. Schmidt, M.A., served as Principal Investigator (PI) for cultural resources analyses and reporting. Christopher K. Dvorscak, M.A., served as Nautical Archaeologist; he was assisted by Michael R. Twarog, M.S., who acted as Geoarcheologist. Kevin May, M.A., GISP assisted with the mapping and preparation. This addendum describes the methods

applied during geotechnical analyses, provides the results of the archaeological analyses, and contains a summary and recommendations.

CHAPTER II

METHODOLOGY

VIBRATORY CORE SAMPLING

Following the geophysical survey, Alpine conducted a vibratory core program along the pipeline alignment to ground truth the geophysical data and to evaluate near surface conditions. Vibracore samples also are an effective method of determining whether stratigraphy detected in the sub-surface geophysical investigation contains Pleistocene-Holocene components indicative of sensitive areas for archaeological sites. Information collected during the geophysical survey was used to refine and revise the locations, as well as intervals, of the actual sample locations.

The geotechnical investigations were conducted from Alpine's multi-purpose vessel R/V *Shearwater* (Figure II-1). The vessel did not anchor, but maintained positioning utilizing Dynamic Positioning thrusters (Alpine 2018). As with the survey task, navigation checks were performed at the beginning and end of the coring program to ensure the positioning system was functioning properly and delivering the horizontal position accuracy required for the project. The coring locations were referenced horizontally using the project's datum and spatial projection reference system. Depth measurements at each coring station were corrected for tidal variation based on predicted tides in the area.

Figure II-1. Alpine Research Vessel *Shearwater* (Alpine Ocean Seismic Survey, Inc. 2018).

In accordance with the Northeast Supply Enhancement Project's Soil Boring and Sediment Sampling Program Scope of Work and Specification (Intecsea 2016), the equipment used during vibracore testing included a pneumatic powered vibracore system to collect hardliner and "soft" liner samples. Vibracores measured 3.25 to 3.5 inches in diameter and achieved 5.33 to 29.25 feet of penetration below seabed.

INTERPRETATIONS OF GEOTECHNICAL DATA

All core sections were analyzed by a geologist. The analyses included splitting, visually describing, photographing, and subsampling. Subsamples were then analyzed for grain size. RCG&A conducted a desktop review of the vibratory core logs and photographs for 53 cores in NY state waters and 16 cores in NJ state waters. The review supported interpretations of the possible depositional environments that the vibracores captured as well as the potential for preservation of archaeological resources.

CHAPTER III

ARCHAEOLOGICAL SURVEY RESULTS

Sixteen (16) vibracores were collected in New Jersey state waters (the Project consisted of 69 vibracores in total) along the offshore study area in Raritan Bay off the coast of New York and New Jersey impacting subsurface depths ranging from 5.33 to 29.25 feet. Coring activities crossed a variety of manmade and natural features including: Round Shoal, Raritan Bay West Reach, Old Orchard Shoal, Chapel Hill North Channel, Romer Shoal, Ambrose Channel Reach B, and a number of smaller shoals. The coring transect stretched from just off the mouth of Cheesequake Creek, past the bay entrance north of Sandy Hook, into the near-shore Inner Continental Shelf of the Mid-Atlantic.

The graphic log and photo logs of each vibracore were reviewed to their full length and position relative to previously acquired vibracores discussed in Schmidt et al. (2017). The potential depositional environment of the sediments in each core was interpreted as well as could be without further analysis. The results were compared with the findings of the primary reports to which this addendum applies (Schmidt et al. 2017); then an assessment of the archaeological potential of the cored units was inferred, taking into account all available information (Table III-1).

The cored sediments were indicative of a variety of potential depositional environments, consistent with the geologic history of the area. The majority of cored sediments were indicative of their modern depositional environment, estuarine depositional environments, and in some cases fluvial and tidal influenced environments. Most units were given a low potential for containing cultural resources as a result of their proximity to previously reviewed locations with low potential and their indicated depositional sequence. The cores that may contain fluvially related sediments were given a slightly increased, low to moderate potential to contain cultural resources. However, it is worth noting that given the geologic history of the area (e.g., rising eustatic sea level over the late Pleistocene/ Holocene and the erosive processes of fluvial channel migration) it is unlikely that even the units with a low to moderate potential would contain *in situ* cultural material. Therefore, no buffers or recommendations for avoidance have been made.

Table III-1. Characteristics of cores.

Core ID	Location X	Location Y	Core Recovery (ft)	Interpreted Depositional Environment	Archaeological Potential
DEP1	914266.91	110737.33	6'2"	estuarine to modern; ravinement surface/paleo-shoreline?	low to moderate
DEP2	927277.74	118151.39	7'9"	estuarine to modern	low
DEP3	917350.18	112494.78	7'1"	estuarine to modern	low
DEP4R	918189.16	112955.66	7'7"	estuarine to modern	low
DEP5R	919875.91	113936.31	6'11"	estuarine to modern	low
DEP6	935879.14	122979.85	26'	fluvial? Estuarine to modern	low to moderate
DEP7	936249.98	123280.01	18'10"	fluvial? Estuarine to modern	low to moderate
VC204	912556.06	109742.34	11'10"	estuarine to modern; possible ravinement surface?	low to moderate
VC205	912597.27	109814.64	10'10"	estuarine to modern; Possible ravinement surface?	low to moderate
VC208	912975.11	110006.95	7'5"	estuarine to modern	low
VC211	913376.8	110230.19	7'11"	fluvial? Estuarine to modern.	low to moderate
VC214	913780.35	110461.12	7'5"	tidal? to modern	low
VC216	920546.8	114312.79	7'3"	estuarine to modern	low
VC217	921108.14	114633.11	7'8"	estuarine to modern	low
VC218	921620.7	114928.68	8'2"	estuarine to modern	low
VC219	922140.04	115220.35	7'2"	estuarine to modern	low
VC220	922665.63	115522.17	7'8"	estuarine to modern	low
VC221	923189.92	115820.54	7'8"	estuarine to modern	low
VC222	923695.87	116108.82	7'11"	estuarine to modern	low
VC223	924121.94	116350.96	7'7"	estuarine to modern	low
VVC225	934946.46	122452.07	7'6"	estuarine to modern	low
VC227	935132.88	122555.28	15'	estuarine to modern	low
VC228	935318.81	122659.12	8'	estuarine to modern	low
VC229	935516.79	122769.84	23'2"	estuarine to modern	low
VC230	935696.74	122880.39	24'	estuarine to modern	low
VC230A	935637.91	122921.32	29'3"	estuarine to modern	low
VC230B	935762.39	122850.32	28'	estuarine to modern	low

Core ID	Location X	Location Y	Core Recovery (ft)	Interpreted Depositional Environment	Archaeological Potential
VC232	936059.13	123083.06	20'8"	estuarine to modern	low
VC232A	936122.86	123056.16	22'6"	estuarine to modern	low
VC232B	935986.51	123122.29	22'	estuarine to modern	low
VC235	936522	123347.61	24'3"	estuarine to modern	low
VC237	936646.56	123432.37	25'8"	estuarine to modern	low
VC237A	936725.19	123388.69	25'9"	estuarine to modern	low
VC237B	936557.57	123446.6	27'2"	estuarine to modern	low
VC238	936831.39	123523.56	24'9"	estuarine to modern	low
VC239	937021.99	123628.61	20'5"	estuarine to modern	low
VC240	937214.44	123732.2	15'6"	estuarine to modern	low
VC242	937406.83	123827.25	10'	estuarine to modern	low
VC244	970439.58	131668.5	8'2"	fluvial? To estuarine? and modern; Possible ravinement surface?	low to moderate
VC245	971012.78	131523.4	9'2"	fluvial? To estuarine? and modern; Possible ravinement surface?	low to moderate
VC246	971503.46	131395.93	8'11"	fluvial? To estuarine? to modern	low
VC247	972037.82	131266.38	18'	fluvial? To estuarine? and modern; Possible ravinement surface?	low to moderate
VC251	974446.59	130671.43	7'3"	estuarine to modern	low
VC252	975122.45	130457.4	7'1"	estuarine to modern	low
VC253	975756.87	130189.89	8'1"	estuarine to modern	low
VC255	1013100.55	130432.14	6'5"	estuarine? to modern; Possible ravinement surface?	low to moderate
VC256	1014065.56	130795.63	6'2"	estuarine? to modern; Possible ravinement surface?	low to moderate
VC301R	914794.17	111025.04	7'6"	estuarine to modern	low
VC303	915637.7	111518.36	7'5"	estuarine to modern	low
VC304	916484.28	112001.78	7'8"	estuarine to modern	low
VC307	924958.82	116830.22	7'1"	estuarine to modern	low
VC308	925726.37	117267.82	7'11"	estuarine to modern	low
VC309	926497.83	117705.54	7'7"	fluvial? To estuarine and modern	low to moderate
VC310	927913.18	118511.4	7'5"	modern	low
VC311	928697.75	118960.99	7'6"	fluvial? To modern	low to moderate

Core ID	Location X	Location Y	Core Recovery (ft)	Interpreted Depositional Environment	Archaeological Potential
VC312	929392.54	119352.18	6'	modern	low
VC313	930256.23	119847.47	6'1"	fluvial? To modern	low to moderate
VC314	931036.21	120303.9	5'4"	fluvial? To modern	low to moderate
VC315	968210.72	132031.94	9'10"	modern	low
VC316	969022.72	131951.95	7'3"	tidal marine to modern	low
VC317	970014.31	131761.32	8"5"	tidal? to modern	low
VC318	972501.24	131152.65	20'8"	fluvial? To estuarine and modern	low to moderate
VC320	972862.71	131065.88	19'3"	fluvial? To estuarine and modern	low to moderate
VC321	973221.28	130979.56	18'3"	fluvial? To tidally influenced estuarine? To estuarine/modern	low to moderate
VC323	973577.61	130889.4	17'3"	fluvial? To estuarine to modern	low to moderate
VC326	993185.94	122763.05	19'8"	estuarine to modern	low
VC327	993199.35	122723.89	19'6"	estuarine to modern	low
VC328	997098.34	124375.97	21'2"	fluvial? To tidal? transitioning to modern	low to moderate
VC329	997108.01	124336.67	25'3"	fluvial? To tidal? transitioning to modern	low to moderate

CHAPTER IV

SUMMARY AND RECOMMENDATIONS

This addendum provides the review of geotechnical sampling conducted in New Jersey waters of Raritan and New York bays (Figure I-1). This addendum was prepared for Transcontinental Gas Pipe Line Company (Transco), a subsidiary of Williams Partners L.P. (Williams), to assist compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations 36 CFR 800, entitled "Protection of Historic Properties." All work was performed in accordance with the Abandoned Shipwrecks Act of 1987 (43 U.S.C. 2101-2106); and with applicable administrative rules and guidelines pertaining to historic preservation published by the New Jersey Historic Preservation Office (NJ HPO).

R. Christopher Goodwin & Associates, Inc. (RCG&A) conducted archaeological assessment of marine geophysical survey and evaluated the project corridor for the presence of submerged cultural resources. Geotechnical investigation (i.e., seabed sampling) then was conducted by Alpine Ocean Seismic Survey, Inc. (Alpine) following completion of geophysical data acquisition. RCG&A reviewed the geophysical data prior to mobilization for the geotechnical investigations, and all data collected during the geotechnical investigations were analyzed by RCG&A as part of the geomorphic reconstruction and cultural resources analysis.

The cored sediments displayed a variety of depositional environments that were evaluated for their potential to contain *in situ* cultural resources. The majority of cored units were given a low potential to contain cultural resources, although some were given a low to moderate archaeological potential. However, because of the areas geologic history and the destructive processes once active in the region, the potential to recover *in situ* cultural material remains low. Furthermore, no cultural material was recovered in the cores themselves. For these reasons, no buffers or recommendations for avoidance have been made.

REFERENCES

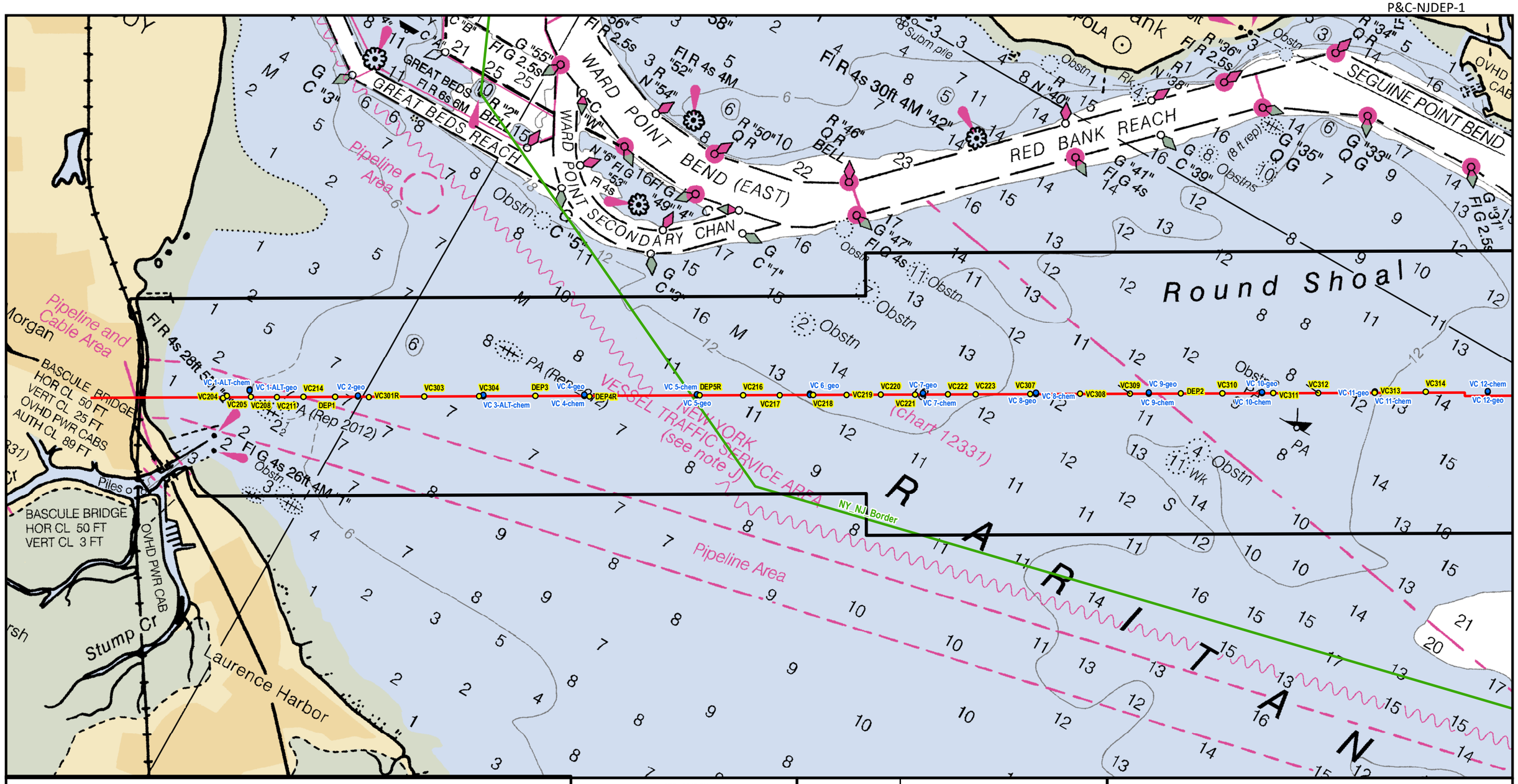
Alpine Ocean Seismic Survey, Inc. (Alpine)
2018 *R/V Shearwater Multi-role Survey Vessel*. Electronic brochure, http://www.alpineocean.com/vessels-equipment/vessels/, accessed December 20, 2018.

Rogers Surveying, PLLC
2016 *Survey Vessel and Equipment*. Prepared for R. Christopher Goodwin & Associates, Inc., by Rogers Surveying, PLLC.

Schmidt, James S., Kathryn Ryberg, R. Christopher Goodwin, Benjamin Wells, and Nicholas Delong
2017 *Geophysical/Cultural Resource Survey to Support Transcontinental Gas Pipe Line Company's Offshore Raritan Bay Loop Natural Gas Pipeline Expansion New Jersey and New York State Waters*. Prepared for Williams Partners LP, by R. Christopher Goodwin & Associates, Inc.

APPENDIX I

GEOTECHNICAL LOCATOR MAPS



Legend

- As-Cored Location
- Previous As-Cored Location
- Centerline (Preferred)
- NJ-NY Maritime Boundary
- Preferred Alignment APE

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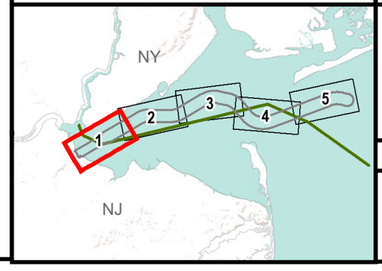
Miles

SITE LOCATION



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NORTHEAST SUPPLY ENHANCEMENT PROJECT (NESE)
NEW JERSEY, NEW YORK

Williams

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Data Sources: Williams 2017; E&E 2017; ESRI 2012; ESRI Base, RCGA 2017, NOAA 2017, NOAA Chart 12326, 12327

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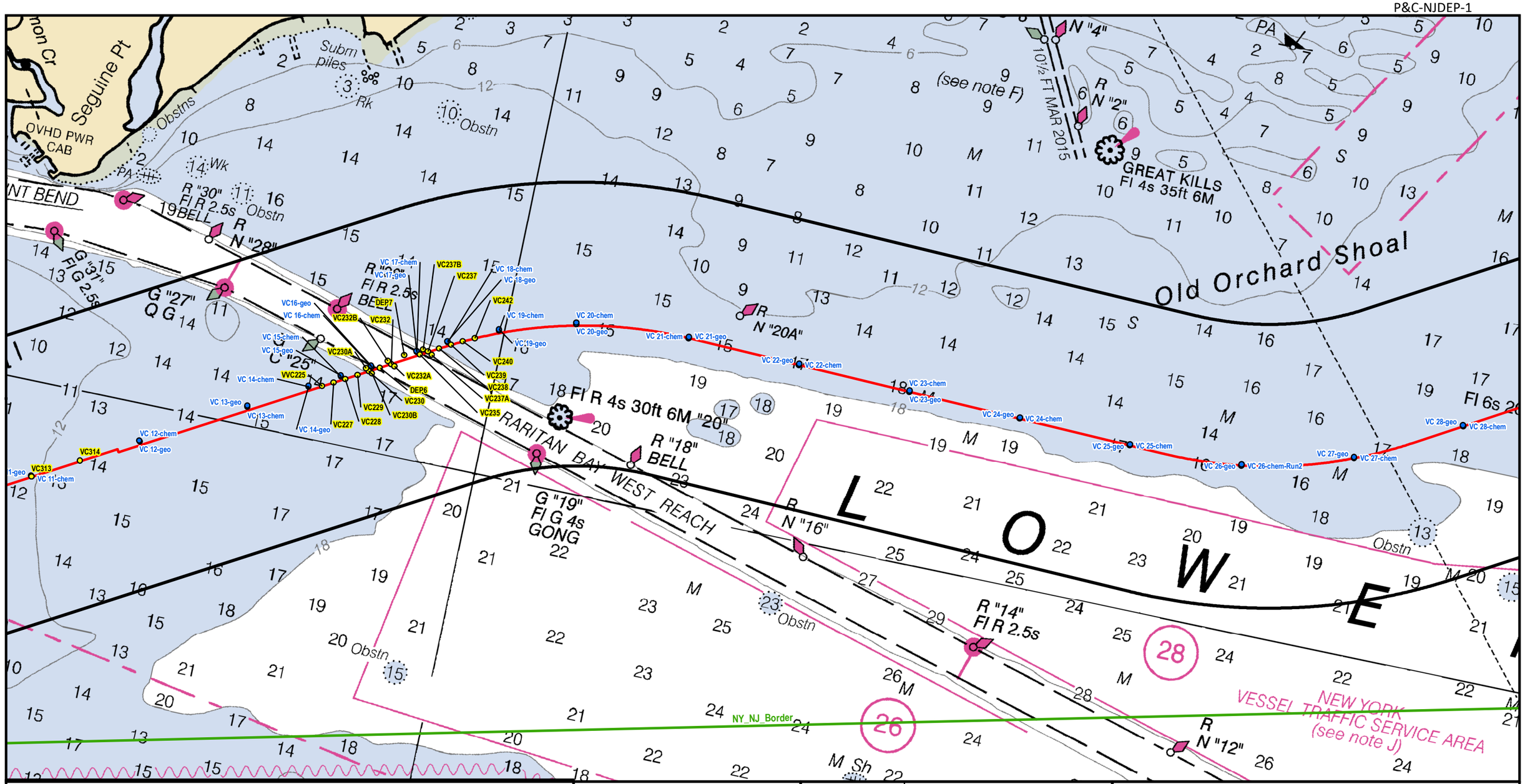

Legend

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- Previous As-Cored Location
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- Preferred Alignment APE

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Miles

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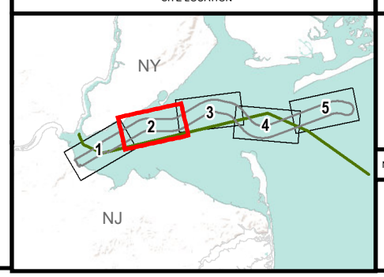
SITE LOCATION



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GEOTECHNICAL LOCATOR MAP
NORTHEAST SUPPLY ENHANCEMENT PROJECT (NESE)
NEW JERSEY, NEW YORK

Williams

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Data Sources: Williams 2017; E&E 2017; ESRI 2012; ESRI Base, RCGA 2017, NOAA 2017, NOAA Chart 12326, 12327

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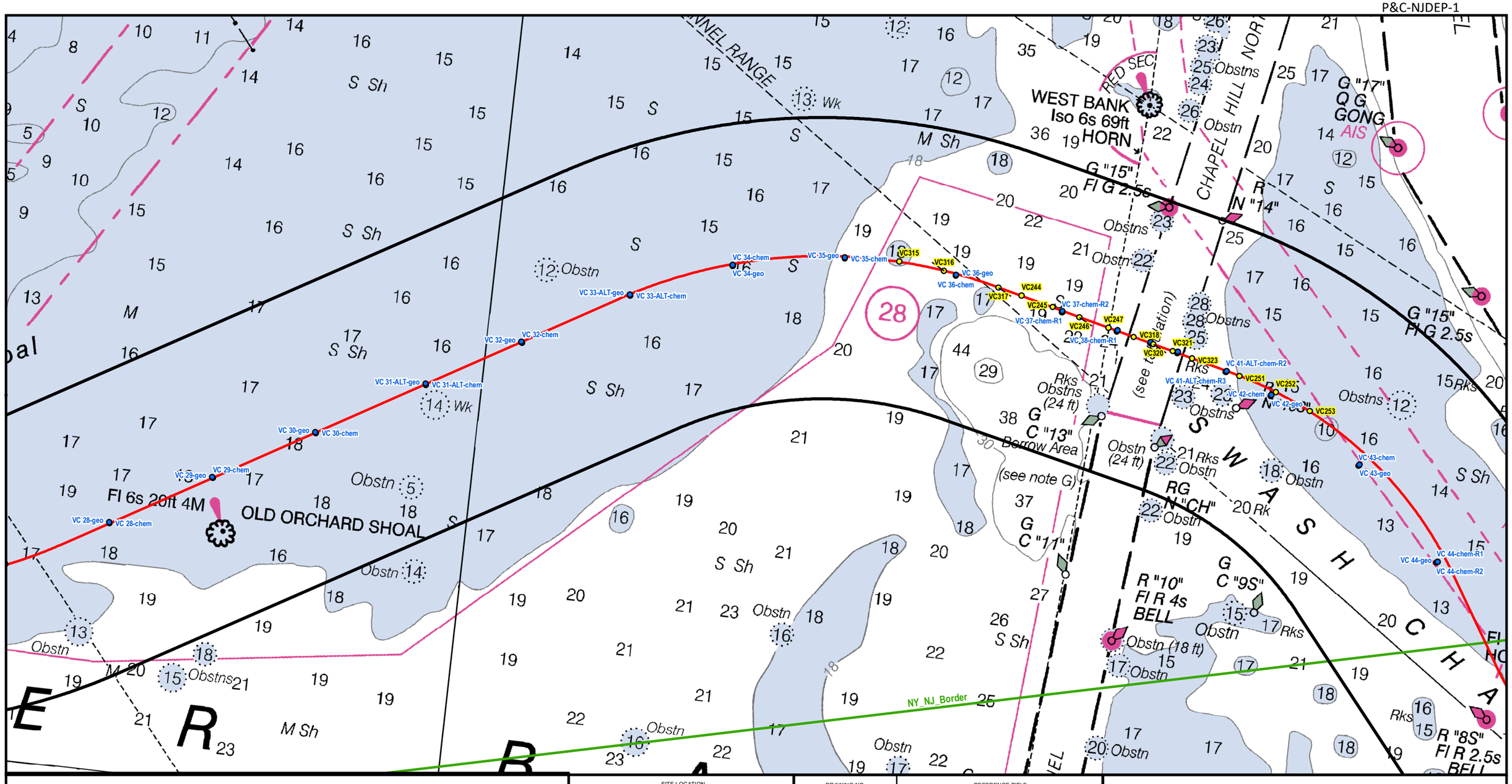

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- NJ-NY Maritime Boundary
- Preferred Alignment APE

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Miles

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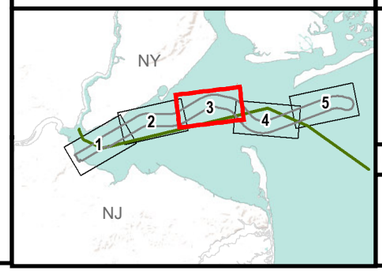
SITE LOCATION



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GEOTECHNICAL LOCATOR MAP
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NEW JERSEY, NEW YORK

Williams

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Data Sources: Williams 2017; E&E 2017; ESRI 2012; ESRI Base, RCGA 2017, NOAA 2017, NOAA Chart 12326, 12327

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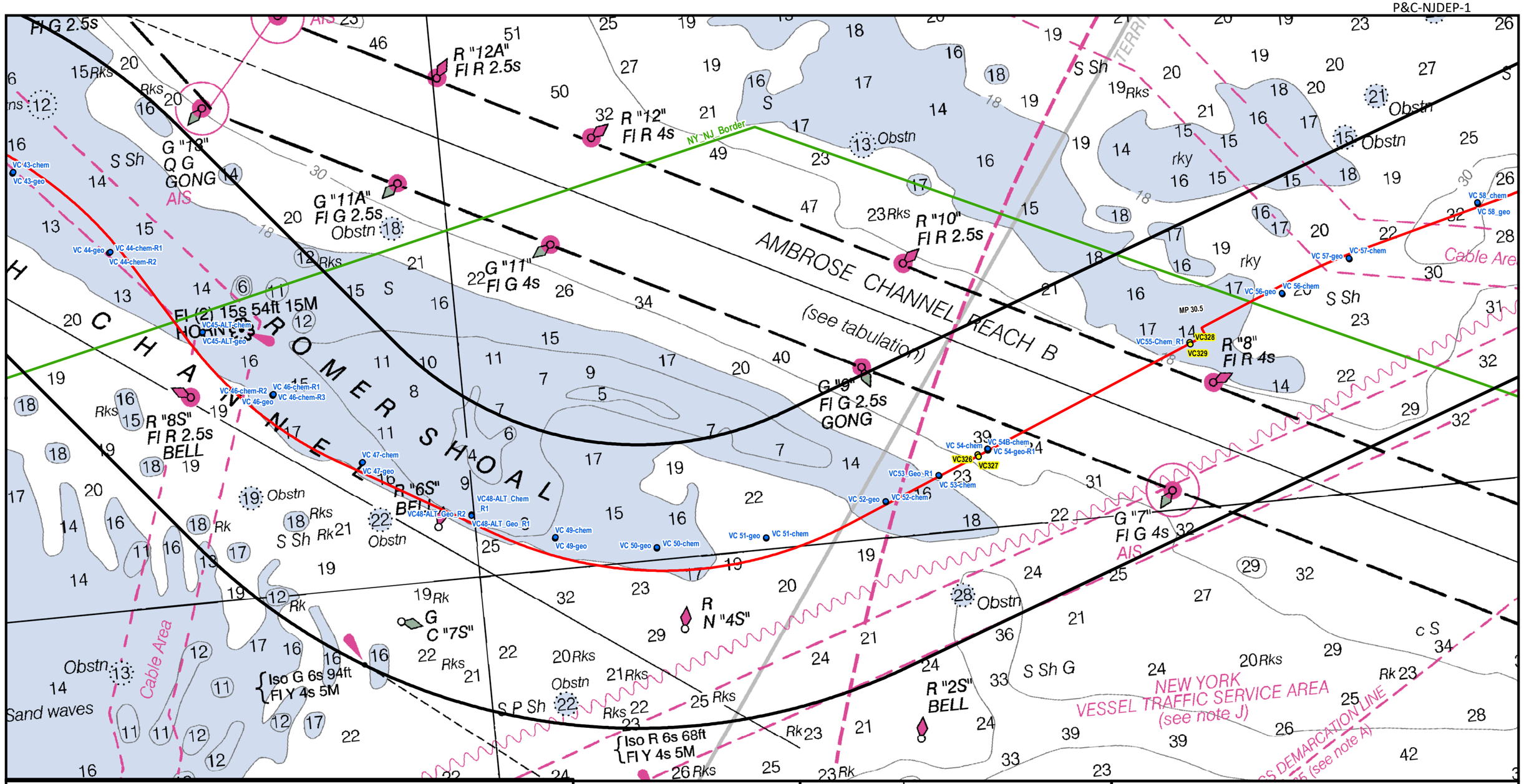

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- Preferred Alignment APE

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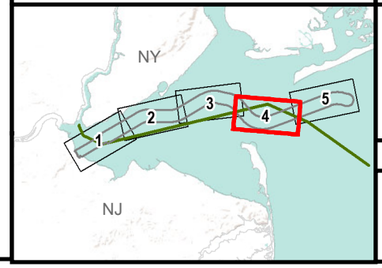
SITE LOCATION



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GEOTECHNICAL LOCATOR MAP
NORTHEAST SUPPLY ENHANCEMENT PROJECT (NESE)
NEW JERSEY, NEW YORK

Williams

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Data Sources: Williams 2017; E&E 2017; ESRI 2012; ESRI Base, RCGA 2017, NOAA 2017, NOAA Chart 12326, 12327

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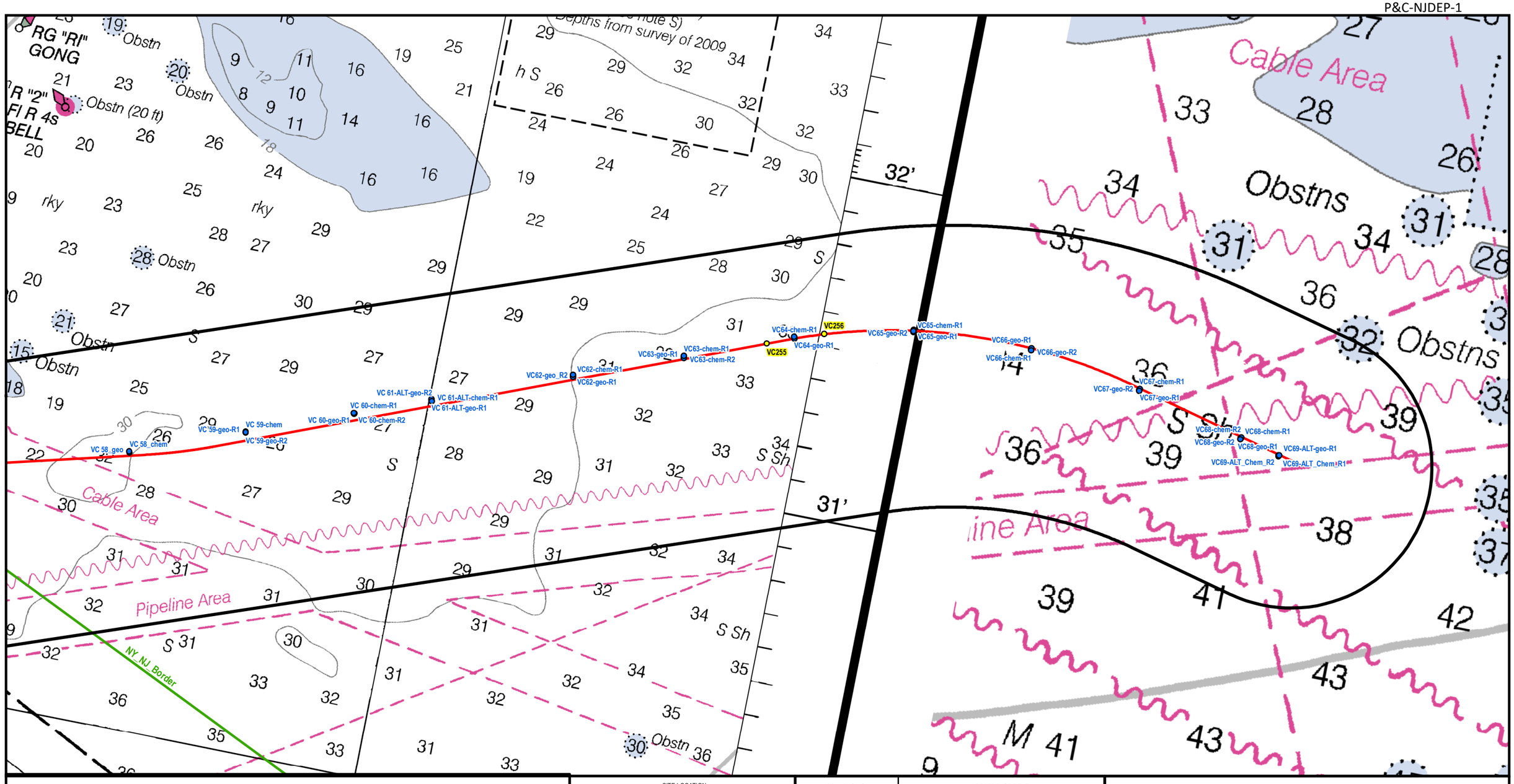

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- NJ-NY Maritime Boundary
- Preferred Alignment APE

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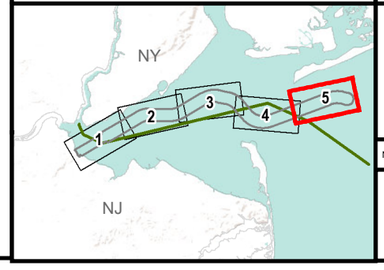
Miles

N

SITE LOCATION



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NEW JERSEY, NEW YORK

Williams

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Data Sources: Williams 2017; E&E 2017; ESRI 2012; ESRI Base, RCGA 2017, NOAA 2017, NOAA Chart 12326, 12327

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APPENDIX II

GEOTECHNICAL GRAPHIC CORE LOGS

BORING NUMBER DEP1

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 31/10/18 **COMPLETED** 31/10/18
WATER DEPTH -9.1 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.76
DRILLING METHOD Vibracore
CORE RECOVERY: 6.17 (79%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:914266.91 Y:110737.33
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-9		(OL) Wet, black loose shells with a loose Organic Silt matrix	DEP-1-D0-7.5E		0	0.05	3
			(ML) Wet to damp, soft, gray, Organic Silt to sandy Silt			0	0.22	2
						0	0.15	3
						0	0.096	2
5	-14		(ML) Wet, dark gray sandy Silt, some intermixes lenses of peat and wood fragments			2.5	>1.0	2
			(CH) Dry, light gray, highly plastic and cohesive Clay			1.7	>1.0	2
								4

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.8 feet.

BORING NUMBER DEP2

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -14.2 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.74
DRILLING METHOD Vibracore
CORE RECOVERY: 7.75 (100%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:927277.74 Y:118151.39
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-14		(SP) Wet, loose, gray, fine to medium Sand and shells					
			(OL) Wet, soft, gray-green Organic Silt, few pieces of shell	COMP-J-D0-7.5E	0.8	0	0.06	5
					1.1	0	0.08	4
					2	0	0.06	4
					1.1	0	0.04	4
5	-19				2	0	0.06	3
					0.8	0	0.06	4
						0	0.07	3

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 7.8 feet.

BORING NUMBER DEP3

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 31/10/18 **COMPLETED** 31/10/18
WATER DEPTH -11.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.65
DRILLING METHOD Vibracore
CORE RECOVERY: 7.08 (92%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:917350.18 Y:112494.78
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-11		(OL) Wet, black loose shells with Organic Silt matrix					
			(CL-ML) Wet to damp, soft, black at top grading down to dark gray-green Silt/Clay; few small shell fragments	DEP-3-D0-7.5E		0	0.06	2
						0	0.09	2
						0	0.12	2
						0	0.13	2
5	-16					0	0.13	2
						0	0.17	2
						0	0.15	2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.7 feet.

BORING NUMBER DEP4R

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 30/10/18 **COMPLETED** 30/10/18
WATER DEPTH -11.5 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.61
DRILLING METHOD Vibracore
CORE RECOVERY: 7.59 (100%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:918189.16 Y:112955.66
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-12		(OL) Wet, loose, black shells with some silt matrix					
			(CL-ML) Wet to damp, soft gray-green Silt/Clay	DEP-4-REV-D0-7.5E		0	0.08	3
						0	0.10	3
						0	0.08	3
						0	0.10	3
5	-17					0	0.16	3
						0	0.14	3
						0	0.14	3

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
□ FINES CONTENT (%) □
20 40 60 80

Bottom of borehole at 7.6 feet.

BORING NUMBER DEP5R

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 30/10/18 **COMPLETED** 30/10/18
WATER DEPTH -12.4 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.76
DRILLING METHOD Vibracore
CORE RECOVERY: 6.92 (89%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:919875.91 Y:113936.31
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-12		(OL) Wet, loose, black Organic Silt and shells					
			(CL-ML) Wet to damp, soft, brown to gray-green Silt/Clay; some small shell fragments throughout	DEP-5-REV-D0-7.5E		0	0.06	2
						0	0.10	2
						0	0.09	2
						0	0.15	2
5	-17					0	0.13	2
						0	0.20	2
								2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 7.8 feet.

BORING NUMBER DEP6

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 22/10/18 **COMPLETED** 22/10/18
WATER DEPTH -38.4 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 27.06
DRILLING METHOD Vibracore
CORE RECOVERY: 26 (96%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:935879.14 Y:122979.85
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-38		(OH) Wet to damp, dark gray to black, soft to medium stiff Organic Silt	DEP-6-D0-13.5E		n/a	0.03	3
						n/a	0.07	3
5	-43					n/a	0.07	4
						n/a	0.08	4
						n/a	0.01	4
10	-48					n/a	0.13	4
						n/a	0.15	4
			(CH) Damp, green-gray, soft to medium stiff Clay; cohesive	DEP-6-D13.5-27E		n/a	0.27	4
15	-53					n/a	0.30	5
						n/a	0.30	4
20	-58					n/a	0.27	4
						n/a	0.09	4
25	-63					n/a	0.25	4
								5

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 27.1 feet.

BORING NUMBER DEP7

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 22/10/18 **COMPLETED** 22/10/18
WATER DEPTH -38.1 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 20.26
DRILLING METHOD Vibracore
CORE RECOVERY: 18.67 (92%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:936249.98 Y:123280.01
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-38		(OH) Damp, black to dark gray Silt, soft to medium stiff, slightly cohesive below 4 feet' some medium to dark tan banding 2"-4" thick with no change in sediment	DEP-7-D0-15E		n/a	n/a	1
						n/a	0.03	2
5	-43					n/a	0.08	2
						n/a	0.12	2
						n/a	0.11	1
10	-48					n/a	0.10	1
						n/a	0.12	1
15	-53		(CH) Damp, gray- green, soft to medium stiff Clay; cohesive	DEP-7-D15-20E		n/a	0.30	1
						n/a	0.25	1
20	-58							2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 20.3 feet.

P&C-NJDEP-1

BORING NUMBER VC204

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 12/11/18 **COMPLETED** 12/11/18
WATER DEPTH -7.1 ft MLLW **HOLE SIZE** 3.25 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 14
DRILLING METHOD Mini-Vibracore
CORE RECOVERY: 11.75 (84%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:912556.06 Y:109742.34
NOTES Total penetration measured manually
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-7		(OL) Wet, soft, dark gray Organic Silt	COMP-A-D0-15E		0	0.15	n/a
						0	0.06	n/a
						0	0.07	n/a
						0.2	0.18	n/a
5	-12		(SP) Wet, medium dense, gray fine Sand			0.5	n/a	n/a
			(OL) Wet, soft, dark gray Organic Silt			0	0.18	n/a
			Refusal at 14.0 '			0	0.17	n/a
						0	0.19	n/a
						0	0.20	n/a
10	-17					0	0.26	n/a
						0	0.30	n/a
								n/a
								n/a
								n/a

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 14.0 feet.

BORING NUMBER VC205

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 12/11/18 **COMPLETED** 12/11/18
WATER DEPTH -6.5 ft MLLW **HOLE SIZE** 3.25 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 15
DRILLING METHOD Mini-Vibracore
CORE RECOVERY: 10.83 (72%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:912597.27 Y:109814.64
NOTES Total penetration measured manually
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-7		(ML) Wet, soft, gray slightly sandy Organic Silt	COMP-A-D0-15E		0.1	0.08	n/a
						0.2	0.08	n/a
			(SP) Wet, medium dense, light gray-brown fine Sand			0.4	n/a	n/a
						0.3	n/a	n/a
5	-12		(ML) Wet, soft, gray sandy Organic Silt			0.0	0.11	n/a
						0.0	0.12	n/a
						0.1	0.12	n/a
						0.3	0.23	n/a
						0.2	0.10	n/a
10	-17					0.5	0.11	n/a
								n/a
								n/a
								n/a
								n/a
15	-22							n/a

Bottom of borehole at 15.0 feet.

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
☐ FINES CONTENT (%) ☐
20 40 60 80

BORING NUMBER VC208

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 12/11/18 **COMPLETED** 12/11/18
WATER DEPTH -7.8 ft MLLW **HOLE SIZE** 3.25 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 8
DRILLING METHOD Mini-Vibracore
CORE RECOVERY: 7.42 (93%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:912975.11 Y:110006.95
NOTES Total penetration measured manually
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-8		(SP) Wet, soft, gray to dark gray fine Sand, rare shells	VC-208-D0-7.5E		0.8	n/a	n/a
			(ML) Wet, soft, dark gray sandy Silt. with lenses of silty Sand- few shells at 2.5-2.67 ft, 3-3.08 ft and 3.5-3.58 feet. Grades to lighter gray at about 6 feet; piece of wood root at 6'11"			0.0	0.07	n/a
						0.0	0.09	n/a
						0.0	0.07	n/a
5	-13					0.1	0.10	n/a
						0.2	0.18	n/a
						0.2	0.15	n/a

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 8.0 feet.

BORING NUMBER VC211

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 12/11/18 **COMPLETED** 12/11/18
WATER DEPTH -8 ft MLLW **HOLE SIZE** 3.25 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 8
DRILLING METHOD Mini-Vibracore
CORE RECOVERY: 7.92 (99%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:913376.8 Y:110230.19
NOTES Total penetration measured manually
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-8		(SW) Wet, gray, loose silty fine Sand; pocket of fine to coarse Gravel at 0.42'-1.92'	VC-211-D0-7.5E		0.6	n/a	n/a
			(SW-SM) Wet, soft, dark gray silty fine Sand with shells			0.7	n/a	n/a
						0.2	0.05	n/a
						0.2	0.06	n/a
5	-13		(ML) Wet, soft, dark gray sandy Organic Silt		0.1	0.1	0.03	n/a
					0.8	0.0	0.24	n/a
			(CL-ML) Wet, soft, dark gray silty Clay to clayey Silt		0.7	0.0	0.45	n/a
					0.8			

▲ SECONDS PER FOOT ▲ (20 40 60 80)
● WATER CONTENT % ● (30 60 90 120)
☐ FINES CONTENT (%) ☐ (20 40 60 80)

Bottom of borehole at 8.0 feet.

BORING NUMBER VC214

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 29/10/18 **COMPLETED** 29/10/18
WATER DEPTH -8.2 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.86
DRILLING METHOD Vibracore
CORE RECOVERY: 7.42 (94%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:913780.35 Y:110461.12
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-8		(OL) Wet, soft, black Organic Silt	VC-214-D0-7.5E		0	0.03	6
						0	0.05	6
						0	0.05	4
			(OL) Shell layer with loose, wet black Organic Silt matrix			0	0.10	3
5	-13		(OL) Wet, soft, black to brown Organic Silt with color change in lenses 3-4" thick		0.2	0	0.11	3
					0.9	0	0.12	2
			(OL) Wet, soft, black to brown Organic Silt with numerous shells			0	0.09	2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 7.9 feet.

BORING NUMBER VC216

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 29/10/18 **COMPLETED** 29/10/18
WATER DEPTH -12.2 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.64
DRILLING METHOD Vibracore
CORE RECOVERY: 7.25 (95%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:920546.8 Y:114312.79
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-12		(OL) Wet, very soft, black Organic Silt, few shells					
			(CL-ML) Damp to wet, soft, brown to green-gray Silt/Clay; numerous small shell fragments	VC-216-D0-7.5E		0	0.02	5
						0	0.11	4
						0	0.12	4
						0	0.14	3
5	-17					0	0.13	3
						0	0.10	3
						0	0.07	3

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.6 feet.

BORING NUMBER VC217

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 29/10/18 **COMPLETED** 29/10/18
WATER DEPTH -13.1 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.7
DRILLING METHOD Vibracore
CORE RECOVERY: 7.67 (100%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:921108.14 Y:114633.11
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-13		(OL) Wet, loose very soft, black Organic Silt with shells			0	0.04	5
			(CL-ML) Wet, soft, gray-green Silt/Clay; rare shells			0	0.10	4
						0	0.07	3
				VC-217-D0-7.5E	0.8	0	0.10	3
5	-18					0	0.05	3
						0	0.08	3
						0	0.10	3

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.7 feet.

BORING NUMBER VC218

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 29/10/18 **COMPLETED** 29/10/18
WATER DEPTH -13.6 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.69
DRILLING METHOD Vibracore
CORE RECOVERY: 8.17 (100%) *See Note
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:921620.7 Y:114928.68
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-14		(OL) Wet, loose, soft, black Organic Silt	VC-218-D0-7.5E		0	0.04	3
						0	0.06	2
						0	0.05	3
						0	0.03	3
5	-19					0	0.10	3
			(OL) Layer of compact shells with Organic Silt matrix			0	0.14	3
			(CL-ML) Damp, medium stiff, gray-green Silt/Clay; numerous small shell fragments			0	0.16	4

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
□ FINES CONTENT (%) □
20 40 60 80

*Note: Recovery value higher than penetration value as a result of core vibration causing de-compaction of materials penetrated.

Bottom of borehole at 7.7 feet.

BORING NUMBER VC219

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -14.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.52
DRILLING METHOD Vibracore
CORE RECOVERY: 7.17 (95%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:922140.04 Y:115220.35
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-14		(OL) Wet, soft, black Organic Silt; 2 inch thick shell layer at 5.42-5.58'	COMP-G-D0-7.5E		0	0.02	5
						0	0.04	4
						0	0.04	4
						0	0.11	3
5	-19					0	0.07	3
			(OL) Wet, soft, brown to gray-green silty Clay / clayey Silt; numerous small shell fragments in upper three inches of section			0	0.06	3
						0	0.09	2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.5 feet.

BORING NUMBER VC220

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -14.8 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.92
DRILLING METHOD Vibracore
CORE RECOVERY: 7.67 (97%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:922665.63 Y:115522.17
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-15		(OL) Wet, soft, black Organic Silt	COMP-G-D0-7.5E		0	0.05	3
						0	0.15	3
						0	0.15	2
						0	0.06	2
5	-20		(OL) Damp, soft, brown to gray-green silty Clay to clayey Silt; numerous small shell fragments in upper few inches of section			0	0.10	2
						0	0.06	2
						0	0.06	2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.9 feet.

BORING NUMBER VC221

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -14.4 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.80
DRILLING METHOD Vibracore
CORE RECOVERY: 7.58 (97%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:923189.92 Y:115820.54
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-14		(OL) Wet, soft, black Organic Silt	COMP-G-D0-7.5E		0	0.04	3
						0	0.04	3
						0	0.01	2
						0	0.10	2
5	-19		(OL) Wet, soft to medium stiff, Organic Silt, numerous small shell fragments			0	0.04	2
			(OL) Wet, soft, dark green-gray silty Clay to clayey Silt; rare shells			0	0.09	2
						0	0.10	2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.8 feet.

BORING NUMBER VC222

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -14.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.59
DRILLING METHOD Vibracore
CORE RECOVERY: 7.75 (100%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:923695.87 Y:116108.82
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-14		(OL) Wet, soft, dark gray to black Organic Silt	VC-222-D0-7.5E		0	0.01	6
						0	0.00	6
						0	0.03	5
						0	0.05	4
5	-19					0	0.10	4
			(OL) Wet, soft, dark gray-green Organic Silt			0	0.05	4
						0	0.05	4

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.8 feet.

BORING NUMBER VC223

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -14.5 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.77
DRILLING METHOD Vibracore
CORE RECOVERY: 7.5 (96%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:924121.94 Y:116350.96
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-15		(OL) Wet, black, soft Organic Silt	VC-223-D0-7.5E		0	0.03	5
						0	0.05	4
						0	0.10	4
			(OL) Wet, soft, green-gray silty Clay; slightly cohesive			0	0.08	3
5	-20					0	0.08	4
						0	0.06	4
						0	0.10	4

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
□ FINES CONTENT (%) □
20 40 60 80

Bottom of borehole at 7.8 feet.

BORING NUMBER VC225

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 20/10/18 **COMPLETED** 20/10/18
WATER DEPTH -17.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.5
DRILLING METHOD Vibracore
CORE RECOVERY: 7.5 (100%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:934946.46 Y:122452.07
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-17		(CH) Wet, soft, dark gray-green Clay	COMP-L-D0-20.5E	1.3	n/a	0.04	7
						n/a	0.09	8
					1.1	n/a	0.06	9
						n/a	0.01	8
5	-22				1	n/a	0.08	9
						n/a	0.06	8
					0.3	n/a	0.05	10

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.5 feet.

BORING NUMBER VC227

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 20/10/18 **COMPLETED** 20/10/18
WATER DEPTH -17.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 14.22
DRILLING METHOD Vibracore
CORE RECOVERY: 15 (100%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:935132.88 Y:122555.28
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-17		(OL) Numerous shells and shell fragments in Silt matrix; soft, wet, dark gray-green		1.2	n/a	0.05	13
			(CH) Wet to damp, soft to medium stiff, dark gray-green Clay		3			13
					0.9	n/a	0.03	12
					0.8			12
5	-22			COMP-L-D0-20.5E		n/a	0.10	9
								8
						n/a	0.08	7
								6
						n/a	0.09	8
10	-27							14
						n/a	0.10	11
								4
						n/a	0.13	3
						n/a	0.12	3

▲ SECONDS PER FOOT ▲ (20 40 60 80)
● WATER CONTENT % ● (30 60 90 120)
□ FINES CONTENT (%) □ (20 40 60 80)

*Note: Recovery value higher than penetration value as a result of core vibration causing de-compaction of materials penetrated.

Bottom of borehole at 14.2 feet.

BORING NUMBER VC228

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 20/10/18 **COMPLETED** 20/10/18
WATER DEPTH -17.4 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 21.36
DRILLING METHOD Vibracore
CORE RECOVERY: 18.9 (89%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:935318.81 Y:122659.12
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-17		(OL) Dark gray silt with whole shell pieces, soft, loose					
			(CH) Wet to damp soft to medium dense, dark gray-green Clay	COMP-L-D0-20.5E		n/a	0.08	7
						n/a	0.05	6
5	-22					n/a	0.08	5
						n/a	0.12	4
10	-27					n/a	0.12	4
						n/a	0.12	4
						n/a	0.16	5
15	-32					n/a	0.15	4
						n/a	0.12	5
20	-37							5
								5

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 21.4 feet.

BORING NUMBER VC229

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 20/10/18 **COMPLETED** 20/10/18
WATER DEPTH -17.9 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 28.9
DRILLING METHOD Vibracore
CORE RECOVERY: 23.0 (80%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:935516.79 Y:122769.84
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-18		(OL) Wet, loose, black Silt					
			(CH) Damp, soft to medium stiff, dark gray-green Clay, cohesive	VC-229-D0-28E		n/a	0.05	7
						n/a	0.10	6
5	-23					n/a	0.10	5
						n/a	0.15	4
						n/a	0.16	4
10	-28					n/a	0.16	4
						n/a	0.20	5
						n/a	0.17	4
15	-33					n/a	0.15	5
						n/a	0.22	5
						n/a	0.17	5
20	-38							6
								6
25	-43							6

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 28.9 feet.

BORING NUMBER VC230

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 20/10/18 **COMPLETED** 20/10/18
WATER DEPTH -29.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 27.64
DRILLING METHOD Vibracore
CORE RECOVERY: 24.0 (87%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:935696.74 Y:122880.39
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-29		(OL) Black soft wet Silt			n/a	0.03	4
			(CH) Damp, soft to medium stiff, dark gray-green Clay, cohesive			n/a	0.13	5
								6
5	-34					n/a	0.07	6
								5
						n/a	0.11	7
								3
						n/a	0.16	2
10	-39							
				COMP-M-D0-27E		n/a	0.13	2
						n/a	0.19	2
15	-44					n/a	0.15	2
						n/a	0.20	3
						n/a	0.20	2
20	-49					n/a	0.20	3
						n/a	0.20	2
25	-54							2
								2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 27.6 feet.

BORING NUMBER VC230A

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 20/10/18 **COMPLETED** 20/10/18
WATER DEPTH -29.9 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 27.02
DRILLING METHOD Vibracore
CORE RECOVERY: 29.25 (100%) *See Note
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:935637.91 Y:122921.32
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-30		(OL) Loose black Silt, trace shell fragments			n/a	0.03	7
						n/a	0.05	6
5	-35		(CH) Dark gray-green soft to medium stiff Clay; cohesive; rare fine shell fragments			n/a	0.11	6
						n/a	0.12	7
10	-40					n/a	0.12	7
						n/a	0.13	6
				COMP-M-D0-27E		n/a	0.13	7
15	-45					n/a	0.17	7
						n/a	0.15	9
20	-50					n/a	0.18	9
						n/a	0.20	7
						n/a	0.22	8
25	-55					n/a	0.20	10
			*Note: Recovery value higher than penetration value as a result of core vibration causing de-compaction of materials penetrated.			n/a	0.30	10

Bottom of borehole at 27.0 feet.

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

BORING NUMBER VC230B

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 20/10/18 **COMPLETED** 20/10/18
WATER DEPTH -28.9 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 27.13
DRILLING METHOD Vibracore
CORE RECOVERY: 28 (100%) *See Note
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:935762.39 Y:122850.32
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-29		(CH) Wet, soft to medium stiff; dark gray-green Clay; cohesive	COMP-M-D0-27E		n/a	0.15	7
						n/a	0.10	6
								6
5	-34					n/a	0.15	3
								3
						n/a	0.10	6
								8
						n/a	0.20	9
10	-39							7
						n/a	0.20	6
						n/a	0.15	6
15	-44					n/a	0.10	5
						n/a	0.15	5
						n/a	0.10	5
20	-49					n/a	0.15	4
						n/a	0.15	5
25	-54					n/a	0.10	5
			*Note: Recovery value higher than penetration value as a result of core vibration causing de-compaction of materials penetrated.			n/a	0.10	6

Bottom of borehole at 27.1 feet.

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

BORING NUMBER VC232

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 22/10/18 **COMPLETED** 22/10/18
WATER DEPTH -46.2 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 22.82
DRILLING METHOD Vibracore
CORE RECOVERY: 20.67 (90%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:936059.13 Y:123083.06
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-46		(OL) Damp, dark gray to black, soft to medium stiff Organic Silt	COMP-N-D0-4E		n/a	0.10	3
						n/a	0.10	3
								4
5	-51					n/a	0.15	5
			(CH) Damp, soft to medium stiff, gray-green Clay, cohesive	COMP-N-D4-22.5E				17
						n/a	0.28	34
								9
10	-56					n/a	0.20	10
								8
						n/a	0.30	7
						n/a	0.17	6
15	-61					n/a	0.30	5
						n/a	0.25	5
						n/a	0.28	4
20	-66					n/a	0.15	5

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 22.8 feet.

BORING NUMBER VC232A

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 22/10/18 **COMPLETED** 22/10/18
WATER DEPTH -45.1 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 23.07
DRILLING METHOD Vibracore
CORE RECOVERY: 22.5 (97%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:936122.86 Y:123056.16
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-45		(OL) Wet, black to dark gray Organic Silt	COMP-N-D0-4E		n/a	n/a	3
						n/a	0.07	3
5	-50		(CH) Damp, green-gray, soft to medium Stiff Clay; cohesive			n/a	0.30	3
						n/a	0.29	3
						n/a	0.30	3
10	-55					n/a	0.26	3
				COMP-N-D4-22.5E		n/a	0.20	2
15	-60					n/a	0.25	2
						n/a	0.25	2
						n/a	0.27	2
20	-65					n/a	0.30	2
								2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 23.1 feet.

BORING NUMBER VC232B

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 22/10/18 **COMPLETED** 22/10/18
WATER DEPTH -46.9 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 22.5
DRILLING METHOD Vibracore
CORE RECOVERY: 22.0 (98%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:935986.51 Y:123122.29
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-47		(OL) Wet, soft, dark gray to black Organic Silt	COMP-N-D0-4E		n/a	0.05	2
						n/a	0.17	3
5	-52		(CH) Damp, soft to medium stiff Clay; cohesive			n/a	0.07	3
								4
						n/a	0.30	5
								8
10	-57					n/a	0.25	10
				COMP-N-D4-22.5E		n/a	0.20	10
						n/a	0.13	10
15	-62					n/a	0.25	10
						n/a	0.20	9
20	-67					n/a	0.28	10
						n/a	0.34	9

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 22.5 feet.

BORING NUMBER VC235

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 22/10/18 **COMPLETED** 22/10/18
WATER DEPTH -31.8 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 24.23
DRILLING METHOD Vibracore
CORE RECOVERY: 21.3 (88%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:936522 Y:123347.61
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-32		(OL) Damp, black to dark gray Organic Silt; cohesive from 4 ft to 13.83; loose 0-4 feet	VC-235-D0-13.7E		n/a	n/a	2
					0.2			
					0.2	n/a	0.04	2
					0.8			
5	-37					n/a	0.06	2
						n/a	0.10	2
						n/a	0.14	2
10	-42					n/a	0.16	2
						n/a	0.12	2
15	-47		(CH) Damp, gray-green soft to medium stiff Clay; cohesive	VC-235-D13.7-24E		n/a	0.16	2
						n/a	0.16	2
						n/a	0.25	2
20	-52					n/a	0.35	2
								2

Bottom of borehole at 24.2 feet.

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

P&C-NIDEP-1

BORING NUMBER VC237

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 22/10/18 **COMPLETED** 22/10/18
WATER DEPTH -19.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 25.72
DRILLING METHOD Vibracore
CORE RECOVERY: 25.67 (100%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:936646.56 Y:123432.37
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-19		(OH) Wet, black to dark gray, soft Organic Silt	COMP-O-D0-2E		n/a	n/a	3
						n/a	0.08	2
			(CH) Damp, soft to medium stiff, gray-green Clay; cohesive					
5	-24					n/a	0.10	2
						n/a	0.18	2
						n/a	0.15	2
10	-29				0.8			
					10	n/a	0.24	2
					2			
				COMP-O-D2-25E		n/a	0.15	1
15	-34					n/a	0.20	2
						n/a	0.22	2
						n/a	0.24	1
20	-39					n/a	0.21	2
						n/a	0.18	2
25	-44					n/a	0.28	1

▲ SECONDS PER FOOT ▲ (20 40 60 80)
● WATER CONTENT % ● (30 60 90 120)
□ FINES CONTENT (%) □ (20 40 60 80)

Bottom of borehole at 25.7 feet.

BORING NUMBER VC237A

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 22/10/18 **COMPLETED** 22/10/18
WATER DEPTH -21 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 25.97
DRILLING METHOD Vibracore
CORE RECOVERY: 25.67 (99%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:936725.19 Y:123388.69
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-21		(OL) Wet, soft, black to dark gray Organic Silt	COMP-O-D0-2E		n/a	n/a	3
						n/a	0.04	2
5	-26		(CH) Damp, soft to medium stiff, green-gray Clay; cohesive; 2"x3" section of oyster shell at 5.75 feet	COMP-O-D2-25E		n/a	0.10	2
						n/a	0.20	2
10	-31					n/a	0.19	2
						n/a	0.23	2
						n/a	0.14	1
15	-36					n/a	0.24	1
						n/a	0.25	1
						n/a	0.25	2
20	-41					n/a	0.25	1
						n/a	0.28	1
25	-46					n/a	0.22	2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 26.0 feet.

BORING NUMBER VC237B

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 22/10/18 **COMPLETED** 22/10/18
WATER DEPTH -30.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 25.74
DRILLING METHOD Vibracore
CORE RECOVERY: 27.17 (100%) *See Note
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:936557.57 Y:123446.6
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-30		(OL) Wet, soft, dark gray to black Organic Silt	COMP-O- D0-2E		n/a	0.04	3
			(CL) Damp, soft to medium stiff gray-green Clay; cohesive			n/a	0.04	3
5	-35					n/a	0.10	2
					0.8	n/a	0.12	2
					1			
					0.6	n/a	0.00	2
10	-40				1			
					1.4	n/a	0.20	2
					0.8			
				COMP-O-D2-25E		n/a	0.21	1
15	-45					n/a	0.20	2
						n/a	0.20	2
						n/a	0.15	1
20	-50					n/a	0.20	1
						n/a	0.19	2
25	-55					n/a	0.22	2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

*Note: Recovery value higher than penetration value as a result of core vibration causing de-compaction of materials penetrated.

Bottom of borehole at 25.7 feet.

BORING NUMBER VC238

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -19.5 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 28.86
DRILLING METHOD Vibracore
CORE RECOVERY: 24.75 (88%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:936831.39 Y:123523.56
NOTES Recovery on Run 1 was too short; Run 2 shown
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-20		(OL) Dark gray, wet, soft Organic Silt; slightly cohesive	VC-238-D0-28E		n/a	0.06	4
			(OL) Black, loose shell hash with soft, loose Silt matrix		2			4
			(CH) Damp, soft to medium stiff, gray-green Clay; cohesive			n/a	0.14	5
								1
5	-25					n/a	0.15	1
						n/a	0.16	1
						n/a	0.19	1
10	-30					n/a	0.14	1
						n/a	0.18	1
15	-35					n/a	0.20	1
						n/a	0.26	1
						n/a	0.25	1
20	-40					n/a	0.23	2
						n/a	0.22	1
25	-45							1
								2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 28.9 feet.

BORING NUMBER VC239

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -17.9 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 24.26
DRILLING METHOD Vibracore
CORE RECOVERY: 20.5 (84%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:937021.99 Y:123628.61
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-18		(OL) Loose. wet, black Silt					
			(CH) Damp, soft to medium Stiff gray-green Clay; cohesive	COMP-P-D0-23E		n/a	0.15	4
								4
					1	n/a	0.15	1
								1
5	-23					n/a	0.15	1
						n/a	0.15	1
						n/a	0.10	1
10	-28							
						n/a	0.15	1
						n/a	0.22	1
15	-33					n/a	0.21	1
						n/a	0.27	1
						n/a	0.15	1
20	-38							
								1
								1

Bottom of borehole at 24.3 feet.

BORING NUMBER VC240

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -17.8 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 16.12
DRILLING METHOD Vibracore
CORE RECOVERY: 15.5 (95%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:937214.44 Y:123732.2
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-18		(OL) Loose, wet, black Silt with shells					
			(CH) Damp, soft to medium dense green-gray Clay; cohesive	COMP-P-D0-23E		n/a	0.08	6
								13
						n/a	0.04	9
								2
5	-23					n/a	0.05	2
								2
						n/a	0.08	2
								2
						n/a	0.18	2
10	-28							1
						n/a	0.23	1
								2
						n/a	0.23	1
								1
15	-33					n/a	0.24	1
								2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 16.1 feet.

BORING NUMBER VC242

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -17.6 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 10.54
DRILLING METHOD Vibracore
CORE RECOVERY: 10.0 (95%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:937406.83 Y:123827.25
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-18		(OL) Wet, soft, dark gray to black Organic Silt; large shells at bottom of section	COMP-P-D0-23E		n/a	n/a	5
								5
			(CH) Damp, soft to medium stiff, gray-green Clay		1.3	n/a	0.05	5
								2
5	-23					n/a	0.12	2
								1
						n/a	0.09	1
								1
						n/a	0.20	1
10	-28							1

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 10.5 feet.

BORING NUMBER VC244

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 26/10/18 **COMPLETED** 26/10/18
WATER DEPTH -21.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 10.68
DRILLING METHOD Vibracore
CORE RECOVERY: 8.17 (76%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:970439.58 Y:131668.5
NOTES Longest recovery of three attempts; Run 3 shown
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-21		(OL) Wet, loose, black Organic Silt with shells			0.8	0.16	6
			(SM) Wet, soft gray sandy Silt to silty fine Sand	VC-244-D0-4E		n/a	0.12	6
			(SM) Wet, soft, dark gray Organic Silt, some fine sand; some fine shell fragments			0.5	0.14	6
						n/a	0.15	2
5	-26		(SM) Wet, soft, dark gray silty fine Sand, some small shell fragments	COMP-R-D4-10.5E		0.4	0.15	2
						0.2	0.13	2
						1.7	n/a	3
			(SP) Damp, medium dense red-brown fine to medium Sand			1.5	n/a	3
								4
10	-31							7

Bottom of borehole at 10.7 feet.

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

BORING NUMBER VC245

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 26/10/18 **COMPLETED** 26/10/18
WATER DEPTH -21.9 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 11.91
DRILLING METHOD Vibracore
CORE RECOVERY: 9.17 (77%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:971012.78 Y:131523.4
NOTES Longest recovery of three attempts; Run 3 shown
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-22		(OL) Wet, black to dark gray, soft Organic Silt	VC-245-D0-4E		0.0	0.14	10
						0.0	0.13	7
						0.0	0.07	3
			(SP) Damp, gray, medium dense fine Sand, with 1/2" thick silt lens at 5.5 feet. Sand grades with shells from 7.6 feet to bottom of section			2.5	n/a	2
5	-27			COMP-R-D4-10.5E		1.5	n/a	3
						2.5	n/a	3
						2.4	n/a	3
			(SP) Damp, medium dense red-brown medium Sand, grading down to fine sand, little silt			1.7	n/a	6
						1.6	n/a	8
10	-32							5
								3

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 11.9 feet.

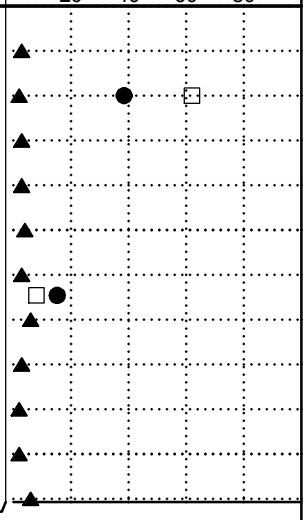
BORING NUMBER VC246

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 26/10/18 **COMPLETED** 26/10/18
WATER DEPTH -22.7 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 11.07
DRILLING METHOD Vibracore
CORE RECOVERY: 8.92 (81%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:971503.46 Y:131395.93
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-23		(OL) Wet, soft, black Organic Silt	VC-246-D0-4E		0.0	0.04	3
						0.0	0.07	2
						0.0	0.16	3
						0	0.15	3
5	-28		(ML) Wet, soft, dark gray Organic Silt with numerous small shell fragments	COMP-R-D4-10.5E		0.7	0.18	4
			(SP) Wet, medium dense, gray fine Sand, few shell fragments			3.5	n/a	3
						0.4	n/a	6
						0.4	n/a	3
			(SP) Damp, medium dense brown fine to medium Sand					2
10	-33							2
								6

Bottom of borehole at 11.1 feet.

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
□ FINES CONTENT (%) □
20 40 60 80



BORING NUMBER VC247

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -24.6 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 21.6
DRILLING METHOD Vibracore
CORE RECOVERY: 18.0 (83%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:972037.82 Y:131266.38
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-25	(ML) Wet, soft, black Silt, few shells; little medium Sand	VC-247-D0-4E		n/a	n/a	3
		(OL) Wet, black soft, loose, Organic Silt; rare fine shell fragments					
		(OL) Wet, soft, black to dark gray Organic Silt			n/a	0.15	2
5	-30	(SM) Wet, loose, dark gray silty fine to medium Sand	VC-247-D4-21.5E		n/a	0.08	1
					0.25	n/a	1
		(SP) Damp, dense, red-brown fine to medium Sand; one piece of gravel 1.5" x 2" at 16.67 feet			0.7	n/a	1
10	-35						2
					0.7	n/a	8
							7
					1.2	n/a	4
							3
15	-40				1.2	n/a	3
					0.4	n/a	3
							8
							4
20	-45						4
							7

SECONDS PER FOOT ▲ (20 40 60 80)
WATER CONTENT % ● (30 60 90 120)
FINES CONTENT (%) □ (20 40 60 80)

Bottom of borehole at 21.6 feet.

BORING NUMBER VC251

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -18.2 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 9.23
DRILLING METHOD Vibracore
CORE RECOVERY: 7.25 (78%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:974446.59 Y:130671.43
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-18		(SM) Black to dark gray, wet, medium dense silty fine Sand, numerous shell fragments	VC-251-D0-7.5E	0.8	0.1	n/a	3
					1.1	0.22	n/a	3
			(OL) Wet, soft black shell hash with Organic Silt matrix; slightly cohesive		3.4	n/a	n/a	2
					1.8	n/a	n/a	1
5	-23		(SP) Damp, medium dense, gray fine to medium Sand, few small shell fragments		0.8	0.1	n/a	1
						0.17	n/a	2
						0.1	n/a	2
							n/a	1
							n/a	1

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 9.2 feet.

BORING NUMBER VC252

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 26/10/18 **COMPLETED** 26/10/18
WATER DEPTH -16.5 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 8.03
DRILLING METHOD Vibracore
CORE RECOVERY: 7.08 (88%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:975122.45 Y:130457.4
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-17		(OL) Wet, soft, black Organic Silt					
			(SP) Wet, loose, dark gray fine Sand, some shells and shell fragments	VC-252-D0-7.5E		0.2	n/a	4
						0.2	n/a	3
			(SP) Damp, medium dense, gray fine to medium Sand, rare shell fragments			2.3	n/a	2
						2.2	n/a	3
5	-22					2.2	n/a	6
						1.7	n/a	8
						1.6	n/a	7
								7

Bottom of borehole at 8.0 feet.

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
□ FINES CONTENT (%) □
20 40 60 80

BORING NUMBER VC253

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 26/10/18 **COMPLETED** 26/10/18
WATER DEPTH -16.7 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 8.43
DRILLING METHOD Vibracore
CORE RECOVERY: 8.0 (90%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:975756.87 Y:130189.89
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-17		(SP) Damp, loose, dark gray fine Sand; numerous shells					
			(SP) Damp, medium dense gray fine to medium Sand	VC-253-D0-7.5E		2.0	n/a	2
						2.0	n/a	2
						3.0	n/a	2
						2.2	n/a	4
5	-22					2.5	n/a	11
						2.5	n/a	12
						2.6	n/a	13
						2.0	n/a	9

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 8.4 feet.

BORING NUMBER VC255

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 26/10/18 **COMPLETED** 26/10/18
WATER DEPTH -32.9 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 8.11
DRILLING METHOD Vibracore
CORE RECOVERY: 6.42 (79%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:1013100.55 Y:130432.14
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-33		(SM) Wet, soft to medium dense, dark gray silty fine Sand, rare shell fragments	VC-255-D0-7.5E		1.0	n/a	4
								5
						3.5	n/a	3
								4
5	-38					3.5	n/a	5
			(SP) Damp, dark gray, loose fine to medium Sand			2.0	n/a	16
								58
								17

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 8.1 feet.

BORING NUMBER VC256

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 26/10/18 **COMPLETED** 26/10/18
WATER DEPTH -33.7 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.76
DRILLING METHOD Vibracore
CORE RECOVERY: 6.17 (80%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:1014065.56 Y:130795.63
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-34		(SM) Damp, dark gray, medium dense silty fine Sand, few shells; 1/2" thick Organic Silt lens at 4.25'	VC-256-D0-7.5E		0.5	n/a	5
								5
						2.1	n/a	4
								4
5	-39		(SP) Damp, loose to medium dense, brown fine to medium Sand, trace coarse Sand; rare shell fragments			2.5	n/a	4
								8
								14

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 7.8 feet.

BORING NUMBER VC301R

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 30/10/18 **COMPLETED** 30/10/18
WATER DEPTH -9.1 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 8.0
DRILLING METHOD Vibracore
CORE RECOVERY: 7.5 (94%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:914794.17 Y:111025.04
NOTES No recovery on Run 1, Run 2 shown
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-9		(ML) Wet, soft, loose Organic Silt, little fine sand					
			(CL-ML) Wet, soft to medium dense gray-green slightly organic Silt/Clay; little fine sand	VC-301-REV-D0-7.5E		0	0.09	4
						0	0.18	3
						0	0.00	2
						0	0.14	2
5	-14					0	0.16	2
						0	0.18	2
						0	0.23	5
								1

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 8.0 feet.

BORING NUMBER VC303

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 31/10/18 **COMPLETED** 31/10/18
WATER DEPTH -10.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.72
DRILLING METHOD Vibracore
CORE RECOVERY: 7.42 (96%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:915637.7 Y:111518.36
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-10		(OL) Wet, loose, black shell hash with Organic Silt matrix			0	0.07	2
			(ML) Wet to damp, soft to medium dense, dark gray grading down to gray-green Silt, some small sandy lenses	VC-303-D0-7.5E		0	0.12	2
						0	0.13	2
						0	0.20	1
5	-15					0.3	0.26	1
						0	0.03	1
						0	0.16	1

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 7.7 feet.

BORING NUMBER VC304

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 29/10/18 **COMPLETED** 29/10/18
WATER DEPTH -9.4 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.72
DRILLING METHOD Vibracore
CORE RECOVERY: 7.67 (99%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:916484.28 Y:112001.78
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-9		(OL) Wet, soft, red-brown to green-gray Organic Silt; numerous small shell fragments	VC-304-D0-7.5E		0	0.09	3
			(CL-ML) Wet to damp, soft. gray-green Silt/Clay; rare shells			0	0.10	2
						0	0.05	2
						0	0.09	2
5	-14					0	0.11	2
						0	0.11	2
						0	0.14	2

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 7.7 feet.

BORING NUMBER VC307

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -14.7 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.68
DRILLING METHOD Vibracore
CORE RECOVERY: 7.08 (92%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:924958.82 Y:116830.22
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-15		(SM) Wet, soft, loose, black silty fine Sand; few shell fragments			0	0.02	3
			(OL) Wet, soft, gray-green silty clay - clayey silt			0	0.05	3
						0	0.04	2
				COMP-I-D0-7.5E		0	0.06	3
5	-20					0	0.07	2
						0	0.06	3
						0	0.10	3

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.7 feet.

BORING NUMBER VC308

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -14.4 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.74
DRILLING METHOD Vibracore
CORE RECOVERY: 7.92 (100%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:925726.37 Y:117267.82
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-14		(SM) Numerous shells with a silty Sand matrix; loose, wet, dark gray			0	0.05	3
			(OL) Wet, very soft, loose, black Organic Silt	COMP-I-D0-7.5E	18	0	0.01	3
					17	0	0.06	3
					28	0	0.08	3
5	-19				17	0	0.05	3
					18.1	0	0.01	4
					8	0	0.05	4

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 7.9 feet.

BORING NUMBER VC309

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -13.6 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.70
DRILLING METHOD Vibracore
CORE RECOVERY: 7.58 (98%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:926497.83 Y:117705.54
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-14		(OL) Wet, soft, gray-green Organic Silt to silty clay; not cohesive	COMP-I-D0-7.5E	0.5	0	0.01	4
					0.8	0	0.08	4
					0.5	0	0.04	3
					0.9	0	0.08	3
5	-19				0.8	0	0.00	3
					3	0	0.08	3
					1	0	0.07	3
					0.5			

Bottom of borehole at 7.7 feet.

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

BORING NUMBER VC310

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -11.6 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.71
DRILLING METHOD Vibracore
CORE RECOVERY: 7.42 (96%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:927913.18 Y:118511.4
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-12		(SM) Wet, loose, dark gray silty Sand with shells	COMP-J-D0-7.5E		0.2	0.10	3
						0	0.05	3
			(OL) Wet, soft, gray-green Organic Silt; few shell pieces			0	0.05	3
						0	0.06	3
5	-17					0	0.14	3
						0	0.14	3
						0	0.02	3

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 7.7 feet.

BORING NUMBER VC311

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -9.6 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.64
DRILLING METHOD Vibracore
CORE RECOVERY: 7.5 (98%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:928697.75 Y:118960.99
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-10		(SP) Wet, loose, dark gray to gray fine to medium Sand, some shells	VC-311-D0-7.5E		0.7	n/a	6
			(GW-GC) Wet, soft to loose, gray, mixture of well graded Sand, medium to coarse Gravel and cohesive Clay			0.0	n/a	6
			(GW-GC) Wet, gray to red-brown, dense to medium dense, mixture of sandy Clay with fine to medium Gravel; clay in small slightly cohesive sections in the gravel			0.3	n/a	7
						1.0	n/a	6
5	-15					2.0	n/a	7
			(SP) Damp, medium dense, red-brown fine to medium Sand			1.1	n/a	13
						2.7	n/a	16

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 7.6 feet.

BORING NUMBER VC312

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -10.7 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.76
DRILLING METHOD Vibracore
CORE RECOVERY: 6.0 (77%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:929392.54 Y:119352.18
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-11		(SP) Wet, loose, fine to medium Sand, little fine to medium gravel			0.4	n/a	8
			(SP) Damp, gray, medium dense, fine to medium Sand	COMP-K-D0-7.5E		0.3	n/a	7
						1.5	n/a	6
						2.6	n/a	4
5	-16					2.2	n/a	4
						1.3	n/a	4
								5

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 7.8 feet.

BORING NUMBER VC313

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -13.2 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.65
DRILLING METHOD Vibracore
CORE RECOVERY: 6.08 (79%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:930256.23 Y:119847.47
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-13		(SP) Wet, loose, gray fine to medium Sand, some shells			0.1	n/a	7
			(SW) Wet, loose, gray to brown fine to medium Sand, some fine gravel			1.5	n/a	7
			(SP) Damp, medium dense, red-brown fine to medium Sand, little fine gravel; layer of fine to coarse gravel with sand matrix from 5.75 to 6.08 feet	COMP-K-D0-7.5E		2.5	n/a	5
						3.0	n/a	4
5	-18					2.5	n/a	4
						1.0	n/a	8
								10

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 7.7 feet.

BORING NUMBER VC314

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 28/10/18 **COMPLETED** 28/10/18
WATER DEPTH -14.9 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 7.58
DRILLING METHOD Vibracore
CORE RECOVERY: 5.33 (68%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:931036.21 Y:120303.9
NOTES Longest recovery of three attempts
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-15		(SP) Wet, loose, gray fine to medium Sand, some shells					
			(SW) Damp, loose to medium dense, gray to red-brown fine to coarse Sand, some fine to coarse Gravel	COMP-K-D0-7.5E		0.5	n/a	4
						1.2	n/a	2
						1.4	n/a	2
						0.9	n/a	2
5	-20					1.0	n/a	3
								3
								3

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 7.6 feet.

BORING NUMBER VC315

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 29/10/18 **COMPLETED** 29/10/18
WATER DEPTH -20.7 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 12.59
DRILLING METHOD Vibracore
CORE RECOVERY: 9.83 (78%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:968210.72 Y:132031.94
NOTES Longest recovery of three attempts
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-21		(SM) Wet, soft to medium dense, silty medium to coarse Sand, some fine to medium Gravel; few shell pieces	COMP-Q-D0-10.5E		0.0	0.11	3
			(SP) Wet, medium dense, red-brown fine to medium Sand, rare fine gravel			0.0	n/a	3
						0.9	n/a	3
						1.6	n/a	2
5	-26					2.2	n/a	2
						2.5	n/a	2
						2.4	n/a	1
						2.2	n/a	1
						2.5	n/a	1
10	-31							1
								2
								2

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 12.6 feet.

BORING NUMBER VC316

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 29/10/18 **COMPLETED** 29/10/18
WATER DEPTH -21 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 10.75
DRILLING METHOD Vibracore
CORE RECOVERY: 7.25 (67%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:969022.72 Y:131951.95
NOTES Longest recovery of three attempts
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-21		(OL) Wet, soft, loose, dark gray Organic Silt, few shells	COMP-Q-D0-10.5E		0.0	0.10	3
			(SM) Wet, medium dense, gray, silty fine to medium Sand; numerous small shell fragments			0.0	0.13	3
			(SP) Wet, medium dense, gray to red-brown fine to medium Sand, rare fine gravel			1.6	n/a	1
						1.5	n/a	18
5	-26					2.1	n/a	2
						2.2	n/a	3
						1.5	n/a	5
								5
								4
10	-31							5

▲ SECONDS PER FOOT ▲
20 40 60 80
● WATER CONTENT % ●
30 60 90 120
☐ FINES CONTENT (%) ☐
20 40 60 80

Bottom of borehole at 10.8 feet.

BORING NUMBER VC317

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 29/10/18 **COMPLETED** 29/10/18
WATER DEPTH -20.8 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 10.41
DRILLING METHOD Vibracore
CORE RECOVERY: 8.42 (79%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:970014.31 Y:131761.32
NOTES Longest recovery of three attempts
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-21		(SP) Wet, medium dense, gray fine Sand	COMP-Q-D0-10.5E		1.2	0.14	14
			(ML) Wet, soft, dark gray sandy Silt; few shells			0.3	0.08	10
						0.0	0.22	1
			(SM) Wet, gray, loose silty fine to medium Sand			0.0	n/a	2
5	-26					0.5	n/a	2
			(SP) Wet, medium dense, red-brown fine to coarse Sand, rare fine gravel			0.4	n/a	1
						1.7	n/a	1
						0.9	n/a	2
								2
10	-31							3

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

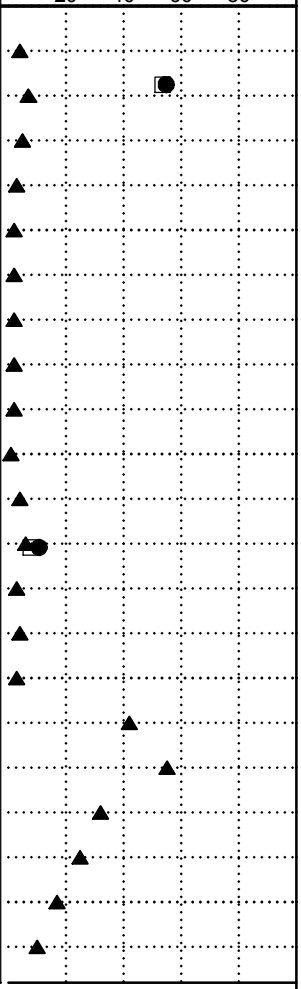
Bottom of borehole at 10.4 feet.

BORING NUMBER VC318

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -30.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 21.80
DRILLING METHOD Vibracore
CORE RECOVERY: 20.67 (95%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:972501.24 Y:131152.65
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-30	(OL) Wet, loose black Organic Silt	VC-318-D0-3.5E		n/a	0.05	4
							7
					n/a	0.03	5
		(SP) Damp, dense red-brown fine to medium Sand, trace fine gravel	VC-318-D3.5-21.5E				3
5	-35				1.6	n/a	2
							2
					2.2	n/a	2
							2
					1.8	n/a	2
10	-40						1
					1.4	n/a	4
		(CH) Damp, light gray, stiff to semi-stiff sandy Clay					6
		(CH) Damp, light gray and red-brown layering, lenses of fine to medium Sand and lenses of semi-stiff damp clay; lenses 2-3 inches thick			n/a	0.26	3
							4
15	-45	(SW) Damp, dense, red-brown fine to medium Sand with 20%-30% fine gravel			1.7	n/a	3
							42
					1.7	n/a	55
							32
					1.0	n/a	25
20	-50				0.5	n/a	17
							10



Bottom of borehole at 21.8 feet.

BORING NUMBER VC320

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -35.4 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 19.08
DRILLING METHOD Vibracore
CORE RECOVERY: 19.3 (100%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:972862.71 Y:131065.88
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-35		(SM) Wet, dense, dark gray to gray silty fine Sand, numerous small shell fragments	VC-320-D0-19E		0.0	n/a	4
			(SP) Grades to damp, gray medium dense fine to medium Sand, few fine shell fragments			0.2	n/a	3
5	-40		Damp, dense to hard Peat, with layering less than 2 inches, some thin silt laminae between Peat lenses			0.7	n/a	2
			(SP) Medium dense, damp, gray to light brown medium to fine Sand; rare fine gravel			0.5	n/a	2
10	-45					0.0	n/a	2
			(CL) Gray, dry, very stiff Clay; cohesive			2.0	n/a	2
			(CL) Gray, stiff sandy Clay, cohesive			0.7	0.55	3
			(CL) Damp to dry, stiff, red-brown to gray sandy Clay to clayey Sand					
15	-50		(SP) Damp, dense, red-brown fine to medium Sand			1.6	n/a	5
								15
						2.0	n/a	55
								54
			(SW) Gray to red-brown, medium dense, damp, fine to coarse Sand, little fine to medium Gravel			2.5	n/a	56

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

Bottom of borehole at 19.3 feet.

BORING NUMBER VC321

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -33.1 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 20.98
DRILLING METHOD Vibracore
CORE RECOVERY: 18.25 (87%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:973221.28 Y:130979.56
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-33		(SW-SM) Black to dark gray, wet, very soft sandy Silt to silty fine Sand interbedded in 6 inch thick layers	VC-321-D0-20.5E		0.0	n/a	2
			(SP-SM) Wet, medium dense,gray fine Sand with some silt; some shell fragments			1.5	n/a	2
5	-38					0.9	n/a	2
						0.5	n/a	2
			(SW) Damp, loose to medium dense, light gray to brown medium to coarse Sand, some fine to medium Gravel			0.7	n/a	2
10	-43					0.5	n/a	2
			(CL) Damp, dark gray stiff Clay			1.2	0.8	4
			(SP) Damp, medium dense, gray to red-brown fine to medium Sand, little fine Gravel			0.1	n/a	4
15	-48					1.5	n/a	2
								3
20	-53							

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
☐ FINES CONTENT (%) ☐ 20 40 60 80

Bottom of borehole at 21.0 feet.

BORING NUMBER VC323

Alpine A GARDLINE COMPANY | HALEY ALDRICH

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 23/10/18 **COMPLETED** 23/10/18
WATER DEPTH -27.7 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 22.34
DRILLING METHOD Vibracore
CORE RECOVERY: 17.25 (77%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:973577.61 Y:130889.4
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-28		(SM) Wet, loose to soft, dark gray to black silty fine Sand; few small shell fragments			0.20	n/a	15
			(SP) Damp, medium dense, fine Sand, some shell fragments					13
						0.35	n/a	13
								2
5	-33					0.25	n/a	2
						0.30	n/a	3
			(SM) Wet, soft to medium dense, silty fine Sand, numerous shell fragment; trace fine gravel	VC-323-D0-22E		0.20	n/a	2
10	-38					0.30	n/a	3
						0.20	n/a	2
15	-43		(SP) Damp, loose to medium dense, gray to red-brown medium to coarse Sand			0.15	n/a	2
						n/a	n/a	2
								3
20	-48							5
								23
								25

SECONDS PER FOOT: 20 40 60 80
WATER CONTENT %: 30 60 90 120
FINES CONTENT (%): 20 40 60 80

Bottom of borehole at 22.3 feet.

BORING NUMBER VC326

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 25/10/18 **COMPLETED** 25/10/18
WATER DEPTH -38.6 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 22.16
DRILLING METHOD Vibracore
CORE RECOVERY: 19.67 (89%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:993185.94 Y:122763.05
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-39		(SP) Wet, loose to medium dense gray fine Sand; soft black lens of Organic Silt at 7'-7.25'	COMP-S-D0-0-21E		0.7	n/a	5
					1			3
					6.7	1.25	n/a	2
					14.8			2
5	-44				10	1.0	n/a	2
					10			
					20.1	0.5	n/a	3
					18.2			
					10	n/a	0.07	3
10	-49		(ML) Wet, black, soft sandy Organic Silt					2
						0.3	n/a	5
								4
			(SM) Wet, gray to dark gray, loose to medium dense, silty Sand to Sandy Silt			n/a	0.05	3
15	-54					0.5	n/a	3
						0.5	n/a	3
						1.2	n/a	3
20	-59							
								2
								4

Bottom of borehole at 22.2 feet.

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

BORING NUMBER VC327

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 25/10/18 **COMPLETED** 25/10/18
WATER DEPTH -36.9 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 22.58
DRILLING METHOD Vibracore
CORE RECOVERY: 19.5 (86%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:993199.35 Y:122723.89
NOTES
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-37		(SP-SM) Damp to wet, loose to medium dense, gray fine to medium Sand, with lenses of dark gray soft Organic Silt 2"-3" thick at 4.17' and 8.5 ft	COMP-S-D0-0-21E		2.5	n/a	6
								4
						2.2	n/a	2
								3
5	-42					1.8	n/a	3
						2.5	n/a	2
								3
						2.0	n/a	3
10	-47							7
			(SM) Wet, dark gray to gray, loose to medium dense silty fine Sand, occasional lenses of black Organic Silt (slightly cohesive, 3-4" thick at 10.5', 12.5', 14.25' and 16.67'			0.75	n/a	7
								3
						n/a	0.09	6
								3
15	-52					0.2	0.11	3
						0.1	n/a	3
						1.0	n/a	3
20	-57							
								3
								4

SECONDS PER FOOT ▲ (20 40 60 80)
WATER CONTENT % ● (30 60 90 120)
FINES CONTENT (%) □ (20 40 60 80)

Bottom of borehole at 22.6 feet.

BORING NUMBER VC328

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 25/10/18 **COMPLETED** 25/10/18
WATER DEPTH -16.3 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 22.63
DRILLING METHOD Vibracore
CORE RECOVERY: 18.75 (83%)
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:997098.34 Y:124375.97
NOTES Refusal at 22.6 ft
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-16		No sample recovery					3
								3
			(SW) Damp, medium dense, light gray, medium to coarse Sand, 20% fine to medium gravel			0.0	n/a	1
								2
5	-21					1.5	n/a	4
								8
						3.5	n/a	16
								17
						2.7	n/a	12
10	-26			COMP-T-D0-22.5E				11
						2.0	n/a	12
								11
						4.0	n/a	9
								12
15	-31					2.0	n/a	15
								58
						0.1	n/a	127
								21
						0.1	n/a	31
20	-36							27
						0.3	n/a	39
								39

SECONDS PER FOOT (20 40 60 80)
WATER CONTENT % (30 60 90 120)
FINES CONTENT (%) (20 40 60 80)

Bottom of borehole at 22.6 feet.

BORING NUMBER VC329

CLIENT Haley and Aldrich
PROJECT NAME Williams NESE project, NJ Upland Disposal
PROJECT NUMBER 1853
PROJECT LOCATION Lower NY Harbor and Raritan Bay
DATE STARTED 25/10/18 **COMPLETED** 25/10/18
WATER DEPTH -16.2 ft MLLW **HOLE SIZE** 3.5 inches
DRILLING CONTRACTOR Alpine Ocean Seismic
CORE PENETRATION: 20.95
DRILLING METHOD Vibracore
CORE RECOVERY: 25.42 (100%) *See Note
LOGGED BY CD **CHECKED BY** TM
CORE LOCATION: X:997108.01 Y:124336.67
NOTES Encountered refusal at 20.95 feet on Run 1 and Run 2; Run 1 shown
DATUM / PROJECTION: NAD 83, NY Long Island Lambert, ft

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE ID	PID READING per foot (ppm)	POCKET PEN. (tsf)	TORVANE (tsf)	PENETRATION SECONDS PER FOOT
0	-16		(SP) Damp, loose to medium dense, gray fine to medium Sand, rare shell fragments		12.4	n/a	n/a	4
					2.6			4
					6.8	1.5	n/a	2
								4
5	-21		(SW) Damp, medium dense, medium to coarse Sand, some fine gravel; NOTE: bottom two feet of core liner empty due to wash out of sand during recovery			3.0	n/a	6
								9
						0.9	n/a	11
								10
				COMP-T-D0-22.5E		1.5	n/a	10
10	-26							8
						2.2	n/a	9
								9
						2.5	n/a	7
								7
15	-31					1.2	n/a	9
								142
						0.5	n/a	60
								40
						2.5	n/a	40
20	-36							70

▲ SECONDS PER FOOT ▲ 20 40 60 80
● WATER CONTENT % ● 30 60 90 120
□ FINES CONTENT (%) □ 20 40 60 80

*Note: Recovery value higher than penetration value as a result of core vibration causing de-compaction of materials penetrated.

Bottom of borehole at 21.0 feet.

MAJOR DIVISION			GROUP SYMBOL	LETTER SYMBOL	GROUP NAME
COARSE GRAINED SOILS CONTAINS MORE THAN 50% FINES	**GRAVEL AND GRAVELLY SOILS** MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVEL WITH * 5% FINES		GW	Well-graded GRAVEL
				GP	Poorly graded GRAVEL
		GRAVEL WITH BETWEEN 5% AND 15% FINES		GW-GM	Well-graded GRAVEL with silt
				GW-GC	Well-graded GRAVEL with clay
				GP-GM	Poorly graded GRAVEL with silt
				GP-GC	Poorly graded GRAVEL with clay
		GRAVEL WITH ≥ 15% FINES		GM	Silty GRAVEL
				GC	Clayey GRAVEL
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SAND WITH * 5% FINES		SW	Well-graded SAND
				SP	Poorly graded SAND
		SAND WITH BETWEEN 5% AND 15% FINES		SW-SM	Well-graded SAND with silt
				SW-SC	Well-graded SAND with clay
				SP-SM	Poorly graded SAND with silt
				SP-SC	Poorly graded SAND with clay
		SAND WITH ≥ 15% FINES		SM	Silty SAND
				SC	Clayey SAND
FINE GRAINED SOILS CONTAINS MORE THAN 50% FINES	SILT AND CLAY	LIQUID LIMIT LESS THAN 50		ML	Inorganic SILT with low plasticity
				CL	Lean inorganic CLAY with low plasticity
				OL	Organic SILT with low plasticity
		LIQUID LIMIT GREATER THAN 50		MH	Elastic inorganic SILT with moderate to high plasticity
				CH	Fat inorganic CLAY with moderate to high plasticity
				OH	Organic SILT or CLAY with moderate to high plasticity
HIGHLY ORGANIC SOILS				PT	PEAT soils with high organic contents

Abbreviations and Symbology

When the lithology identifies that a material is “fine” it is referring to sediment that will pass a 200-mesh sieve.

APPENDIX III

GEOTECHNICAL PHOTO CORE LOGS

DEP 1
0'-2'

DEP 1
2'-4'

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

DEP3
0'-2'

DEP3
2'-4'

DEP3
4'-6'

DEP3
6'-7'1"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

DEP-4R
4'-6'

DEP-4R
6'-7'7"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

DEP-6
0-2

DEP-6
2-4

DEP-6
4'-6'

DEP-6
6'-8'

DEP-6
8'-10'

DEP-6
10'-12'

DEP-6
12'-14'

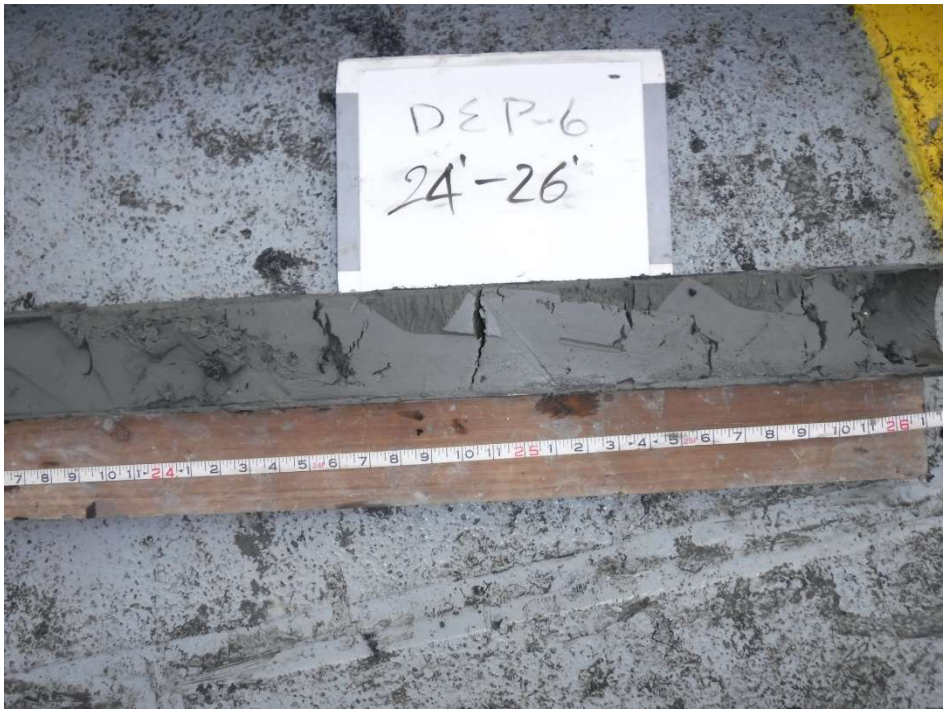
DEP-6
14'-16'2"

DEP-6
16'2" - 18'

DEP-6
18' - 20'

DEP-6
20'-22'

DEP-6
22'-24'


DEP-6
24'-26'

DEP 7
0'-2'

DEP 7
2'-4'

DEP 7
4'-6'

DEP 7
6'-8'

DEP 7
8'-8' 10"

DEP 7
8'10"-10'

DEP 7
10' - 12'

DEP 7
12' - 14'

DEP 7
14' - 16'

DEP 7
16' - 18'

DEP 7
18' - 18'10"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *George* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *George* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *George* Vibracore Photographs

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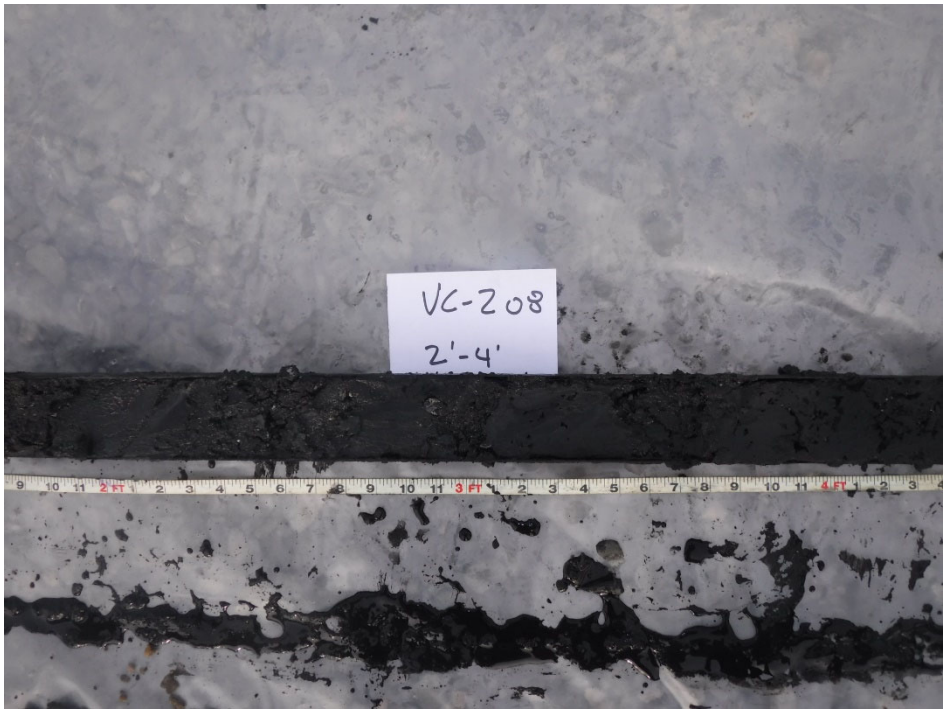
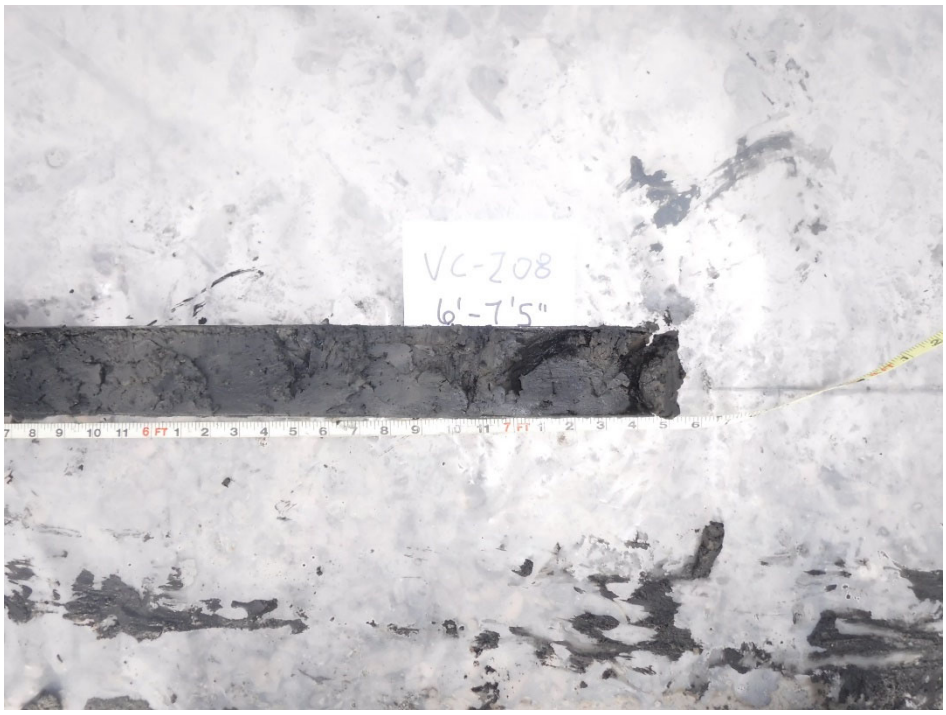
Alpine Report Ref 1853
RV *George* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *George* Vibracore Photographs

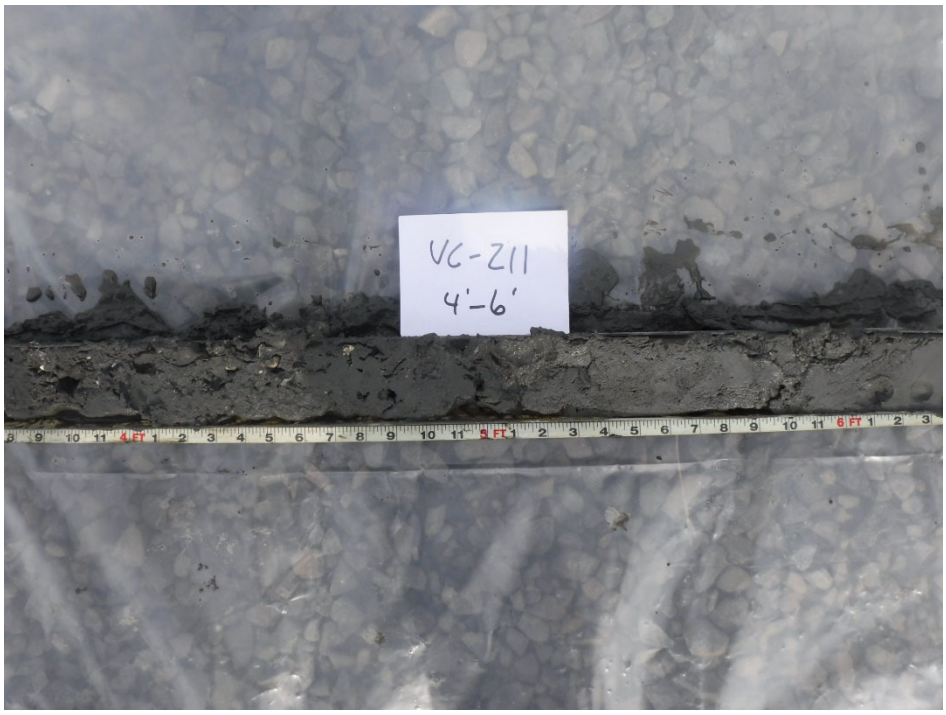


Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *George* Vibracore Photographs

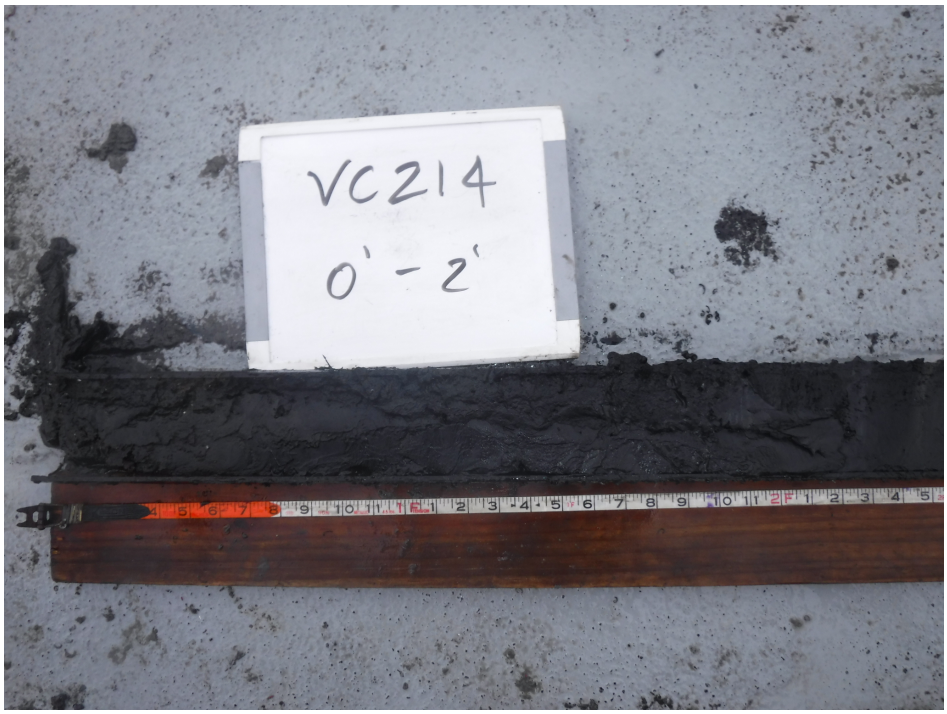


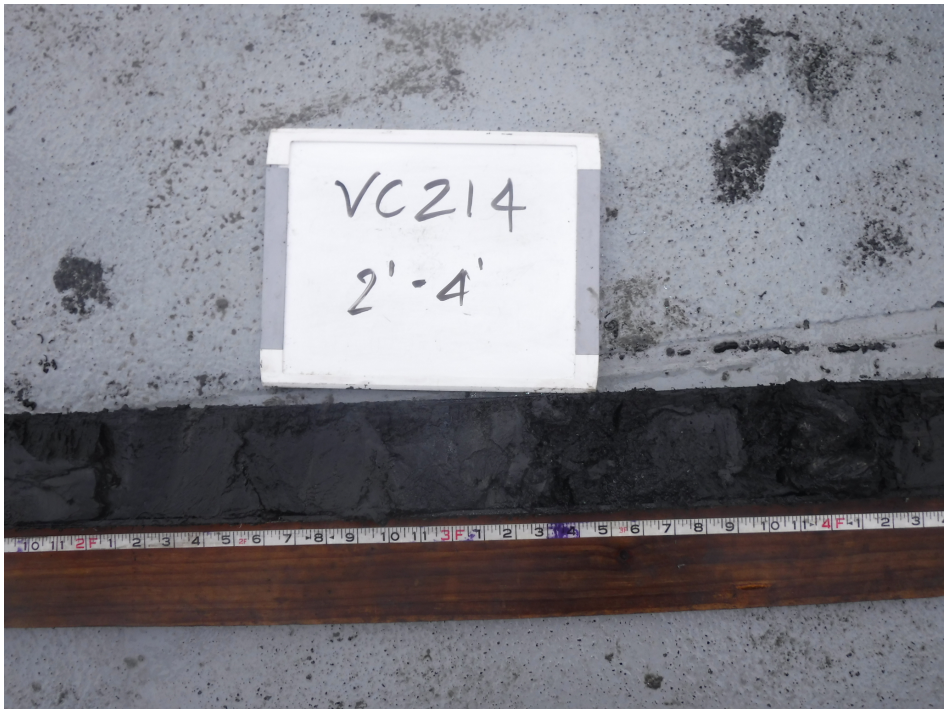
Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *George* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *George* Vibracore Photographs



Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs





VC214
4'-6'

VC214
6'-7'5"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

VC-217
4'-6'

VC-217
6'-7'8"

VC218
0-2'

VC-218
2'-4'

VC-218
4'-6'

VC-218
6'-8'2"

VC219
0'-2'

VC219
2'-4'

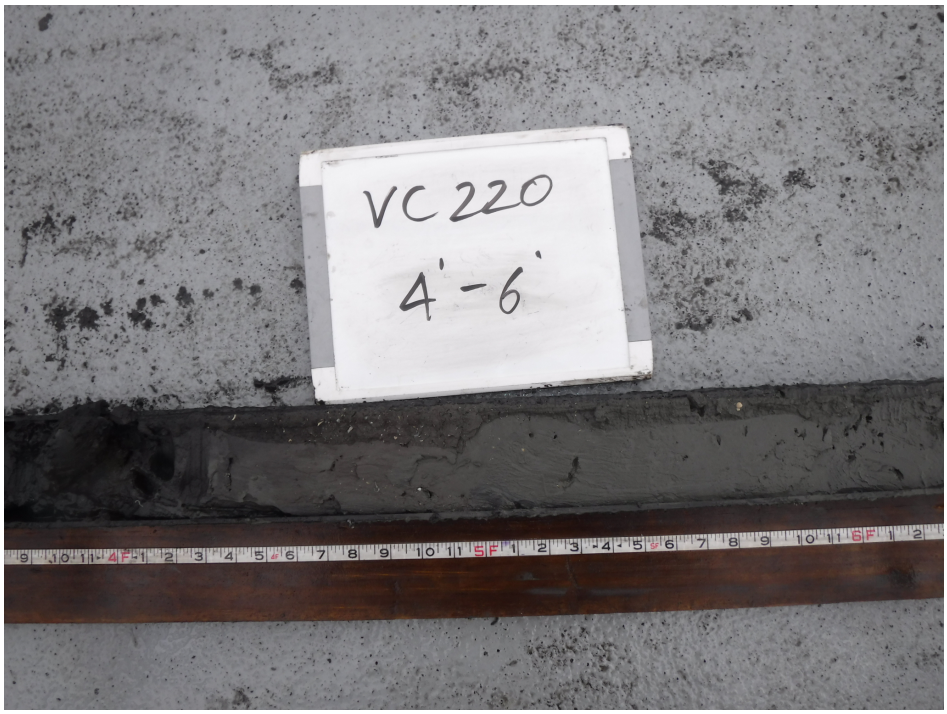
VC219
4'-6'

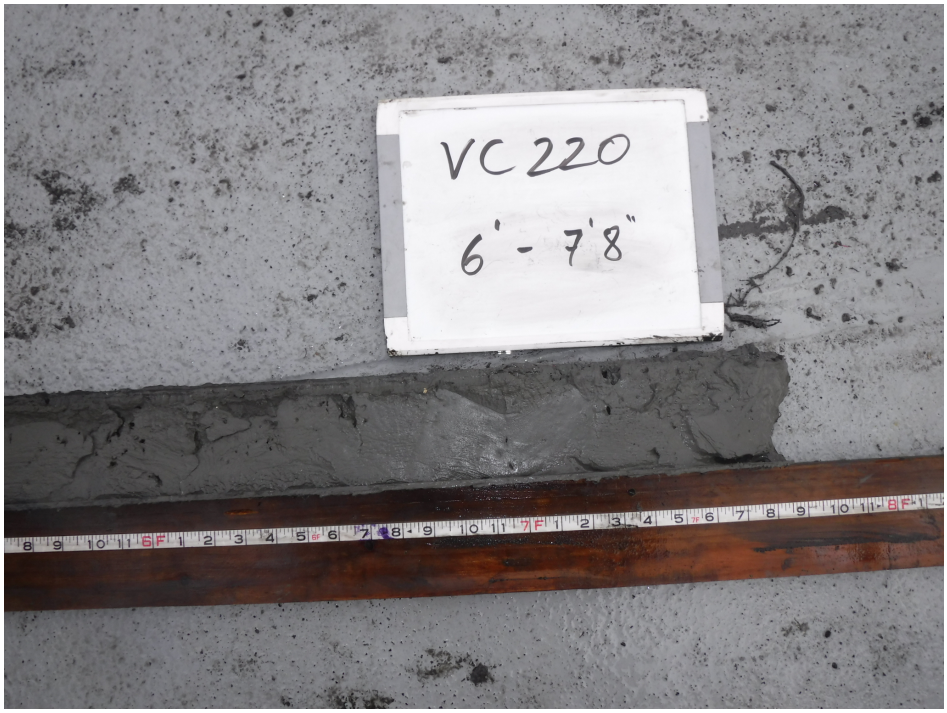
VC219
6'-7'2"

VC 220
0'-2'

VC 220
2'-4'

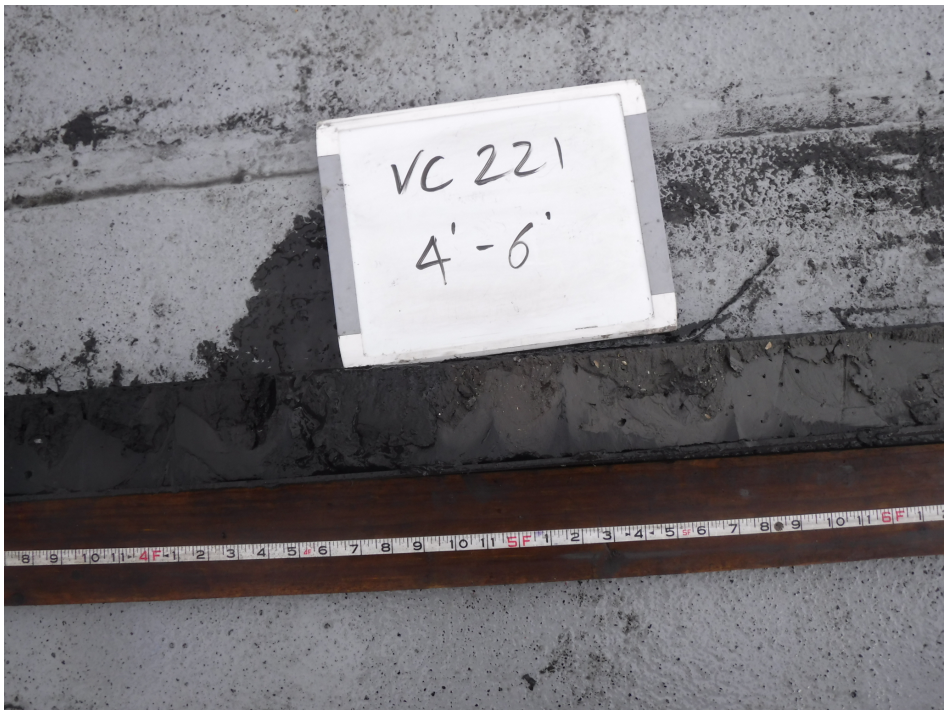
Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

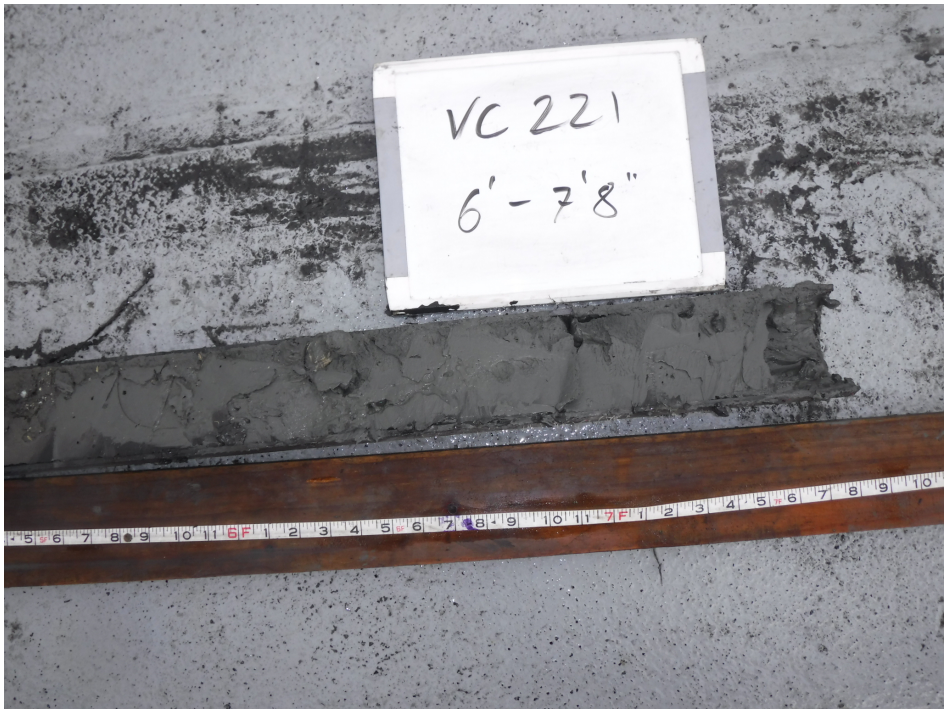




Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs





Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

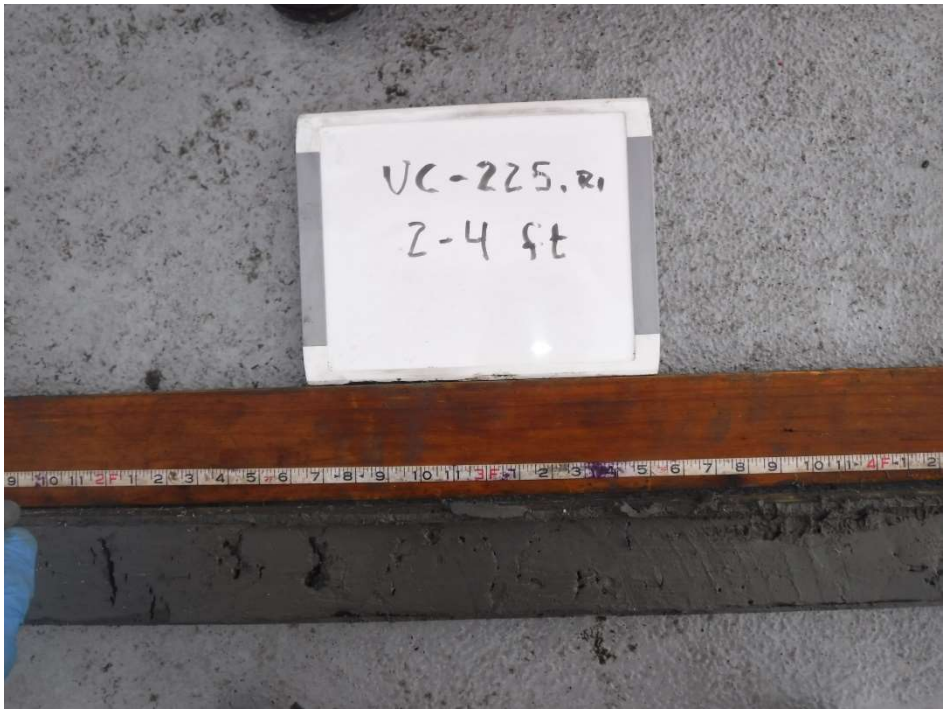
Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

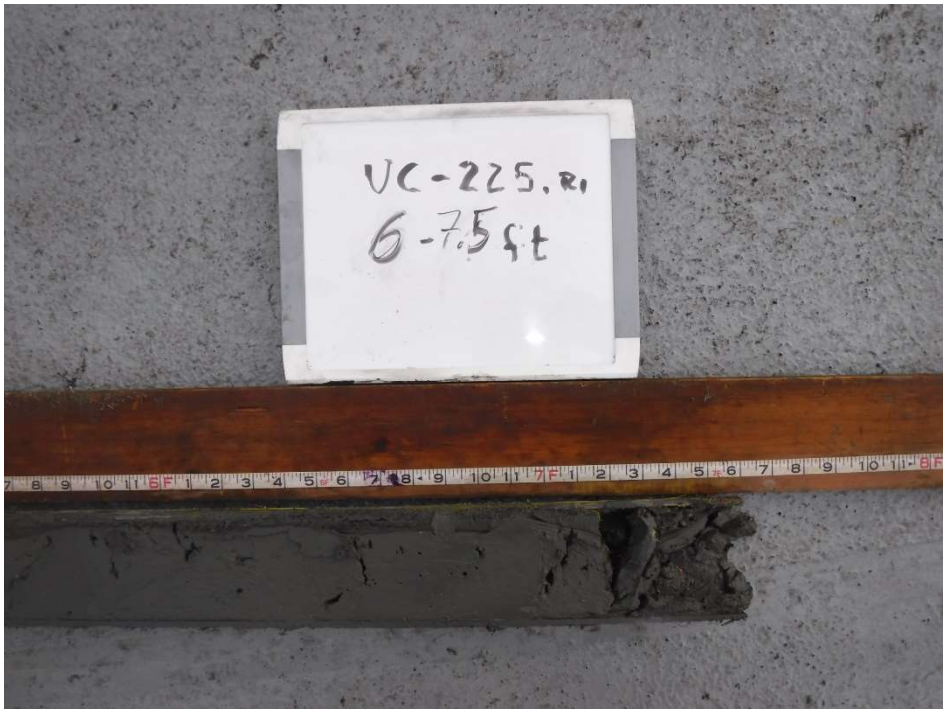
VC 223
4'-6'

VC 223
6'- 7'7"

VC-225.R1
0-2 ft


VC-225.R1
2-4 ft

VC-225.R1
4-6 ft


VC-225.R1
6-7.5 ft

VC-227
0-2'

VC-227
2-4'

VC-227
4'-6'

VC-227
6'-8'

VC-227
8'-10'

VC-227
10'-12'

VC-227
12'-14'

VC-227
14'-15'

VC-228
0'-2'

VC-228
2'-4'

VC-228
4'-6'

VC-228
6'-8'

VC-228
8'-10'

VC-228
10'-12'

VC-228
12"-14'

VC-228
14"-16'

VC-228
16'-18'

VC-228
18'-19'

VC 229
0'-2'

VC 229
2'-4'

VC 229
4'-6'

VC 229
6'-8'

VC 229
8'-10'

VC 229
10'-12'

VC 229
12'-14'

VC 229
14'-16'

VC 229
16'-18'

VC 229
18'-20'

VC 229
20'-22'

VC 229
22'-23.2"

VC-230
0'-2'

VC-230
2'-4'

VC-230
4'-6'

VC-230
6'-8'

VC-230
8'-10'

VC-230
10'-12'

VC-230
12-14

VC-230
14-16

VC-230
16-17'2"

VC-230
17'2"-19

VC-230
19-21'

VC-230
21'-23'

VC-230
23'-24'

VC-230A
0'-2'

VC-230A
2'-4'

VC-230A
4'-6'

VC-230A
6'-8'

VC-230A
8'-10'

VC-230A
10'-12'

VC-230A
12'-14'

VC-230A
14'-16'

VC-230A
16'-18'

VC-230A
18'-20'

VC-230A
20'-22'

VC-230A
22'-24'

VC-230A
24'-26'

VC-230A
26'-28'

VC-230A
28'-29'3"

VC-230B
0'-2'

VC-230B
2'-4'

VC-230B
4'-6'

VC-230B
6'-8'

VC-230B
8'-10'

VC-230B
10'-12'

VC-230B
12'-14'

VC-230B
14'-16'

VC-230B
16'-18'

VC-230B
18'-20'

VC-230B
20'-22'

VC-230B
22'-24'

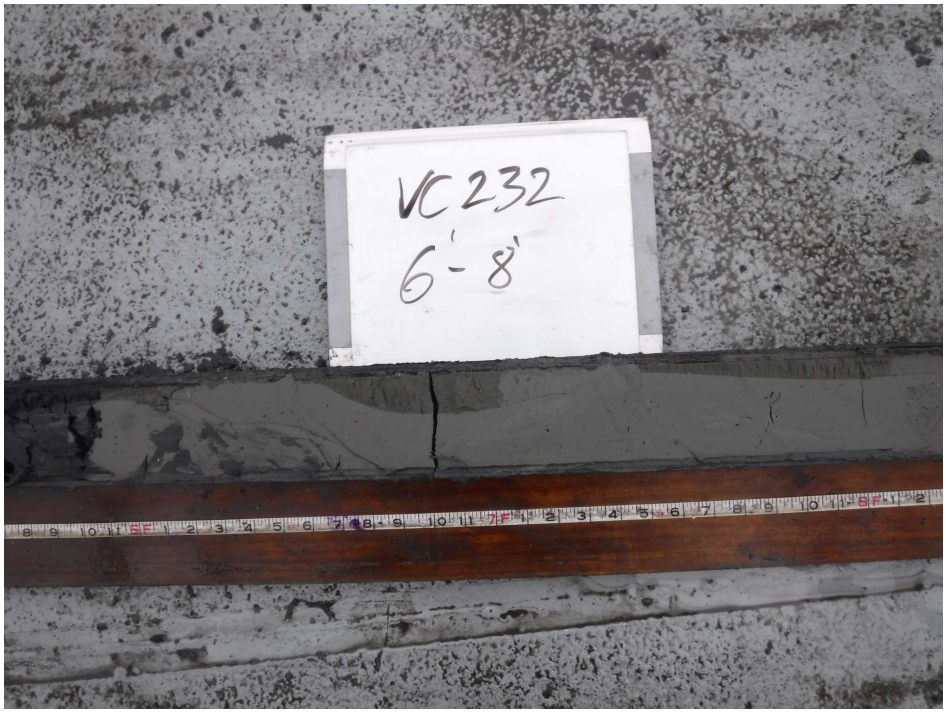
VC-230B
24'-26'

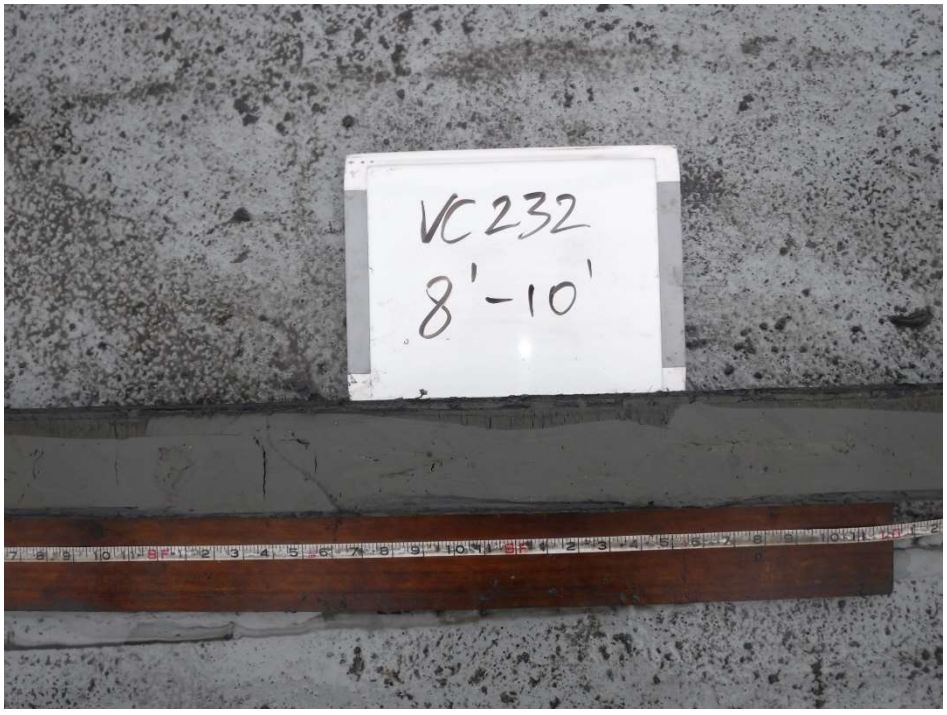
VC-230B
26'-28'

VC232
0'-2'

VC232
2'-4'

VC 232
4'-6'


VC 232
6'-8'

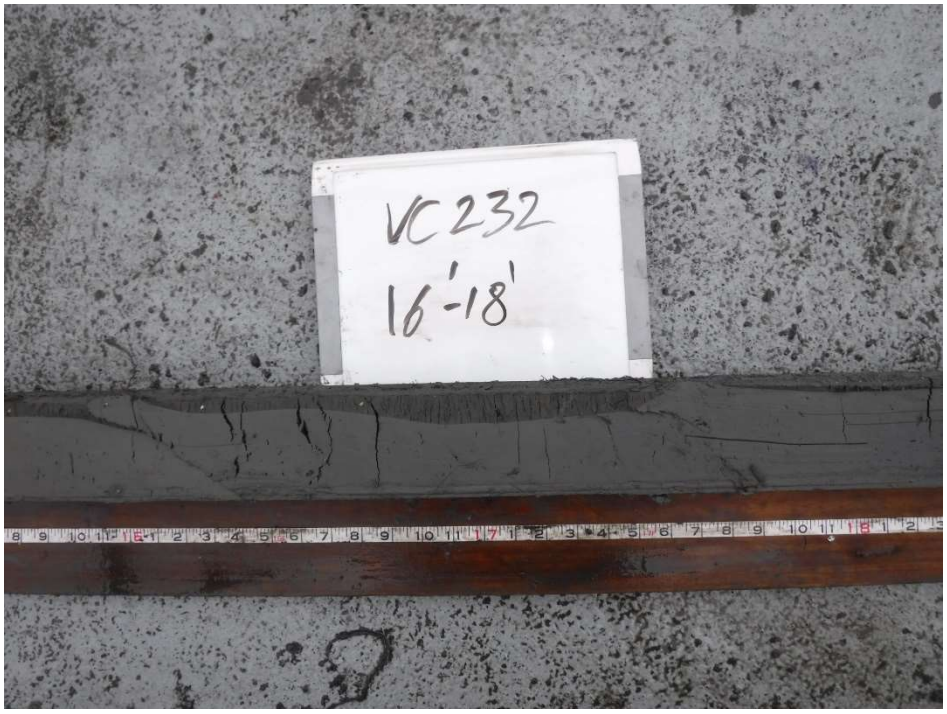

VC232
8'-10'

VC232
10'-10'9"

VC232
10'9" – 12'

VC232
12' – 14'

VC232
14'-16'


VC232
16'-18'

VC232
18-20'

VC232
20'-20'8"

VC232A
0'-2'

VC232A
2'-4'

VC232A
4'-6'

VC232A
6'-8'

VC232A
8'-10'

VC232A
10'-12

VC232A
12'-12'10"

VC232A
12'10"-14'

VC232A
14'-16'

VC232A
16'-18'

VC232A
18'-20'

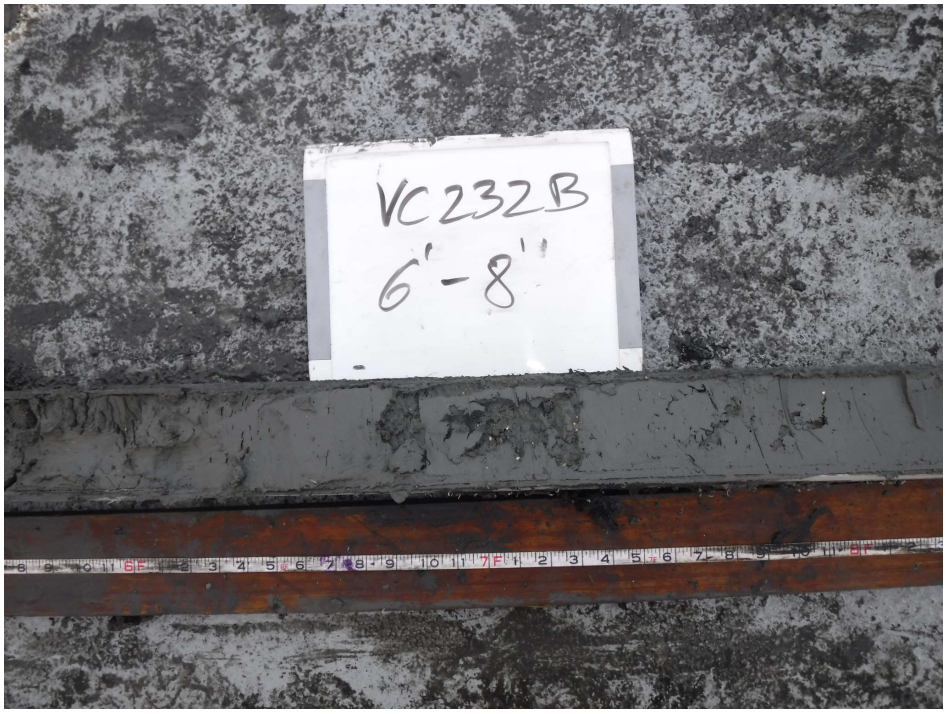
VC232A
20'-22'

VC232A
22'-22'6"

VC232B
0'-2'

VC232B
2'-4'

VC232B
4'-6'


VC232B
6'-8"

VC232B
8'-10'

VC232B
10'-12'

VC232B
12'-14'

VC232B
14'-16'

VC232B
16'-18'

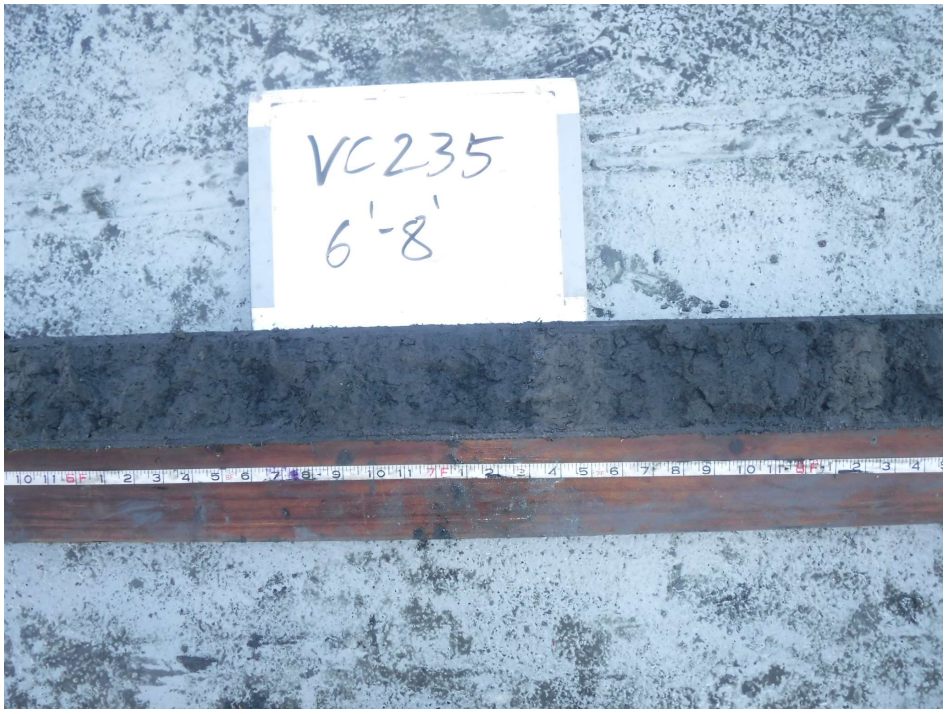
VC232B
18'-20'

VC232B
20'-22'

VC235
0'-2'

VC235
2'-4'

VC235
4'-6'


VC235
6'-8'

VC235
8'-10'

VC235
10'-11'3"

VC235
11'3" – 12'

VC235
12' – 14'

VC235
14'-16'

VC235
16'-18'

VC235
18'-20'

VC235
20'-21'3"

VC 237
0'-2'

VC 237
2'-4'

VC 237
4'-6

VC 237
6'-8'

VC 237
8'-10'

VC 237
10'-12'

VC 237
12' - 14'

VC 237
14' - 15'6"

VC 237
15'6" - 18'

VC 237
18' - 20'

VC 237
20'-22'

VC 237
22'-24'

VC 237
24' - 25'8"

VC237A
0'-2'

VC237A
2'-4'

VC237A
4'-6'

VC237A
6'-8'

VC237A
8'-10'

VC237A
10'-12'

VC237A
12'-14'

VC237A
14'-15'11"

VC237A
15'11" - 18'

VC237A
18' - 20'

VC237A
20'-22'

VC237A
22'-24'

VC237A
24'-25'9"

VC 237B
0'-2'

VC 237B
2'-4'

VC 237B
4'-6'

VC 237B
6'-8'

VC 237B
8'-10'

VC 237B
10'-12'

VC 237B
12'-14'

VC 237B
14'-16'

VC 237B
16'-17'5"

VC 237B
17'5"-18'

VC 237B
18'-20'

VC 237B
20'-22'

VC 237B
22'-24'

VC 237B
24'-26'

VC 237B
26 - 27' 2"

VC238
0'-2'

VC238
2'-4'

VC238
4'-6'

VC238
6'-8'

VC238
8'-10'

VC238
10'-12'

VC238
12'-14'

VC238
14'-15'

VC238
15'-17'

VC238
17'-19'

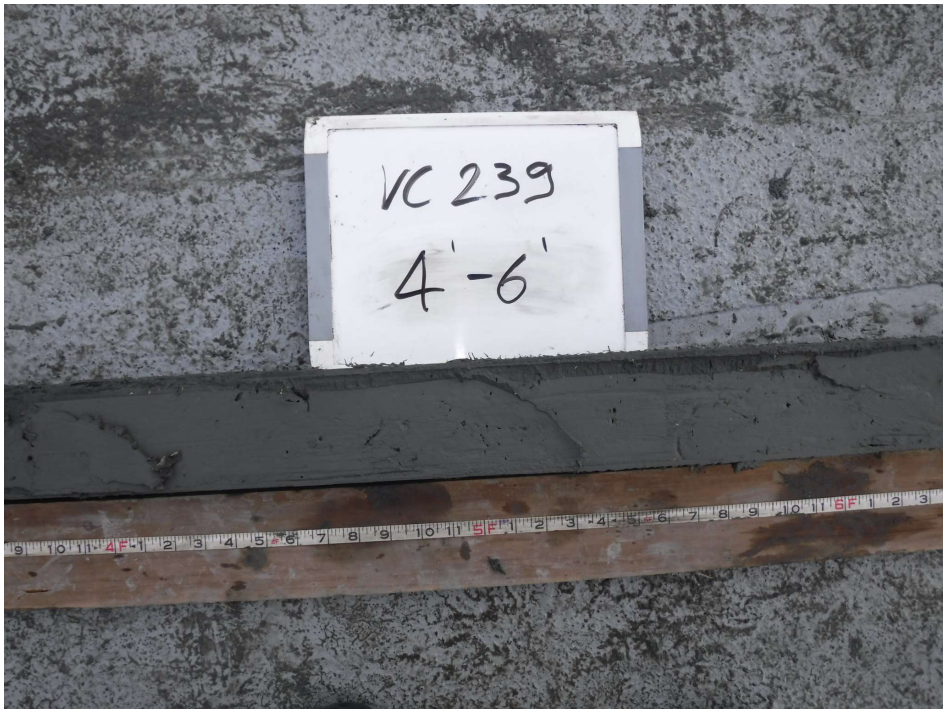
VC238
19'-21'

VC238
21'-23'

VC238
23'-24'9"

VC 239
0' - 2'

VC 239
2' - 4'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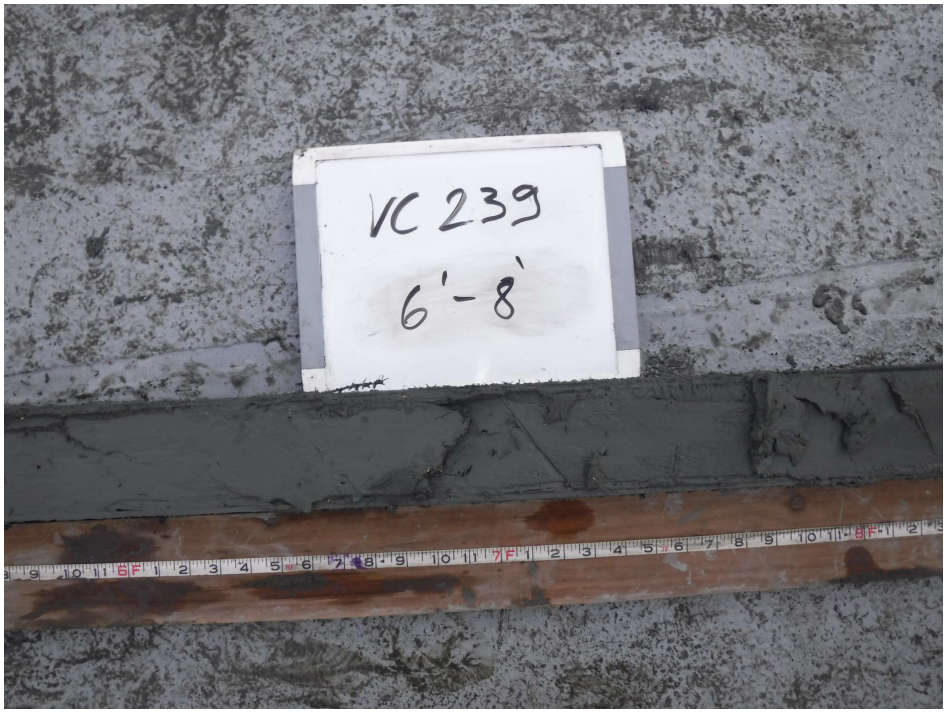
4'-6'


VC 239
6'-8'

VC 239
8'-10'

VC 239
10'-10'7"

VC 239
10'7"-12'

VC 239
12'-14'

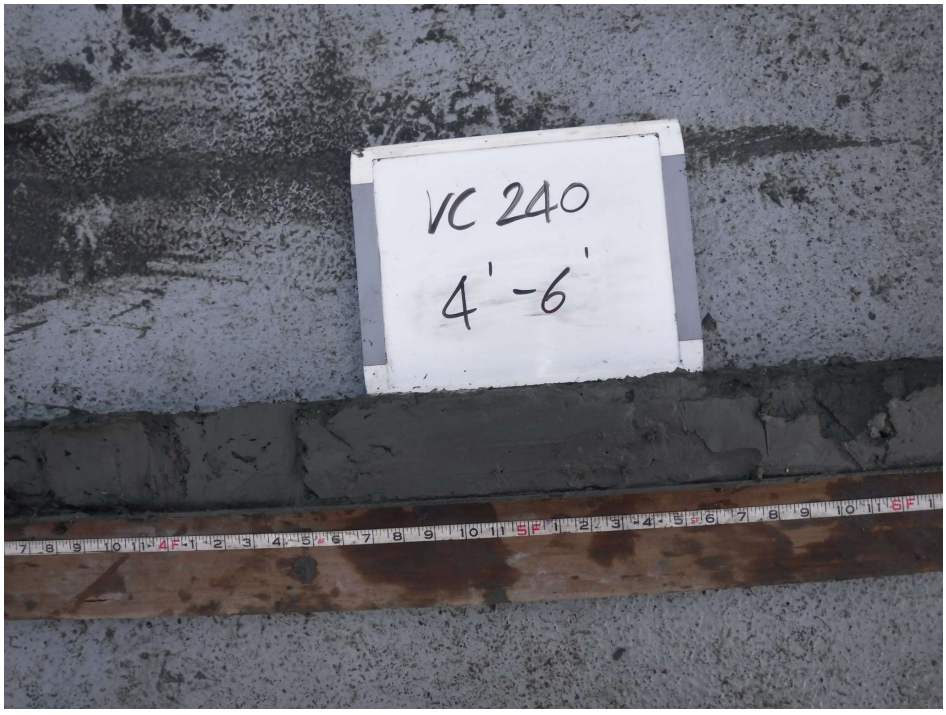
VC 239
14'-16'

VC 239
16'-18'

VC 239
18'- 20'5"

VC 240
0' - 2'

VC 240
2' - 4'


VC 240
4'-6'

VC 240
6'-8'

VC 240
8' - 10'

VC 240
10' - 12'

VC 240
12'-14'

VC 240
14'-15'6"

VC 242
0'-2'

VC 242
2'-4'

VC 242
4'-6'

VC 242
6'-8'

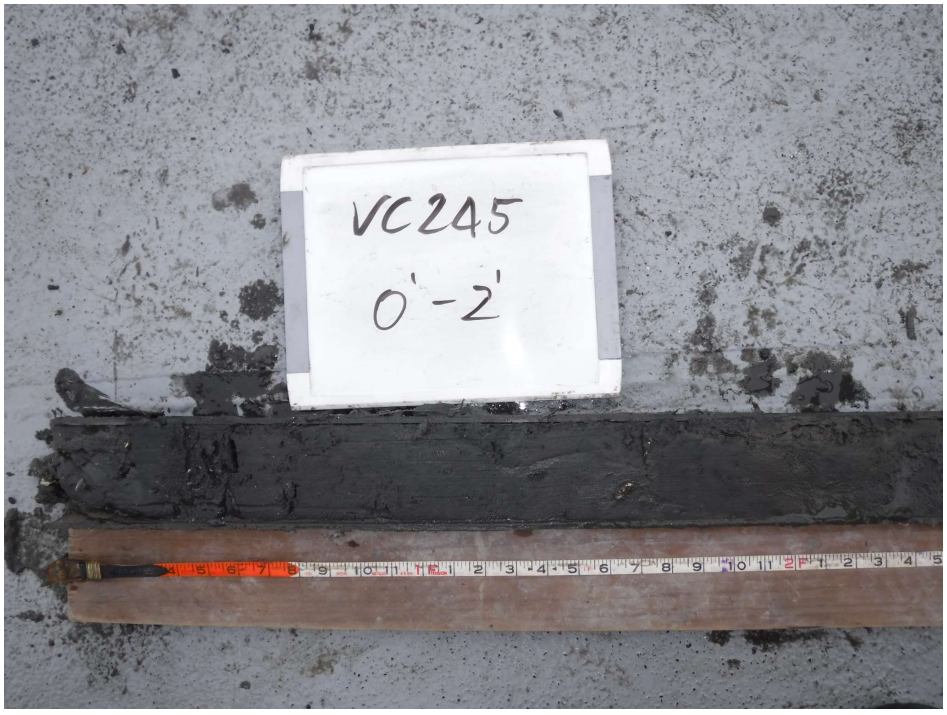
VC 242
8'-10'

VC244
0'-2'

VC244
2'-4'

VC 244
4'-6'

VC 244
6'-8'2"


VC245
0'-2'

VC245
2'-4'

VC245
4'-6'

VC245
6'-8'

VC245
8' - 9' 2"

VC 246
0'-2'

VC 246
2'-4'

VC 246
4'-6'

VC 246
6'-8'

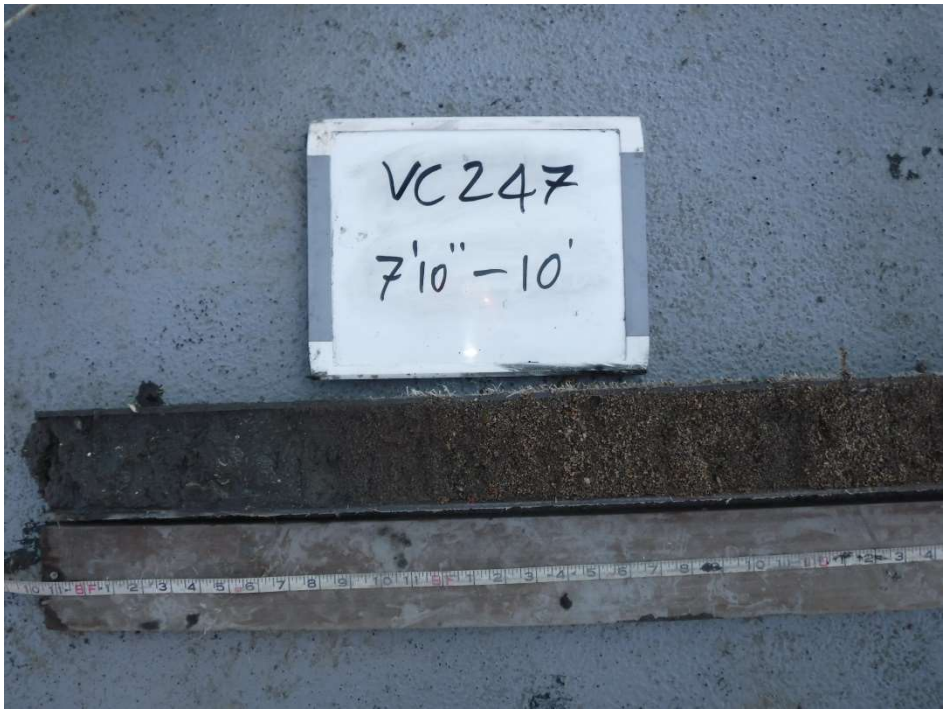
VC 246
8' - 8'11"

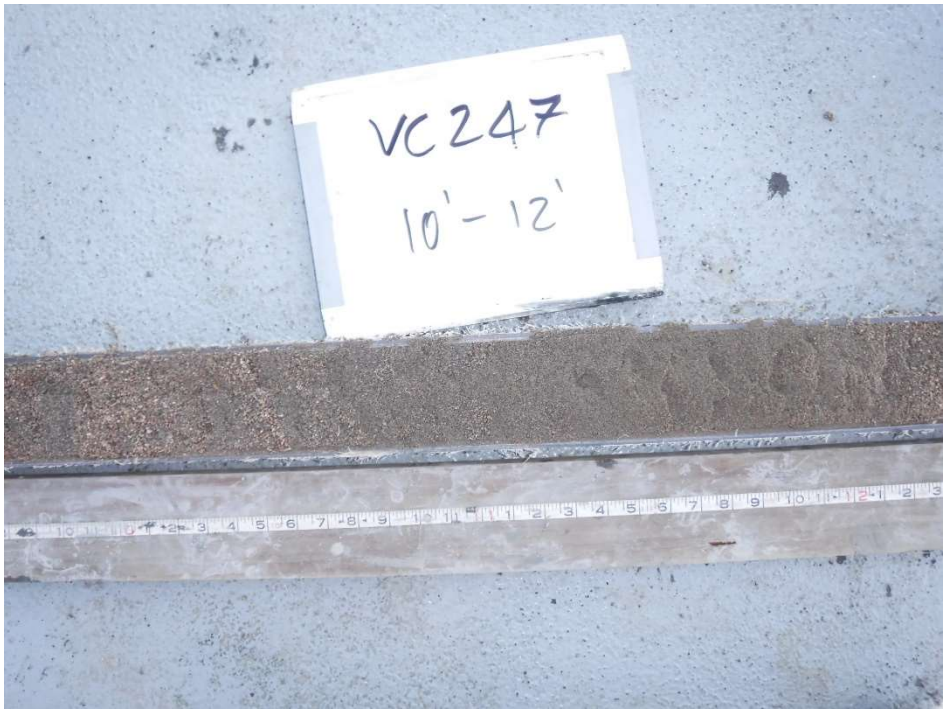
VC247
0'-2'

VC247
2'-4'

VC247
4'-6'

VC247
6'-7'10"


VC247
7'10" – 10'

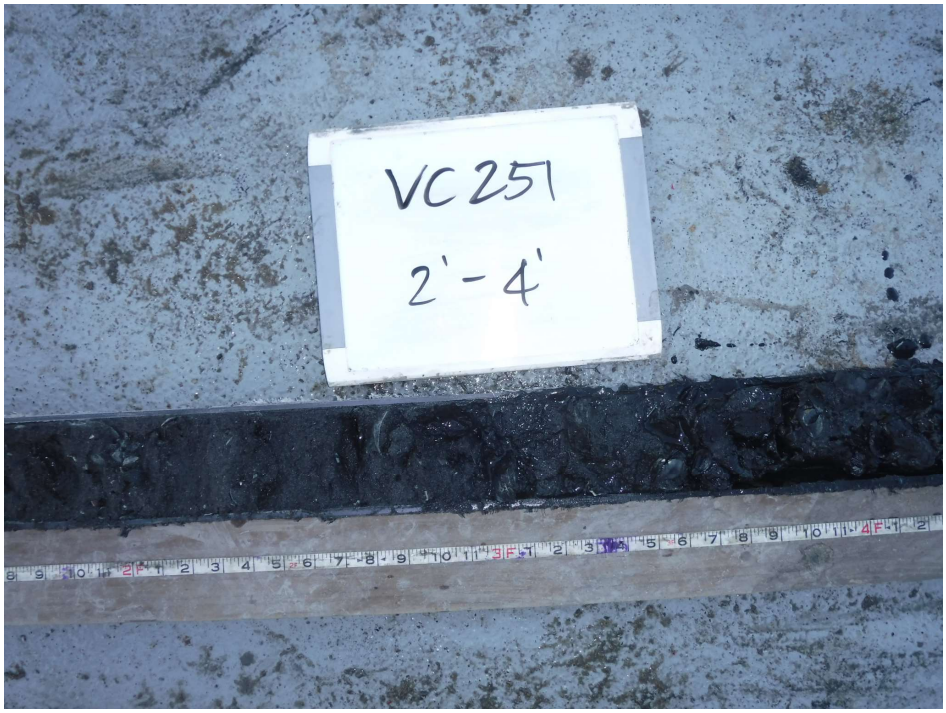

VC247
10' – 12'

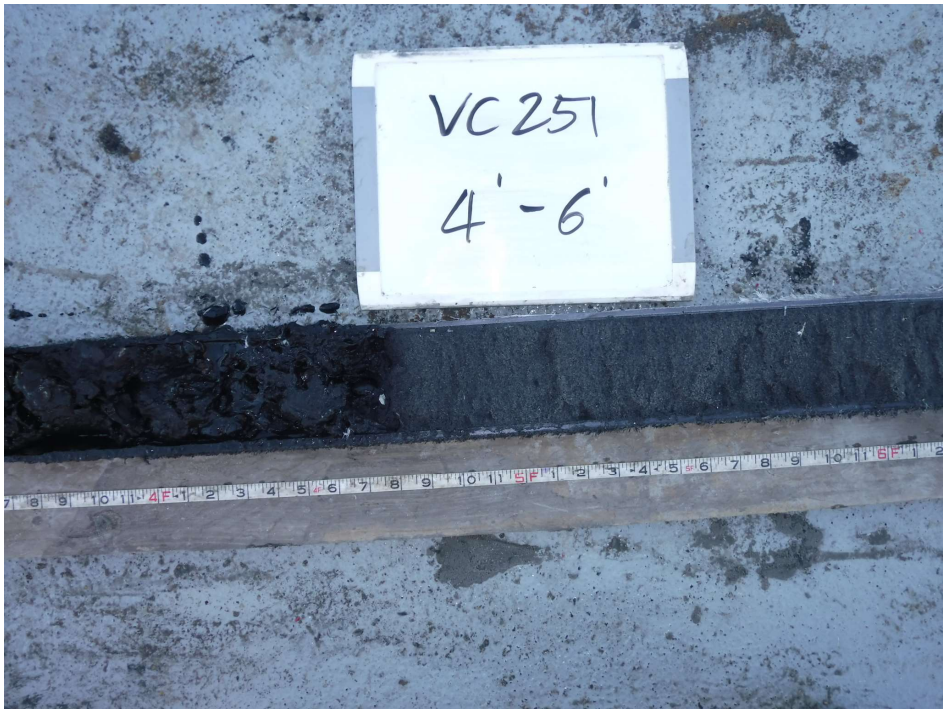
VC247
12'-14'

VC247
14'-16'

VC247
16-18'

VC 251
0'-2'


VC 251
2'-4'


VC 251
4'-6'

VC 251
6'-7'3"

VC 252
0'-2'

VC 252
2'-4'

VC 252
4'-6'

VC 252
6'-7'1"

VC253
0'-2'

VC253
2'-4'

VC253
4'-6'

VC253
6'-8'1"

VC 255
0' - 2'

VC 255
2' - 4'

VC 255
4'-6'5"

VC256
0'-2'

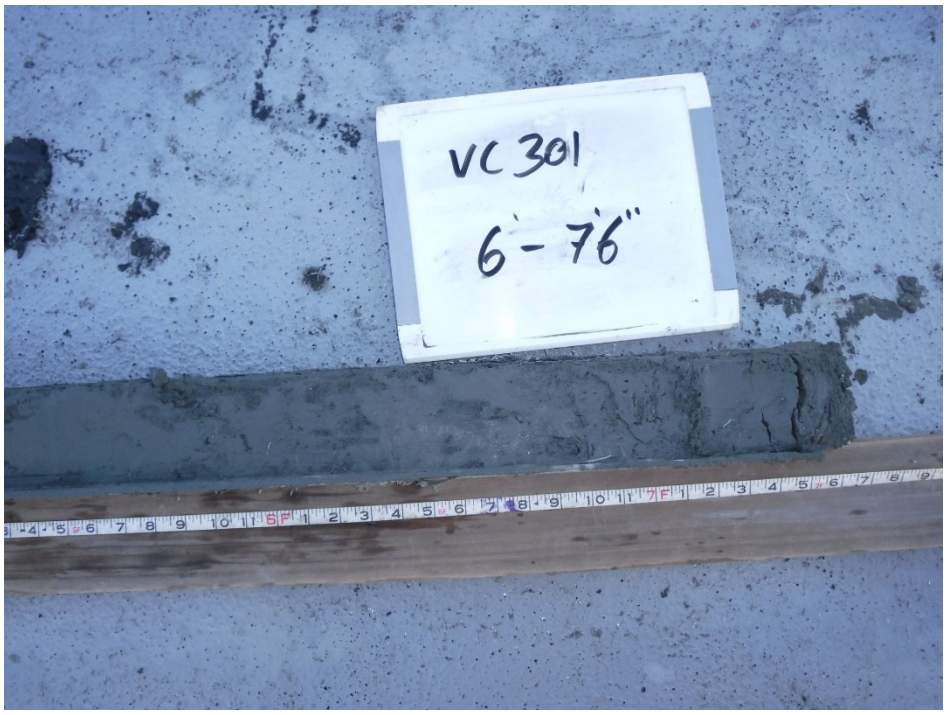
VC256
2'-4'

VC256
4' - 6' 2"

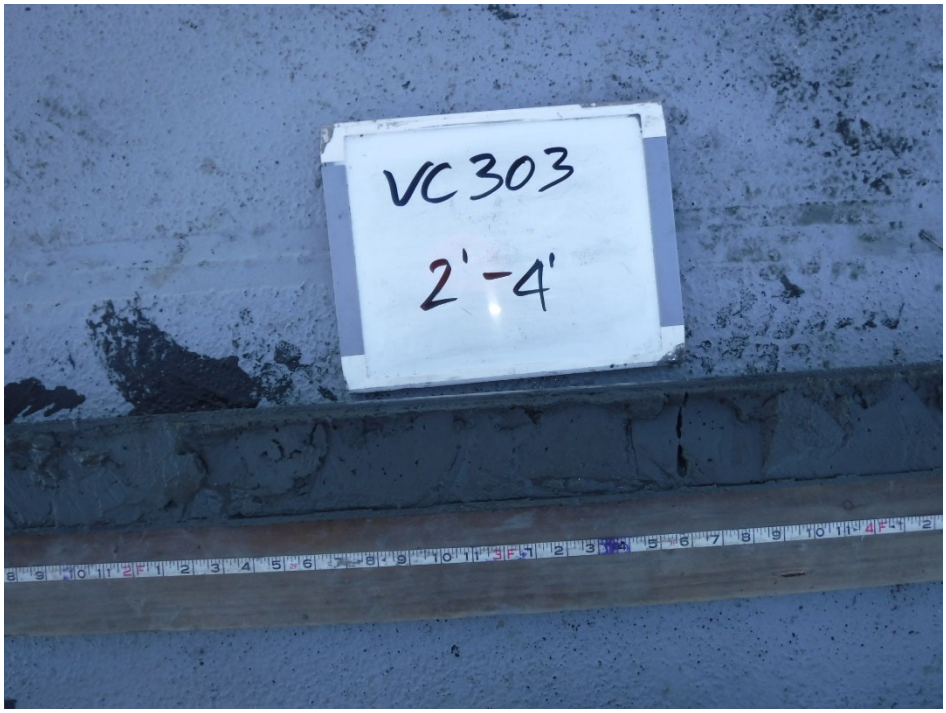
VC 301
0'-2'

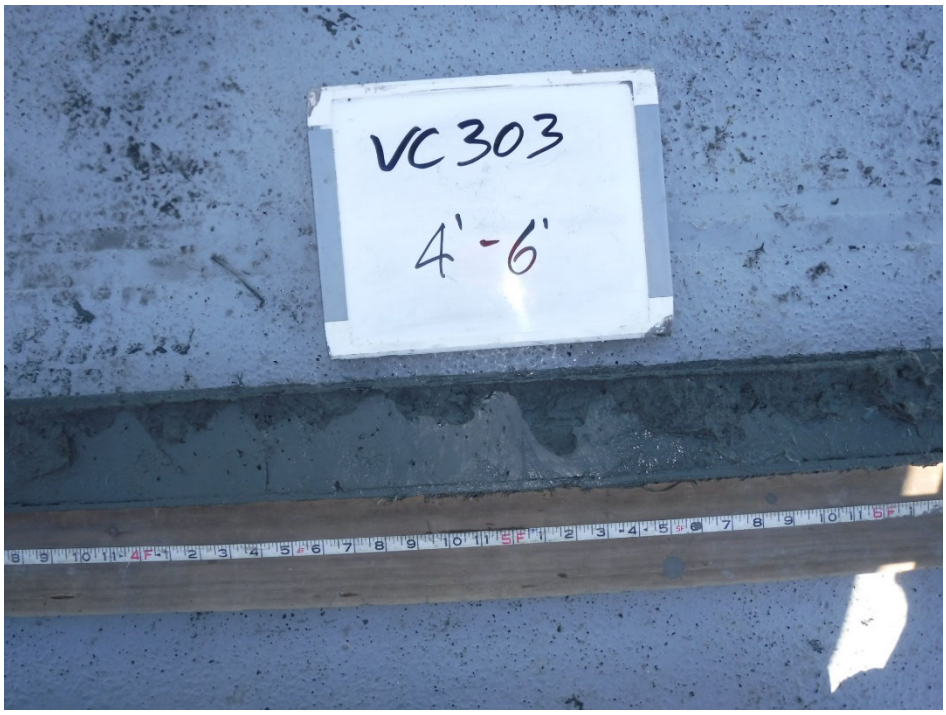
VC 301
2'-4'

VC 301
4'-6'


VC 301
6'-7'6"

VC303
0'-2'

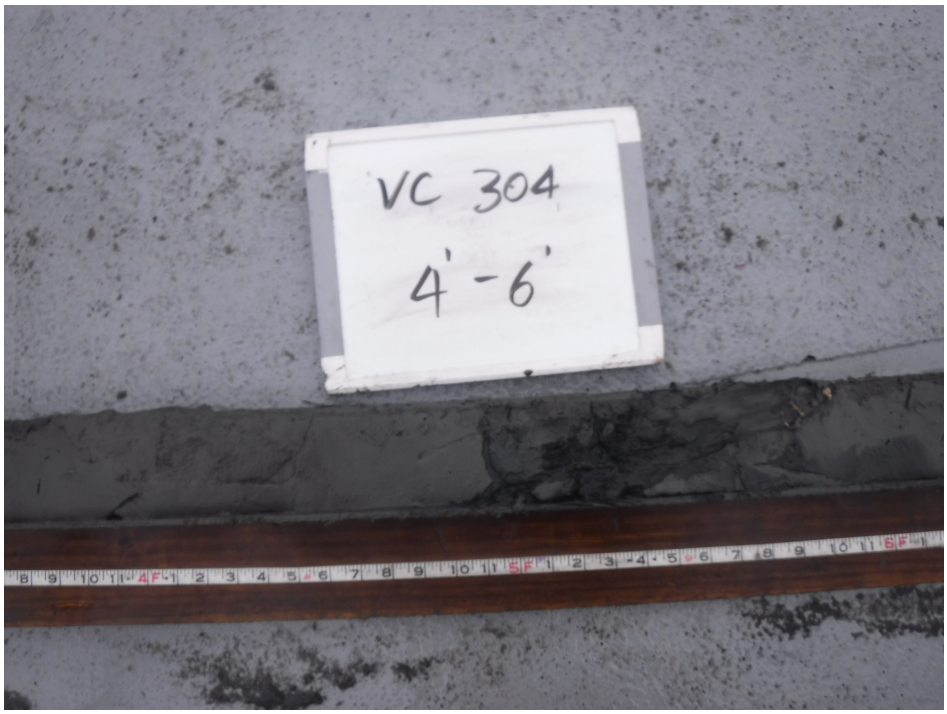

VC303
2'-4'


VC303
4'-6'

VC303
6'-7'5"

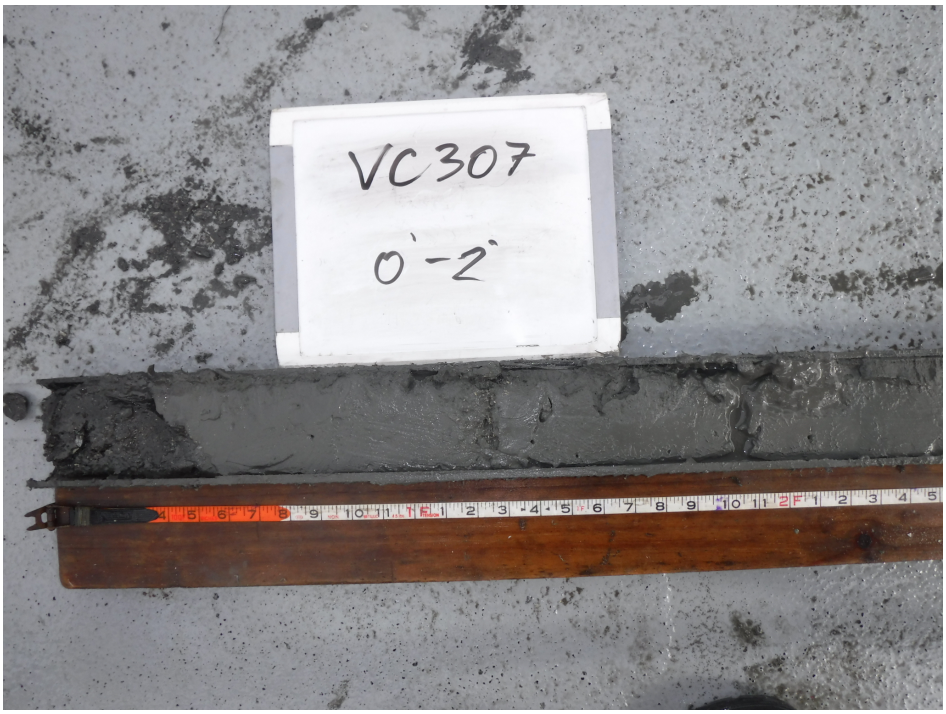
VC 304
0'-2'

VC 304
2'-4'


VC 304
4'-6'

VC 304
6'-7'8"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs



VC307
4'-6'

VC307
6'-7½"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

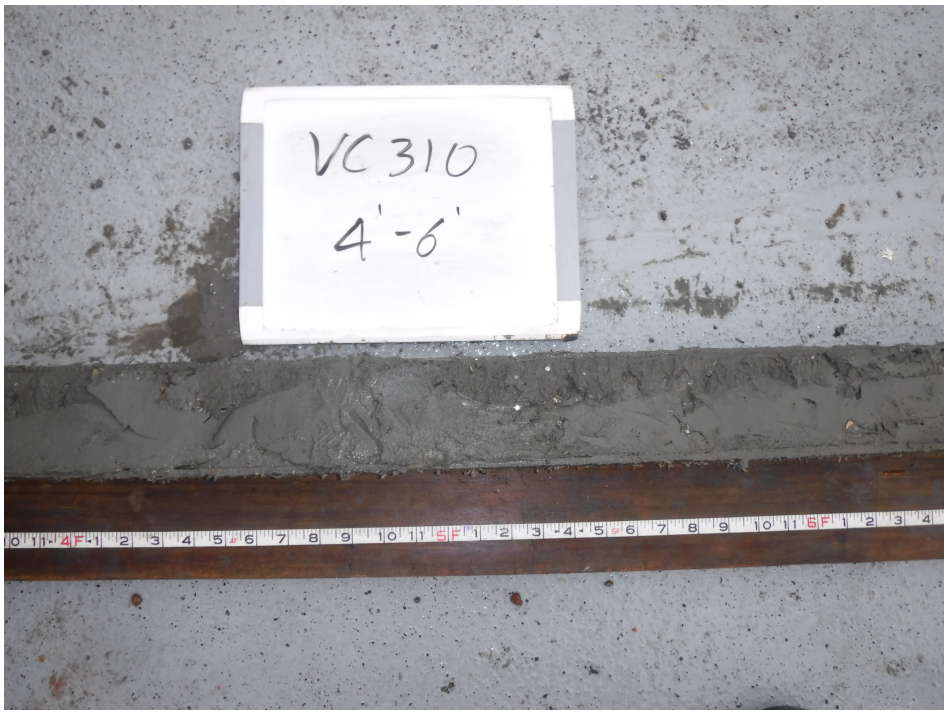
VC 308
4'-6'

VC 308
6'-7' 11"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs


VC 310
4'-6'

VC 310
6'-7'5"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

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RV *Shearwater* Vibracore Photographs

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RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
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Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

VC 316 (R2)
4'-6'

VC 316 (R2)
6'-7'3"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

VC 317
4'-6'

VC 317
6'-8'

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

VC 318
0'-2'

VC 318
2'-4'

VC 318
4'-6'

VC 318
6'-8'

VC 318
8' - 10'

VC 318
10' - 12'

VC 318
12'-14'

VC 318
14'-16'

VC 318
16'-18'

VC 318
18'-20'

VC 318
20'-20'8"

VC320
0'-2'

VC320
2'-4'

VC320
4'-6'

VC320
6'-8'

VC320
8'-9'8"

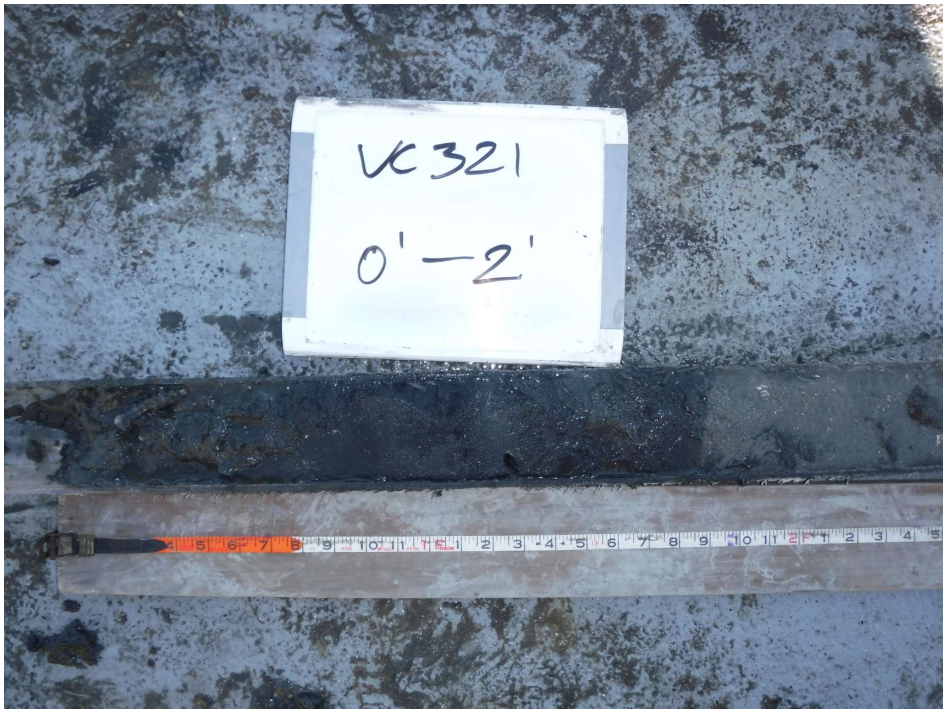
VC320
9'8"-12'

VC320
12' - 14'

VC320
14' - 16'

VC320
16'-18'

VC320
18'-19' 3"


VC321
0'-2'

VC321
2'-4'

VC321
4'-6'

VC321
6'-8'5"

VC321
8'5" - 10'

VC321
10' - 12'

VC321
12' - 14'

VC321
14' - 16'

VC321
16'-18'3"

VC323
0'-2'

VC323
2'-4'

VC323
4' - 6'

VC323
6' - 8'

VC323
8'-10'

VC323
10'-12'

VC323
12'-14'

VC323
14'-16

VC323
16'-17'3"

VC 326
0'-2'

VC 326
2'-4'

VC 326
4'-6'

VC 326
6'-8'

VC 326
8'-9' 8"

VC 326
9'8"-12'

VC 326
12'-14'

VC 326
14'-16'

VC 326
16'-18'

VC 326
18'-19'8"

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

VC327
4'-6'

VC327
6'-8'

VC327
8'-9'7"

VC327
9'7"-12'

VC327
12'-14'

VC327
14'-16'

VC327
16'-18'

VC327
18'-19'6"

VC 328
2'6" - 5'

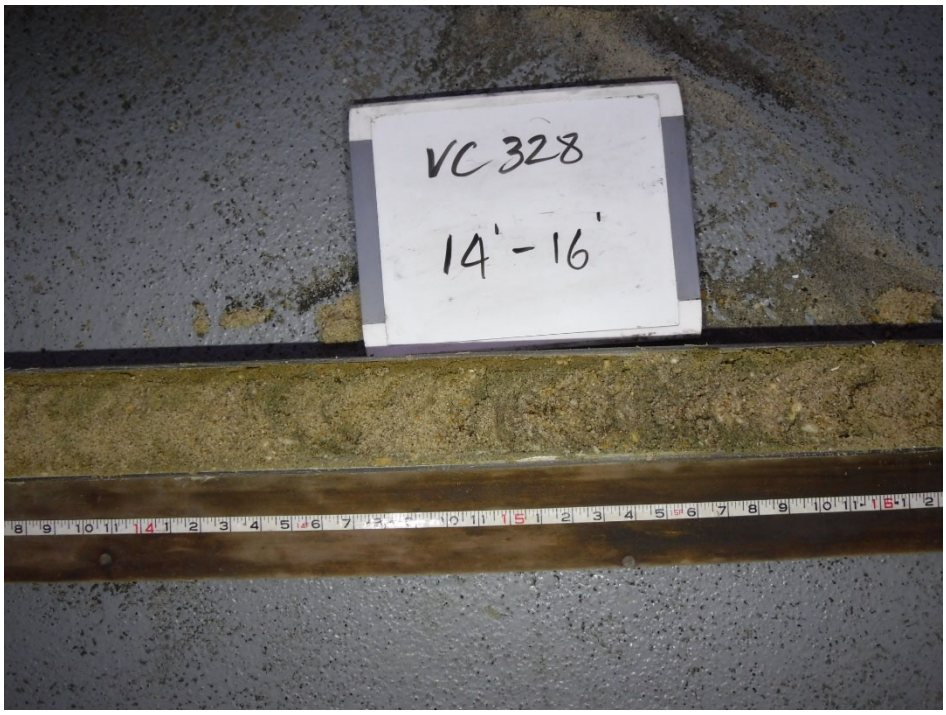
VC 328
5' - 7'

VC 328
7'-9'

VC 328
9'-11'

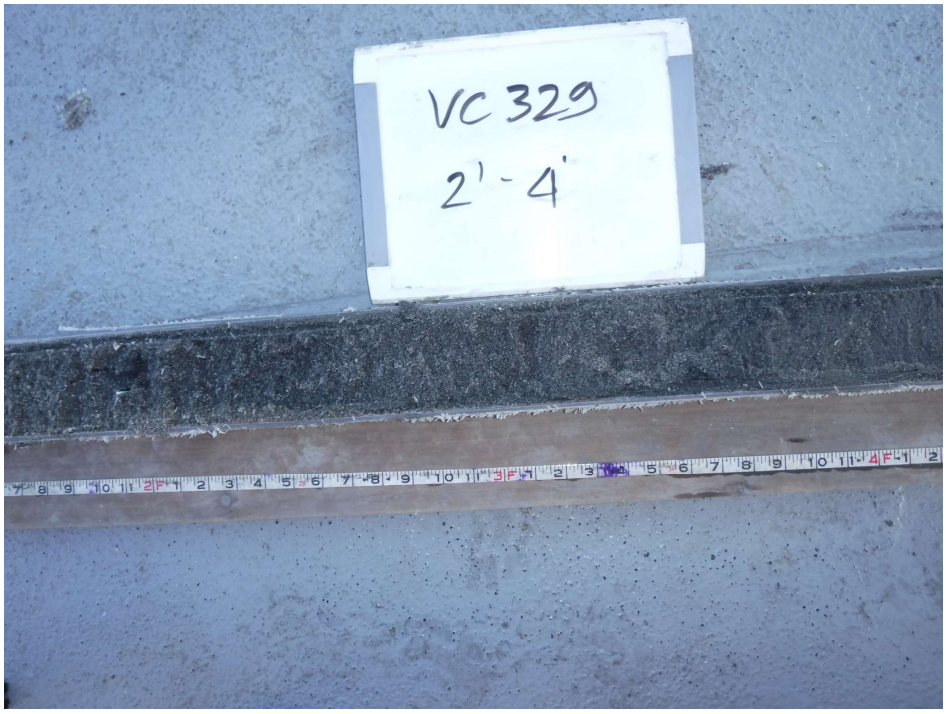
Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs



Haley Aldrich-Williams NESE Vibracoring
Alpine Report Ref 1853
RV *Shearwater* Vibracore Photographs

VC 329
0'-2'


VC 329
2'-4'

VC 329
4' - 6'

VC 329
6' - 8'

VC 329
8' - 10'

VC 329
10' - 12'

VC 329
12'-14'

VC 329
14'-16'5"

VC 329
16'5" - 18'

VC 329
18' - 20'

VC 329
20' - 22'

VC 329
22' - 24'

VC 329
24'-25'3"

From:	Haas, Peter
To:	Stephen.Olivera@dep.nj.gov
Cc:	joseph.dean@williams.com; Ham, Brian; Mochrie, Sara; Eakin,Megan; Albers, Meghan; Jones, Christopher (Christopher.Jones@dep.nj.gov)
Subject:	RE: CS 206 - 01/08/2019 NJDEP Meeting Minutes
Date:	Tuesday, January 29, 2019 11:52:06 AM
Attachments:	Detention Basin Profile.pdf Detention Basin Test Pits.pdf

Hi Stephen –

We performed soil test pits in the locations of the proposed detention basins, as requested per comment 3.k of the review letter and per our discussion earlier this month. Four (4) test pits (identified as TP-13, TP-14, TP-15 and TP-16) were investigated within the basin footprints. The results of this evaluation were fairly consistent, indicating a depth to groundwater ranging 3.8' to 4.1' beneath existing grade. A Detention Basin Profile Plan showing this groundwater surface profile was then plotted and the detention basin grading revised to be raised by approximately 2' such that a minimum separation of 2.1' was provided between the groundwater profile and the basin bottom, which is greater than the 1' minimum requirement. The results of the test pits and the revised basin profile are attached. I believe this was the last remaining item to address based on our previous discussions. If you have any questions, please feel free to give a call or send me an email, if possible by the end of this week. Our plan is to formally send all the revised information in hard copy form the middle of next week.

Thanks!

Peter P. Haas, P.E.
Senior Civil Engineer
D 610.832.8832
peter.haas@aecom.com

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www.aecom.com

Before printing please consider the environment

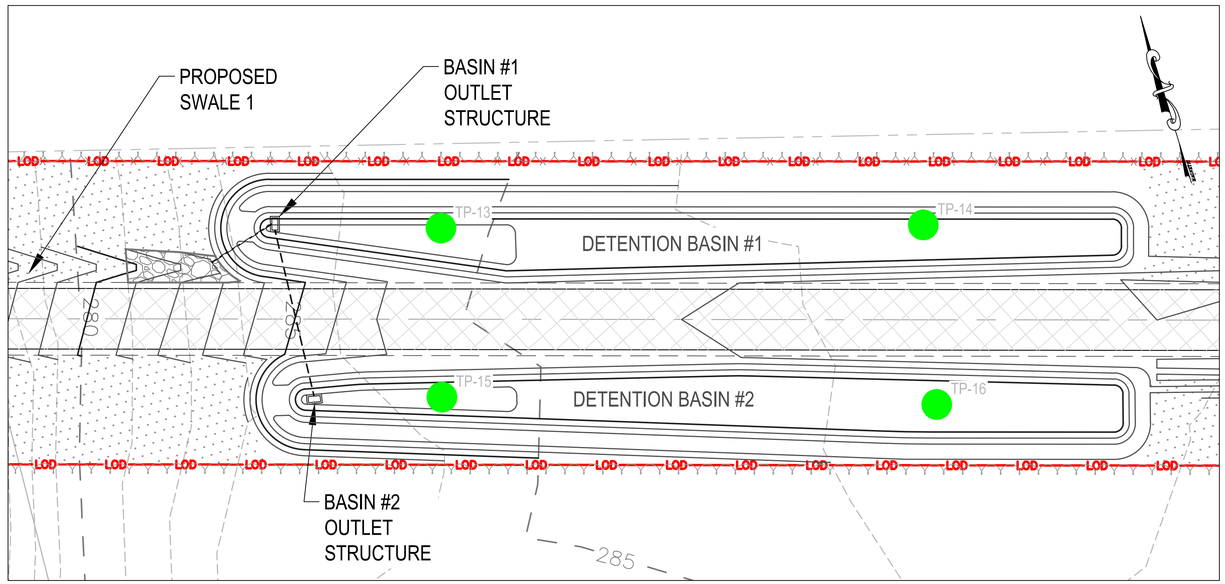
LEGEND

EXISTING FEATURES

- 265 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- STREAM CENTERLINE
- WETLAND
- EXISTING TREE LINE
- PARCEL LINE
- EXISTING ACCESS ROADS
- EXISTING FENCE
- OHE — EXISTING OVERHEAD POWER LINE
- EXISTING PIPELINE
- EXISTING RIGHT OF WAY
- SOIL TYPE BOUNDARY
- MopCb — SOIL TYPE

PROPOSED FEATURES

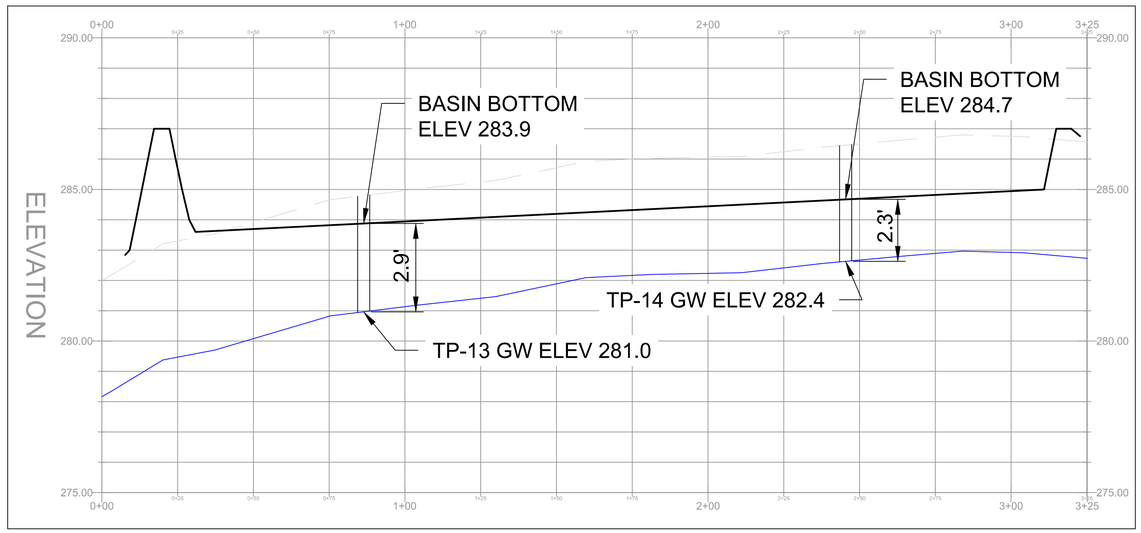
- LOD — LIMIT OF DISTURBANCE
- PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- GAS — PROPOSED PIPELINE
- CULVERT
- RIP RAP APRON
- X — PROPOSED FENCE
- PROPOSED TREE LINE
- PROPOSED GRAVEL
- PROPOSED CONCRETE
- RIPRAP SLOPE PROTECTION
- PROPOSED BRUSH SEED MIX
- TP-8 — SOIL TEST LOCATION



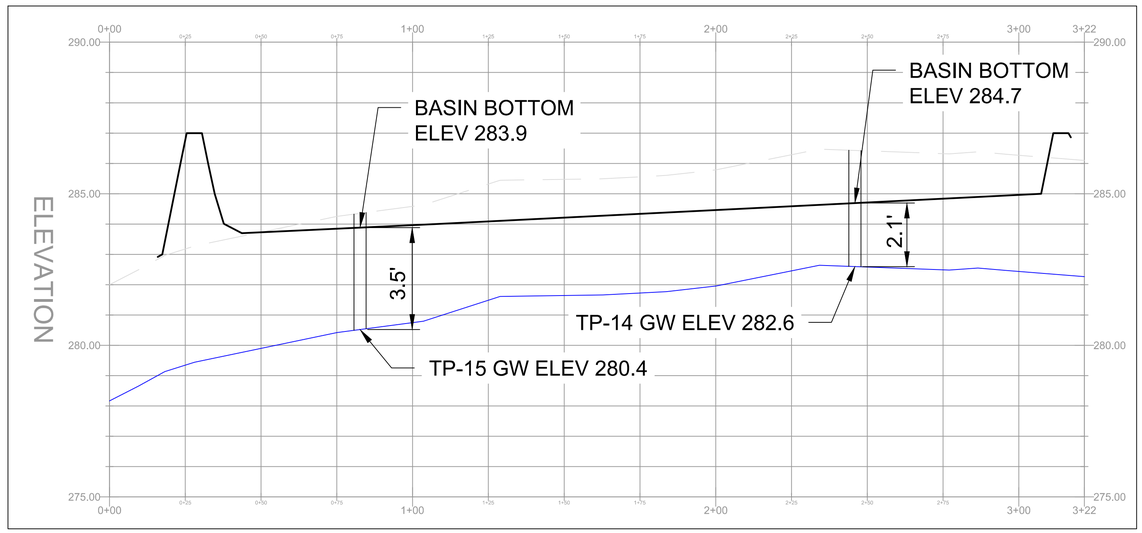
Soil Test Summary

Location I.D.	Test Type [1]	Existing Grade Elevation (ft)	Test Pit Bottom Depth (ft)	Test Pit Bottom Elevation (ft)	Bedrock Depth (ft)	Bedrock Elevation (ft)	Groundwater Depth (ft)	Groundwater Elevation (ft)
TP-13	TP	284.8	4.0	280.8	N/E [2]		3.8	281.0
TP-14	TP	286.5	4.2	282.3	N/E [2]		4.1	282.4
TP-15	TP	284.4	4.0	280.4	N/E [2]		3.9	280.4
TP-16	TP	286.4	4.0	282.4	N/E [2]		3.8	282.6

1. TP = Test Pit
2. N/E = Not encountered



DETENTION BASIN #1 PROFILE



DETENTION BASIN #2 PROFILE

KEVIN McKEON, P.E.

NEW JERSEY
PROFESSIONAL ENGINEER NO GE32586

AECOM
625 WEST RIDGE PIKE, SUITE E-100
CONSHOHOCKEN, PA 19428
(610) 832-3500

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
0	06/15/17	GMS	SUBMITTED TO SOMERSET-UNION SCD	1185732	PPH	KDM
1	08/11/17	GMS	REVISED NJDEP AND SCD SUBMISSION	1185732	PPH	KDM
2	01/05/18	GMS	REVISED WORKSPACE	1185732	PPH	KDM
3	02/09/18	GMS	REVISED SUBMISSION TO SOMERSET-UNION SCD	1185732	PPH	KDM
4	06/05/18	PPH	SUBMITTED TO NJDEP	1185732	TPF	KDM
5	08/24/18	GMS	SUBMITTED TO NJDEP	1185732	PPH	KDM
6	02/01/19	PPH	SUBMITTED TO NJDEP	1185732	TPF	KDM

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC.
POST CONSTUCTION STORMWATER MANAGEMENT PLAN
NORTHEAST SUPPLY ENHANCEMENT PROJECT
COMPRESSOR STATION NO. 206
DETENTION BASIN PROFILE PLAN
FRANKLIN TOWNSHIP, SOMERSET COUNTY, NJ

Williams GAS PIPELINE

DRAWN BY: GMS	DATE: 06/15/17	ISSUED FOR BID: TBD	SCALE: 1"=50'
CHECKED BY: PPH	DATE: 06/15/17	ISSUED FOR CONSTRUCTION: TBD	REVISION: 6
APPROVED BY: KDM	DATE: 06/15/17	DRAWING NUMBER:	SHEET 13 OF 13
W.O. 1185732			

Drawn By & Date/Time: haasp Jan 23, 2019 - 3:35pm
Drawing Location & Name: S:\Projects\ENV\60537393_NESE_CS206\900-CAD-GIS\910-CAD\20-PCSM SHEETS\12-13 - Basin Profile Plan CS 206.dwg

DETENTION BASIN SOIL TEST PIT RESULTS

FOR
NORTHEAST SUPPLY ENHANCEMENT PROJECT
COMPRESSOR STATION 206

FRANKLIN TOWNSHIP
SOMERSET COUNTY, NEW JERSEY

JANUARY 2019

Prepared for:

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
2800 POST OAK BOULEVARD
HOUSTON, TEXAS 77251-1396

Prepared By:

625 WEST RIDGE PIKE, SUITE E-100
CONSHOHOCKEN, PENNSYLVANIA 19428

AECOM Project No. 60537393

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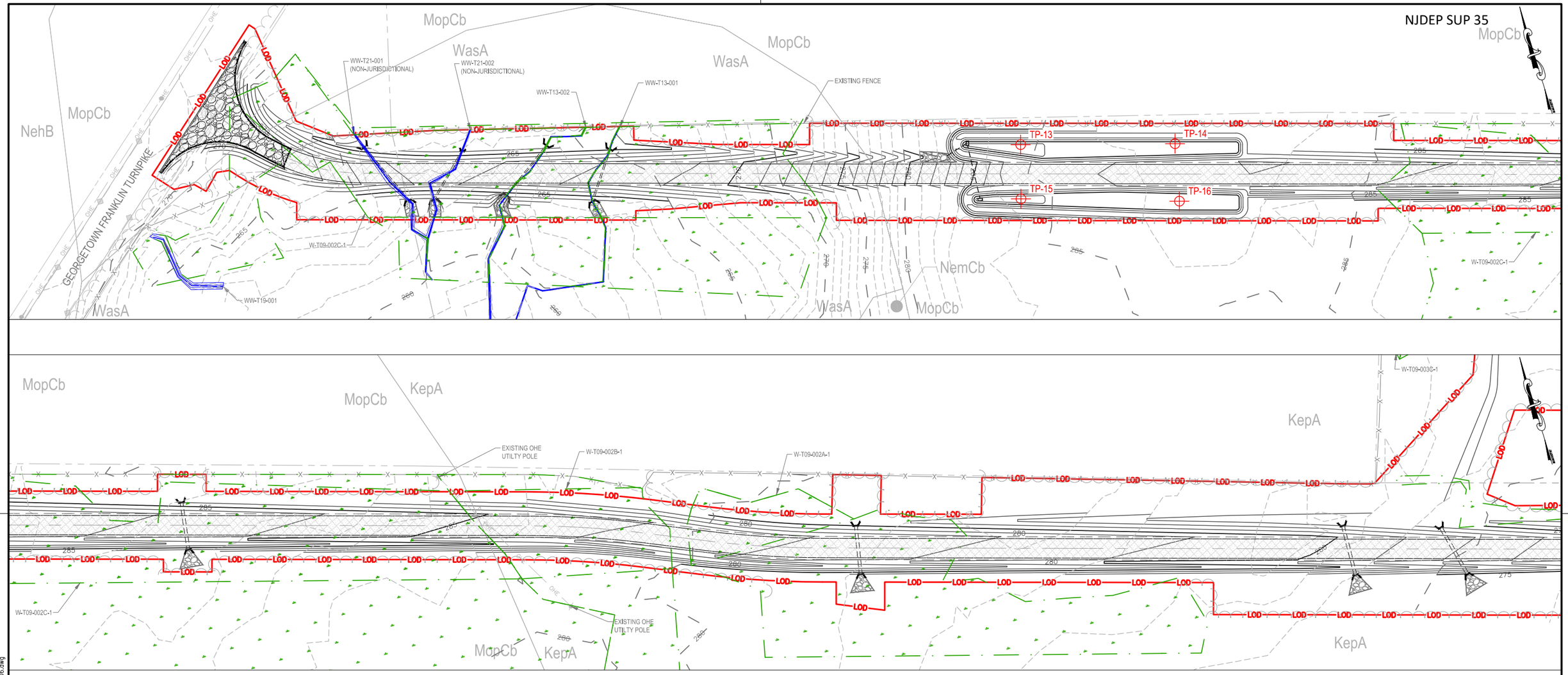
2. SECTION B – TEST PIT LOGS
3. SECTION C – TEST PIT PHOTOS

SECTION A

TEST PIT LOCATION MAP

NJDEP SUP 35



LEGEND

EXISTING FEATURES

- 265 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- STREAM CENTERLINE
- WETLAND
- EXISTING TREE LINE
- PARCEL LINE
- EXISTING ACCESS ROADS
- EXISTING FENCE
- OHE — EXISTING OVERHEAD POWER LINE
- EXISTING PIPELINE
- EXISTING RIGHT OF WAY
- SOIL TYPE BOUNDARY
- MopCb — SOIL TYPE

PROPOSED FEATURES

- LOD — LIMIT OF DISTURBANCE
- PROPOSED CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- PROPOSED PIPELINE
- CULVERT
- RIP RAP APRON
- PROPOSED FENCE
- PROPOSED TREE LINE
- PROPOSED GRAVEL
- PROPOSED CONCRETE
- RIPRAP SLOPE PROTECTION
- TP-1X — PREVIOUS TEST LOCATION
- TP-12 — ADDITIONAL TEST LOCATION

SOIL TESTING LOCATIONS

TEST PIT I.D.	LATITUDE	LONGITUDE	NORTHING	EASTING	EXISTING ELEV.
TP-13	N40° 24' 13.27"	W74° 36' 24.91"	571980.641	462350.583	284.8
TP-14	N40° 24' 12.82"	W74° 36' 22.93"	571935.100	462503.061	286.5
TP-15	N40° 24' 12.74"	W74° 36' 25.11"	571927.209	462334.568	284.4
TP-16	N40° 24' 12.25"	W74° 36' 23.10"	571877.159	462489.978	286.4

NOTES:

1. THIS BASE MAP WAS PREPARED ON AERIAL TOPOGRAPHY AND ACTUAL FIELD SURVEY PROVIDED BY WILLIAMS AND ARE REFERENCED TO THE NEW JERSEY STATE PLANE DATUM.
2. PROPERTY LINE INFORMATION PROVIDED BY WILLIAMS.

SOIL LEGEND:

- EkbA ELKTON SILT LOAMS, 0 TO 2 PERCENT SLOPES
- KepA KEYPORT SILT LOAM, 0 TO 2 PERCENT SLOPES
- KepB KEYPORT SILT LOAMS, 2 TO 5 PERCENT SLOPES
- MopCb MOUNT LUCAS-WATCHUNG SILT LOAMS, 6 TO 12 PERCENT SLOPES, VERY STONY
- NehB NESHAMINY SILT LOAMS, 2 TO 6 PERCENT SLOPES
- NehEb NESHAMINY SILT LOAMS, 18 TO 35 PERCENT SLOPES, VERY STONY
- NemCb NESHAMINY-MOUNT LUCAS SILT LOAMS, 6 TO 12 PERCENT SLOPES, VERY STONY
- WasA WATCHUNG SILT LOAM, 0 TO 2 PERCENT SLOPES

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

AECOM
625 WEST RIDGE PIKE, SUITE E-100
CONSHOHOCKEN, PA 19428
(610) 832-3500

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK	APP.
0	08/11/2017	GMS	ISSUED FOR NJDEP REVIEW	0000000	RC	PPH
1	04/17/2018	PPH	REVISED CONCEPTUAL BASIN LAYOUT AND ADDITIONAL BORINGS	0000000	JAC	PPH
2	05/22/2018	PPH	ISSUED FOR REPORT	0000000	JAC	PPH
3	01/09/2019	PPH	ACCESS ROAD BASIN TEST PITS	0000000	JAC	PPH

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC.
NORTHEAST SUPLPLY ENHANCEMENT PROJECT
COMPRESSOR STATION NO. 206
TEST PIT LOCATION PLAN
FRANKLIN TOWNSHIP, SOMERSET COUNTY, NJ

Williams GAS PIPELINE

DRAWN BY: PPH	DATE: 08/11/17	ISSUED FOR BID: TBD	SCALE: 1"=50'
CHECKED BY: JAC	DATE: 08/11/17	ISSUED FOR CONSTRUCTION: TBD	REVISION: 3
APPROVED BY: PPH	DATE: 08/11/17	DRAWING NUMBER:	SHEET 1 OF 2
WO: 0000000			

Drawn By & Date/Time: hoasp Jan 23, 2019 - 2:55pm
Drawing Location & Name: C:\Users\hoasp\appdata\local\temp\AcPublish_10204\Test Pit Location Plan CS 206.dwg

SECTION B

TEST PIT LOGS

NJDEP SUP 35

PIT NUMBER: TP-13

AECOM PROJECT NUMBER: 60537393.2

AECOM

MECHANICSBURG, PA OFFICE

SOIL EVALUATION FORM

DATE: 1/17/19 STATE: NJ COUNTY: Somerset MUNICIPALITY: Franklin Twp.

CLIENT: Williams SUBDIVISION: SITE LOCATION: Station 206 Access

MORPHOLOGIC DETERMINATION: SEWAGE STORMWATER SHWT Soils INVESTIGATOR: B. Skuba / A. Bachman

Horizon	Depth Upper	Depth Lower	Boundary A/C/D/G	Color	Texture	% CFs	REDOX A/C	Structure	Consistence	Roots	NOTES (% clay, macro pores)
A	0	2"	C	7.5YR 2.5/2 V. dk brown	Silty loam	5	N/A	granular	V. friable	many, F-M	moist, frost
A	2"	9"	G	7.5YR 4/4 brown	Silty loam	5	N/A	granular	Friable	many, F-C	moist
B	9"	42"	G	5YR 5/6 yellowish red	Silty loam, few cobbles	15	N/A	granular	Friable	few, fine	moist, cobbly
C	42"	48"	G	5YR 5/6 yellowish red	Cobbly loam	20	N/A	granular	Friable	none	wet, very cobbly

COMMENTS:

SOIL TYPE: Mount Lucas-Watchung Silt loams, 6-12% slope, V. Stony
Limiting Zone: Water
Type:
Depth: 46"

USDA Soil Drainage Class:

___ Excessively Drained	___ Somewhat Poorly Drained
___ Well Drained	___ Poorly Drained
X Moderately Well Drained	___ Very Poorly Drained

SIGNATURES:

SOIL DESCRIPTION PREPARER:

COVER: Forest
SLOPE: 0%
WEATHER: M. Sunny, 30°F

METHOD: hand dig
EXCAVATION DEPTH: 48"
LANDSCAPE POSITION: Flat

REDOX - Redoxymorphic features (Drainage Mottling) A/C - Abundance/Contrast Boundary: A-abrupt, C-clear, G-gradual, D-diffuse

Roots/Pores - f - few, c - common, m - many; f - fine, m - medium, c - coarse

NJDEP SUP 35

PIT NUMBER: TP-14

AECOM PROJECT NUMBER: 60537393.2

AECOM

MECHANICSBURG, PA OFFICE

SOIL EVALUATION FORM

DATE: 1/16/19 STATE: NJ COUNTY: Somerset MUNICIPALITY: Franklin Twp.

CLIENT: Williams SUBDIVISION: SITE LOCATION: Station 206 Access

MORPHOLOGIC DETERMINATION: SEWAGE (STORMWATER) SHWT Soils INVESTIGATOR: B. Skuba / A. Bachman

Horizon	Depth Upper	Depth Lower	Boundary A/C/D/G	Color	Texture	% CFs	REDOX A/C	Structure	Consistence	Roots	NOTES (% clay, macro pores)
A	0	2"	G	10YR 3/2 V. dk. grayish brown	Silty loam	10%	N/A	granular	loose	many, FC	moist, frost
A	2"	11"	C	7.5YR 3/4 dk. brown	Silty loam	10%	N/A	granular	Friable	many, FM	sl. moist to moist
B	11"	24"	C	5YR 4/6 Yellowish red	Silty loam	10-15%	N/A	granular	Friable	Few, FM	moist
B	24"	48"	G	5YR 4/6 Yellowish red	Silty loam	15%	N/A	granular to blocky	V. friable	Few, Fine	sl. moist
C	48"	50"	G	7.5YR 4/4 brown	Silty loam w/ cobbles	15-20%	N/A	granular	Friable	Few, fine	V. moist to wet

COMMENTS:

SOIL TYPE: Mount Lucas-Watchung Silt loams, 6-12% slope, V. stony

Limiting Zone: water

Type:

Depth: 49"

USDA Soil Drainage Class:

___ Excessively Drained	___ Somewhat Poorly Drained
___ Well Drained	___ Poorly Drained
X Moderately Well Drained	___ Very Poorly Drained

SIGNATURES:

SOIL DESCRIPTION PREPARER: B

COVER: Forest

SLOPE: 0%

WEATHER: Cloudy, 38°F

METHOD: hand dig

EXCAVATION DEPTH: 50"

LANDSCAPE POSITION: Flat

REDOX - Redoxymorphic features (Drainage Mottling) A/C - Abundance/Contrast Boundary: A-abrupt, C-clear, G-gradual, D-diffuse

Roots/Pores - f - few, c - common, m - many; f - fine, m - medium, c - coarse

100 Sterling Parkway; Suite 205
Mechanicsburg, PA 17055

www.AECOM.com

717-795-8001

NJDEP SUP 35

PIT NUMBER: TP-15

AECOM PROJECT NUMBER: 60537393.2

AECOM

MECHANICSBURG, PA OFFICE

SOIL EVALUATION FORM

DATE: 1/17/19 STATE: NJ COUNTY: Somerset MUNICIPALITY: Franklin Twp.

CLIENT: Williams SUBDIVISION: SITE LOCATION: Station 206 Access

MORPHOLOGIC DETERMINATION: SEWAGE **STORMWATER** SHWT Soils INVESTIGATOR: B. Skuba / A. Bachman

Horizon	Depth Upper	Depth Lower	Boundary A/C/D/G	Color	Texture	% CFs	REDOX A/C	Structure	Consistence	Roots	NOTES (% clay, macro pores)
A	0	1"	G	10YR 3/2 V. dk grayish brown	Silt loam	10%	N/A	granular	Friable	many, F-C	moist, Frost
A	1"	14"	C	7.5YR 4/3 Brown	Silty loam	5%	N/A	granular	Friable	many, FC	moist, trace cobbles 10-14"
B	14"	46"	A	5YR 5/8 yellowish red	Silty loam	5%	N/A	granular	Friable	few, Fine	moist
C	46"	48"	G	7.5YR 5/8 Strong brown	Silty loam	10%	N/A	granular	Friable	none	wet, trace to few cobbles

COMMENTS:

SOIL TYPE: Mount Lucas-Watchung Silt loams, 6-12% Slope, U. Stony
Limiting Zone: Water
Type:
Depth: 47"

USDA Soil Drainage Class:

___ Excessively Drained	___ Somewhat Poorly Drained
___ Well Drained	___ Poorly Drained
X Moderately Well Drained	___ Very Poorly Drained

SIGNATURES:

SOIL DESCRIPTION PREPARER: B

COVER: Forest METHOD: hand dig

SLOPE: 0-1% EXCAVATION DEPTH: 48"

WEATHER: M. Sunny, 26°F LANDSCAPE POSITION: Flat

REDOX - Redoxymorphic features (Drainage Mottling) A/C - Abundance/Contrast Boundary: A-abrupt, C-clear, G-gradual, D-diffuse

Roots/Pores - f - few, c - common, m - many; f - fine, m - medium, c - coarse

100 Sterling Parkway; Suite 205
Mechanicsburg, PA 17055
www.AECOM.com
717-795-8001

PIT NUMBER: TP-16

NJDEP SUP 35

AECOM PROJECT NUMBER: 60537593.2

AECOM

MECHANICSBURG, PA OFFICE

SOIL EVALUATION FORM

DATE: 1/16/19 STATE: NJ COUNTY: Somerset MUNICIPALITY: Franklin Twp.

CLIENT: Williams SUBDIVISION: SITE LOCATION: Station 206 Access

MORPHOLOGIC DETERMINATION: SEWAGE STORMWATER SHWT Soils INVESTIGATOR: B. Skuba / A. Bachman

Horizon	Depth Upper	Depth Lower	Boundary A/C/D/G	Color	Texture	% CFs	REDOX A/C	Structure	Consistence	Roots	NOTES (% clay, macro pores)
A	0	3"	G	10YR 3/3 dk. brown	Silty loam	15%	N/A	granular	friable	many, F-C	moist, frost, trace cobbles
A	3"	8"	C	7.5YR 4/3 brown	Silty loam	10%	N/A	granular	V. friable	few, FC	moist, trace cobbles
B	8"	30"	C	5YR 5/6 yellowish red	Silty loam	5%	N/A	granular	friable	few, F-M	moist, trace cobbles
C	30"	48"	G	7.5YR 4/4 brown	cobbly loam	20%	N/A	granular	friable	few, fine	~~bbb~~ moist, wet at 46"

COMMENTS: water at 46"

SOIL TYPE: Mardin-Lucas-Watchung Silt loams, 6-12% slope, v. stony
Limiting Zone: water
Type:
Depth: 46"

USDA Soil Drainage Class:

___ Excessively Drained
___ Well Drained
X Moderately Well Drained
___ Somewhat Poorly Drained
___ Poorly Drained
___ Very Poorly Drained

SIGNATURES:

SOIL DESCRIPTION PREPARER:

COVER: forest
SLOPE: 0%
WEATHER: cloudy, 38°F

METHOD: hand dig
EXCAVATION DEPTH: 48"
LANDSCAPE POSITION: flat

REDOX - Redoxymorphic features (Drainage Mottling) A/C - Abundance/Contrast Boundary: A-abrupt, C-clear, G-gradual, D-diffuse

Roots/Pores - f - few, c - common, m - many; f - fine, m - medium, c - coarse

SECTION C

TEST PIT PHOTOS

AECOM

PHOTOGRAPHIC LOG

Client:	Project Name:	Project No.
Williams/Transco	CS 206	60537393
Photo No.	**Date:**	**Description:**
1	1/17/2019	TP-13

AECOM

PHOTOGRAPHIC LOG

Client:	Project Name:	Project No.
Williams/Transco	CS 206	60537393
Photo No.	**Date:**	**Description:**
2	1/17/2019	TP-14

AECOM

PHOTOGRAPHIC LOG

Client:	Project Name:	Project No.
Williams/Transco	CS 206	60537393
Photo No.	**Date:**	**Description:**
3	1/17/2019	TP-15

AECOM

PHOTOGRAPHIC LOG

Client:	Project Name:	Project No.
Williams/Transco	CS 206	60537393
Photo No.	**Date:**	**Description:**
4	1/17/2019	TP-16

From:	Mochrie, Sara
To:	christopher.jones@dep.nj.gov; Resnick, Matthew; Foster, Ruth
Cc:	Horner, Scott (Scott.Horner@williams.com); "Dean, Joseph" (Joseph.Dean@Williams.com); Eakin,Megan; Albers, Meghan; Sundar, Nischint; Kellogg, Stephen (Stephen.Kellogg@Williams.com); Merz, Dan; Christine Roy; Richard Scott; Haas, Peter; Schooling, Jason; Clements, Blake (Blake.Clements@williams.com); Ham, Brian; Jaaskelainen, Su-Lin; MacLeod, Steven
Subject:	NESE-NJDEP EIR Response to 9-27-18 deficiency
Date:	Tuesday, February 5, 2019 6:51:55 PM
Attachments:	NJDEP EIR Responses (dated 9-27-18).pdf Attachment K - Upland Disposal Facility Correspondence.pdf image001.jpg

NJDEP Review Team,

Attached please find a response to the NESE Project - NJDEP DLUR deficiency letter dated September 27, 2018.

A hard copy including all attachments called out in the response letter (Attachments B-K) as well as CD of Sampling Analytical Data will be delivered to your office tomorrow.

If you have any questions or need additional copies of any parts of this submission please let us know.

Thanks,
Sara

Sara Mochrie, *Principal*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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Transcontinental Gas Pipe Line Company, LLC
Land, Permits & GIS Department
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

February 6, 2019

Christopher Jones, Manager
New Jersey Department of Environmental Protection
Division of Land Use Regulation, Bureau of Urban Growth & Redevelopment
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625

Re: Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Request for Flood Hazard Area Individual Permit, Flood Hazard Area Verification. Freshwater Wetlands Individual Permit, Waterfront Development Permit (Upland & In-Water), Coastal Wetland Permit
LUR File No. 0000-01-1001.3: FHA180001, FHA180002, FWWW180001, WFD180001, WFD180002, CSW180001

Mr. Jones:

On June 23, 2017, Transcontinental Gas Pipe Line, LLC (Transco) submitted an application to the New Jersey Department of Environmental Protection (NJDEP) Division of Land Use Regulation (DLUR) requesting a Flood Hazard Area Individual Permit & Verification and a Freshwater Wetlands Individual Permit. On July 10, 2017, Transco submitted an application requesting a Waterfront Development Individual Permit & Wetlands Act of 1970 Permit for the Northeast Supply Enhancement Project (Project). In order to provide NJDEP with additional time to comply with the timeframes by which it must act on Transco's request for a Water Quality Certification pursuant to Section 401(a)(1) of the Clean Water Act, 33 U.S.C §1341(a)(1), Transco withdrew these applications from NJDEP review on June 15, 2018. Transco resubmitted its request for the aforementioned permits and corresponding permit applications on June 20, 2018.

On July 18, 2018, the NJDEP DLUR issued a deficiency letter on Transco's June 20, 2018 permit applications. Transco filed a response to the deficiency letter on August 31, 2018. NJDEP DLUR issued a second deficiency letter on September 12, 2018, stating that four items set forth in the

July 18, 2018 deficiency letter had not been satisfied. Transco filed additional responses with NJDEP DLUR on September 14, 2018 and September 21, 2018. NJDEP DLUR issued a third deficiency letter on September 27, 2018. On November 5, 2018, the NJDEP held a public hearing on Transco's FWW Permit application. Transco reviewed the public comments that were placed on the record at the hearing and developed a summary of the comments along with supporting responses on December 17, 2018 in order to assist the NJDEP in responding to all comments.

Provided herein are Transco's responses to the September 27, 2018 deficiency letter (Attachment 1), including:

a. Results of the sampling and analysis efforts (provided on CD) and acceptance letters from upland disposal facilities; and
b. Revisions to the Compressor Station 206 infiltration basin design, including a revised set of permit plans (provided under separate cover).

If you have any questions regarding this response, or require additional Project information, please do not hesitate to contact Scott Horner at (713) 215-4953 or via email at Scott.Horner@williams.com. Alternatively, you can contact Ms. Sara Mochrie, Project Manager at Ecology and Environment, Inc. at (716) 684-8060 or via email at smochrie@ene.com.

Respectfully,

Transcontinental Gas Pipe Line Company, LLC.

Joseph Dean
Manager, Environmental Permitting, Atlantic-Gulf Operating Area

cc (via e-mail): Stephen Kellogg, Transco
Blake Clements, Transco
Scott Horner, Transco
Brian Ham, Transco
Su-Lin Jaaskelainen, Transco
Sara Mochrie, E & E
Megan Eakin, E & E
Steven MacLeod, E & E
Matt Resnick, NJDEP (DLUR)
Ruth Foster, NJDEP (PCER)

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

RESPONSES TO ENVIRONMENTAL INFORMATION REQUESTS

DATED SEPTEMBER 27, 2018

NORTHEAST SUPPLY ENHANCEMENT PROJECT

FEBRUARY 2019

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
Northeast Supply Enhancement Project
Responses to Environmental Information Requests dated September 27, 2018

Comment No. 1

The Division previously reviewed Transco's draft SSAP (Version 3) and based upon the August 28 and September 18 conference calls, the Division determined that the SSAP required changes. Our staff committed to assisting Transco with making those changes so that the sediment sampling could move forward. The Office of Dredging and Sediment Technology finalized a SSAP for the characterization of dredge material for an upland disposal facility and the Division will be sending that to you electronically. Transco may initiate the sediment sampling upon receipt of that SSAP. However, please note that the application remains deficient until the analytical results of the SSAP are reviewed by an upland disposal facility and the applicant has provided a letter of acceptance from the facility.

Response:

As described in the finalized Sediment Sampling and Analysis Plan (SSAP) approved for implementation October 9, 2018, Transco conducted the sampling campaign in October and November 2018. Upon completion, results of this effort were provided to Donjon Marine Co. Inc. and Clean Earth, Inc. On December 27, 2018 Donjon Marine Co. Inc. provided a letter of acceptance for the expected dredged materials from the construction of the Raritan Bay Loop as part of the NESE Project. In addition, on January 22, 2019 Clean Earth, Inc. provided a letter confirming their ability to accept the expected dredged materials from construction of the Raritan Bay Loop and part of the NESE Project. These facility approvals are conditional upon final evaluation of the material after it has been dredged. See Attachment K for results of the sampling and analysis effort and copies of correspondence with these facilities.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
Northeast Supply Enhancement Project
Responses to Environmental Information Requests dated September 27, 2018

Comment No. 2

As noted previously, Transco has not yet received approval from an upland disposal facility, or the U.S. Army Corps of Engineers for the HARS, based on the analytical results of the department approved SSAP.

Response:
Refer to response to Comment No. 1 above and Attachment K regarding upland disposal facility acceptance of the dredged materials. Note that Transco intends to dispose of all dredged material upland. However, if the U.S. Army Corps of Engineers provides authorization for Transco to utilize the HARS in the future, Transco would seek to modify its application to the NJDEP accordingly, with guidance provided by the NJDEP DLUR.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

Comment No. 3

The following information is required to demonstrate compliance with the Stormwater Management Rule, N.J.A.C. 7:8.

a. Please revise the hydrologic calculations to use the Type C rainfall distribution, instead of the Type III rainfall distribution. NRCS has revised the rainfall distributions and the Department required the use of the updated rainfall distributions for all hydrologic calculations.

b. Please provide the backup calculations for the time of concentration for all subareas for the existing and proposed conditions.

c. Please provide all backup information, including Soil Surveys, such that the Department can verify the Curve Numbers associated with the hydrologic calculations.

d. Please revise the submitted drainage area maps to match the name of the subcatchments used in the hydrologic calculations.

e. Based on the submitted hydrologic calculations, the entire routed water quality volume within the proposed bioretention basin is not contained. Please revise the outlet control structure such that no discharge leaves the bioretention basin during the water quality storm event.

f. Please provide a Profile Plan of the proposed bioretention basin, which illustrates basin bottom and depth of soil media. Additionally, please provide Landscape Plan for the bioretention basin which illustrates the planting schedule.

g. Please provide a Detail Sheet which illustrates the outlet structure details for the proposed bioretention basin and detention basins 1 and 2.

h. Please provide Grading and Drainage Plans and/or Construction Plans to illustrate details associated with the access road, such as material (gravel or paved road), curbing, etc. Additionally, please provide a Detail Sheet which illustrates a typical cross-sectional detail of gravel access road and paved road.

i. The monitoring well located at TP-6 identified a high groundwater elevation at 261.2 feet and the monitoring well located at TP-5 identified a high groundwater elevation at 258.5 feet. Both of these monitoring wells are within the vicinity of the proposed bioretention basin. Based on the submitted plans (last revised August 24, 2018) and the Stormwater Management Report (last revised August 2018), the proposed bioretention basin has a basin set at elevation 262; thus, the bottom of the proposed bioretention basin's soil media would be located at elevation 260. As such, based on the soil testing information that was provided, the proposed bioretention basin does not have the required 2-foot separation from

the seasonal high groundwater table. Consequently, the proposed bioretention is not designed in accordance with the NJ BMP Manual and therefore, water quality credit cannot be assigned to the BMP. Please relocated and/or redesign the bioretention basin, such that the required 2-foot clearance from the seasonal high groundwater table is achieved.

j. Based on the high groundwater table and the presence of shall bedrock, it is recommended that the applicant perform a mounding analysis to determine whether the proposed bioretention basin will function and drain properly.

k. Please provide information regarding the location of the seasonal high groundwater table for the proposed detention basins.

Response:

a. The hydrologic calculations, utilizing HydroCAD 10.00-22 software (Attachment A) have been revised to use the requested Type C rainfall distribution (Attachment B).

b. The time of concentration (Tc) was computed utilizing the methods outlined in Chapter 3 of the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Technical Release 55 (TR-55) Urban Hydrology for Small Watersheds, as referenced in Chapter 5 of the New Jersey Stormwater Best Management Practices Manual (BMP Manual). Standard Worksheet 3 from this document was completed to calculate the Tc for each subarea (Attachment C), which were then entered into the hydrologic calculations (Attachment A).

c. The Curve Numbers (CNs) were computed utilizing the methods outlined in Chapter 2 of the USDA NRCS TR-55 document, as referenced in Chapter 5 of the BMP Manual. Tables 2-2a through 2-2d from this document, Standard Worksheet 2 from this document, and the hydrologic soil groups obtained from the USDA NRCS Soil Survey was utilized to tabulate the CNs for each subarea (Attachment D), which were then entered into the hydrologic calculations (Attachment A). Separate pervious/impervious CN values were calculated (i.e. weighted/composite CNs were not used) pursuant to a previous comment issued by NJDEP.

d. The drainage area maps (Attachment E) have been revised to match the name of the subcatchments used in the hydrologic calculations (Attachment A).

e. The proposed infiltration basin has been revised such that the entire water quality (WQ) volume is contained beneath the lowest outlet orifice (Attachment F).

f. The previously proposed bio-retention basin has been revised to an infiltration basin to provide a greater separation from the seasonal high groundwater table and bedrock, which is discussed in greater detail within a response to a later review comment. As such, since infiltration basins utilize a sand media bottom without any vegetation, a Landscape Plan is no longer applicable. A Profile Plan of the infiltration basin has been provided which illustrates the basin bottom,

depth of sand media, and elevation of the seasonal high groundwater table (Attachment I – Sheet 12).

g. An updated Detail Sheet has been provided which more clearly illustrates the outlet structure details for the proposed infiltration basin (Attachment I – Sheet 8) and detention basins 1 and 2 (Attachment I – Sheet 9).

h. The Post Construction Stormwater Management Plans (Attachment I – Sheets 5 & 6) have been revised to illustrate the material of the access road, which is proposed as gravel. Additionally, an updated Detail Sheet (Attachment I – Sheet 11) has been provided which shows a typical cross-sectional detail of the gravel road. Please note that no paved roads are proposed at this time.

i. Pursuant to discussions held between NJDEP, Transco and AECOM on October 18 and December 6, 2018, the footprint of the basin has been relocated to be a minimum of 100 feet away from TP-6 as to not encounter the groundwater associated with that test pit, as well as 60 feet away from TP-5. As such, a total of eight (8) test data points (including TP-5) have been utilized to ascertain the elevation of the seasonal high groundwater table in the vicinity of the basin. Additionally, the previously proposed bio-retention basin with a soil media bottom has been revised to an infiltration basin with a sand media bottom to provide a greater vertical separation distance from groundwater. An Infiltration Basin Profile Plan (Attachment I – Sheet 12) showing the elevation of the basin bottom relative to the groundwater elevations, which illustrates, a two and a half foot (2.5 feet) vertical separation is being provided above the highest groundwater elevation.

j. A mounding analysis for the infiltration basin has been performed in accordance with the document "Simulation of Groundwater Mounding Beneath Hypothetical Stormwater Infiltration Basins", U.S. Geological Survey Scientific Investigations Report 2010-5102, prepared in cooperation with the New Jersey Department of Environmental Protection, Carlton, G.B., 2010 (Attachment G) as referenced in Chapter 9.5 of the BMP Manual.

k. Additional soil test pits were performed in January 2019. Four (4) test pits (identified as TP-13, TP-14, TP-15 and TP-16) were investigated within the footprints of the two small detention basins alongside the proposed gravel access road to determine the presence of bedrock and/or groundwater. The results of this evaluation were fairly consistent, indicating a depth to groundwater ranging 3.8 feet to 4.1 feet beneath existing grade (Attachment H). A Detention Basin Profile Plan (Attachment I – Sheet 13) showing this groundwater surface profile was then plotted and the detention basins designed such that a minimum separation of 2.1 feet was provided between groundwater profile and the bottom of the basin bottom, which is greater than the 1-foot minimum requirement.

Also enclosed are revised Freshwater Wetland and Flood Hazard Area Plans for Compressor Station 206 (Attachment J) which have been updated to reflect these revisions.

Prepared by:

Scott Horner
Environmental Specialist IV
713-215-4953

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

RESPONSES TO ENVIRONMENTAL INFORMATION REQUESTS

DATED SEPTEMBER 27, 2018

ATTACHMENT K

UPLAND DISPOSAL FACILITY CORRESPONDENCE

NORTHEAST SUPPLY ENHANCEMENT PROJECT

FEBRUARY 2019

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VIA ELECTRONIC MAIL

January 22, 2019

Transcontinental Gas Pipe Line Company
Attn: Scott Horner
2800 Post Oak Boulevard, Level 11
Houston, Texas 77056

RE: Northeast Supply Enhancement Project
Extending from the Borough of Sayreville shoreline, Middlesex County, NJ
To the Rockaway Transfer Point

Dear Mr. Horner:

Clean Earth, Inc. (CEI) is in receipt of analytical data for a new source of dredge material for the Clean Earth Bethlehem (CEB) Site. The analytical data supplied represents 741,252 cubic yards (1,111,878 tons) of material generated from the Northeast Supply Enhancement Project which will extend from the borough of Sayreville shoreline, Middlesex County, New Jersey to the Rockaway Transfer Point, located in the Atlantic Ocean approximately 3 statue miles seaward of Rockaway, New York.

The CEB Site is estimated to require more than 3,000,000 cubic yards of fill material. The site therefore has sufficient uncommitted upland disposal/beneficial use capacity to accommodate the dredged material from the referenced dredging project after processing at Clean Earth Dredging Technologies, LLC (CEDT) Claremont Dredge Material Processing Facility (DMPF) and/or CEDT Koppers DMPF during the anticipated project schedule.

A review of the analytical data, supplied by Haley & Aldrich, Inc., has been completed. The analytical data indicates that this sediment and the processed dredge to be produced from this sediment meet the Pennsylvania Regulated Fill Criteria. The following samples have been reviewed for consideration at CEB:

- COMP-A-D0-15E
- VC-208-D0-7.5E
- VC-211-D0-7.5E
- VC-214-D0-7.5E
- DEP-1-D0-7.5E
- VC-301-REV-D0-7.5E
- VC-303-D0-7.5E
- VC-304-D0-7.5E
- DEP-3-D0-7.5E
- DEP-4-REV-D0-7.5E
- DEP-5-REV-D0-7.5E
- VC-216-D0-7.5E
- VC-217-D0-7.5E
- VC-218-D0-7.5E
- COMP-G-D0-7.5E
- VC-222-D0-7.5E
- VC-223-D0-7.5E
- COMP-I-D0-7.5E
- COMP-J-D0-7.5E
- VC-311-D0-7.5E
- COMP-K-D0-7.5E

- COMP-L-D0-20.5E
- VC-229-D0-28E
- COMP-M-D0-27E
- DEP-6-D0-13.5E
- DEP-6-D13.5-27E
- COMP-N-D0-4E
- COMP-N-D4-22.5E
- DEP-7-D0-15E
- DEP-7-D15-20E
- VC-235-D0-13.7E
- VC-235-D13.5-24E
- COMP-O-D0-2E
- COMP-O-D2-25E
- VC-238-D0-28E
- COMP-P-D0-23E
- COMP-Q-D0-10.5E
- VC-244-D0-4E
- VC-245-D0-4E
- VC-246-D0-4E
- COMP-R-D4-10.5E
- VC-247-D0-4E
- VC-247-D4-21.5E
- VC-318-D0-3.5E
- VC-318-D3.5-21.5E
- VC-320-D0-19E
- VC-321-D0-20.5E
- VC-323-D0-22E
- VC-251-D0-7.5E
- VC-252-D0-7.5E
- VC-253-D0-7.5E
- COMP-S-D0-21E
- COMP-T-D0-22.5E
- VC-255-D0-7.5E
- VC-256-D0-7.5E

The material to be generated from this project meets the definition of Regulated Fill as defined in General Permit No. WMGR096-NE004. Acceptance of any material from this project is contingent upon the collection of additional samples to satisfy the Clean Earth Bethlehem sampling frequency requirements. Acceptance of dredged material at Clean Earth Bethlehem is further contingent upon the receipt of all necessary approvals and authorizations from all applicable regulatory agencies and authorities.

Please contact me should you have any questions at (215) 734-1400, extension 1256.

Very truly yours,
CLEAN EARTH DREDGING TECHNOLOGIES, LLC

Kristin Foldes
Project Manager – Compliance

cc: Ryan Scott – Haley & Aldrich
Steve Sands, Ken Sykes – Clean Earth Dredging Technologies

CLEANEARTH®

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VIA ELECTRONIC MAIL

January 22, 2019

Transcontinental Gas Pipe Line Company
Attn: Scott Horner
2800 Post Oak Boulevard, Level 11
Houston, Texas 77056

RE: Northeast Supply Enhancement Project
Sediment Generated between Milepost 35.21 and 35.49

Dear Mr. Horner:

Clean Earth, Inc. (CEI) is in receipt of analytical data for a new source of dredge material for the Clean Earth Bethlehem (CEB) Site. The analytical data supplied represents 13,152 cubic yards (19,728 tons) of material generated from a subsection of the Northeast Supply Enhancement Project which will extend from Milepost 35.21 and 35.49.

The CEB Site is estimated to require more than 3,000,000 cubic yards of fill material. The site therefore has sufficient uncommitted upland disposal/beneficial use capacity to accommodate the dredged material from the referenced dredging project after processing at Clean Earth Dredging Technologies, LLC (CEDT) Claremont Dredge Material Processing Facility (DMPF) and/or CEDT Koppers DMPF during the anticipated project schedule.

A review of the analytical data tables, supplied by Haley & Aldrich, Inc., has been completed. The analytical data tables indicate that this sediment and the processed dredge to be produced from this sediment meet the Pennsylvania Regulated Fill Criteria. The following samples have been reviewed for consideration at CEB:

- VC68-D0-3E
- VC68-D3-6.8E
- VC69-ALT-D0-3E
- VC69-ALT-D3-6E
- VC69-ALT-D6-8.10E

The material to be generated from this project meets the definition of Regulated Fill as defined in General Permit No. WMGR096-NE004. Acceptance of any material from this project is contingent upon the collection of additional samples to satisfy the Clean Earth Bethlehem sampling requirements and sampling frequency. Acceptance of dredged material at Clean Earth Bethlehem is further contingent upon the receipt of all necessary approvals and authorizations from all applicable regulatory agencies and authorities.

Please contact me should you have any questions at (215) 734-1400, extension 1256.

Very truly yours,
CLEAN EARTH DREDGING TECHNOLOGIES, LLC

Kristin Foldes
Project Manager – Compliance

cc: Ryan Scott – Haley & Aldrich
Steve Sands, Ken Sykes – Clean Earth Dredging Technologies

Material Solution Services

21 East 10th Street Northampton, PA 18067
p(610)262-3804

December 27th, 2018

Donjon Marine Co. Inc.
100 Central Avenue
Hillside, New Jersey 07205

Re: **MSS18583: Williams Pipeline PA-Clean Fill Conditional Approval**
Construction Dredging
Conditional Regulated Fill Approval: N/A

Dear Ms. Mullins:

Material Solution Services is the exclusive brokerage firm for the Coplay Quarry Reclamation Project facility that is accepting PA-Clean Fill. As requested, Material Solution Services (MSS) has reviewed the information provided by Donjon Marine Co. Inc. and is pleased to provide you with this conditional acceptance letter for PA-Clean fill dredge material being generated from the project site referenced above into our Coplay Quarry Reclamation Project facility accepting PA-Clean Fill.

The laboratory analysis and reports made available for this review include the following documents:

A. Table1_Project Data
B. Table2_VOC Data
C. Table3.1_Historical TEQ Data
D. Table3_TEQ Data
E. Table4_TICs Data
F. TerraSense_Amendment_Grain_Size_Reports

At this time, only the projects listed immediately below are – at this time – conditionally approved into our Coplay facility as PA-Clean fill. Please note, no other material is being conditionally approved under this approval letter. Additional sampling & documentation are required for Final Approval of this project.

MSS18583 Williams Pipeline

The documents reviewed indicate that the above referenced material meet the facility's Clean Fill Protocol and are in full compliance with Pennsylvania Department of Environmental Protection Rules and Regulations and associated project requirements. All the analytical results and reports mentioned above were reviewed and compared to the PADEP Management of Fill Policy (258-2182-773). We will accept all material that meets the PADEP Management of Fill Policy (258-2182-773).

Under the Management of Fill Policy, material must not contain any strong odors and not contain any free liquid. The material must not contain wood, metal, tires or trash/garbage as will be addressed in our agreement. Any material received that does not meet the acceptance criteria and specifications will be rejected/reloaded and returned to the site of origin. All associated transportation fees and facility handling cost that may be accrued due to non-acceptance of material will be your responsibility.

MSS facility material physical acceptance criteria:

Facility	Types of Acceptable Material	Photo-Ionization Detector Limit (PPM)	Material Size Limitation	Moisture Content Limitation	Treated & Untreated Wood Limitation	Slag/Ash/ Cinder Limitation	Types of Unacceptable Material
Coplay Quarry	Soil & Construction Fill Material Meeting the Facilities PA Clean Fill Criteria	NA	None	No Free-Standing Liquid	<3%	<3%	MSW, Deleterious Material, Industrial or Hazardous Waste
Capital Dev.	Soil & Construction Fill Material Meeting the Facilities PA Clean Fill Criteria	NA	None	No Free-Standing Liquid	<3%	<3%	MSW, Deleterious Material, Industrial or Hazardous Waste

Should you have any questions regarding the above approval, please call me at the above phone numbers.

Sincerely:

Justin Tocci

Justin Tocci
Environmental Professional

ATTACHMENT K

SAMPLING ANALYTICAL DATA PROVIDED SEPARATELY ON CD

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From:	Resnick, Matthew
To:	Jones, Christopher; Mochrie, Sara; Andrews, Anika
Cc:	Mason, Jeffrey A.; Albers, Meghan; Scott Horner; Bill Macholdt; Su-Lin Jaaskelainen; Brian Ham; Stephen Kellogg
Subject:	RE: NESE wetland mitigation questions
Date:	Thursday, February 7, 2019 1:05:28 PM
Attachments:	Wet RZ mitigation transmittal.pdf

Attached is the transmittal forms I sent to Anika for Mitigation, as well as a narrative explaining the breakdown of the Riparian Zone impacts/Mitigation.

From: Jones, Christopher
Sent: Thursday, February 07, 2019 2:50 PM
To: Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Andrews, Anika <Anika.Andrews@dep.nj.gov>
Cc: Mason, Jeffrey A. <JMason@ene.com>; Albers, Meghan <MAlbers@ene.com>; Scott Horner <Scott.Horner@williams.com>; Bill Macholdt <bmacholdt@amygreene.com>; Su-Lin Jaaskelainen <SuLin.Jaaskelainen@williams.com>; Brian Ham <Brian.Ham@Williams.com>; Stephen Kellogg <Stephen.Kellogg@Williams.com>
Subject: RE: NESE wetland mitigation questions

Sara,

As I said in our meeting, the impact numbers that I had were tentative because Matt Resnick was not available to confirm them. I do believe Matt had numbers that were slightly different and I don't know if he let you know what they are.

Matt, If you haven't shared the impact numbers that you have can you forward them to all the recipients of Sara's email? Thanks.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Wednesday, February 06, 2019 10:57 AM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Andrews, Anika <Anika.Andrews@dep.nj.gov>
Cc: Mason, Jeffrey A. <JMason@ene.com>; Albers, Meghan <MAlbers@ene.com>; Scott Horner <Scott.Horner@williams.com>; Bill Macholdt <bmacholdt@amygreene.com>; Su-Lin Jaaskelainen <SuLin.Jaaskelainen@williams.com>; Brian Ham <Brian.Ham@Williams.com>; Stephen Kellogg <Stephen.Kellogg@Williams.com>
Subject: [EXTERNAL] NESE wetland mitigation questions

NJDEP team

Following our call last week we have a few questions about mitigation ratios that will apply for the

NESE project and total impact numbers.

Would you have any time this week for a quick 30 min or less call to discuss.

Please let me know and our team can set up a call.

Thanks in advance,
Sara

Madison Loop

Impacts Checklist for FWW and RZ Mitigation Review

DATE SENT: 12/11/18	90TH/180TH DAY: T.B.D
PROGRAM INTEREST # Class Code/Activity Code: 0000-01-1004.3 Madison Loop	PROJECT MANAGER: Resnick
PERMIT TYPE: FHA IP FHA IP, FWW IP, WFD-IP, CSW	APPLICANT: Transco
BLOCK(S): M	LOT(S):
MUNICIPALITY: Old Bridge, Sayreville	COUNTY: Middlesex

Wetland Impacts Requiring Mitigation

Impacts (acres)	Forest	Shrub / scrub	Emergent / Herbaceous	SOW	Coastal	ISS	Project Total
Permanent	.327	Ø	Ø	Ø	Ø		
Temporary	0	.287	~~1.696~~ 1.700	0.157	1.968		
Total	.327	.287	1.700	~~Ø~~ 0.157	1.968		

☐ Vernal ☐ C1

☐ E&T (species)_____

Riparian Impacts

Table on Plan sheets more comprehensive

Activity (Section 11.2)	RZ width	Total impact	Impacts in excess of table C		Forested	Shrub/Scrub	Herbaceous	Grass/Ag
see matt's report				Perm				
				Temp				
				Perm				
				Temp				
				Perm				
				Temp				

☐ Hardship ☐ Overlapping RZ/wetland impacts

☐ E&T (species) _____

To Be Completed By Mitigation Unit:

Mitigation Proposal Review

☐ No Mitigation Proposal provided

☐ Mitigation proposal acceptable

☐ Mitigation proposal not acceptable

Mitigation Conditions:

☐ Standard Mitigation Conditions apply

☐ Modified Mitigation Conditions apply

Compressor Station

Impacts Checklist for FWW and RZ Mitigation Review

TE SENT: Resent 12/11/18	90TH/180TH DAY: T.B.D
ROGRAM INTEREST # Class Code/Activity Code: 2000-01-10013 Comp. Station 206	PROJECT MANAGER: Resnick
ERMIT TYPE: FHA IP, FWIP	APPLICANT: Transco
BLOCK(S): 5.02	LOT(S): 1.02, 9, 10, 11.02, 12, 16, 17, 23, 25
MUNICIPALITY: Franklin	COUNTY: Somerset

Wetland Impacts Requiring Mitigation

Impacts (acres)	Forest	Shrub / scrub	Emergent / Herbaceous	SOW	Coastal	ISS	Project Total
Permanent	2.637	.308	.779	.06			3.7
Temporary	0	Ø	.149	0			
Total	2.637	.308	.928	.06			

☐ Vernal ☐ C1

☐ E&T (species)_____

Riparian Impacts

	Activity (Section 11.2)	RZ width	Total impact	Impacts in excess of table C		Forested	Shrub/Scrub	Herbaceous	Grass/Ag
A2*	H	50	3287	1287	Perm	3,287			
					Temp	Ø			
A3*	H	50	7,743	3,743	Perm	7,743			
					Temp	Ø			
A4	H	50	10,089	6089	Perm	10,089			
					Temp	Ø			
			21,119	11,119					

☐ Hardship ☑ Overlapping RZ/wetland impacts

☐ E&T (species)_____

To Be Completed By Mitigation Unit:

Mitigation Proposal Review

- ☐ No Mitigation Proposal provided
- ☐ Mitigation proposal acceptable
- ☐ Mitigation proposal not acceptable

Mitigation Conditions:

- ☐ Standard Mitigation Conditions apply
- ☐ Modified Mitigation Conditions apply

* Activity A2 shown as 4000' Limit on Plan. should be 2000

* Over lap between A3 + A4 counted for and removed from ~~final~~ fiscal #

Madison Loop: The new 26" gas pipe line will impact the riparian zone of three tributaries to Tennent Brook, one tributary to the Cheesequake Creek, and one tributary to Crosswicks Creek. The following table 11.2 limits for a new utility line (k) apply. Additionally, riparian zone impacts for access into the site or to stage construction equipment have been included as either temporary forested riparian zone impacts which includes the access roads and HDD staging areas that will be restored following construction in accordance with NJAC 7:13-11.2(z), or permanent forested riparian zone impacts which includes segments of the ROW that will need to be cleared of forested vegetation which will require mitigation.

- Utility Crossing at MP 8.61, over UNT to Tennant Brook: Per 7:13-11.2(k), Table 11.2 the maximum allowed disturbance for a new underground utility is 30' SF X Linear Length of the utility line proposed; 30' X 144 LF = 4320 SF total limit. The new gas pipeline at MP 8.61 will result in the permanent impact to **3,537 SF (0.081 of an acre)** of forested riparian zone vegetation. This is below the Table 11.2 limits and will not require additional mitigation.
    - This crossing will also require an additional **3,465 SF** of temporary disturbances to previously disturbed riparian zone areas that are not subject to table 11.2 requirements in accordance with NJAC 11.2(f)
    - This crossing will require the permanent disturbance of **3,381 SF** of forested riparian zone vegetation to access the project. This impact will require mitigation since access does not allow for permanent changes to the riparian zone.

- Utility Crossing at MP 8.7, over UNT to Tennant Brook: Per 7:13-11.2(k), Table 11.2 the maximum allowed disturbance for a new underground utility 30 SF X Linear Length proposed; 30' X 121 LF = 3,630 SF total limit. The new gas pipeline at MP 8.7 will result in the permanent impact to **1,341 SF (0.030 of an acre)** of forested riparian zone vegetation. This is below the Table 11.2 limits and will not require additional mitigation.
    - This crossing will also require an additional **7,833 SF** of temporary disturbances to previously disturbed riparian zone areas that are not subject to table 11.2 requirements in accordance with NJAC 11.2(f).

- Utility Crossing at MP 8.76, Over UNT to Tennant Brook: Per 7:13-11.2(k), Table 11.2 the maximum allowed disturbance for a new underground utility 30 SF X Linear Length proposed; 30' X 138 LF = 4,140 SF total limit. The new gas pipeline at MP 8.76 will result in the permanent impact to **4,080 SF (0.093 of an acre)** of forested riparian zone vegetation. This is below the Table 11.2 limits and will not require additional mitigation.
    - This crossing will also require an additional **2,916 SF** of temporary disturbances to previously disturbed riparian zone areas that are not subject to table 11.2 requirements in accordance with NJAC 11.2(f)
    - This crossing will require the temporary disturbance of **3,158 SF** of forested riparian zone vegetation and the permanent disturbance of **1,036 SF** of forested riparian zone vegetation to access the project site. The temporary disturbances will be required to be restored to preexisting conditions following pipeline installation as per 11.2(z). The permanent impacts will require mitigation as access does not allow for permanent changes to the riparian zone.

- Access Road crossing at MP 8.76A, over UNT to Tennant Brook: Table 11.2 the maximum allowed disturbance to access for a new underground utility line is 1000 SF. The access road

at MP 8.76A will result in the temporary impact of **3,341 SF (0.076 of an acre)** of forested riparian zone vegetation. The temporary disturbances will be required to be restored to preexisting conditions following pipeline installation as per 11.2(z).

- Access Road crossing at MP 8.76B, over UNT to Tennant Brook: Table 11.2 the maximum allowed disturbance for access for a new underground utility line is 1000 SF. The access road at MP 8.76B will result in the temporary impact of **8,413 SF (0.193 of an acre)** of forested riparian zone vegetation. The temporary disturbances will be required to be restored to preexisting conditions following pipeline installation as per 11.2(z).

- Access Road crossing at MP 9.26B, over UNT to Tennent Brook: Table 11.2 the maximum allowed disturbance for access for a new underground utility line is 1000 SF. The access HDD pull location at MP 9.26B will result in temporary disturbance of **10,109 SF** of forested riparian zone vegetation and the permanent disturbance of **2,456 SF** of forested riparian zone vegetation to access the project site for an HDD pulling location and ROW clearing for future maintenance purposes. The temporary disturbances will be required to be restored to preexisting conditions following pipeline installation as per 11.2(z) and the permanent impacts will require mitigation as access does not allow for permanent changes to the riparian zone. This crossing will also require an additional **7,991 SF** of temporary disturbances to previously disturbed riparian zone areas that are not subject to table 11.2 requirements in accordance with NJAC 11.2(f) and must be restored in accordance with 11.2(z).

- Utility Crossing at MP 10.05, UNT tributary to Cheesequake Creek: Per 7:13-11.2(k), Table 11.2 the maximum allowed disturbance for a new underground utility 30' SF X Linear Length proposed; 30' X 167 LF = 5010 SF total limit. The new gas pipeline at MP 10.05 will result in the permanent impact to **4,560 SF (0.104 of an acre)** of forested riparian zone vegetation. This is below the Table 11.2 limits and will not require additional mitigation.
    - This crossing will also require an additional **6,639 SF** of temporary disturbances to previously disturbed riparian zone vegetation that is not subject to table 11.2 requirements in accordance with NJAC 11.2(f)
    - This crossing will require the temporary disturbance of **994 SF** of forested riparian zone vegetation. The temporary disturbances will be required to be restored to preexisting conditions following pipeline installation as per 11.2(z).

- Utility Crossing at MP 11.36, UNT tributary to Crosswicks Creek: **491 SF** of temporary disturbance to previously disturbed riparian zones is proposed to install the utility line. The temporary disturbances will be required to be restored to preexisting conditions following pipeline installation as per 11.2(z).

Total Riparian Zone Impacts for the Madison Loop: The construction of the new 26" gas pipeline will result in the permanent impacts of **20,391 SF (0.46 of an acre)** of forested riparian zone which includes the clearing of forested riparian zones required for the utility line itself and areas cleared for the ROW of the utility line that will be converted into a herbaceous or scrub shrub condition for future ongoing maintenance and inspection purposes. The project will also result in the temporary disturbance of **26,015 SF (0.597 of an acre)** of forested riparian zones to gain access to the site and to stage construction equipment. These impacts will be restored following construction in accordance with NJAC 7:13-11.2(z). Lastly the project will result in the temporary impact of **28,844 SF** of previously disturbed riparian zone vegetation not subject to the Table 11.2 limits and to be restored in accordance with NJAC 7:13-11.2(z)

From: "Jones, Christopher" <Christopher.Jones@dep.nj.gov>
Date: February 6, 2019 at 10:04:06 AM EST
To: "Dean, Joseph" <Joseph.Dean@Williams.com>, "Horner, Scott (Scott.Horner@williams.com) (Scott.Horner@williams.com)" <Scott.Horner@williams.com>, "Mochrie, Sara" <SMochrie@ene.com>, "Bill Macholdt (bmacholdt@amygreene.com)" <bmacholdt@amygreene.com>, "Dow, Diane" <Diane.Dow@dep.nj.gov>, "Resnick, Matthew" <Matthew.Resnick@dep.nj.gov>, "Dietrick, Suzanne" <Suzanne.Dietrick@dep.nj.gov>, "Usarek-Witek, Magda" <Magda.Usarek-Witek@dep.nj.gov>, "Tamagno, Joslin" <Joslin.Tamagno@dep.nj.gov>, "Kopkash, Ginger" <Ginger.Kopkash@dep.nj.gov>
Subject: NESE

Good morning Joe,

I just wanted to touch base on where we are with the public hearing and things.

- The hearing is to be held on March 18 at the Jo Ann Magistro Performing Arts Center located at the Hammarskjold Middle School at 200 Rues Lane, East Brunswick, NJ. The venue is available from 4:00 pm until 11:00 pm.

- I was asked about a public notice that you had said you had forwarded to me for my review. I don't recall receiving a anything from you. If there is something that you need me to look at I would be happy to do so if you send it along. However, the NJDEP will be doing the public hearing notice for publication in the NJ Bulletin. I will be working with Terry Pilawski of our Division of Water Quality on a developing a joint notice. As with the last public hearing, the NJDEP anticipates that Transco will be send notice of the public hearing to the affected municipalities, adjacent landowners and public commenters.

- Finally, this morning we received pdf copies of Transco's response to the NJDEP September 27, 2018 deficiency letter. According to

the email that transmitted this response, hard copies will delivered to the NJDEP today. We will of course be reviewing the submittal without delay.

Please don't hesitate to contact me if you have any questions.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

From: Anderson, Ryan <Ryan.Anderson@dep.nj.gov>
Sent: Friday, March 1, 2019 11:54 AM
To: Doug Freese; Dow, Diane
Cc: Lockwood, Susan; Andrews, Anika
Subject: RE: Mitigation ratios for credit purchases

Doug
I'm sending this email as a follow up to our call yesterday. I highlighted your proposed strategy for mitigation in your email below.

The Department is agreeable to your approach on temporary and permanent impacts. I'll discuss the other two scenarios in more detail below:

Conversion

The Department is open to the concept of a reduced credit ratio for the conversion scenario. N.J.A.C. 7:7A-11.14(a) states that the Department can determine the number of credits on a case-by-case basis that would offset the loss of functions and values to the impacted wetlands. Since we are dealing with conversion of wetlands here and not loss, it would seem reasonable that a lesser credit would be required over the 1:1 ratio we normally require for "fill" projects. Whether that ratio is 0.5:1 or something else would need to be determined during the application process. You can propose a ratio in the application and address the standards at 7:7A-11.14 and we will evaluate.

Riparian zone is not as clear cut. Unlike the wetland rules at 7:7A-11.8, there is not a section or recognition of temporary impacts to forested RZ. I'm thinking we didn't include this

because the trees are pretty much the entire value of the RZ and once they are gone, the resource has been greatly impacted. However, an herbaceous RZ is better than an impervious RZ so I think an argument can be made that a lesser ratio can be applied. There is similar language in the credit purchase section (N.J.A.C. 7:13-13.14) which allows the Department to evaluate credit purchase on a case by case basis. So you can propose a lesser ratio and we will evaluate.

Non-Permanent (Temporary) Impacts Exceeding Six Months

The Department is open to the same strategy (reduced ratio) as outlined in Conversion above. As an alternative, there are allowances in the definition of temporary disturbance that can allow us to consider some impacts as temporary even if they exceed six months. However, I don't know that we would consider anything greater than a year as temporary. If you wanted to make the argument that some of these disturbances should be categorized as temporary (due to anticipated timing restrictions), then you can include that in your application. I would note that it would be much easier to make our call if we knew where exactly those disturbances were going to occur. I know that might not be known information at the time you submit the application but it would be helpful.

I think that covers everything. Let me know if I missed something or if you have any questions.
Ryan

Ryan J. Anderson
Manager
Bureau of Coastal Regulation
Division of Land Use Regulation
(609) 292-1230

From: Doug Freese <dfreese@amygreene.com>
Sent: Thursday, February 14, 2019 11:47 AM
To: Aspinwall, Jill <Jill.Aspinwall@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>
Cc: Rob Piel <rpiel@amygreene.com>; Craig Metzgar <cmetzgar@amygreene.com>
Subject: [EXTERNAL] Mitigation ratios for credit purchases

Diane / Jill,

I have a question on a not-so-hypothetical project. This may ultimately land on Ryan or Diane's desk because it is clear that the mitigation unit will elevate the decision making process.

We are working on a linear utility project and this line of questioning would apply to both riparian zone and wetland. The client would like to purchase credits to offset the impacts and there are credits available.

The project involves some small permanent impacts (i.e. fill or otherwise impacting the RZ/wetland resource). The project also involves conversion of forested RZ's and wetlands to a non-forested condition although there will be no fill and these areas will continue to provide ecological functions as RZ's and wetlands (albeit not at the current level). The project will have temporary impacts that will be restored. The project will have "non-permanent" impacts (i.e. temporary impacts that cannot be restored within 6 months, mainly due to tree clearing timing/limitations).

We have completed projects of this type previously but the mitigation was completed through construction of offsite mitigation projects not credit purchase. In the previous projects, NJDEP has required 1 acre of forested wetland enhancement for every acre of forested wetland conversion within the permanent right of way (this is basically equivalent to purchase of 0.33 bank credits per acre of conversion). Under the old FHACA Rules, we mitigated for riparian zone in the same manner. Under the new rules, we are not required to provide RZ mitigation for these maintenance activities within existing ROW.

So.....for this not-so-hypothetical project we are proposing the following:

Temporary impacts - restore in kind, in place within 6 months (no credit purchase)
Conversion of forested wetlands or forested RZ's - restore emergent wetlands/RZ's, purchase 0.5 credits per 1 acre of conversion
Non-permanent impacts (6-12 months) - restore in kind, in place wetlands/RZ's, purchase 0.5 credits per 1 acre of non-permanent impact
Permanent impacts - purchase 1 credit for every acre of permanent impact

Does this all make sense to you? Our client is looking for a decision as soon as possible so I thought that it was prudent to give you a head's up that this is coming. I'd be happy to talk with you if further explanation is required.

Regards, Doug

Douglas A. Freese, Ph.D., CPSSc, NJ State Approved Forester
Project Director
Amy S. Greene Environmental Consultants, Inc.
4 Walter E Foran Blvd., Suite 209
Flemington, NJ 08822

From:	Resnick, Matthew
To:	Mason, Jeffrey A.
Cc:	Mochrie, Sara; Jones, Christopher; Andrews, Anika; Albers, Meghan; Eakin,Megan; Horner, Scott (Scott.Horner@williams.com)
Subject:	RE: NESE Wetland and riparian impacts table
Date:	Friday, February 22, 2019 11:00:19 AM
Attachments:	image001.jpg

Jeff, the numbers on the tables appear to be accurate with the revised information you gave me previously.

I note that the table does not discussion mitigation. It just simply breaks down temporary and permanent impacts. I think my description in the original transmittal still stands and is what Anika will be working off of once I go over the small changes with her.

As to your two follow up questions, I will defer to Anika on that.

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Friday, February 22, 2019 12:02 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Andrews, Anika <Anika.Andrews@dep.nj.gov>; Albers, Meghan <MAlbers@ene.com>; Eakin,Megan <MEakin@ene.com>; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>
Subject: [EXTERNAL] RE: NESE Wetland and riparian impacts table

Matt

If you concur on those I think we are good on not having the 2pm. Attached is an excel table with those updates we discussed for your confirmation.

Also want to ask a couple quick questions for you and Anika prior to next mitigation meeting we have as Transco is attempting to drill down on the final number of mitigation credits needed…

1. Regarding PFO wetlands that will be converted to PEM after construction and during operation. Many of the PFO impacts considered permanent in the impact analysis are in fact a vegetation conversion from PFO to PEM wetlands. Will those impacts be mitigated at 1:1 for a utility line installation?

Regarding restoration

2. On the coastal wetland temporary impacts… will Transco be required to restore areas mapped as coastal wetland, but that are not in fact a wetland now? The 1.968 acres of coastal temporary impacts would potentially decrease if we remove the areas that are improperly mapped as coastal wetland in the data.

Thanks for your time on this Matt. I will be in touch,

Jeff

Jeffrey A. Mason, PWS, CERP *Chief Environmental Scientist*
368 Pleasant View Dr. Lancaster, NY. 14086
Phone: 716-684-8060 • Cell: 716-462-2543
jmason@ene.com • www.ene.com

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Friday, February 22, 2019 10:48 AM
To: Mason, Jeffrey A. <JMason@ene.com>
Cc: Mochrie, Sara <SMochrie@ene.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Andrews, Anika <Anika.Andrews@dep.nj.gov>
Subject: RE: NESE Wetland and riparian impacts table

Jeffrey,

I went through your edits and compared them to what I had in front of me. I agree completely on the Madison Loop changes. I basically just forgot to add that final number, and read the number at MP 8.7 wrong. Easy fix.

Regarding CS 206, the original site plan that I have did not include the over lap number for the area between A2 and A3, hence why it didn't get included. I also changed the limits on the crossing at A2, because technically, the access road is not crossing the water feature, so I used the "not crossing" scenario under 7:13-11.2(h).

I'll discuss the minor changes with Anika next time I see her. Do we still need a phone call?

From: Resnick, Matthew
Sent: Thursday, February 21, 2019 4:18 PM
To: 'Mason, Jeffrey A.' <JMason@ene.com>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: RE: NESE Wetland and riparian impacts table

I am in tomorrow but I haven't had a chance to fully go over the revisions you submitted and compare to what I did. Does early afternoon work for you? 1pm or so?

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Thursday, February 14, 2019 10:28 AM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: [EXTERNAL] NESE Wetland and riparian impacts table

Good Morning Matt,

We have reviewed the attached table of impacts you sent us before you left on vacation and had a few questions/comments. Any chance we could get together on the phone, prior to our next group mitigation call, and discuss to make sure we are all using the same set of impact numbers? Also attached is Sheet6 of CS206 Riparian plan set with updates per the attached table for discussion purposes.

Thanks,

Jeff

Jeffrey A. Mason, PWS, CERP *Chief Environmental Scientist*
368 Pleasant View Dr. Lancaster, NY. 14086
Phone: 716-684-8060 • Cell: 716-462-2543
jmason@ene.com • www.ene.com

From:	Mochrie, Sara
To:	Resnick, Matthew
Cc:	Jones, Christopher; Eakin,Megan; Albers, Meghan
Subject:	Re: [EXTERNAL] Re: Request for New Submissions from Transco for NESE-related Permit Applications
Date:	Thursday, February 21, 2019 9:03:13 AM

Matt,

Additional copies of submissions will arrive at the municipalities tomorrow.

If you need any additional information please let us know.

Thanks
Sara

On Feb 21, 2019, at 9:19 AM, Resnick, Matthew <Matthew.Resnick@dep.nj.gov> wrote:

> Sara, can you provide an update regarding the townships receipt of all additional submitted information?
>
> ---
>
> **From:** Mochrie, Sara <SMochrie@ene.com>
> **Sent:** Tuesday, February 19, 2019 2:53 PM
> **To:** Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
> **Cc:** Jones, Christopher <Christopher.Jones@dep.nj.gov>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>
> **Subject:** Re: [EXTERNAL] Re: Request for New Submissions from Transco for NESE-related Permit Applications
>
> Matt - I will confirm receipt and then let you and Chris know so you can respond.
>
> Thanks
> Sara
>
> Sent from my iPhone
>
> On Feb 19, 2019, at 11:19 AM, Resnick, Matthew <Matthew.Resnick@dep.nj.gov> wrote:
>
> > Sara can you confirm that the new information was submitted to the relevant township/county clerks offices?
> >
> > **From:** William Bittinger <wbittinger@easternenvironmental.org>
> > **Sent:** Friday, February 15, 2019 4:48 PM
> > **To:** Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
> > **Cc:** Jones, Christopher <Christopher.Jones@dep.nj.gov>; Aaron Kleinbaum <akleinbaum@easternenvironmental.org>

Subject: [EXTERNAL] Re: Request for New Submissions from Transco for NESE-related Permit Applications

Hi Matthew,

I wanted to pass along that, after my conversation with you today, we at EELC have checked to see if any of these new submissions from Transco have also been sent to the Municipal Clerks' offices in Franklin Township, Sayreville, or Old Bridge. A local citizen said she contacted the Municipal Clerk's office in Franklin Township and apparently there is nothing new there from February 6, 2019. We have contacted the Municipal Clerks' offices in Sayreville and Old Bridge but have been unable to determine if they have anything new.

We would appreciate DEP's help in providing us access to or copies of these new submissions as soon as possible. This will enable EELC to provide comments on them in a timely fashion.

Thank you,
Will

Will Bittinger
Staff Attorney*
Eastern Environmental Law Center
50 Park Place, Suite 1025
Newark, NJ 07102
Office: 973-424-1166

* Admitted in New Hampshire only. Not admitted in New Jersey.

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On Fri, Feb 15, 2019 at 11:33 AM William Bittinger <wbittinger@easternenvironmental.org> wrote:

> Hi Matthew,
>
> It was good speaking with you just now on the phone. As we discussed, EELC would like copies of the new submissions from Transco for its NESE-related permit applications to DEP. According to DEP's Dataminer, these new submissions (referred to as "technical deficiency information") were received by DEP on February 6, 2019.
>
> Just to be clear, the applications I am referring to are listed under Program Interest #: 0000-01-1001.3 and are for a Freshwater Wetlands Individual Permit, Flood Hazard Area Individual Permit & Verification, Waterfront Development Individual

Permit (In-Water & Upland), and Coastal Wetlands Permit.

Please pass along EELC's request to the appropriate DEP staffers.

Thank you,
Will

Will Bittinger
Staff Attorney*
Eastern Environmental Law Center
50 Park Place, Suite 1025
Newark, NJ 07102
Office: 973-424-1166

* Admitted in New Hampshire only. Not admitted in New Jersey.

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Horner, Scott

From: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Sent: Thursday, February 21, 2019 7:26 AM
To: Horner, Scott; Mochrie, Sara; Resnick, Matthew
Subject: [EXTERNAL] NESE

Scott,

Can you provide a response to this comment that we just received? Thanks

From: Mark Gallagher <mgallagher@princetonhydro.com>
Sent: Wednesday, February 20, 2019 3:24 PM
To: Kopkash, Ginger <Ginger.Kopkash@dep.nj.gov>
Cc: Foster, Ruth <Ruth.Foster@dep.nj.gov>; Aaron Kleinbaum <akleinbaum@easternenvironmental.org>; William Bittinger <wbittinger@easternenvironmental.org>
Subject: [EXTERNAL] NESE

Hi Virginia,

At the request of my clients I am reaching out to you again regarding the NESE application. It has recently come to our attention that Transco submitted additional information to the Department on February 6, 2019 to satisfy its previous deficiencies. As you are aware the Department has 15 calendar days after receiving additional information to respond. If NJDEP does not determine that the application (1) is technically complete or (2) remains technically incomplete within 15 calendar days after receiving additional information submitted for a technically incomplete application, the application shall be declared complete for review, effective as of the date the additional information was received by NJDEP. [see FWPA Rule N.J.A.C. 7:7A-19.2(g), FHACA Rule N.J.A.C. 7:13–21.2(f), and CZM Rules N.J.A.C. 7:7–26.2(f)].

Although we have yet to see the new submission as the TOwnship we contacted were unaware of the new submission we continue to believe that the application is incomplete based on previous responses. For example, we still do not believe that Transco has addressed specific portions of the regulations such as NJAC 7:7A-16.9 (b)4 iv. An analysis of any potential temporary and/or permanent adverse environmental impact(s), whether onsite or offsite, of the proposed regulated activity or project on freshwater wetlands, State open waters, transition areas, fishery resources, and threatened or endangered species and their habitat. For example, This section is especially relevant to the characterization of impacts to regulated area on slopes adjacent to the proposed Right of way. no clear description of what Transco is planning in these areas when they are located in ATWS. If for not other reason it is important to understand whether they contemplate grading in Transition areas as the activity would by definition not be temporary. Transco has yet to respond to 7:7A-10.2 (b)8. Will not cause or contribute to a significant degradation, as defined at 40 C.F.R. 230.10(c), of ground or surface waters. In the previous application all the provide in response to this important section of the rules was that they will have an Erosion and sediment control plan. This alone should be the basis for a deficient application. Anyway, we just wanted to make you aware that tomorrow is the last date to respond to Transco on the recent submission. Thank you.

Sincerely.

Mark Gallagher

This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.

NJDEP-20 16-1743-45 JWR
HPO-B2019-147

ecology and environment, inc.
Global Environmental Specialists
BUFFALO CORPORATE CENTER
368 Pleasant View Drive, Lancaster, New York 14086
Tel: (716) 684-8060, Fax: (716) 684-0844

RECEIVED
JAN 25 2019
HISTORIC PRESERVATION OFFICE

January 24, 2019

Katherine J. Marcopul,
Deputy State Historic Preservation Officer
Historic Preservation Office
501 East State Street, Building 5, 4th Floor
Mail Code 501-04B
PO Box 420
Trenton, New Jersey 08625-0420

Re: Consideration of a Geotechnical Review of Sixteen (16) Vibracore Locations to Support Transcontinental Gas Pipe Line Company LLC's Offshore Raritan Bay Loop Natural Gas Pipeline Expansion, New Jersey and New York State Waters. NJHPO Project No. 16-1743, FERC Docket No. CP17-101-000.

Dear Ms. Marcopul:

The attached addendum provides the results of geotechnical survey investigations conducted in support of the Transcontinental Gas Pipe Line Company, LLC's Northeast Supply Enhancement Project (Project) located in New Jersey waters.

R. Christopher Goodwin & Associates, Inc. (RCG&A) conducted an archaeological assessment of marine geophysical survey data and evaluated the Project corridor for the presence of submerged cultural resources. Subsequently, a geotechnical investigation was then conducted by Alpine Ocean Seismic Survey, Inc. Sixteen (16) vibracores were collected in New Jersey waters (sixty-nine (69) vibracores in total were collected for the Project, with the remainder in New York waters, along the offshore study area in Raritan Bay off the coast of New York and New Jersey impacting subsurface depths ranging from 5.33 to 29.25 feet.

The cored sediments displayed a variety of depositional environments that were evaluated for their potential to contain in situ cultural resources. The majority of cored units were given a low probability for containing cultural material due to area's geologic history and the destructive shoreline processes that have occurred since the Pleistocene-Holocene Transition. RCG&A identified no cultural material in the extracted core samples provided. As such, no buffers or recommendations for avoidance were recommended.

HPO Project # 16-1743-45
HPO-B2019-147

If you should have any questions or concerns about the Project please do not hesitate to contact Scott Horner at (713) 215-4953 (scott.horner@williams.com) regarding offshore resources. Additionally, you may contact me at (716) 684-8060, ext. 2132 (owright@ene.com).

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Owen Wright,
Senior Cultural Resource Specialist & Maritime Archaeologist

CC: Scott Horner, Transco
Sara Mochrie, Ecology & Environment, Inc.

Attachment

CONCUR

Katherine J. Marcopul 2/22/2019
Katherine J. Marcopul Date
Deputy State Historic Preservation Officer

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From: Horner, Scott
Sent: Thursday, February 28, 2019 1:02 PM
To: Christopher Jones (Christopher.Jones@dep.nj.gov) <Christopher.Jones@dep.nj.gov>
Subject: RE: NESE Project - Response Letters

Chris,

As requested, please see the attached letter from Transco in response to Mr. Mark Gallagher's February 20, 2019 email.

Thanks,
Scott

Scott Horner | Williams | Senior Environmental Scientist | Atlantic – Gulf| Engineering and Construction |Environmental Permitting
Office: 713-215-4953 | Cell: 832-954-4916 | Fax: 713-215-2222 | 2800 Post Oak Blvd., Level 11| Houston, TX 77056

If you have received this message in error, please reply to advise the sender of the error and then immediately delete this message.

From: Jones, Christopher [mailto:Christopher.Jones@dep.nj.gov]
Sent: Monday, February 25, 2019 3:23 PM
To: Horner, Scott <Scott.Horner@williams.com>
Subject: [EXTERNAL] RE: NESE Project - Response Letters

Scott,

Sorry I didn't get the chance to get back to you today. It's been meetings all day today. We can talk tomorrow.

From: Horner, Scott <Scott.Horner@williams.com>
Sent: Monday, February 25, 2019 1:08 PM
To: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] NESE Project - Response Letters

Good Afternoon Chris,

I just tried your office, but understand that you're in meetings this afternoon. In short, I just wanted

to reach out regarding your two email forwards from last Thursday (Princeton Hydro email) and Friday (EELC letter). As requested, we are preparing a response to each of those, but I just wanted to make sure that a letter response was in-line with your expectations. If so, then I expect to provide those response documents to you this week.

Thank you in advance Chris.
Scott

Scott Horner | Williams | Senior Environmental Scientist | Atlantic – Gulf| Engineering and Construction |Environmental Permitting
Office: 713-215-4953 | Cell: 832-954-4916 | Fax: 713-215-2222 | 2800 Post Oak Blvd., Level 11| Houston, TX 77056

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Transcontinental Gas Pipe Line Company, LLC
Land, Permits & GIS Department
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

February 27, 2019

Christopher Jones
New Jersey Department of Environmental Protection
Division of Land Use Regulation
Bureau of Urban Growth and Redevelopment
Mail Code 501-02A
P.O. Box 420
Trenton, NJ 08625

RE: Transcontinental Gas Pipe Line Company, LLC
Proposed Northeast Supply Enhancement Project
Request for Flood Hazard Area Individual Permit, Flood Hazard Area Verification, Freshwater Wetlands Individual Permit, Waterfront Development Permit (Upland & In-Water), Coastal Wetland Permit
LUR File No. 0000-01-1001.3FHA180001, FHA 180002, FWW180001, WFD180001, WFD180002, CSW180001

Dear Mr. Jones:

Transcontinental Gas Pipe Line Company, LLC (Transco), has reviewed the email comment from Mark Gallagher dated February 20, 2019 to the New Jersey Department of Environmental Protection (NJDEP) on Transco's pending Freshwater Wetlands Protection Act (FWPA) Individual Permit application for the Northeast Supply Enhancement Project. Transco has provided all responses to the NJDEP's formal deficiency letters to the municipal clerks for Franklin Township, the Borough of Sayreville, and Old Bridge Township.

As an initial matter, Mr. Gallagher provides no support for any of his assertions, and simply makes conclusory statements that Transco's submittals fail to meet the rules. Regardless, Transco's June 20, 2018 permit application, coupled with these subsequent submittals, sufficiently satisfied the rules and, specifically, Mr. Gallagher's concerns.

Transco thoroughly analyzed the potential temporary and permanent impacts associated with the Project pursuant to N.J.A.C. 7:7A-16.9 (b)4iv. See Application, Sections 3 and 4. While grading within a transition area is certainly a regulated activity pursuant to N.J.A.C. 7:7A-2.3(a), grading is not, in and of itself, considered a permanent disturbance (i.e. not temporary) under the FWPA Rules. In fact, the FWPA Rules define a "Temporary disturbance" to mean "a regulated activity that occupies, persists, and/or occurs on a site for no more than six months." Accordingly, where

Transco proposes construction activities within a transition area, but proposes within six months of disturbance to restore those areas to their pre-construction topography and take the necessary measures to restore the original vegetative cover, those impacts would be considered temporary under the Rules. Thus, Transco clearly identified and analyzed the temporary and permanent impacts associated with the Project within its Application.

Furthermore, Transco has adequately addressed N.J.A.C. 7:7A-10.2(b)8, which requires that the proposed regulated activity not "cause or contribute to a significant degradation, as defined at 40 C.F.R. 230.10(c), of ground or surface waters". Mr. Gallagher contends that Transco's reliance on an approved soil erosion and sediment control plan is insufficient, but the FWPA Rules allow for an applicant to rely on the implementation of Best Management Practices (BMPs) to establish compliance with various state and federal environmental laws and regulations, including the Clean Water Act's Section 404(b)(1) guidelines (40 CFR Part 230). See N.J.A.C. 7:7A-1.3(definition of "best management practices"). Transco detailed within its application the BMPs it intends to implement during construction, including soil erosion and sediment control measures and the timely restoration of vegetated areas following construction activities. See Application, Section 7; see also Transco's current Permitting Plans. Transco contends that through implementation of these BMPs, the Project "will not cause or contribute to a significant degradation… of ground or surface waters", in accordance with N.J.A.C. 7:7A-10.2(b)8.

If you have any questions regarding this response, or require additional Project information, please do not hesitate to contact Scott Horner at (713) 215-4953 or via email at Scott.Horner@williams.com. Alternatively, you can contact Ms. Sara Mochrie, Project Manager at Ecology and Environment, Inc. at (716) 684-8060 or via email at smochrie@ene.com.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Joseph Dean
Manager, Environmental Permitting, Atlantic-Gulf Operating Area

cc (via e-mail): Stephen Kellogg, Transco
Blake Clements, Transco
Scott Horner, Transco
Karen Olson, Transco
Brian Ham, Transco
Su-Lin Jaaskelainen, Transco
Christine Allen, FERC
Sara Mochrie, E & E
Megan Eakin, E & E
Steven MacLeod, E & E
Matt Resnick, NJDEP (PCER)

From: Andrews, Anika
To: Mason, Jeffrey A.
Cc: Lockwood, Susan; Anderson, Ryan; Jones, Christopher
Subject: RE: NESE Mitigation Next Steps
Date: Thursday, March 14, 2019 3:00:37 PM

Hi Jeff,
My response to your inquiry is detailed below each question in blue

In addition to the review of the minutes, we have a question regarding PFO wetlands that will be converted to PEM wetlands due to a vegetation conversion resulting from the construction of the pipeline and maintenance during operation. While we understand that all PFO impacts are considered permanent in New Jersey for the purposes of calculating overall project impacts, we also understand that those PFO wetland impacts resulting from a vegetation conversion only (i.e., a change to a PEM wetland post construction and during maintenance) may potentially be mitigated at a different ratio (e.g., 0.5:1) as compared to the permanent PFO impacts resulting from excavation/fill that represent a total loss of the wetland resource altogether. Please advise application for the NESE project.

Per our discussion during the last conference call, I consulted with management for a case by case determination. The Department has made the determination that based on the small amount of impacts proposed to be converted from forest to emergent (0.46 ac) that if you chose to purchase credits for the "off-site restoration" component of your restoration, then you would be required to conduct an on-site 1:1 restoration and purchase credits at a reduced ratio of 0.5:1 as proposed .

Impacts occurring within WMA 9 may be mitigated for at Cranbury Bank (FWW and RZ credits):
Cranbury Wetland Mitigation Bank – Contact Doug Lashley of GreenVest/Cranbury LLC at 410-987-5500 or at Doug@greenvestus.com

Impacts occurring within WMA 12 may be mitigated for at either Manasquan Bank (FWW &RZ credits) or Marsh Bog Brook I & II (FWW & RZ credits):
Manasquan River Mitigation Bank - Contact Doug Lashley of GreenVest/Cranbury LLC at 410-987-5500 or at Doug@greenvestus.com
Marsh Bog Brook 1 and 2- Contact Mark Renna of Evergreen Environmental, LLC at 973-305-0643 or 973-356-7164 or at mrenna@evergreenenv.com

If credits are not available, then you will need to conduct a 1:1 off-site restoration project in addition to the on-site 1:1 PEM restoration. Please consult with the Department **prior** to procurement or purchase of property to be used as mitigation.

Also, we had a question regarding restoration of temporary impacts to coastal wetlands for the purposes of the Waterfront Development permitting. Will Transco be required to restore areas mapped as coastal wetland, but that are not in fact wetlands based on our field delineation data, back to a wetland status? The 1.968 acres of coastal temporary wetland impacts shown on the Waterfront Development plan set will decrease if we were to remove the areas that are improperly mapped as coastal wetlands currently along the Madison loop. While we understand that these mapped coastal "wetland" areas will still need to be restored to grade and re-vegetated post-construction, it does make a substantial difference to our restoration planning if they do not need to be restored back to a functioning wetland. If you could please provide some input on these temporary coastal wetland impacts to help guide our development of the project restoration plan it would be much appreciated.

With regard to the mitigation for temporary coastal impacts I offer the following guidance; If the wetlands appear on the promulgated map then a permit is required for any disturbance occurring within the wetlands. However, if you can demonstrate that the wetlands are not present as featured on the map then no mitigation is required. Therefore, please provide photo documentation and datasheets for any areas that you find questionable. The Division will review the submitted information and make a determination. If you prefer not to provide information to support your position you may make a petition for a map amendment with the understanding that the process may take up to 1 year.

With respect to areas of the ROW and LOD that you requested during our 1/31 mitigation call that Transco identify as potentially being an issue for temporary impacts becoming permanent after 6 months of construction has elapsed and restoration of temporary impacts have not have commenced, Transco has identified one area, assuming activities occur in early 2020, that will require continued access to a wetland for a period longer than 6 months past the onset of initial construction activities. This area is located at MP 11.80 and is related to accessing the wetland (W-T01-017D-1) which is designated as a source for the hydrostatic testing which cannot be conducted between April and July due to time of year restrictions. As such, Transco will need to access the wetland via the foot traffic designated portion of the LOD at MP 11.80 in August/September of 2020 at the earliest to conduct these tests. This would represent a period of 7 to 8 months after initial tree and brush clearing of the ROW before the wetland would be accessed again for the hydrostatic testing. The hydrostatic tests will involve no permanent, nor any real temporary impacts for that matter, at the time of the testing to any of the wetlands (W-T01-017D-1 or W-T01-017A-1) in this area and as such Transco is requesting that this area be exempted from the NJAC 7:7A-11.3(a)2 six month rule requirement for conversion of temporary impacts to permanent.
Upon review of the submitted plans the Division has determined on a case by case basis that your request for an extension of the 6 month restoration of temporary impacts is acceptable due to your obligation to adhere to timing restrictions which in turn delays your ability to conduct hydrostatic testing. Please note the areas slated for hydrostatic testing detailed in your request as W-T01-017D-1 or W-T01-017A-1 shall be restored within 9 months of initial clearing. Any temporary impacts that have not been restored within 1 year of initial clearing shall be considered permanent and they will need to be mitigated for as such. Please submit written concurrence with this approach.

Lastly, we would like to request a chance to discuss the above questions with you and to finalize the number of mitigation credits that are required for the Project so that Transco may begin to negotiate a deposit to hold the credits with the mitigation banks we discussed during our last call. If you have some time to discuss the above mitigation ratio question and the coastal impacts restoration issue next week it would be much appreciated.
If you still need to discuss anything further, we can touch base next week.

Have a nice weekend
Anika

Anika Andrews
Environmental Specialist 3
DEP Division of Land Use Regulation
Mail Code 501-02A, P.O. Box 420
Trenton, NJ 08625-0420

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Wednesday, March 13, 2019 5:16 PM
To: Andrews, Anika <Anika.Andrews@dep.nj.gov>
Subject: [EXTERNAL] Re: NESE Mitigation Next Steps

Hi Anika,

Wondering if you had a chance to discuss NESE mitigation today with your team at NJDEP. Could we chat briefly tomorrow at some point?

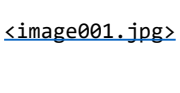
Thanks,

Jeff

Jeffrey A. Mason, PWS, CERP
Chief Environmental Scientist
Ecology & Environment, Inc.
368 Pleasant View Dr.
Lancaster, NY 14086
(716) 462-2543
jmason@ene.com

Hi Anika,

Jeff



Jeffrey A. Mason, PWS, CERP *Chief Environmental Scientist*
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Phone: 716-684-8060 • Cell: 716-462-2543
jmason@ene.com • www.ene.com

From: Andrews, Anika <Anika.Andrews@dep.nj.gov>
Sent: Thursday, March 7, 2019 6:22 PM
To: Mason, Jeffrey A. <JMason@ene.com>
Subject: RE: NESE Mitigation Next Steps

Hi Eric,
I wasn't able to meet with the management team and wont be able to do so until next week Wednesday at best. We are having a number of internal trainings this week and it was difficult getting everyone's schedule to jive. Once I speak with them I will get back to you schedule something. I am not in tomorrow.

Anika

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Tuesday, March 5, 2019 12:04 PM

To: Andrews, Anika <Anika.Andrews@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: [EXTERNAL] RE: NESE Mitigation Next Steps

Thanks for the reply Anika. Yes please at your earliest convenience. Please propose a time that works.
Transco is anxious to finalize the number of credits required for the project and secure them with deposits to the mitigation banks.

Thanks,
Jeff

Jeffrey A. Mason, PWS, CERP *Chief Environmental Scientist*
368 Pleasant View Dr. Lancaster, NY. 14086
Phone: 716-684-8060 • Cell: 716-462-2543
jmason@ene.com • www.ene.com

From: Andrews, Anika <Anika.Andrews@dep.nj.gov>
Sent: Tuesday, March 5, 2019 11:32 AM
To: Mason, Jeffrey A. <JMason@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: RE: NESE Mitigation Next Steps

Hi Jeff,

Thanks for following up. Now that we have the information that was requested, I need to consult with management so that I can provide specific guidance and recommendations. Would you like to schedule a call for mid to late week next week?

Anika

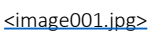
From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Tuesday, March 5, 2019 10:00 AM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Andrews, Anika <Anika.Andrews@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: [EXTERNAL] RE: NESE Mitigation Next Steps

Hi Matt and Anika,

I was following up on Sara's email below. Any chance we could catch up to discuss?

Thanks,

Jeff



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jmason@ene.com • www.ene.com

From: Mochrie, Sara
Sent: Thursday, February 28, 2019 6:13 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; 'Andrews, Anika' <Anika.Andrews@dep.nj.gov>
Cc: Bill Macholdt <bmacholdt@amygreene.com>; Sue Quackenbush (squackenbush@amygreene.com) <squackenbush@amygreene.com>; Mason, Jeffrey A. <JMason@ene.com>; Eakin,Megan <MEakin@ene.com>; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Albers, Meghan <MAlbers@ene.com>; christopher.jones@dep.nj.gov; Ham, Brian <Brian.Ham@Williams.com>; Su-Lin Jaaskelainen <SuLin.Jaaskelainen@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Kellogg, Stephen (Stephen.Kellogg@Williams.com) <Stephen.Kellogg@Williams.com>
Subject: NESE Mitigation Next Steps

Matt and Anika,

Thanks for your time during our first call (1/31/2019) regarding the impacts and mitigation requirements for the NESE project. We wanted to provide the meeting minutes from that call for your review and comment, as well as ask a few additional questions that will help us to hone down on the final mitigation requirements/credits needed for the project. Please feel free to comment and edit the attached draft minutes as you see fit and return to us. We will incorporate any comments you have and enter the minutes into the agency correspondence for the Project.

In addition to the review of the minutes, we have a question regarding PFO wetlands that will be converted to PEM wetlands due to a vegetation conversion resulting from the construction of the pipeline and maintenance during operation. While we understand that all PFO impacts are considered permanent in New Jersey for the purposes of calculating overall project impacts, we also understand that those PFO wetland impacts resulting from a vegetation conversion only (i.e., a change to a PEM wetland post construction and during maintenance) may potentially be mitigated at a different ratio (e.g., 0.5:1) as compared to the permanent PFO impacts resulting from excavation/fill that represent a total loss of the wetland resource altogether. Please advise application for the NESE project.

Also, we had a question regarding restoration of temporary impacts to coastal wetlands for the purposes of the Waterfront Development permitting. Will Transco be required to restore areas mapped as coastal wetland, but that are not in fact wetlands based on our field delineation data, back to a wetland status? The 1.968 acres of coastal temporary wetland impacts shown on the Waterfront Development plan set will decrease if we were to remove the areas that are improperly mapped as coastal wetlands currently along the Madison loop. While we understand that these mapped coastal "wetland" areas will still need to be restored to grade and re-vegetated post-construction, it does make a substantial difference to our restoration planning if they do not need to be restored back to a functioning wetland. If you could please

provide some input on these temporary coastal wetland impacts to help guide our development of the project restoration plan it would be much appreciated.

With respect to areas of the ROW and LOD that you requested during our 1/31 mitigation call that Transco identify as potentially being an issue for temporary impacts becoming permanent after 6 months of construction has elapsed and restoration of temporary impacts have not have commenced, Transco has identified one area, assuming activities occur in early 2020, that will require continued access to a wetland for a period longer than 6 months past the onset of initial construction activities. This area is located at MP 11.80 and is related to accessing the wetland (W-T01-017D-1) which is designated as a source for the hydrostatic testing which cannot be conducted between April and July due to time of year restrictions. As such, Transco will need to access the wetland via the foot traffic designated portion of the LOD at MP 11.80 in August/September of 2020 at the earliest to conduct these tests. This would represent a period of 7 to 8 months after initial tree and brush clearing of the ROW before the wetland would be accessed again for the hydrostatic testing. The hydrostatic tests will involve no permanent, nor any real temporary impacts for that matter, at the time of the testing to any of the wetlands (W-T01-017D-1 or W-T01-017A-1) in this area and as such Transco is requesting that this area be exempted from the NJAC 7:7A-11.3(a)2 six month rule requirement for conversion of temporary impacts to permanent.

Lastly, we would like to request a chance to discuss the above questions with you and to finalize the number of mitigation credits that are required for the Project so that Transco may begin to negotiate a deposit to hold the credits with the mitigation banks we discussed during our last call. If you have some time to discuss the above mitigation ratio question and the coastal impacts restoration issue next week it would be much appreciated.

Thanks to both of you for your time on this matter and to the NESE project overall.

Sara

Sara Mochrie, *Principal-Regional Manager*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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From:	Mochrie, Sara
To:	Resnick, Matthew
Cc:	Jones, Christopher; Dow, Diane; Horner, Scott (Scott.Horner@williams.com); Richard Scott; Mason, Jeffrey A.; Perry, Katharine; Eakin,Megan; Albers, Meghan; Ham, Brian; Jaaskelainen, Su-Lin; Merz, Dan; Kellogg, Stephen (Stephen.Kellogg@Williams.com)
Subject:	RE: Regarding FERC reported impacts vrs DEP reported Impacts
Date:	Tuesday, March 12, 2019 12:32:46 PM
Attachments:	Table 4.3.4-1_FERC to NJDEP Impact Comparison_03_08_2019.docx Fig01_NJ_FERC_WetlandImpact_T01_003C.pdf Fig02_NJ_FERC_WetlandImpact_T07_003B.pdf Fig03_NJ_FERC_WetlandImpact_T07_004D.pdf Fig04_NJ_FERC_WetlandImpact_T01_017.pdf image001.jpg

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Good afternoon Matt,

In response to your question below regarding FERC vs NJDEP wetland impacts, please see the following information and attachments. Unfortunately, it is not as simple as directly comparing the permanent impacts due to differences in how impacts are calculated by FERC and NJDEP. We created a table of each wetland feature and compared the FERC and NJDEP numbers and provided comments which are also tied to the attached figures for your reference. Please let us know if you have any additional questions or if you feel a webinar would be helpful to walk through the various scenarios we have presented or any other areas that are in question.

Madison Loop

- FERC requires that environmental impacts present the operational [permanent] requirements/impacts as a subset of the construction [temporary] requirements/impacts (i.e., the construction requirements/impacts include the entire Northeast supply Enhancement (NESE) Project footprint). As such the FERC construction numbers will not match the NJDEP temporary numbers.

- Impacts to PFO and PSS wetlands are accounted for differently by FERC and NJDEP. While NJDEP considers impacts to PFOs to be permanent, per FERC guidance (FERC Wetland and Waterbody Construction and Mitigation Procedures) routine vegetation mowing or clearing should not be conducted in wetlands located along pipeline ROWs, as such, the majority of wetland impacts along pipeline ROWs are considered temporary by FERC regardless of wetland classification. The exception along pipeline ROWs is that a corridor centered on the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state and trees within 15 feet of the pipeline with roots that could compromise the integrity of pipeline coating may be selectively cut and removed from the permanent right-of-way. These two exceptions result in the conversion of PSS wetlands to PEM along a 10 foot corridor of the pipeline ROW and the conversion of PFO wetlands to PEM along a 30 foot corridor of the pipeline ROW and as such impacts to PFO and PSS wetlands within these corridors are considered permanent by FERC.

    - The two above factors account for a number of the discrepancies between the construction and operational PFO impacts reported by FERC and the temporary and permanent PFO impacts on the NJDEP permit plans along the Madison Loop (See Table 4.3.4-1 attached which is from the FEIS and used for this comparison). Because impacts

are calculated in different ways for FERC and NJDEP according to each agency's regulatory requirements described above the permanent impacts for PFO and PSS wetlands along the Madison Loop will not match. See Figure 1 and 2 for examples of these scenarios.

- A number of wetlands are crossed by HDD. FERC requires that the wetlands within these areas are accounted for in the impact tables. However, because these wetlands will be avoided via the use of HDD, impacts have been excluded from state permit impact calculations. See Figure 3 for an example of this situation.

- In two instances, impacts to wetlands (W-T01-015A and W-T01-012D [Transco mapped portion of the E2EM wetland]) were presented to FERC and thus show up in the FEIS impact table. However, in subsequent refinements of the Project made in an effort to avoid and minimize wetland impacts they are shown as being avoided on the NJDEP FWW Permit Plans. In accordance with FERC requirements, Transco will submit the final alignment sheets showing that these features will be avoided with Transco's Implementation Plan and provide NJDEP with updated FWW plans indicating this fact for wetland W-T01-015A (currently the FWW drawing lacks a label indicating construction fencing and silt fence will be installed around the wetland).

- As directed in the NJDEP letter dated July 17, 2017 to Transco, all impacts to mapped coastal wetlands were moved to the WFD Plans and do not appear on the FWW Plans. The NJDEP WFD Plans depict coastal wetland impacts which reflect the NJDEP mapped 1970 coastal wetland boundary. In instances where the 1970 coastal wetland boundary overlies a wetland delineated by Transco the 1970 line is used instead on the NJDEP WFD Plans. Transco conducted a full delineation of all wetlands along the Madison Loop including the areas within the 1970 coastal wetland boundary and found areas of upland are included within areas mapped as coastal wetland by the 1970 coastal wetland boundary. The FERC reported impacts do not include impacts to areas within NJDEPs 1970 mapped coastal wetland boundary. Instead, FERC impacts reflect the results of Transco's wetland delineation. As such, there are discrepancies between some PEM wetlands and E2EM wetlands amongst the FERC reported impacts and the impacts reported on the NJDEP Permit Plans. See Figures 3 and 4 for examples of these scenarios.

Compressor Station 206

- Compressor Station 206 is a facility with fixed temporary and permanent workspaces wherein permanently impacted areas will not be allowed to revert to previous conditions. As such, the operational impacts shown by FERC are equivalent (with the exception of rounding) to those described on the NJDEP FWW Permit Plans. The FERC construction and NJDEP temporary impacts shown on the FWW Permit Plan do not match because of FERCs requirement to bundle impacts as described above.

Please feel free to contact me or Jeff Mason on our team if you have any questions, or want to discuss the attached material in greater detail.

Thanks
Sara

Sara Mochrie, *Principal-Regional Manager*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Monday, March 4, 2019 11:47 AM
To: Mochrie, Sara <SMochrie@ene.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>
Subject: Regarding FERC reported impacts vrs DEP reported Impacts

Sara,

In light of some of the public comments we have received regarding the impacts to wetland resources related to the NESE, I need to bring up a topic that we had discussed shortly after the Public Hearing. Specifically, the discrepancy between the FERC reported wetlands impacts versus what we are reviewing under the NJ portion of the NESE project.

In short, the sections below in red from your email dated 11/19/18 require further clarification in order to appropriately address public comments on this topic.

-
"The footprint of the project provided to FERC was essentially frozen in time and submitted to FERC before the DEIS was published. This usually occurs well in advance of the publish date. The DEIS was published in March of this year and since that time further refinements have been made to the impacts due to engineering adjustments and consultations with your office. It's not uncommon for there to be minor discrepancies between the FERC impact calculations and what ends up being the final, permitted impacts. The footprint/impacts in front of you now from the June 2018 application package are what Transco is seeking authorization for.

In addition, FERC calculates wetland impacts between temporary and permanent differently than NJDEP. That is why you have a much lower total on the wetland plans (2.1 vs. 9.3). FERC considers the total temporary calculation as temporary and permanent together and then the permanent is a smaller piece of that. Wetland plans you have for review are depicted differently in accordance with NJDEP regulations. "

In reporting temporary and permanent impacts, as mentioned and demonstrated in a previous email, all of the FERC reported impacts in the EIS are greater than what is currently under review. We need to be able to explain those differences to the public. You had previously mentioned that the wetland impacts reported to FERC are calculated differently then what is reported to DEP. Can you elaborate and further clarify that statement? Can you provide us with a table or chart comparing the impacts

provided to FERC versus the impacts provided to DEP at the various locations for CS 206 and the Madison Loop and provide notes as to why the two totals differ? The numbers FERC is reviewing and that we are reviewing should be essentially the same, minus any refinements made during the review process. Even if FERC reviews the numbers differently then we do, we should still be able to look at permanent impacts under the FERC document, and permanent impacts under our review and see that they are effectively the same.

Regarding the “Frozen in time” remark, is it accurate to say then that the project has been revised to such that there are less wetland impacts when compared to the original FERC submission? If that’s the case, why weren’t the documents to FERC updated as well?

NJ DEP Wetland Impact
Wetland W-T07-003B-1

0 50 100 Feet

N

W-T07-004D-1

PEM
PEM
PEM
PEM
PSS
PSS
PSS
PSS
PSS
MP 11.4
W-T07-003B-1
PEM
PEM
W-T07-003A-1

FIGURE 2

- Milepost
- Pipe Centerline
- Construction Workspace (v20)
- 5-ft Buffer of Centerline (for PSS wetlands)
- Permanent Wetland Impact
- Temporary Wetland Impact

FEIS Wetland Impact
Wetland W-T07-003B-1

E2EM
PEM
PEM
PEM
PEM
PSS
PSS
PSS
PSS
PSS
PSS
MP 11.4
W-T07-003B-1
PEM
PEM
PEM
PSS
PEM
W-T07-003A-1

NJ DEP Wetland Impact
Wetland W-T01-003C-1

0 50 100 Feet

N

PFO W-T01-003C-1 PFO PFO PEM PFO W-T01-003A-1 PFO PFO PEM PFO PFO PEM PFO PEM

FIGURE 1

- Pipe Centerline
- Construction Workspace (v20)
- 15-ft Buffer of Centerline (for PFO wetlands)
- Permanent Wetland Impact
- Temporary Wetland Impact

FEIS Wetland Impact
Wetland W-T01-003C-1

PFO W-T01-003C-1 PFO PFO PFO PFO PEM PFO W-T01-003A-1 PFO PFO PEM PFO PFO PFO PFO PEM

NJ DEP Wetland Impact
Wetland W-T07-004D-1

0 100 200 Feet

N

MP 11.6

MHWL

HDD

E2EM

W-T07-004D-1

E2EM

MP 11.5

E2EM

E2EM

E2EM

1970 NJDEP Coastal Wetland Boundary

FIGURE 3

- Milepost
- Pipe Centerline
- Construction Workspace (v20)
- 1970 NJDEP Coastal Wetlands Boundary
- Mean High Water Line (approximate)
- Additional NJDEP 1970 Coastal Wetland
- Permanent Wetland Impact (Tansco mapped wetland)
- Temporary Wetland Impact (Tansco mapped wetland)

FEIS Wetland Impact
Wetland W-T07-004D-1

MP 11.6

MHWL

HDD

E2EM

W-T07-004D-1

E2EM

MP 11.5

E2EM

E2EM

E2EM

1970 NJDEP Coastal Wetland Boundary

NJ DEP Wetland Impact
Wetland W-T01-017A-1 and W-T01-017D-1

0 100 200 Feet

N

MP 11.9

MP 11.8

HDD

E2EM

W-T01-017D-1

E2EM

PEM

W-T01-017A-1

PEM

E2EM

1970 NJDEP Coastal Wetland Boundary

MHWL

MHWL

FIGURE 4

- Milepost
- Pipe Centerline
- Construction Workspace (v20)
- Mean High Water Line (approximate)
- 1970 NJDEP Coastal Wetlands Boundary
- Permanent Wetland Impact (Tansco mapped wetland)
- Temporary Wetland Impact(Tansco mapped wetland)
- NJDEP 1970 Coastal Wetland Area

FEIS Wetland Impact
Wetland W-T01-017A-1 and W-T01-017D-1

MP 11.9

MP 11.8

HDD

E2EM

E2EM

W-T01-017D-1

PEM

W-T01-017A-1

PEM

PEM

PEM

E2EM

1970 NJDEP Coastal Wetland Boundary

MHWL

MHWL

MHWL

Northeast Supply Enhancement Project (NESE)

Contact Report

Email Date: 03/14/2019 **Contact Report Date: 03/14/2019**	**Purpose: Provide Clarification on Geophysical Assessments Having Received Concurrence from the NJHPO.**
Participants: **Owen Wright, Archaeologist & Senior Cultural Resources Specialist & Maritime Archaeologist, E & E** **Jesse West-Rosenthal, NJHPO**	**Contact Information:** **716.684.8060 Ext. 2132** **owright@ene.com** **609-984-6019** **Jesse.West-Rosenthal@dep.nj.gov**

Summary: NJHPO Project No. 16-1743

Owen Wright submitted an email request to Jesse West-Rosenthal, NJHPO Project Reviewer, regarding the NJDEP's response to the recently released FEIS. The NJDEP indicated that Transco had not completed consultation with the NJHPO regarding additional geotechnical testing along the Offshore Raritan Bay Loop. In response, Jesse indicated that the data gap probably has to do with the timing of the reviews.

The email exchanged has been attached to this contact report.

A detailed synopsis of all cultural resource investigations associated with the Offshore Raritan Bay Loop is currently being drafted for the NJHPO and will be submitted as an "unsolicited response."

1			

Wright, Owen

To: West-Rosenthal, Jesse
Subject: RE: Concerns Over Data Ga : NJHPO Project No. 16-1743

From: West-Rosenthal, Jesse <Jesse.West-Rosenthal@dep.nj.gov>
Sent: Thursday, March 14, 2019 9:36 AM
To: Wright, Owen <OWright@ene.com>
Subject: RE: Concerns Over Data Ga : NJHPO Project No. 16-1743

Owen,

I think this has to do with the timing of the reviews. That was FERC's assessment in the FEIS, which was submitted prior to the submission of the most recent response to the geotech work. We reviewed and concurred with that assessment based on our understanding of the project at the time. Our internal review and response to DEP on the FEIS came before our review and response to the geotech work. However, it looks like DEP's actual issuance of the comments post-date both of these reviews. Compliance with 106 is ultimately FERC's responsibility. They ultimately have the final sign off.

-Jesse

Jesse West-Rosenthal, M.A. | Historic Preservation Specialist 2
Historic Preservation Office | New Jersey Department of Environmental Protection
501 E. State Street | Mail Code 501-04B | PO Box 420 | Trenton, New Jersey 08625-0420
P: 609-984-6019 | F: 609-984-0578 | Website: http://www.nj.gov/dep/hpo

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** PLEASE NOTE: The HPO does not currently accept consultation requests for regulatory review via e-mail, at this time. All consultation requests must be submitted in hard copy via mail. **

From: Wright, Owen <OWright@ene.com>
Sent: Thursday, March 14, 2019 9:18 AM
To: West-Rosenthal, Jesse <Jesse.West-Rosenthal@dep.nj.gov>
Subject: [EXTERNAL] Concerns Over Data Ga : NJHPO Project No. 16-1743
Importance: High

Jesse,

We received the attached comment letter from NJDEP on the FEIS. Wondering if you have any input on the comment (below) from page 5. We have stayed on top of our geotech work and am wondering where the gap may be… you guys submitted concurrence on the last set of geotech sample location on February 22, 2019. *Note that there were a set of sampling locations that were submitted but never sampled due to engineering adjustments. Could this be the culprit?*

Thanks,
Owen

According to FERC, compliance with Section 106 has not been completed for the Northeast Supply Enhancement Project. Transco has not completed consultation with the HPO regarding additional offshore geotechnical testing along Raritan Bay Loop. To ensure that the FERC's responsibilities under Section 106 and its implementing regulations are met, FERC is recommending that Transco should not begin construction of the Raritan Bay Loop until consultation under Section 106 of the National Historic Preservation Act has been completed and that all appropriate agencies are afforded the opportunity to comment. Based on the information provided, the HPO concurs that this is an accurate assessment of the status of consultation and concurs with the recommendation to continue Section 106 consultation until completed.

Owen Wright, MA
Senior Cultural Resource Specialist and
Maritime Archaeologist
Ecology & Environment, Inc.
368 Pleasant View Drive, Lancaster, New York 14086
Phone: 716-684-8060 Ext: 2132 | Fax: 716-684-0844
owright@ene.com | www.ene.com

From: Andrews, Anika
To: Mason, Jeffrey A.
Cc: Lockwood, Susan; Jones, Christopher; Anderson, Ryan
Subject: RE: NESE Mitigation Next Steps
Date: Thursday, May 2, 2019 3:17:06 PM

Hi Jeff,
I am following up on my email from March 14. Have you had an opportunity to develop/ refine your mitigation proposal? If we need to discuss anything further to aid your process let me know. I am out of the office until next Tuesday 5/7 and back on Wednesday 5/8.

Thanks
Anika

Anika Andrews
Environmental Specialist 3
DEP Division of Land Use Regulation
Mail Code 501-02A, P.O. Box 420
Trenton, NJ 08625-0420

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Thursday, March 14, 2019 5:25 PM
To: Andrews, Anika <Anika.Andrews@dep.nj.gov>
Cc: Lockwood, Susan <Susan.Lockwood@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Anderson, Ryan <Ryan.Anderson@dep.nj.gov>
Subject: [EXTERNAL] Re: NESE Mitigation Next Steps

Thanks Anika! Let us digest and we will get back with any questions.
Thank you for your time and attention to all this. Much obliged!

Regards,

Jeff

Jeffrey A. Mason, PWS, CERP
Chief Environmental Scientist
Ecology & Environment, Inc.
368 Pleasant View Dr.
Lancaster, NY 14086
(716) 462-2543
jmason@ene.com

On Mar 14, 2019, at 5:08 PM, Andrews, Anika <Anika.Andrews@dep.nj.gov> wrote:

> Jeff,
> I neglected to add the following to my previous email. Apologies.
>
> Specifically, I will need restoration plans complete with woody plantings and seed mixes to be used within the onsite restoration areas. Please provide a plant schedule that details species and sizes of plant material to be used within you restoration areas.

Once you have purchase agreements for the credit purchases or have the actual bill of sale please provide me with a copy.

Can you provide a listing of areas to be converted from PFO to PEM? Right now all I have is an overall impact number unless I missed something in the plans.

Any agreements that have be reached between the applicant and the Department will appear as conditions within the permit.

Again if you have questions feel free to contact me.

Thanks
Anika

Anika Andrews
Environmental Specialist 3
DEP Division of Land Use Regulation
Mail Code 501-02A, P.O. Box 420
Trenton, NJ 08625-0420

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Wednesday, March 13, 2019 5:16 PM
To: Andrews, Anika <Anika.Andrews@dep.nj.gov>
Subject: [EXTERNAL] Re: NESE Mitigation Next Steps

Hi Anika,

Wondering if you had a chance to discuss NESE mitigation today with your team at NJDEP. Could we chat briefly tomorrow at some point?

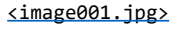
Thanks,

Jeff

Jeffrey A. Mason, PWS, CERP
Chief Environmental Scientist
Ecology & Environment, Inc.
368 Pleasant View Dr.
Lancaster, NY 14086
(716) 462-2543
jmason@ene.com

Hi Anika,

Jeff



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368 Pleasant View Dr. Lancaster, NY. 14086

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jmason@ene.com • www.ene.com

From: Andrews, Anika <Anika.Andrews@dep.nj.gov>
Sent: Thursday, March 7, 2019 6:22 PM
To: Mason, Jeffrey A. <JMason@ene.com>
Subject: RE: NESE Mitigation Next Steps

Hi Eric,
I wasn't able to meet with the management team and wont be able to do so until next week Wednesday at best. We are having a number of internal trainings this week and it was difficult getting everyone's schedule to jive. Once I speak with them I will get back to you schedule something. I am not in tomorrow.

Anika

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Tuesday, March 5, 2019 12:04 PM
To: Andrews, Anika <Anika.Andrews@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: [EXTERNAL] RE: NESE Mitigation Next Steps

Thanks for the reply Anika. Yes please at your earliest convenience. Please propose a time that works.
Transco is anxious to finalize the number of credits required for the project and secure them with deposits to the mitigation banks.

Thanks,
Jeff

<image001.jpg>

Jeffrey A. Mason, PWS, CERP *Chief Environmental Scientist*
368 Pleasant View Dr. Lancaster, NY. 14086
Phone: 716-684-8060 • Cell: 716-462-2543
jmason@ene.com • www.ene.com

From: Andrews, Anika <Anika.Andrews@dep.nj.gov>
Sent: Tuesday, March 5, 2019 11:32 AM
To: Mason, Jeffrey A. <JMason@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: RE: NESE Mitigation Next Steps

Hi Jeff,

Thanks for following up. Now that we have the information that was requested, I need to consult with management so that I can provide specific guidance and recommendations. Would you like to schedule a call for mid to late week next week?

Anika

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Tuesday, March 5, 2019 10:00 AM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Andrews, Anika <Anika.Andrews@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: [EXTERNAL] RE: NESE Mitigation Next Steps

Hi Matt and Anika,

I was following up on Sara's email below. Any chance we could catch up to discuss?

Thanks,

Jeff

<image001.jpg>

Jeffrey A. Mason, PWS, CERP *Chief Environmental Scientist*
368 Pleasant View Dr. Lancaster, NY. 14086
Phone: 716-684-8060 • Cell: 716-462-2543
jmason@ene.com • www.ene.com

From: Mochrie, Sara
Sent: Thursday, February 28, 2019 6:13 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; 'Andrews, Anika' <Anika.Andrews@dep.nj.gov>
Cc: Bill Macholdt <bmacholdt@amygreene.com>; Sue Quackenbush (squackenbush@amygreene.com) <squackenbush@amygreene.com>; Mason, Jeffrey A. <JMason@ene.com>; Eakin,Megan <MEakin@ene.com>; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Albers, Meghan <MAlbers@ene.com>; christopher.jones@dep.nj.gov; Ham, Brian <Brian.Ham@Williams.com>; Su-Lin Jaaskelainen <SuLin.Jaaskelainen@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Kellogg, Stephen (Stephen.Kellogg@Williams.com) <Stephen.Kellogg@Williams.com>
Subject: NESE Mitigation Next Steps

Matt and Anika,

Thanks for your time during our first call (1/31/2019) regarding the impacts and mitigation requirements for the NESE project. We wanted to provide the meeting minutes from that call for your review and comment, as well as ask a few additional questions that will help us to hone down on the final mitigation requirements/credits needed for the project. Please feel free to comment and edit the attached draft minutes as you see fit and return to us. We will incorporate any comments you have and enter the minutes into the agency correspondence for the Project.

In addition to the review of the minutes, we have a question regarding PFO wetlands that will be converted to PEM wetlands due to a vegetation conversion resulting from the construction of the pipeline and maintenance during operation. While we understand that all PFO impacts are considered permanent in New Jersey for the

purposes of calculating overall project impacts, we also understand that those PFO wetland impacts resulting from a vegetation conversion only (i.e., a change to a PEM wetland post construction and during maintenance) may potentially be mitigated at a different ratio (e.g., 0.5:1) as compared to the permanent PFO impacts resulting from excavation/fill that represent a total loss of the wetland resource altogether. Please advise application for the NESE project.

Also, we had a question regarding restoration of temporary impacts to coastal wetlands for the purposes of the Waterfront Development permitting. Will Transco be required to restore areas mapped as coastal wetland, but that are not in fact wetlands based on our field delineation data, back to a wetland status? The 1.968 acres of coastal temporary wetland impacts shown on the Waterfront Development plan set will decrease if we were to remove the areas that are improperly mapped as coastal wetlands currently along the Madison loop. While we understand that these mapped coastal "wetland" areas will still need to be restored to grade and re-vegetated post-construction, it does make a substantial difference to our restoration planning if they do not need to be restored back to a functioning wetland. If you could please provide some input on these temporary coastal wetland impacts to help guide our development of the project restoration plan it would be much appreciated.

With respect to areas of the ROW and LOD that you requested during our 1/31 mitigation call that Transco identify as potentially being an issue for temporary impacts becoming permanent after 6 months of construction has elapsed and restoration of temporary impacts have not have commenced, Transco has identified one area, assuming activities occur in early 2020, that will require continued access to a wetland for a period longer than 6 months past the onset of initial construction activities. This area is located at MP 11.80 and is related to accessing the wetland (W-T01-017D-1) which is designated as a source for the hydrostatic testing which cannot be conducted between April and July due to time of year restrictions. As such, Transco will need to access the wetland via the foot traffic designated portion of the LOD at MP 11.80 in August/September of 2020 at the earliest to conduct these tests. This would represent a period of 7 to 8 months after initial tree and brush clearing of the ROW before the wetland would be accessed again for the hydrostatic testing. The hydrostatic tests will involve no permanent, nor any real temporary impacts for that matter, at the time of the testing to any of the wetlands (W-T01-017D-1 or W-T01-017A-1) in this area and as such Transco is requesting that this area be exempted from the NJAC 7:7A-11.3(a)2 six month rule requirement for conversion of temporary impacts to permanent.

Lastly, we would like to request a chance to discuss the above questions with you and to finalize the number of mitigation credits that are required for the Project so that Transco may begin to negotiate a deposit to hold the credits with the mitigation banks we discussed during our last call. If you have some time to discuss the above mitigation ratio question and the coastal impacts restoration issue next week it would be much appreciated.

Thanks to both of you for your time on this matter and to the NESE project overall.

Sara

Sara Mochrie, *Principal-Regional Manager*
368 Pleasant View Drive Lancaster, NY 14086

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smochrie@ene.com • www.ene.com

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From: Albers, Dave
Sent: Friday, April 12, 2019 6:11 PM
To: Matthew Resnick (Matthew.Resnick@dep.nj.gov) <Matthew.Resnick@dep.nj.gov>; Magda Usarek-Witek (Magda.Usarek-Witek@dep.nj.gov) <Magda.Usarek-Witek@dep.nj.gov>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Tanya Mitchell (mitchell.tanya@epa.gov) <mitchell.tanya@epa.gov>; Lingard Knutson (knutson.lingard@epa.gov) <knutson.lingard@epa.gov>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Kellogg, Stephen <Stephen.Kellogg@Williams.com>; Clements, Blake <Blake.Clements@williams.com>; Horner, Scott <Scott.Horner@williams.com>; Mochrie, Sara <SMochrie@ene.com>
Subject: RE: errata for NESE

Mr. Resnick/Ms. Usarek-Witek,

Attached is Transco's response to Mr. Resnick's email below.

Respectfully,

Dave Albers
Project Quality Manager
Ecology and Environment, Inc.
368 Pleasant View Drive, Lancaster, NY 14086 | t: 716-684-8060 | m: 716-462-7214 |
www.ene.com

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From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Monday, April 1, 2019 11:42 AM

To: Mochrie, Sara <SMochrie@ene.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: RE: errata for NESE

Sara,

Thank you for the response on the Raritan Bay Slag Site. I have follow-up questions.

1. I was under the impression that authorization from EPA was required for work in the Raritan Bay Superfund site. The meeting minutes that you sent indicate that EPA hasn't signed off on this yet. Has NJ Site Remediation had anything to add to this? Can you clarify?
2. Regarding the 5000 SF temporary work spaces:
    - I am a unclear as to the specific location of the work space location. It is called out on yellow in the key provided to EPA on the meeting slides. I note the yellow areas inland leading to the Morgan shore approach, as well as the larger area of yellow in the bay. That looks significantly larger then 5000 SF. Can you clarify?
    - My current understanding is that the temporary work spaces are for project related marine traffic to transit through the area, anchorage areas, and security vehicles to keep non project related traffic outside of the work zone. Beyond subsurface disturbance for anchors, no actual subsurface disturbance is required? Is this accurate?
    - Are areas 7 and 11 considered part of the remediation area and of the slag site proper? The previous statement that areas 7 and 11 are only impacted by temporary work activities doesn't appear to be accurate. The HDD pit for the Morgan Shore approach, as well as the trenching and the pipe line itself will impact Areas 7 and 11. According to the data summary you provided, areas 7 and 11 are not currently planned for remediation by EPA because they fall below the current lead thresh hold for remediation? Does EPA agree with that? Or are they requiring further action on Transco's part before the pipeline can be installed?

3. EPA mentions something call PRPS but no definition was given.

4. My understanding is that in general, remediation for areas like this, consists of removing the existing polluted materials to upland disposal sites and back filling with clean suitable fill. If that is the case, isn't the installation of the pipeline effectively doing something similar in contaminated areas?

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Friday, March 29, 2019 12:32 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Albers, Dave <DAlbers@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Sundar, Nischint

<NSundar@ene.com>; dan.merz@williams.com; Richard Scott <rscott@rutterroy.com>; Christine Roy <croy@rutterroy.com>; Perry, Katharine <KPerry@ene.com>
Subject: [EXTERNAL] errata for NESE

Matt and Chris,

Attached please see the correspondence with EPA relative to the Raritan Bay Slag site. Our meeting took place with EPA on August 15, 2017 and the final meeting summary outlines our commitment to specific measures when working in this area.

In addition – please see the attached HDD contingency plans for onshore and offshore that were filed with FERC as part of our application in March 2017.

Please let us know if you need any further information to address comments.

Thanks,
Sara

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Wednesday, March 20, 2019 5:05 PM
To: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Horner, Scott (Scott.Horner@williams.com) (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Eakin,Megan <MEakin@ene.com>
Subject: [EXTERNAL] Re: errata for NESE

Chris and Matt,

We will provide feedback on both items.

Thanks
Sara

Sent from my iPhone

On Mar 20, 2019, at 4:34 PM, Jones, Christopher <Christopher.Jones@dep.nj.gov> wrote:

> Sara, Scott,
>
> Can I also request, if you have not already provided, Transco's contingency plan for any failures or mishaps with the HDD. We have been receiving comments regarding the HDD technique that it's prone to failure and leaks. I'm sure Transco has contingency plans for when there are leaks, breaks in bore, etc. thanks.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

From: Resnick, Matthew
Sent: Wednesday, March 20, 2019 3:33 PM
To: Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Horner, Scott (Scott.Horner@williams.com) (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: errata for NESE

Sara I bumped into Scott at the public hearing the other day, and one of the comments reminded me of something that I had brought up earlier. A portion of the work space in the Raritan Loop crosses the Raritan Bay Slag site. The report mentions that EPA has granted authorization to work in this area since the pipeline is running to the north of this and this will only be for transiting marine construction vessels. Can you confirm that assessment? Also do you have the authorization or other documentation from EPA on this site?

Second, I forwarded the recently received FWGP 12, and Coastal GP 23 to our T&E unit, more as a confirmation that no new T&E species have shown up. Our unit indicated that there arnt as many exceptional resource value wetlands within the Madison Loop cooridor and work areas as originally thought. The comments were as follows;

"Freshwater wetlands depicted on plan sheets 14 (east of Gondek Drive) and 15 (all wetlands exceptional except wetland points 2957 through 2976) titled "Northeast Supply Enhancement Project Proposed 26" Madison Loop-Wetland Permit Plan MP 11.4-11.6 and 11.6-11.9," are documented and suitable habitat for bald eagle and osprey. 150' transition area shall apply in these locations. Proposed horizontal directional drilling (HDD) in this area, no adverse impacts to T+E are anticipated with plans.

Mapped coastal wetlands depicted on plan sheets 14, 15 and 16 titled "Northeast Supply Enhancement Project Proposed 26" Madison Loop-Wetland Permit Plan MP11.4-11.6, Wetland Permit Plan 11.6-11.9 and Wetland Permit Plan 11.9-12.1," are documented and suitable habitat for bald eagle and osprey. Proposed horizontal directional drilling (HDD) in a large portion of this area, no adverse impacts to T+E are anticipated with plans.

Remaining mapped coastal wetlands on sheets 11, 12 and 13 are not suitable T+E habitat."

The upside of this is that it will reduce your transition area impacts for everything that was called out as exceptional west of Gondek drive. The down side is the FWW plan sets will need updating and recalculating of the TA impacts.

Northeast Supply Enhancement (NESE) Project

Project Meeting Summary

Date: August 15, 2017, 1:30pm – 2:30pm
RE: RBS Superfund Site and Raritan Bay Loop
Location: U.S. Environmental Protection Agency, New York City

Participants

See attached sign-in sheet.

Meeting Summary

A meeting was held with the U.S. Environmental Protection Agency (EPA) to discuss the requirements and constraints of Superfund, NEPA, and the proposed NESE Project in the area of the RBS site. The following is a summary of what was discussed.

1) Williams and E & E provided EPA with an introduction to the NESE Project as a whole, including an introduction to the Federal Energy Regulatory Commission (FERC) Natural Gas Pipeline permitting process and Project milestones.
    a) The purpose of the NESE Project is to expand existing pipeline facilities in order to meet the demand for additional supply of natural gas to National Grid.
    b) There has been an 18 month-long siting process that has led to the proposed Raritan Bay Loop footprint (i.e. not a straight line). Factors incorporated in the siting of the Raritan Bay Loop include: anchorage areas, clamshell habitat, navigational channels, and bathymetry. Burial depths have been specified by the USACE.
    c) The NESE Project interacts with the Higgins Farm Superfund site, and the project team has previously met with the EPA RPM.
    d) There have been numerous scoping and open house meetings in the vicinity of the Project, as part of the FERC permitting process. The NESE project team has had meetings with local Township officials in New Jersey and has met with NGOs including BayKeeper.

2) EPA raised several concerns regarding Williams' proposed construction through the RBS Site. Among these are (a) the heightened sensitivity of the local community to environmental impacts; (b) changing conditions of the sea bed; and (c) impacts of the new pipeline on the ability to monitor and remediate within the area of the Raritan Bay Loop.
    a) Heightened Sensitivity of the Local Community
        - EPA asked about outreach to State and local agencies and, specifically, the municipalities. Williams indicated that most correspondence to date has been with Franklin Township given the strong opposition to Compressor Station 206.

- EPA asked for the name of the NJDEP permit reviewer for the Project, which Williams provided.

b) Changing Conditions of the Sea bed

- EPA noted that maps and data are "good" at the time of sampling, but may not be accurate at the time of construction due to sediment transport. EPA was concerned this could result in the deposition of contaminated sediments on top of the Raritan Bay Loop post-construction. In the event the sediments above the buried Raritan Bay Loop are above the RBS site cleanup threshold for lead (400 mg/kg) then the area would have to be remediated. However, the remediation method set forth in the Record of Decision is to dredge contaminated sediments, which EPA expressed could not be done overlying the Raritan Bay Loop as it is currently designed.
- Williams indicated that pre and post Sandy sampling were consistent, indicating that storms may not have a significant impact on movement of hazardous substances.
- Williams offered to provide EPA with the results of the Project-specific hydrodynamic sediment modeling results to further inform on potential deposition due to the Project activities in the RBS. EPA indicated they conducted their own hydrodynamic sediment modeling for the RBS and it was available for download from the Administrative Record.

c) Impacts of the Project on Remediation

- While there is no set schedule, EPA provided some estimates. Remediation is taking place in the Margaret's Creek section of the RBS Site (anticipated completion within 12 months). The Sea Wall section of the RBS Site would be addressed next, with the Jetty section being handled last. EPA estimated 3-4 years before work begins on the Jetty section.
- EPA expressed concerned about the ability to sample or perform remediation over the new pipeline. Access would be needed over the pipeline to sample and verify that conditions are the same. Attorneys could work out agreements to allow for sampling in the future.
- EPA asked whether it is feasible for Williams to route the pipeline around the RBS Site or extend the HDD through the Study Area. Transco stated that HDD designs are site specific and conducive to the local geological formations. The geology of the area is critical when considering any changes, and must be further examined before considering moving the HDD location.
- EPA's counsel raised the issue of upsetting the dealings with the PRPs. EPA indicated that there are several PRPs for the RBS site, but that EPA has not formally met with them. This meeting (to discuss settlement) is scheduled for September 2017. No settlement parameters have been set (whether work to be completed by EPA or PRPs has not yet been determined). EPA indicated that it is too soon to reach out to the PRPs, and suggested that Transco follow up with EPA after the September meeting on this point. EPA noted that some PRPs are more aggressive or more involved than others.

3) Other items:
    a) E & E agreed to provide EPA with shapefiles for the Project components that overlap with the RBS site.
    b) In addition to the sediment sample locations provided in the memo to EPA dated July 5, 2017, two bore holes (BHA7-ALT and BHA9-ALT) that were initially sampled for geotechnical analysis were later analyzed for metals.
    c) All materials dredged within the RBS site for the HDD exit pit and 1,000 feet of trenching would be disposed upland, and clean compatible fill material would be brought in to cover the pipeline.
    d) EPA asked for clarification on the construction workspace. The proposed 5,000-foot-wide temporary construction workspace for the offshore Raritan Bay Loop is needed for the anchor spread of the various barges and support vessels during offshore construction and provides room for security and escort boats to monitor and alert non-Project vessels approaching the construction area. The direct disturbance of the seafloor associated with construction of the Raritan Bay Loop is significantly smaller than the 5,000-foot-wide temporary construction workspace. There will be a permanent easement from New Jersey Tide Lands for 30 feet on either side of the Raritan Bay Loop.
    e) EPA indicated that screening levels for lead are currently being reassessed and may be lowered in the near future.

-End Summary-

NJDEP-23

Williams

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Northeast Supply Enhancement (NESE) Project

U.S. Environmental Protection Agency Meeting

Raritan Bay Slag (RBS) Superfund Site and Raritan Bay Loop

August 15, 2017

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Agenda

- Introductions and Safety Moment
- Meeting Purpose
- Project Overview and Schedule
- Raritan Bay Slag and Northeast Supply Enhancement Interaction
- Working on a Superfund Site (EPA)
- Investigation Results
- Material Handling
- Path Forward

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Introductions

USEPA

- Tanya Mitchell, Remedial Project Manager
- Angela Carpenter, ERRD
- Eric Wilson, ERRD
- Frank Cardiello, Counsel
- Damaris Urdaz, Counsel
- Stephanie Vaughn, Technical
- Michael Scorca, Technical
- Lingard Knutson, NEPA Lead

Williams NESE Project Team

- Stephen Kellogg, Project Director
- Dan Merz, Project Counsel
- Richard Scott, Project Counsel
- Blake Clements, Williams Raritan Bay Loop Project Manager
- Scott Horner, Williams Environmental Project Manager
- Chris Martinez, Williams Engineering
- Sara Mochrie, E&E Project Manager
- Dave Albers, E&E Program Quality Assurance/Superfund
- Kathleen Marean, E&E Technical

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National Safety Council – Safely View the Aug. 21 Solar Eclipse

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- On Monday, August 21, the moon will cross in front of the sun
- According to the American Academy of Ophthalmology, the only safe way to look directly at the sun is through special-purpose solar filters
  - Eclipse glasses with certification insignia: ISO 12312-2
  - Hand-held solar viewers
- Without proper protection, can develop “eclipse blindness” or “retinal burns”
- Children and young adults most at risk to negative ocular effects
- Do not look directly at the sun or use homemade filters or ordinary sunglasses
- Do not look at any stage of an eclipse through a camera, telescope, binoculars or other optical device, never use solar filters with these devices. Will damage device and cause serious eye injury
- Inspect solar filter before use, discard scratched or damaged filters.
- Pinhole project is a safe way to view the sun indirectly

Info source - http://www.nsc.org/learn/safety-knowledge/Pages/How-to-Watch-a-Solar-Eclipse.aspx

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Meeting Purpose

- Raritan Bay Slag Superfund Site interaction with the Proposed Northeast Supply Enhancement Project
  - Understand issues and constraints
  - Collaborate on path forward

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Project Overview and Schedule

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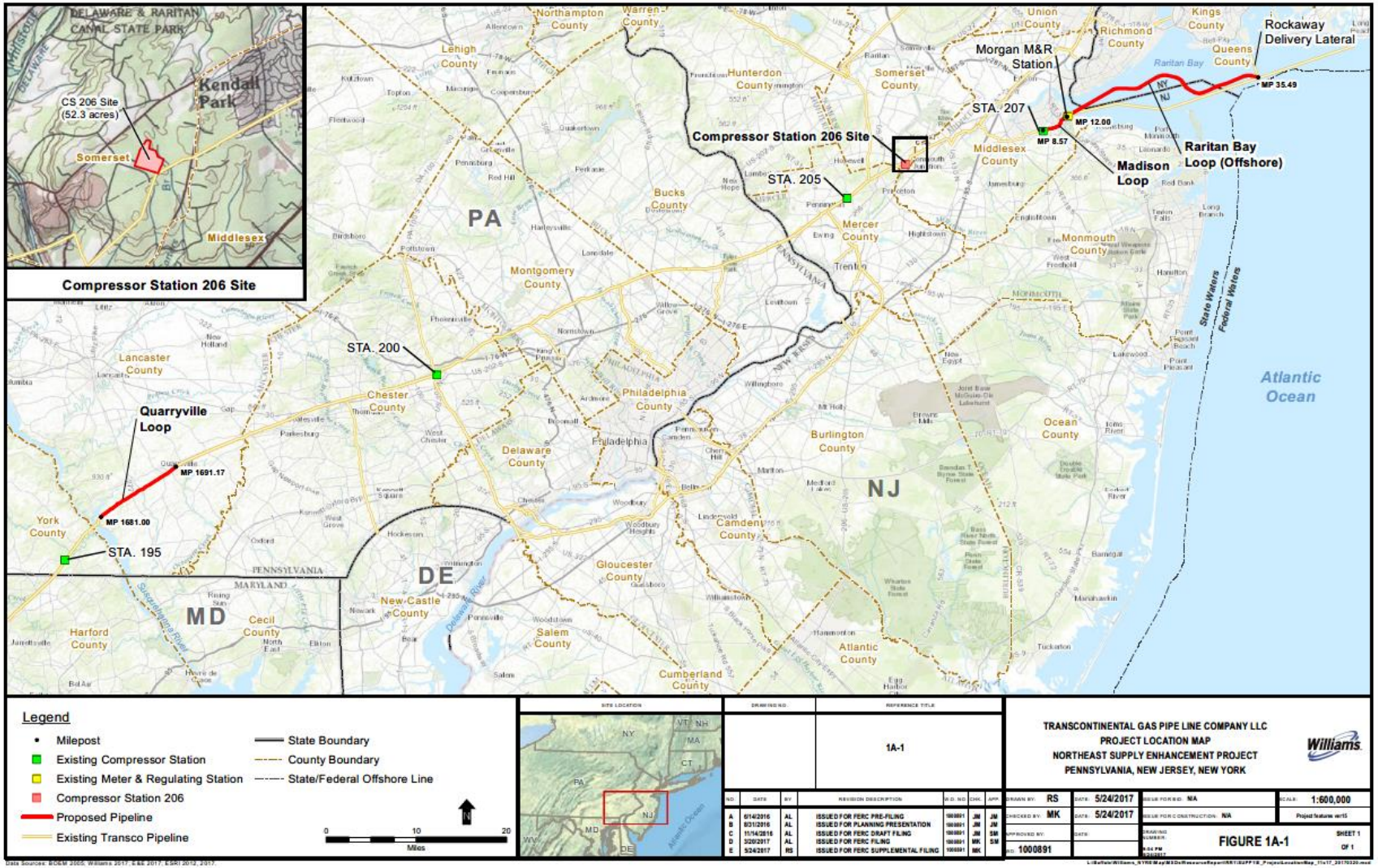
Project Overview: NESE Project



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Project Overview: Project Components

Project Component	Location	Description
Madison Loop	*Old Bridge and Sayreville Townships, Middlesex County, NJ*	*3.43 miles of 26-inch diameter pipe from MP8.57 (Station 207) to MP12.00*
Compressor Station 206	*Franklin Township, Somerset County, NJ*	*Greenfield compressor station – 2 Mars® 100 (or equivalent) natural gas-fired compressors*
Raritan Bay Loop	Middlesex and Monmouth Counties, NJ Richmond and Queens Counties, NY	23.49 miles of 26-inch diameter pipe from MP12.00 to MP35.49
Compressor Station 200	*East Whiteland Township, Chester County, PA*	*Addition of one electric motor-driven compressor (21,000 hp)*
Quarryville Loop	*Drumore, East Drumore, and Eden Townships, Lancaster County, PA*	*10.17 miles of 42-inch diameter pipeline from MP1681.00 to MP1691.17*

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Project Overview: Project Components

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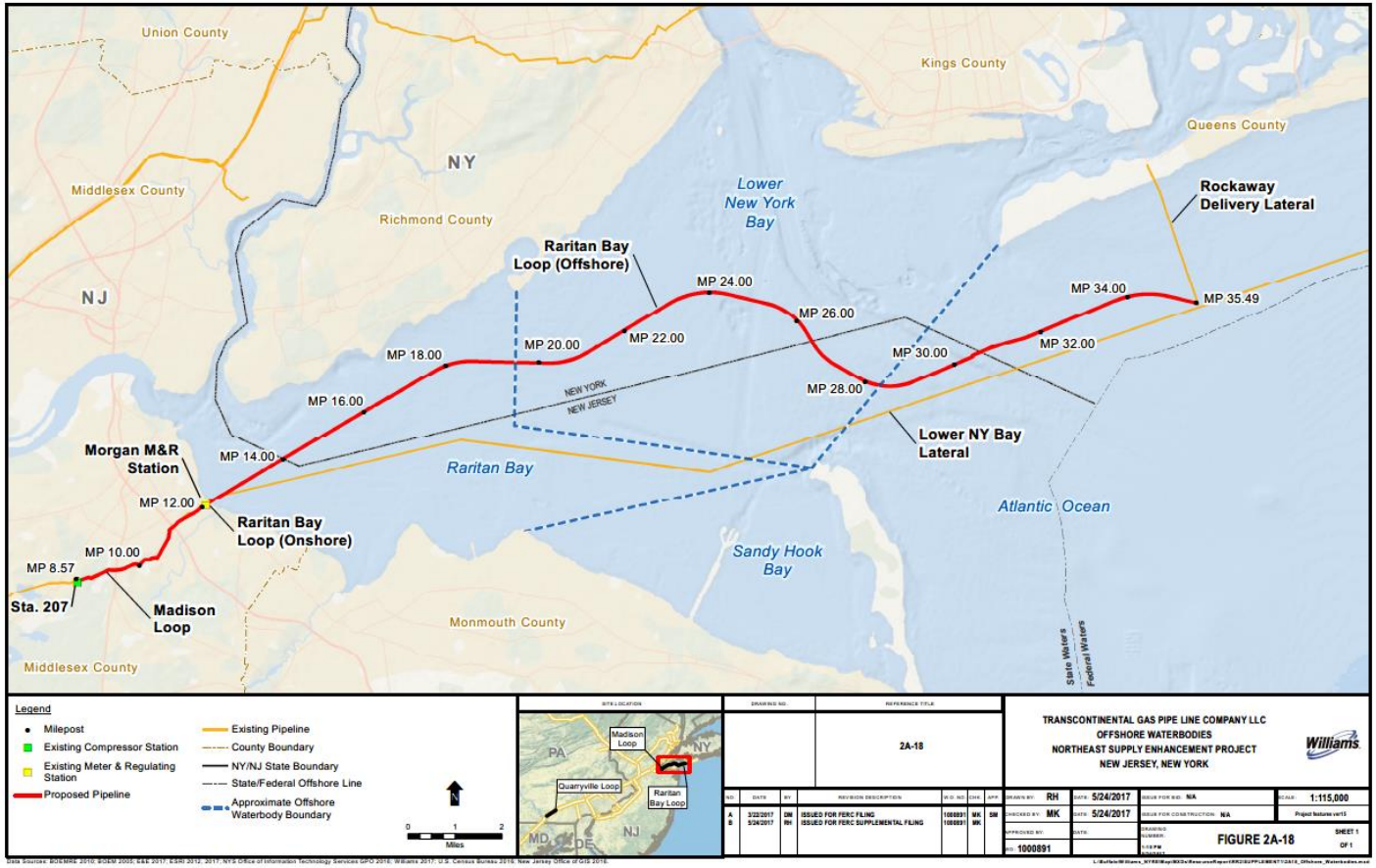
- 26-inch diameter pipeline
- Located in New York and New Jersey waters
- Agency driven siting process
- Offshore survey campaign (SAP/QAPP)
  - Agencies
  - Permits (thumb drive)



- 23.49 miles total length
  - 17.38 miles in New York
  - 6.11 miles in New Jersey (including 0.16 miles onshore)
- 2 planned HDDs
  - Morgan Shore Approach (land to water)
  - Ambrose Channel (water to water)

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Federal Energy Regulatory Commission Processes for Natural Gas Certificates: Key Milestones

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- Pre-filing: May 2016
- Open House Meetings: June 2016
- Scoping Meetings: September 2016
- Draft Application Submittal: November 2016
- Final Application Submittal: March 2017
- *Issuance of DEIS: Fall 2017 (anticipated)*
- *Issuance of FEIS: Spring 2018 (anticipated)*
- *Receipt of FERC Order: Summer 2018 (anticipated)*
- *Construction Begins: 3rd quarter 2018 (anticipated)*

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RBS and NESE - Location Interaction

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Project Overview:

Proposed Project Activities – within RBS Study Area

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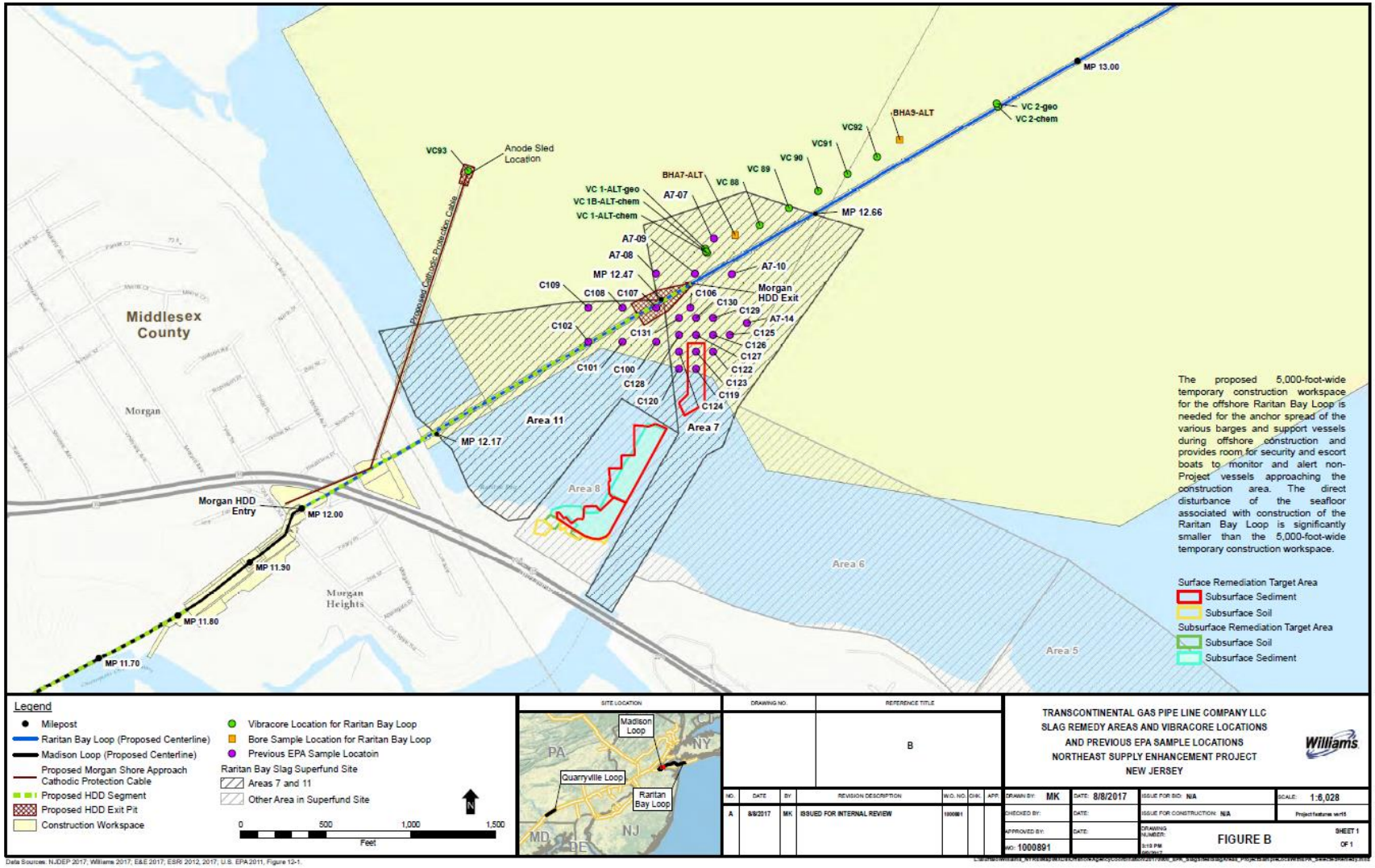

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Morgan Shore Approach HDD – Depth Interaction

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Raritan Bay: Morgan Shore Approach HDD

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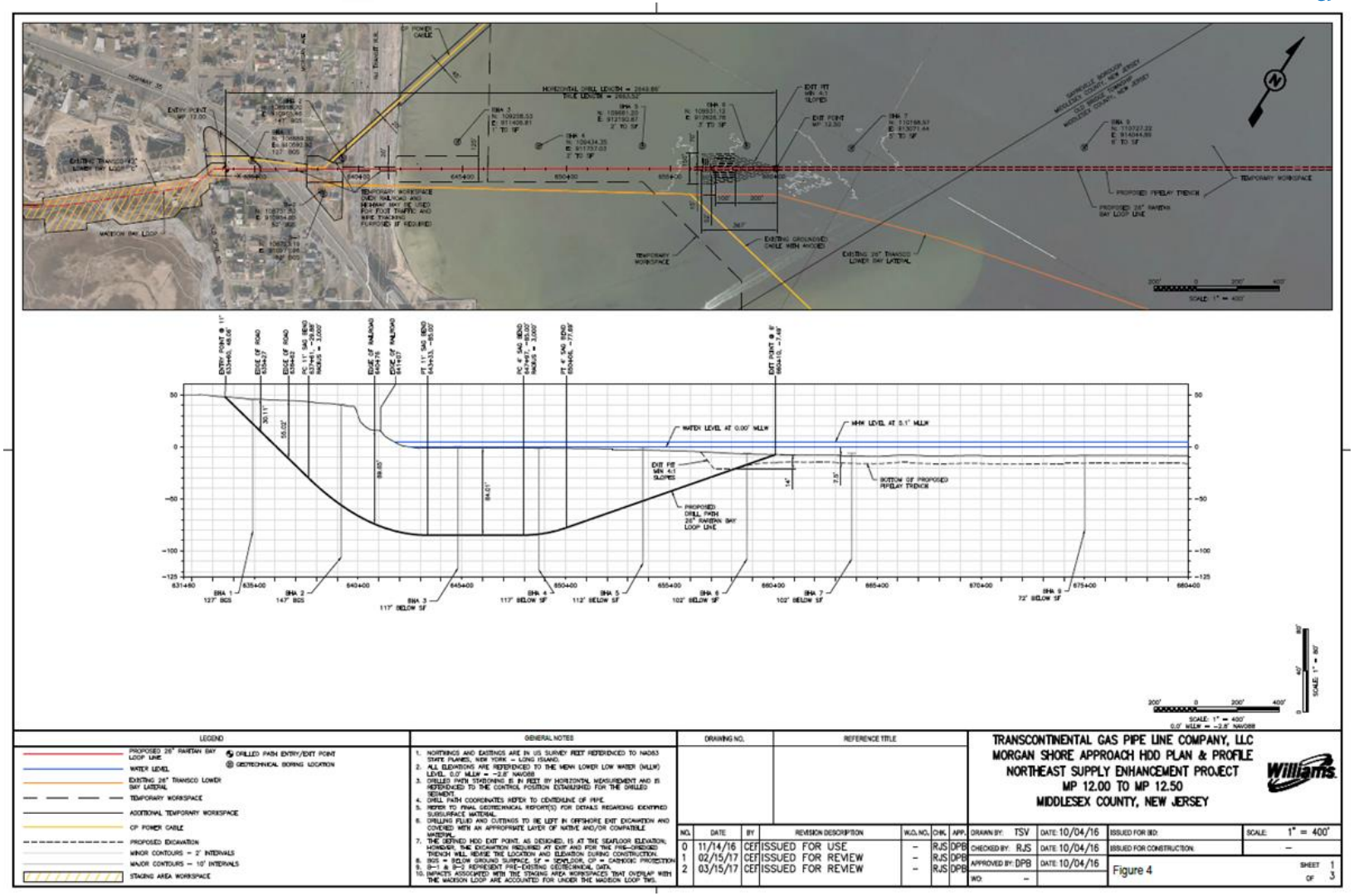

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Raritan Bay: Offshore Pipeline Trenching

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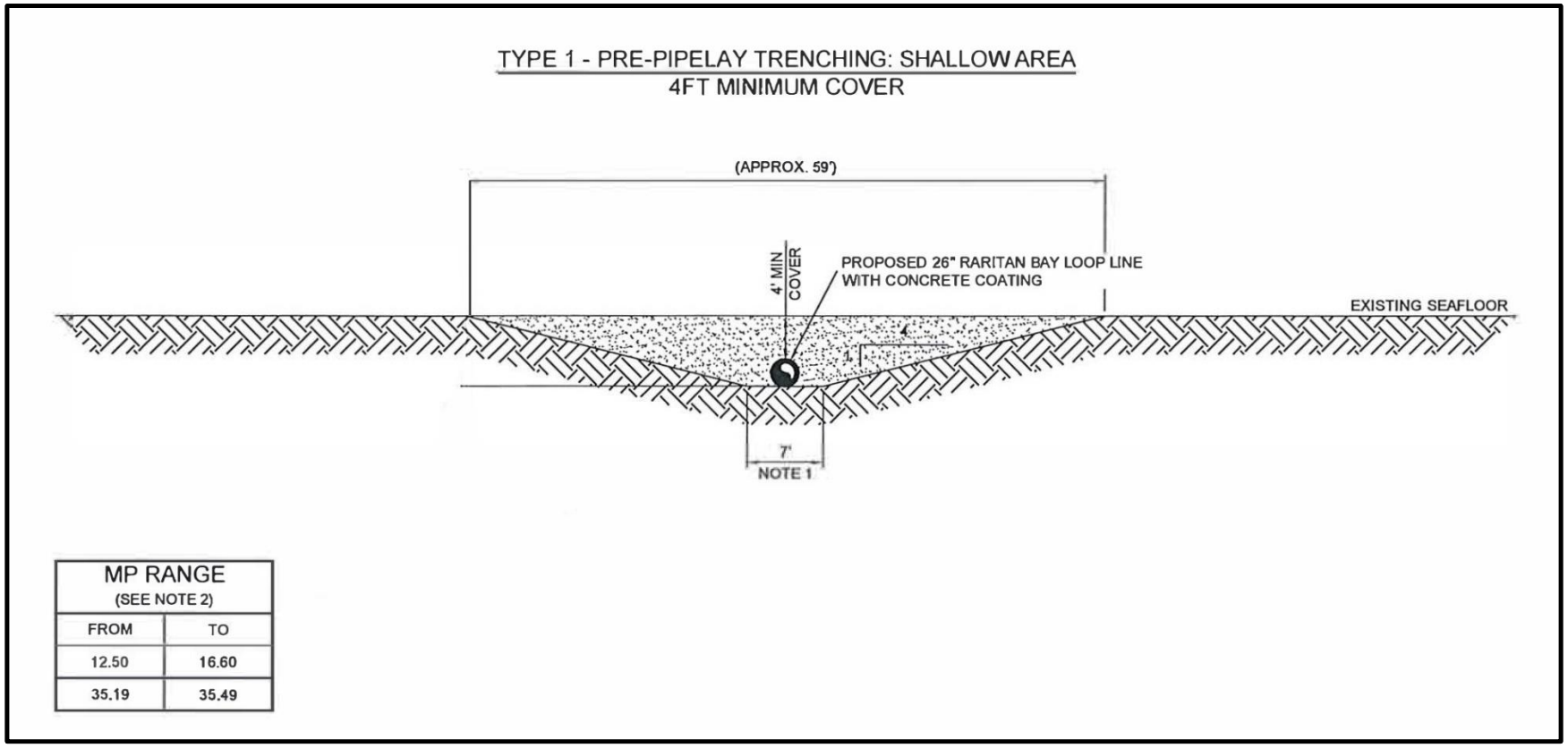

MP RANGE (SEE NOTE 2)	
FROM	TO
12.50	16.60
35.19	35.49

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Working on a Superfund Site

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Investigation Results

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Investigation Results: Combined Sample Location Figure

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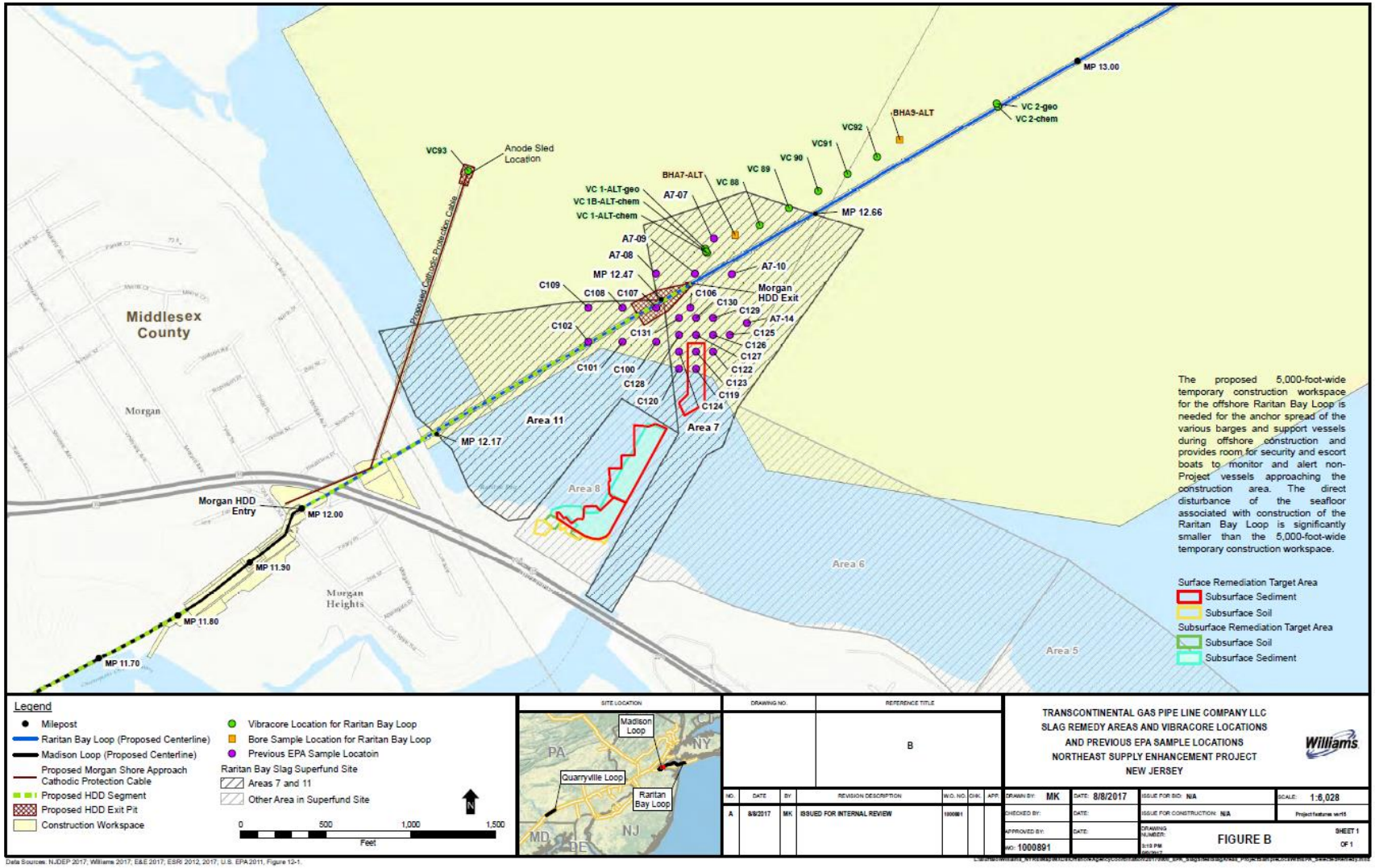

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Investigation Results: Summary

- NESE is outside RBS Remediation Target Areas
  - ROD sediment clean up goal is 400 mg/kg for lead.
  - Area to be impacted by NESE is below this level.
  - Sediments to be addressed by the ROD are greater than 200 feet away from the proposed NESE project.

- What issues should we consider for construction and operation in this area?
  - PRP interaction
  - Future plans
  - Future remediation

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Material Handling

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Material Handling: NESE Sediment-disturbing Activities

- Morgan Shore Approach HDD exit pit
  - Excavate 10,000 (+/-) cubic yards of sediment (38,900 SF footprint, 14 ft. deep)
- Offshore pipe trench
  - Excavate 9,000 (+/-) CYs of sediment (1,000 ft. long, 59 ft. wide at top of trench, 7 ft. wide at trench base, 7.5 ft. deep)
- Cathodic protection
  - No disturbed sediment within the study area

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Material Handling: Disposal and Backfill

- Excavated materials to be disposed at appropriately permitted facilities
- Excavations to be backfilled with clean and compatible material from approved sources

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Path Forward

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Raritan Bay Slag Superfund Site Meeting
Old Bridge/Sayreville, New Jersey

Sign-In Sheet
Northeast Supply Enhancement (NESE) Project
EPA Region 2, New York
August 15, 2017

Name	Signature	Affiliation	Contact Information
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Angela Carpenter	Angela Carpenter	EPA	(212) 637-4435
Eric Wilson	Eric W	EPA	(212) 637-4309
Damaris Urdaz	Participant by phone	EPA	(212) 637-3140
Mike Scorca	Michael Scorca	EPA	(212) 637-4316
Lingard Knutson	Participant by phone	EPA	(212) 637-3747
Dave Albers		E & E	716-684-8060
Sara Mochrie	Sara Mochrie	E & E	716-684-8060
Kathleen Marean		E & E	716-684-8060
Stephen Kellogg		Williams	713·215·2571
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~~Christine Roy~~ Richard Scott		Williams (Ritter + Royce)	732-462-1990
Scott Horner		Williams	
Blake Clements		Williams	
Chris Martinez		Williams	713 215 3773

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

APPENDIX 1B TO RESOURCE REPORT 1

GENERAL PROJECT DESCRIPTION

ATTACHMENT 4A

ONSHORE HORIZONTAL DIRECTIONAL DRILL CONTINGENCY PLAN

NORTHEAST SUPPLY ENHANCEMENT PROJECT

MARCH 2017

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LIST OF APPENDICES

Appendix A Environmental Incident Report

LIST OF ACRONYMS AND ABBREVIATIONS

EI	Environmental Inspector
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
NJDEP	New Jersey Department of Environmental Protection
PADEP	Pennsylvania Department of Environmental Protection
PFBC	Pennsylvania Fish and Boat Commission
Plan	Horizontal Directional Drill Contingency Plan
Transco	Transcontinental Gas Pipe Line Company, LLC.
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

Transcontinental Gas Pipe Line Company, LLC. (Transco) is proposing to use horizontal directional drill (HDD) construction methods as an alternative crossing method at four onshore locations throughout the Northeast Supply Enhancement Project (Project). Transco is currently conducting geotechnical studies at each proposed HDD crossing to evaluate the risks inherent in using the HDD crossing method and determine that each proposed HDD crossing is feasible. Transco has developed this Horizontal Directional Drill Contingency Plan (Plan) to establish procedures for handling these inherent risks, i.e., abandoned HDD drill holes, crossing contingency methods if the drill is abandoned, and to address potential impacts associated with inadvertent releases of drilling fluid returns during the HDD process. This Plan identifies operational procedures and responsibilities for abandoning HDD drill holes and the prevention, containment, and clean-up of drilling fluids that have ponded on the ground surface or within a water body in response to an inadvertent release of drilling fluid during HDD operations. The specific objectives of this Plan include:

- Defining the HDD process and how to identify when the HDD has failed and should be abandoned;
- Identifying the procedures that will be followed when an HDD drill hole has to be abandoned;
- Minimizing the potential for an inadvertent release of drilling fluids;
- Identifying the timely detection of an inadvertent release of drilling fluids;
- Providing for environmental protection of waterbodies and associated habitats, in the event an inadvertent release occurs;
- Establishing response procedures to address containment and clean-up of an inadvertent release of fluids; and
- Providing for notifying the appropriate parties and regulatory agencies in the event of an inadvertent release of fluids.

Transco will ensure that all contractors comply with the methods outlined herein during construction, restoration, and operation of the Project. Contractors will be trained on the requirements of this Plan during mandatory pre-construction environmental training. Compliance with these requirements will be documented in the field by Environmental Inspectors (EIs) in weekly construction inspection reports, which will be submitted to the Federal Energy Regulatory

Commission (FERC) for review and comment. This Plan is subject to revision based on new data or on agency recommendations.

2 HDD PROCESSES AND POTENTIAL CAUSES OF FAILURE

There are three basic steps to install a pipeline crossing using HDD:

1. Pilot hole drilling;
2. Hole reaming; and
3. Pipe pullback.

This section briefly describes the HDD process and some potential causes of failure associated with each installation step.

2.1 PILOT HOLE DRILLING

The first step in the HDD sequence is to drill the initial hole beneath the proposed crossing along a predetermined alignment. The pilot hole is drilled using either a downhole displacement mud motor connected to a tri-cone rotary bit or a jetting assembly. Drilling fluid pumped through the annulus of the drill pipe helps to expedite the mud motor or jetting assembly in cutting the soil, sediment, or rock strata. The drilling fluid also helps lubricate the drill stem, suspends and carries the drilled cuttings to the surface, and forms a wall cake to keep the hole open. The HDD drilling fluid is composed primarily of fresh water and bentonite, a naturally occurring, nonhazardous clay that serves as a viscosifier. If needed to manipulate the rheological properties for optimized drilling operations, the drilling fluid may also be augmented with starch, cellulose, non-toxic polymers, and/or crystalline silica. Control of the drill bit is achieved by using a non-rotating drill string with an asymmetrical leading edge. This leading edge creates a steering bias that is held in a precise position during drilling.

A successful pilot hole provides pertinent data that helps to determine the potential success of the crossing. Data obtained from the pilot hole includes the rate of penetration to be expected and confirmation of the geologic strata. The HDD contractor can then confirm a plan for enlarging the hole to the required diameter. The diameter required to install the pipeline will vary depending on the confirmed geologic strata and the HDD contractor's judgment.

Failure During the Pilot Hole Process

The failure mode that can occur during the drilling of the pilot hole is the hole collapsing on the drill pipe string. This is typically caused by either not being able to maintain a good bentonite wall cake to keep the hole stable or an unfavorable drilling stratum containing glacial till, highly fractured rock, non-cohesive alluvial material, or cobbles. If the hole collapses on the drill pipe and creates high friction on the drill pipe surface, the torque required to rotate the drill

pipe will likely increase. The increased friction may either bind the drill pipe in such a way that it cannot be moved or, if the torque applied to the drill pipe by the drill rig exceeds the strength of the drill pipe, the force may cause the drill pipe to either shear or twist into two or more pipes. The longer the drill length, the more probability there is of this type of failure if non-cohesive alluvial materials are present. Typically, HDD installation will be considered a failure if there are two unsuccessful attempts at completing the pilot hole. If this happens, Transco will follow its standard process of selecting and permitting, as necessary, another appropriate installation method.

2.2 HOLE REAMING

The second step consists of one or more hole-reaming passes. There are two types of tools that enlarge the pilot hole:

- Flycutters, used for most soil formations.
- Rock hole-opening tools, used for very dense soil or rock formations.

Typically, the hole-opening tool is attached to the drill pipe string that drills the pilot hole and is then rotated and pulled back towards the drill rig from the exit point. The number of reaming passes varies depending on the soil conditions and carrier pipe size. Depending on the stability of the hole, the HDD contractor may use a barrel reamer, typically several inches smaller than the outside diameter of the final hole-opening tool, and pull it through the hole immediately prior to pullback. This is typically referred to as a swab pass. The purpose of the swab pass is to ensure the establishment of a good drilling fluid wall cake, a clean hole, and a hole full of drilling fluid with the proper density. Drilling through rock formations typically requires multiple passes, with each pass increasing the diameter of the hole until the desired diameter is achieved. Drill pipe is typically added behind the tool at the exit to keep the drill pipe in the hole for the entire length of the crossing.

A significant length of time may be needed to enlarge the hole to the required diameter. As the length of time to complete this process increases, the probability of failure also increases. This is especially true when drilling in a soil stratum that is loose or unstable (gravel or cobbles). At times, the loose material can be drilled very quickly, but maintaining an open hole through unstable soil strata over an extended period of time can be very difficult.

Failure During Hole Reaming

The main reason for failure during hole reaming is material collapsing into the hole, which in turn has been caused by a lack of an adequate bentonite wall cake. With each reaming pass, the large volume of drilling fluid being dispersed through the tool tends to expand into voids in the

annulus of the drilled hole. Because of the inability to support the soils, the hole becomes unstable and can lead to diminished drilling fluid returns. If the drilling fluid is no longer able to carry the drilled cuttings out of the hole, an excessive amount of cuttings would remain in the hole. The cuttings would slowly build up in the bottom of the hole, increasing the friction on the drill pipe and creating additional stress on the drill pipe. The increased friction can cause the drill pipe to slow or stop rotation to a point where the drill rig cannot supply enough torque to continue reaming without causing drill pipe failure. The two main types of failure in rock formations are the reaming tool breaking apart due to excessive wear on the tool, and weathered rock or cobbles collapsing into the hole.

If the penetration rates are extremely slow, excessive stress can occur on the arms holding the roller cutting cones. If the wear is too excessive, the roller cones can separate from the tool, leaving the tool unable to cut or rotate. If the tool can still be removed from the hole, and the missing pieces retrieved from the hole, the hole-opening pass may resume with different downhole tools.

HDD installation would be considered a failure after two unsuccessful attempts at retrieving tools or equipment downhole and if it has been determined that the hole reaming operation cannot be completed. If failure occurs, the HDD contractor shall then demobilize and remove the equipment from the site after approval from Transco. If this happens, Transco will follow its standard process of selecting and permitting, as necessary, another appropriate installation method.

2.3 PULLBACK

The last step to complete a successful installation is the pullback of the prefabricated pipeline into the enlarged hole. A reinforced pullhead is attached to the leading end of the pipe and to a swivel that is connected to the drill pipe. The swivel is placed between the drill pipe string and the carrier pipe to minimize rotation and torsion from being transferred to the pipeline.

The pipeline may be buoyant in the drilling fluid during the pullback process and may require the pipe to be filled with a calculated amount of water to keep the pipeline as close to neutral buoyancy as possible. The following problems could occur if the pipe is not allowed to remain neutrally buoyant in the hole during the pullback process:

- Skin friction of the pipeline will increase, which will then increase the load that the drill rig has to pull. The pipeline could be damaged if an excessive amount of pull tension has to be applied to the pipe to continue the pullback process.

- The leading edge of the pullhead could dislodge a cobble or rock fragment, binding the pipeline and making it impossible to move in either direction.
- The external coating could be damaged by sharp and/or protruding material and highly abrasive material (coarse sands).

The pull section is also supported with a combination of roller stands, pipe-handling equipment, and/or a floatation ditch to further minimize excessive tension on the pipe and prevent the carrier pipe from being damaged during the pullback process. HDD pipe will be coated with an abrasion-resistant overlay to prevent pipeline damage.

Failure During the Pullback Process

Failure of the pullback process occurs when the pipe becomes lodged in the hole and is unable to be moved in either direction. If this occurs, Transco and the contractor will assess the situation and determine the appropriate course of action. Transco will, based on site-specific conditions, conduct agency consultation if needed.

2.4 MECHANICAL FAILURES

This type of failure occurs if there is a major mechanical breakdown. If the drill pipe remains idle for an extended time, the material in the drilled hole annulus can seize the drill pipe string in place and prevent further movement such that the drill pipe may not continue to rotate or move in either direction. If this occurs during pilot hole drilling, the contractor will be required to change the alignment of the crossing to miss the abandoned hole and start the drilling process from the beginning.

HDD installation also may be considered a failure if after either repairing or replacing the broken drill rig or vital piece of ancillary equipment, the drill pipe, hole-opening tool, or pipeline cannot be rotated or pulled. If failure occurs, the HDD contractor shall then demobilize and remove the equipment from the site after approval from Transco. If this happens, Transco will follow its standard process of selecting and permitting, as necessary, another appropriate installation method.

3 SEALING ABANDONED HDD BOREHOLES

If for any reason an HDD hole must be abandoned, the HDD contractor will fill the abandoned hole with grout to completely seal it off. The top 5 feet of the abandoned hole will be filled with compacted soil to allow vegetation to reestablish. If deemed necessary by Transco, the HDD contractor may be required to complete grouting up to and including the entire

abandoned hole to reduce the risk of ground subsidence, inadvertent drilling fluid returns from adjacent HDD alignments, or to comply with applicable regulatory requirements or other Project conditions.

The grout mixture used to abandon a borehole will consist of either a cement grout or cement/bentonite grout mixture that can be pumped downhole through the drill pipe used to drill/ream the hole. The grout mix (e.g., water/cement/bentonite ratios) will be designed generally for each HDD location based on the geologic formation(s) along the abandoned portion of the hole. Additional modifiers, such as those used in structural concrete, may be used to modify the flowability and/or set time of the grout. To grout the abandoned hole, the HDD contractor will extract all cutting tools (i.e., reamer and cutting heads) from the hole, advance the drill pipe into the hole to the required grout depth, and begin pumping the grout mixture while the drill pipe is extracted from the hole. The rate at which the drill pipe is extracted during grouting operations will be regulated to match the rate of grout placement.

4 REDUCING THE RISK OF INADVERTENT DRILLING FLUID RETURNS

Drilling fluids have several functions that support an HDD installation. The primary functions include:

- Cooling and lubrication of drilling tools, drill pipe, and the carrier pipe.
- Rotation of the drill bit (using a positive displacement mud motor in bedrock installations).
- Suspension of cuttings within the drilling fluid/slurry mixture.
- Removal of soil/bedrock cuttings from the bore during each phase of the installation process.
- Providing a hydrostatic fluid pressure in the bore that offsets natural groundwater formation pressures.
- Stabilizing the bore and preventing raveling of surrounding soil/bedrock materials. Stabilization of the bore is provided from the combination of developing a low-permeability bentonite filter cake along the bore walls and applying a positive fluid pressure to the surrounding bore walls. This supporting pressure is derived from the presence of the column of drilling fluid within the bore.

Prior to beginning construction, a specific scope of work will be developed for each trenchless crossing, and the contractor will be required to address all of the requirements in the specifications, plans, and scope of work. Transco's HDD contractor will be required to maintain a certified and approved drilling fluids engineer/technician on-site during all phases of the HDD installation to assist the HDD contractor with managing and optimizing drilling fluid functions.

The HDD profiles will be designed to extend into bedrock (Quarryville Loop only), where possible, and provide sufficient depth of cover to reduce the potential for inadvertent drilling fluid returns. During HDD installation, the HDD contractor will make every effort to maintain drilling fluid circulation and reduce the potential for inadvertent drilling fluid returns. The efforts may include but will not be limited to:

- Proper drilling fluids management.
- Daily inspection and repair of equipment components (e.g., drilling equipment, hydraulic hoses, and pumps).
- Using special downhole monitoring equipment to monitor fluid pressure.
- Using best management practices to remove cuttings from the hole and maintaining an open flow path from the downhole tooling to the drill rig.

- Using casing as needed to reduce the potential for inadvertent drilling fluid returns near the entry or exit points.
- Maintaining adequate drilling fluid flow rates and penetration rates.
- Using drilling fluid relief wells, if necessary.

If drilling fluid returns to the drill rig are lost during HDD operations, the HDD contractor will cease drilling operations and visually inspect the ground and water surfaces along the HDD alignment for inadvertent returns. The HDD contractor will make reasonable attempts to restore drilling fluid circulation, which may include:

- Extracting the downhole drill pipe string and tooling until drilling fluid returns are restored.
- Manipulating drilling fluid properties; consulting with the on-site drilling fluid engineer/technician.
- Installing small-diameter casing over the downhole drill pipe string through overburden soils.

If the integrity of the drilled hole or the HDD profile geometry is compromised through attempts to restore drilling fluid returns, the HDD contractor will notify Transco or the authorized representative. If it is determined that further attempts to restore drilling fluid returns may compromise the HDD installation or are unlikely to be successful, the HDD contractor will proceed with modified drilling procedures to reduce the risk of inadvertent drilling fluid returns. These procedures may include slowing the rate of penetration, drilling or reaming the hole from the other direction, using large-diameter casing, or installing drilling fluid relief wells, if necessary.

5 CONTINGENCY PLAN FOR DRILLING FLUID RELEASE AND MITIGATION

5.1 DRILLING FLUID CONTAINMENT, COLLECTION SUPPLIES, AND EQUIPMENT

The HDD contractor will monitor the HDD alignment for signs of inadvertent drilling fluid returns and will keep adequate spill containment and collection equipment and supplies on-site at all times to contain and collect any release of drilling fluids to the ground surface, wetlands, or waterbodies. All areas contaminated by drilling fluid migration and release will be cleaned up and restored to the original condition, according to applicable regulatory agency requirements, or as accepted by Transco and FERC. Equipment stored on-site for immediate response may include, but is not limited to:

- Silt fencing, sand bags, or straw bales for containment structures (certified weed-free);
- Stakes to secure bales;
- Straw logs (wattles or fiber rolls);
- Hand tools such as sledge hammers, push brooms, shovels, rakes, etc.;
- Several 5-gallon buckets and plastic sheeting;
- Several 55-gallon drums;
- Portable spill-containment booms, absorbent pads, turbidity curtains or other portable spill-containment kits;
- Leak-free hoses and portable pumps and
- Underwater boom and curtain.

5.2 MITIGATION OF INADVERTENT DRILLING FLUID RETURNS

If inadvertent drilling fluid returns are observed, the HDD contractor will immediately disengage the high pressure drilling fluid pumps, suspend drilling operations, and notify the EI(s) and Transco or their authorized representative. Transco or their authorized representative will notify all concerned parties and regulatory agencies. A complete list of appropriate regulatory agencies and their contact information will be prepared and distributed prior to construction. If inadvertent returns are observed in an upland area, the HDD contractor will:

- Take immediate measures to contain the inadvertent drilling fluid returns to the extent practicable.
- Collect the inadvertent drilling fluid returns using pumps and/or vacuum trucks, if the fluid is of sufficient volume.
- Document the size and impacts of the drilling fluids with photographs.

- Follow the direction of the on-site EI for cleanup and mitigation requirements.
- Remove the drilling fluids and restore the site to pre-existing conditions. Clean-up work will be performed by hand to the maximum extent possible. All collected materials will be disposed of at an approved location or processed through a drilling fluid separation plant.
- Document the cleanup procedures, changes made to the drilling fluid properties or drilling process to prevent future releases, and photograph the conditions of the cleaned up area.
- Adjust drilling fluid properties to inhibit further flow through the leak origin, clear potential blockages in the HDD bore by extracting several or all drill pipe joints and tooling, and/or allow the area to sit or rest for a suitable period to allow the cracked pathway to close naturally.
- Evaluate any further steps that may increase the potential for regaining returns to entry/exit points. This may include advancing the tools in the opposite direction in an attempt to regain drilling fluid returns.
- Once the inadvertent drilling fluid returns are contained and collected, the HDD contractor may resume drilling operations using modified drilling techniques. These modified techniques will be used to reduce further inadvertent drilling fluid returns while maintaining full-time monitoring of the drilling fluid returns area to ensure that containment and collection measures are sufficient to handle any additional inadvertent returns that may result from resuming operations.

If the inadvertent returns are observed in an environmentally or culturally sensitive area, the HDD contractor will, in addition to the measures listed above, contain the inadvertent returns with straw bales or sand bags, without additional disturbance, if possible.

In addition to the measures noted above, Transco will contain any inadvertent releases that may occur within a waterbody using the following procedure:

- The inadvertent release area will be monitored for up to four hours to determine if the drilling mud congeals. Bentonite will usually harden, effectively sealing the inadvertent release location.
- The appropriate regulatory agencies and the property owner representative will be consulted regarding the next action(s) to take from among the following choices:

- If drilling mud congeals, take no other action that could potentially suspend sediments in the water column.
- If drilling mud does not congeal, erect isolation/containment environment (underwater boom and curtain).
- If the release becomes excessively large, a spill response team will be called in to contain and clean up excess drilling mud in the water. Phone numbers of spill response teams in the area will be on-site.

After the inadvertent drilling fluid return has been assessed, the HDD contractor and Transco will make every effort to determine why the seepage occurred. Once the cause of the drilling fluid release has been determined, measures will be developed to control the factors causing the seepage and to minimize the chance of recurrence. Developing the corrective measure will be a joint effort of Transco and the HDD contractor and will be site- and problem-specific.

6 ENVIRONMENTAL INSPECTION AND TRAINING

An EI experienced in HDD and associated environmental protection measures will work with the contractor to verify that the proper equipment and materials are available on-site at all times and that the necessary procedures are followed on a daily basis. Prior to the start of construction, the EI will conduct a training session with all key HDD contractors, drilling, and inspection personnel. All such personnel will be thoroughly trained in the applicable inadvertent release of drilling fluid contingency plan procedures. On-site safety and environmental protection meetings will provide ongoing communications and awareness measures regarding prevention, mitigation, and response associated with potential inadvertent drilling fluid releases.

Visual observations along the land and water portions of the HDD alignment will be completed on a regular basis throughout the drilling program. The frequency of these observations will be greatest during the pilot bore and initial reaming passes, where the probability of an inadvertent release of drilling fluid event occurring is the highest.

7 CONTACT INFORMATION

Transco will provide a technical consultant on-site during the HDD process to keep adequate documentation such as daily progress reports, as-built information, etc., describing the events leading up to the failure. Transco will then submit this documentation to the necessary agencies for their review and approval that the drill has failed at the present alignment. The HDD contractor will not demobilize until Transco approval has been received.

The following Project representatives will be notified in the event of an inadvertent release of drilling fluids:

Transco

Joseph Dean
Manager, Environmental Permitting
2800 Post Oak Blvd
Houston, TX 77056
Phone: 713-215-3427

The following regulatory agency representatives will be notified in the event of an inadvertent release of drilling fluids:

FERC

Christine Allen
Project Manager
Federal Energy Regulatory Commission
888 First Street NE
Washington DC, 20426
Phone: 202-502-8056

Additional Agencies for Notification

- U.S. Army Corps of Engineers (USACE) - [Contact information to be provided prior to construction]
- U.S. Fish and Wildlife Service (USFWS) - [Contact information to be provided prior to construction]
- Pennsylvania Department of Environmental Protection (PADEP) - [Contact information to be provided prior to construction]
- New Jersey Department of Environmental Protection (NJDEP) - [Contact information to be provided prior to construction]

If the release is within a stream or wetland, the following agencies must be contacted within two hours:

- PA Fish and Boat Commission (PFBC);
- NJ Department of Environmental Protection (NJDEP) ; and
- United States Fish and Wildlife Service, in the event of potential impacts on federally listed species.
- *(Contact information to be provided prior to construction.)*

An incident report (see Appendix A) should be prepared for hazardous waste releases and submitted as soon as possible but not later than 15 days after the spill. The report should include, at a minimum:

- an updated listing of all the information provided in the verbal notification;
- actions taken to respond to and contain the release;
- any known or anticipated acute or chronic health risks associated with the release;
- a summary of all actions taken by the owner or operator to prevent a recurrence; and
- other information as may be required.

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APPENDIX A

ENVIRONMENTAL INCIDENT REPORT

Environmental Incident Report	
Location (Facility/Specific Location):	
Date Incident Occurred:	
Time Incident Occurred:	
Type of Incident (Check all that apply):	
☐ Contaminated Groundwater/Soil ☐ Fish Kill ☐ Hazardous Substance Spill/Release ☐ Migratory Bird ☐ Other _____	☐ Oil Spill ☐ PCB Spill ☐ Storage Tank (leak or other problem) ☐ Wildlife Concern
If Spill:	
Type of Substance:	
Origin of Substance:	
Amount (if known):	
Spill On (floor, ground, water):	
Oil Spill to Water or Storm Drain (If any selection is entered, written notice to EPA is due within 60 days)	☐ Spill greater than 1,000 gallons ☐ Two spills > 42 gal. within a 12-month period Date of Previous Spill _____
Description of Incident (include cause, if known, specific location, amount, duration, and impact on environment)	

Immediate Action/Cleanup Procedures			
Action Taken or Planned to Prevent Recurrence			
Notifications Made			
	Name	Date	Time
Emergency Response Coordinator			
Other facility Personnel			
Environmental Services			
State Agency			
National Response Center			
Other (i.e., Local Agency)			

Regulatory Personnel on the Scene (Name and Agency)	
Site Contact for Additional Information (Name and Title)	**Telephone Number** (With Area Code)
Incident Reported By (Name and Title)	**Telephone Number** (With Area Code)
Form Completed By (Signature)	**Date** (MM/DD/YYYY)

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Transcontinental Gas Pipe Line Company, LLC

APPENDIX 1B TO RESOURCE REPORT 1

GENERAL PROJECT DESCRIPTION

ATTACHMENT 4B

OFFSHORE HORIZONTAL DIRECTIONAL DRILL CONTINGENCY PLAN

NORTHEAST SUPPLY ENHANCEMENT PROJECT

MARCH 2017

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Appendix A Environmental Incident Report

LIST OF ACRONYMS AND ABBREVIATIONS

EI	Environmental Inspector
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
NJDEP	New Jersey Department of Environmental Protection
PADEP	Pennsylvania Department of Environmental Protection
PFBC	Pennsylvania Fish and Boat Commission
Plan	Horizontal Directional Drill Contingency Plan
Transco	Transcontinental Gas Pipe Line Company, LLC.
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

Transcontinental Gas Pipe Line Company, LLC. (Transco) is proposing to use horizontal directional drill (HDD) construction methods as an alternative crossing method at two offshore locations throughout the Northeast Supply Enhancement Project (Project). Transco conducted geotechnical studies at each proposed HDD crossing to evaluate the risks inherent in using HDD crossing methods and determined that each proposed HDD crossing is feasible. Transco has developed this Horizontal Directional Drill Contingency Plan (Plan) to establish procedures for handling these inherent risks, e.g., abandoned HDD drill holes, crossing contingency methods if the drill is abandoned, and to address potential impacts associated with inadvertent releases of drilling fluid returns during the HDD process. This Plan identifies operational procedures and responsibilities for abandoning HDD drill holes, and the prevention, containment, and clean-up of drilling fluids that have ponded on the ground surface or within a water body in response to an inadvertent release of drilling fluid event during HDD operations. The specific objectives of this Plan include:

- Defining the HDD process and how to identify when the HDD has failed and should be abandoned;
- Identifying the procedures that will be followed when an HDD drill hole has to be abandoned;
- Minimizing the potential for an inadvertent release of drilling fluids;
- Identifying the timely detection of an inadvertent release of drilling fluids;
- Providing for environmental protection of waterbodies and associated habitats, in the event an inadvertent release occurs;
- Establishing response procedures to address containment and clean-up of an inadvertent release of fluids; and
- Providing for notifying the appropriate parties and regulatory agencies, in the event an inadvertent release of fluids.

Transco will ensure that all contractors comply with the methods outlined herein during construction, restoration, and operation of the Project. Contractors will be trained on the requirements of this Plan during mandatory pre-construction environmental training. Compliance with these requirements will be documented in the field by Environmental Inspectors (EIs) in weekly construction inspection reports, which will be submitted to the Federal Energy Regulatory

Commission (FERC) for review and comment. This Plan is subject to revision based on new data or on agency recommendations.

2 HDD PROCESSES AND POTENTIAL CAUSES OF FAILURE

There are three basic steps to install a pipeline crossing using HDD:

1. Pilot hole drilling;
2. Hole reaming; and
3. Pipe pullback.

This section briefly describes the HDD process and some potential causes of failure associated with each installation step.

2.1 PILOT HOLE DRILLING

The first step in the HDD sequence is to drill the initial hole beneath the proposed crossing along a predetermined alignment. The pilot hole is drilled using either a downhole displacement mud motor connected to a tri-cone rotary bit or a jetting assembly. Drilling fluid pumped through the annulus of the drill pipe helps to expedite the mud motor or jetting assembly in cutting the soil, sediment, or rock strata. The drilling fluid also helps lubricate the drill stem, suspends and carries the drilled cuttings to the surface, and forms a wall cake to keep the hole open. The HDD drilling fluid is composed primarily of fresh water and bentonite, a naturally occurring, nonhazardous clay that serves as a viscosifier. If needed to manipulate the rheological properties for optimized drilling operations, the drilling fluid may also be augmented with starch, cellulose, non-toxic polymers, and/or crystalline silica. Control of the drill bit is achieved by using a non-rotating drill string with an asymmetrical leading edge. This leading edge creates a steering bias that is held in a precise position during drilling.

A successful pilot hole provides pertinent data that helps to determine the potential success of the crossing. Data obtained from the pilot hole includes the rate of penetration to be expected and confirmation of the geologic strata. The HDD contractor can then confirm a plan for enlarging the hole to the required diameter. The diameter required to install the pipeline will vary depending on the confirmed geologic strata and the HDD contractor's judgment.

Failure during the Pilot Hole Process

The failure mode that may occur during the pilot hole drilling is the hole collapsing on the drill pipe string. This is typically caused by either not being able to maintain hole stability or unfavorable drilling strata that contain non-cohesive alluvial material, e.g., gravel and/or cobbles. If the hole collapses on the drill pipe and creates high friction on the drill pipe surface, the torque required to rotate the drill pipe will likely increase. The increased friction may either bind the drill

pipe in such a way that it cannot be moved or, if the torque applied to the drill pipe by the drill rig exceeds the strength of the drill pipe, the force may cause the drill pipe to either shear or twist into two or more pieces. The longer the drill length, the more probability there is of this type of failure if non-cohesive alluvial materials are present. Typically, HDD installation will be considered a failure if there are two unsuccessful attempts at completing the pilot hole. If this happens, Transco will review an alternate crossing profile or location for the HDD.

2.2 HOLE REAMING

The second step consists of one or more hole-reaming passes. There are two types of tools that enlarge the pilot hole:

- Flycutters, used for most soil and sediment formations.
- Rock hole-opening tools, used for very dense soil, sediment, or rock formations.

Typically, the hole-opening tool is attached to the drill pipe string that drills the pilot hole and is then rotated and pulled back towards the drill rig from the exit point. The number of reaming passes varies depending on the soil/sediment conditions and carrier pipe size. Depending on the stability of the hole, the HDD contractor may use a barrel reamer, typically several inches smaller than the outside diameter of the final hole-opening tool, and pull it through the hole immediately prior to pullback. This is typically referred to as a swab pass. The purpose of the swab pass is to ensure the establishment of a good drilling fluid wall cake, a clean hole, and a hole full of drilling fluid with the proper density. Drilling through rock formations typically requires multiple passes, with each pass increasing the diameter of the hole until the desired diameter is achieved. Drill pipe is typically added behind the tool at the exit to keep the drill pipe in the hole for the entire length of the crossing.

A significant length of time may be needed to enlarge the hole to the required diameter. As the length of time to complete this process increases, the probability of failure also increases. This is especially true when drilling in a soil/sediment stratum that is loose or unstable (gravel or cobbles). At times, the loose material can be drilled very quickly, but maintaining an open hole through the unstable soil/sediment strata over an extended period of time can be very difficult.

Failure during the Hole Reaming Process

The main reason for failure during hole reaming is material collapsing into the hole, which in turn has been caused by a lack of an adequate bentonite wall cake. With each reaming pass, the large volume of drilling fluid being dispersed through the tool tends to expand into voids in the annulus of the drilled hole. Because of the inability to support the soils/sediments, the hole

becomes unstable and can lead to diminished drilling fluid returns. If the drilling fluid is no longer able to carry the drilled cuttings out of the hole, an excessive amount of cuttings would remain in the hole. The cuttings would slowly build up in the bottom of the hole, increasing the friction on the drill pipe and creating additional stress on the drill pipe. The increased friction can cause the drill pipe to slow or stop rotation to a point where the drill rig cannot supply enough torque to continue reaming without causing drill pipe failure. The two main types of failure in rock formations are the reaming tool breaking apart due to excessive wear on the tool and weathered rock or cobbles collapsing into the hole.

If the penetration rates are extremely slow, excessive stress can occur on the arms holding the roller cutting cones. If the wear is too excessive, the roller cones can separate from the tool, leaving the tool unable to cut or rotate. If the tool can still be removed from the hole, and the missing pieces retrieved from the hole, the hole opening pass may resume with different downhole tools.

HDD installation would be considered a failure after two unsuccessful attempt at retrieving tools or equipment downhole and if it has been determined that the hole reaming operation cannot be completed. If failure occurs, the HDD contractor shall then demobilize and remove the equipment from the site after approval from Transco. If this happens, Transco will review an alternate crossing profile of location for the HDD.

2.3 PULLBACK PROCESS

The last step to complete a successful installation is the pullback of the prefabricated pipeline into the enlarged hole. A reinforced pullhead is attached to the leading end of the pipe and to a swivel that is connected to the drill pipe. The swivel is placed between the drill pipe string and the carrier pipe to minimize rotation and torsion from being transferred to the pipeline.

The pipeline may be buoyant in the drilling fluid during the pullback process and may require the pipe to be filled with a calculated amount of water to keep the pipeline as close to neutral buoyancy as possible. The following problems could occur if the pipe is not allowed to remain neutrally buoyant in the hole during the pullback process:

- Skin friction of the pipeline will increase, which will then increase the load that the drill rig has to pull. The pipeline could be damaged if an excessive amount of pull tension has to be applied to the pipe to continue the pullback process.
- The leading edge of the pullhead could dislodge a cobble or rock fragment, binding the pipeline and making it impossible to move in either direction.

- The external coating could be damaged by sharp and/or protruding material and highly abrasive material (coarse sands).

The pull section is also supported with a combination of roller stands, pipe-handling equipment, and/or a floatation ditch to further minimize excessive tension on the pipe and prevent the carrier pipe from being damaged during the pullback process. The HDD pipe will be coated with an abrasion-resistant overlay to prevent pipeline damage.

Failure During the Pullback Process

Failure of the pullback process occurs when the pipe becomes lodged in the hole and is unable to be moved in either direction. If this occurs, Transco and the contractor will assess the situation and determine the appropriate course of action. Transco will, based on site-specific conditions, conduct agency consultation if needed.

2.4 MECHANICAL FAILURES

This type of failure occurs if there is a major mechanical breakdown. If the drill pipe remains idle for an extended time, the material in the drilled hole annulus can seize the drill pipe string in place and prevent further movement such that the drill pipe may not continue to rotate or move in either direction. If this occurs during pilot hole drilling, the contractor will be required to change the alignment of the crossing to miss the abandoned hole and start the drilling process from the beginning.

HDD installation method may be considered a failure if after either repairing or replacing the broken drilling rig or vital piece of ancillary equipment, the drill pipe, hole-opening tool, or pipeline cannot be rotated or pulled. If failure occurs, the HDD contractor shall then demobilize and remove the equipment from the site after approval from Transco. If this happens, Transco will review an alternate crossing profile of location for the HDD.

3 SEALING ABANDONED HDD BOREHOLES

If for any reason an HDD hole must be abandoned, the HDD contractor will fill the abandoned hole with grout to completely seal it off. The HDD contractor will grout the top 5 vertical feet of the abandoned hole at the onshore entry side of the crossing by inserting a grout tremie pipe into the drilled hole annulus. The grout will be a cement-type grout. As the grout is pressured into the drilled hole annulus, the tremie pipe will be extracted from the hole so the grout mixture is allowed to sufficiently displace any drilling fluid that may have remained within the hole. The top 12 inches of the hole will be backfilled with the native material, and the HDD contractor will not demobilize until Transco approval has been received.

For offshore entry/exit holes, the minimum extent of grouting will be to completely seal and fill the upper 30 feet of the hole entirely with grout. The top 5 feet of the hole will be backfilled with native material. In the event native material is not available, Transco will use a clean, compatible material to backfill the hole. If deemed necessary by Transco, the HDD contractor may be required to complete grouting up to and including the entire abandoned hole to reduce the risk of inadvertent drilling fluid returns from adjacent HDD alignments, or to comply with applicable regulatory requirements or other Project conditions.

The cement grout mixture used to abandon a borehole will be pumped downhole through the drill pipe used to drill/ream the hole. The grout mix will be designed generally for each HDD location based on the geologic formation(s) along the abandoned portion of the hole. Additional modifiers, such as those used in structural concrete, may be used to modify the viscosity and/or set time of the grout. To grout the abandoned hole, the HDD contractor will extract all cutting tools (i.e., reamer and cutting heads) from the hole, advance the drill pipe into the hole to the required grout depth, and begin pumping the grout mixture while the drill pipe is extracted from the hole. The rate at which the drill pipe is extracted during grouting operations will be regulated to match the rate of grout placement.

4 REDUCING THE RISK OF INADVERTENT DRILLING FLUID RETURNS

Drilling fluids have several functions that support an HDD installation. The primary functions include:

- Cooling and lubrication of drilling tools, drill pipe, and the carrier pipe.
- Rotation of the drill bit (using a positive displacement mud motor in bedrock installations).
- Suspension of cuttings within the drilling fluid/slurry mixture.
- Removal of soil/sediment/bedrock cuttings from the bore during each phase of the installation process.
- Providing a hydrostatic fluid pressure in the bore that offsets natural groundwater formation pressures.
- Stabilizing the bore and preventing raveling of surrounding soil/sediment/bedrock materials. Stabilization of the bore is provided from the combination of developing a low-permeability bentonite filter cake along the bore walls and applying a positive fluid pressure to the surrounding bore walls. This supporting pressure is derived from the presence of the column of drilling fluid within the bore.

Prior to beginning construction, a specific scope of work will be developed for each trenchless crossing, and the contractor will be required to address all of the requirements in the specifications, plans, and scope of work. Transco's HDD contractor will be required to maintain a certified and approved drilling fluids engineer/technician on-site during all phases of the HDD installation process to assist the HDD contractor with managing and optimizing drilling fluid functions.

The HDD profiles will be designed to provide sufficient depth of cover to reduce the potential for inadvertent drilling fluid returns. During HDD installation, the HDD contractor will make every effort to maintain drilling fluid circulation and reduce the potential for inadvertent drilling fluid returns. The efforts may include but will not be limited to:

- Proper drilling fluids management.
- Daily inspection and repair of equipment components (e.g., drilling equipment, hydraulic hoses, and pumps).
- Using special downhole monitoring equipment to monitor fluid pressure.
- Using best management practices to remove cuttings from the hole and maintaining an open flow path from the downhole tooling to the drill rig.

- Using casing as needed to reduce the potential for inadvertent drilling fluid returns near the entry or exit points.
- Maintaining adequate drilling fluid flow rates and penetration rates.

If drilling fluid returns to the drill rig are lost during HDD operations, the HDD contractor will cease drilling operations and visually inspect the water surfaces along the HDD alignment for inadvertent returns. The HDD contractor will make reasonable attempts to restore drilling fluid circulation, which may include:

- Extracting the downhole drill pipe string and tooling until drilling fluid returns are restored.
- Manipulating drilling fluid properties, consulting with the on-site drilling fluid engineer/technician.
- Installing small-diameter casing over the downhole drill pipe string through overburden soils.

If the integrity of the drilled hole or the HDD profile geometry is compromised through attempts to restore drilling fluid returns, the HDD contractor will notify Transco or the authorized representative. If it is determined that further attempts to restore drilling fluid returns may compromise the HDD installation or are unlikely to be successful, the HDD contractor will proceed with modified drilling procedures to reduce the risk of inadvertent drilling fluid returns. These procedures may include slowing the rate of penetration, drilling or reaming the hole from the other direction, or using large-diameter casing, if necessary.

5 CONTINGENCY PLAN FOR DRILLING FLUID RELEASE AND MITIGATION

5.1 DRILLING FLUID CONTAINMENT, COLLECTION SUPPLIES, AND EQUIPMENT

The HDD contractor will monitor the HDD alignment for signs of inadvertent drilling fluid returns and will keep adequate spill containment and collection equipment and supplies on-site at all times to contain and collect any release of drilling fluids to the ocean. All areas contaminated by drilling fluid migration and release will be cleaned up and restored to the original condition, according to applicable regulatory agency requirements, or as accepted by Transco and FERC. Equipment stored on-site for immediate response may include, but is not limited to:

- Several 5-gallon buckets and plastic sheeting;
- Several 55-gallon drums;
- Portable spill containment booms, absorbent pads, turbidity curtains or other portable spill containment kits;
- Leak-free hoses and portable pumps; and
- Underwater boom and curtain.

5.2 MITIGATION OF INADVERTENT DRILLING FLUID RETURNS

If inadvertent drilling fluid returns are observed, the HDD contractor will immediately disengage the high pressure drilling fluid pumps, suspend drilling operations, and notify the EI(s) and Transco or their authorized representative. Transco or their authorized representative will notify all concerned parties and regulatory agencies. A complete list of appropriate regulatory agencies and their contact information will be prepared and distributed prior to construction.

5.2.1 Onshore Returns

If inadvertent drilling fluid returns are detected onshore, the drilling crew will take immediate corrective action. For the duration of drilling operations, the drilling personnel will be aware of what containment materials would be needed when responding to an onshore release of drilling fluid and will have these items available on-site. Since inadvertent drilling fluid returns can be easily controlled onshore, these materials will be stored in the entry site work area along with spill kits. Containment items may include lumber for temporary shoring, sand bags, portable pumps, hand tools, silt fencing, and hay bales. The HDD contractor will also keep heavy equipment that can be used to control and clean up the drilling fluids (e.g., excavators and backhoes) in accessible locations. Transfer pumps, hoses, and possibly vacuum trucks may be used if necessary for transferring any inadvertent drilling fluid released onshore. After removal of

the released drilling fluid, the release area will be returned as close to the original condition as feasible. It may be necessary to store the drilling fluid on-site before disposal.

In the event of an inadvertent return onshore the HDD contractor will:

- Take immediate measures to contain the inadvertent drilling fluid returns to the extent practicable.
- Collect the inadvertent drilling fluid returns using pumps and/or vacuum trucks, if of sufficient volume.
- Document the size and impacts of the drilling fluids with photographs.
- Follow the direction of the on-site EI for cleanup and mitigation requirements.
- Remove the drilling fluids and restore the site to pre-existing conditions. Clean-up work will be performed by hand to the maximum extent possible. All collected materials will be disposed of at an approved location or processed through the drilling fluid-separation plant.
- Document the cleanup procedures, changes made to the drilling fluid properties or drilling process to prevent future releases, and photograph the conditions of the cleaned up area.
- Adjust drilling fluid properties to inhibit further flow through the leak origin, clear potential blockages in the HDD bore by extracting several or all drill pipe joints and tooling, and/or allow the area to sit or rest for a suitable period to allow the cracked pathway to naturally close.
- Evaluate any further steps that may increase the potential for regaining returns to entry/exit points. This may include advancing the tools in the opposite direction in an attempt to regain drilling fluid returns.
- Once the inadvertent drilling fluid returns are contained and collected, the HDD contractor may resume drilling operations using modified drilling techniques. These modified techniques will be used to reduce further inadvertent drilling fluid returns while maintaining full-time monitoring of the inadvertent drilling fluid returns area to ensure that containment and collection measures are sufficient to handle any additional inadvertent returns that may result from resuming operations.

If the inadvertent returns are observed in an environmentally or culturally sensitive area, the HDD contractor will, in addition to the measures listed above, contain the inadvertent returns with straw bales or sand bags, if practical without additional disturbance, if possible.

In addition to the measures noted above, Transco will:

- Notify the appropriate regulatory agencies and the property owner representative regarding their next course of action(s) to protect the sensitive resource.
- If the release becomes excessively large, a spill response team will be called in to contain and clean up excess drilling mud. Phone numbers of spill response teams in the area will be on-site.

After the inadvertent drilling fluid return has been assessed, the HDD contractor and Transco will make every effort to determine why the seepage occurred. Once the cause of the drilling fluid release has been determined, measures will be developed to control the factors causing the seepage and to minimize the chance of recurrence. Developing the corrective measure will be a joint effort of Transco and the HDD contractor and will be site- and problem-specific.

5.2.2 Offshore Returns

A significant inadvertent return occurring offshore may be detected by a visible plume. Minor seepage, however, may be difficult to detect because of currents and the high specific gravity of the drilling fluid. If an inadvertent drilling fluid release is detected offshore, outside of the exit pit, it will be monitored and documented. Drilling activities may be temporarily suspended to evaluate possible implementation of mitigation measures to regain hole integrity. Drilling activities will not be suspended unless the volume of inadvertent drilling fluid returns creates an immediate threat to public health and safety. If an extended shutdown were required to try to reduce the turbidity or amount of drilling fluid being released, it could lead to a hole collapse and, ultimately, a failure in the HDD. This could require drilling a new hole and would therefore extend the duration of the Project.

Removal of drilling fluid surfacing offshore is not feasible because of the strong currents in the area. The exit pit is designed to contain the exiting fluid and cuttings. Drilling fluid returns and cuttings entering the exit pit will be left to naturally dissipate or settle into the excavated pit. Any inadvertent leakage would be expected to disperse naturally with the currents.

In the event an inadvertent return is observed offshore the following actions will be taken:

- The magnitude of the offshore return will be qualitatively determined.
- If warranted by the volume of the drilling fluid return, drilling fluid pumps will be stopped.

- The Transco representative will be notified and will contact the appropriate agencies.
- Drilling fluid properties will be adjusted to inhibit further flow through the leak origin; potential blockages in the HDD bore will be cleared by extracting several or all drill pipe joints and tooling; and/or the area will be left to sit or rest for a suitable period to allow the cracked pathway to naturally close.
- Any further steps that may increase the potential for regaining returns to entry/exit points will be evaluated. This may include tripping the tools in the opposite direction in an attempt to regain drilling fluid returns.

After the inadvertent drilling fluid return has been assessed, the HDD contractor and Transco will make every effort to determine why the seepage occurred. Once the cause of the drilling fluid release has been determined, measures will be developed to control the factors causing the seepage and to minimize the chance of recurrence. Developing the corrective measure will be a joint effort of Transco and the HDD contractor and will be site- and problem-specific.

6 ENVIRONMENTAL INSPECTION AND TRAINING

An EI experienced in HDD and associated environmental protection measures will work with the contractor to verify that the proper equipment and materials are available on-site at all times and that the necessary procedures are followed on a daily basis. Prior to the start of construction, the EI will conduct a training session with all key HDD contractors, drilling, and inspection personnel. All such personnel will be thoroughly trained in the applicable inadvertent release of drilling fluid contingency plan procedures. On-site safety and environmental protection meetings will provide ongoing communications and awareness measures regarding prevention, mitigation, and response associated with potential inadvertent drilling fluid releases.

Visual observations along the land and water portions of the HDD alignment will be completed on a regular basis throughout the drilling program. The frequency of these observations will be greatest during the pilot bore and initial reaming passes where the probability of an inadvertent release of drilling fluid event occurring is the highest.

7 CONTACT INFORMATION

Transco will provide a technical consultant on-site during the HDD process to keep adequate documentation such as daily progress reports, as-built information, etc., describing the events leading up to the failure. Transco will then submit this documentation to the necessary agencies for their review and approval that the drill has failed at the present alignment. The HDD contractor will not demobilize until Transco approval has been received.

The following Project representatives will be notified in the event of an inadvertent release of drilling fluids:

Transco

Joseph Dean
Manager, Environmental Permitting
2800 Post Oak Blvd
Houston, TX 77056
Phone: 713-215-3427

The following regulatory agency representatives will be notified in the event of an inadvertent release of drilling fluids:

FERC

Christine Allen
Project Manager
Federal Energy Regulatory Commission
888 First Street NE
Washington DC, 20426
Phone: 202-502-8056

Additional Agencies for Notification

- U.S. Army Corps of Engineers (USACE) – *(Contact information to be provided prior to construction)*
- U.S. Fish and Wildlife Service (USFWS) - *(Contact information to be provided prior to construction)*
- U.S. Coast Guard (offshore only) - *(Contact information to be provided prior to construction)*
- New Jersey Department of Environmental Protection (NJDEP) - *(Contact information to be provided prior to construction)*
- New York State Department of Environmental Conservation (NYSDEC) – *(Contact information to be provided prior to construction)*

An incident report (see Appendix A) should be prepared for hazardous waste releases and submitted as soon as possible but not later than 15 days after the spill. The report should include, at a minimum:

- an updated listing of all the information provided in the verbal notification;
- actions taken to respond to and contain the release;
- any known or anticipated acute or chronic health risks associated with the release;
- a summary of all actions taken by the owner or operator to prevent a recurrence; and
- other information as may be required.

APPENDIX A

ENVIRONMENTAL INCIDENT REPORT

Environmental Incident Report	
Location (Facility/Specific Location):	
Date Incident Occurred:	
Time Incident Occurred:	
Type of Incident (Check all that apply):	
☐ Contaminated Groundwater/Soil ☐ Fish Kill ☐ Hazardous Substance Spill/Release ☐ Migratory Bird ☐ Other _____	☐ Oil Spill ☐ PCB Spill ☐ Storage Tank (leak or other problem) ☐ Wildlife Concern
If Spill:	
Type of Substance:	
Origin of Substance:	
Amount (if known):	
Spill On (floor, ground, water):	
Oil Spill to Water or Storm Drain (If any selection is entered, written notice to EPA is due within 60 days)	☐ Spill greater than 1,000 gallons ☐ Two spills > 42 gal. within a 12-month period Date of Previous Spill _____
Description of Incident (include cause, if known, specific location, amount, duration, and impact on environment)	

Immediate Action/Cleanup Procedures			
Action Taken or Planned to Prevent Recurrence			
Notifications Made			
	Name	Date	Time
Emergency Response Coordinator			
Other facility Personnel			
Environmental Services			
State Agency			
National Response Center			
Other (i.e., Local Agency)			

Regulatory Personnel on the Scene (Name and Agency)	
Site Contact for Additional Information (Name and Title)	**Telephone Number** (With Area Code)
Incident Reported By (Name and Title)	**Telephone Number** (With Area Code)
Form Completed By (Signature)	**Date** (MM/DD/YYYY)

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Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

April 12, 2019

New Jersey Department of Environmental Protection
Mail Code 501-02A
P.O. Box 420
401 East State Street
Trenton, NJ 08625-0420

Attention: Matthew Resnick and Magda Usarek-Witek (DEP, Division of Land Use)

Reference: Northeast Supply Enhancement Project
Transcontinental Gas Pipe Line Company, LLC
Raritan Bay Slag Superfund Site

Mr. Resnick/Ms. Usarek-Witek:

Transcontinental Gas Pipe Line Company, LLC (Transco) is responding to your recent inquiries about the Raritan Bay Slag (RBS) Superfund Site. As you know, Transco met with the U.S. Environmental Protection Agency (EPA) on August 15, 2017 to discuss the requirements and constraints of Superfund, National Environmental Policy Act (NEPA), and the proposed Northeast Supply Enhancement (NESE) Project (Project) in the area of the Raritan Bay Slag (RBS) site.

Your recent inquiry included the questions below. Our responses are provided immediately after.

1. I was under the impression that authorization from EPA was required for work in the Raritan Bay Superfund site. The meeting minutes that you sent indicate that EPA hasn't signed off on this yet. Has NJ Site Remediation had anything to add to this? Can you clarify?

Response:

EPA was a cooperating agency on the preparation of the Draft and Final Environmental Impact Statement and were provided the opportunity in two instances to comment on the administrative draft of these documents before they were released to the public. No authorization is required from EPA beyond their input captured as a cooperating agency with the Federal Energy Regulatory

Commission (FERC) on the NEPA document. Their input was solicited and provided through that review process and also during informal consultations as noted in the attached meeting summary on August 15, 2017. NJDEP Site Remediation is part of the EPA Region 2 Superfund process for sites in New Jersey.

2. Regarding the 5000 SF temporary work spaces:
    - I am unclear as to the specific location of the work space location. It is called out on yellow in the key provided to EPA on the meeting slides. I note the yellow areas inland leading to the Morgan shore approach, as well as the larger area of yellow in the bay. That looks significantly larger than 5000 SF. Can you clarify?

    Response:
    The attached figure (Slide 18 from the slides used at the EPA meeting) notes a "5,000-foot-wide temporary construction workspace." Transco will anchor within the Study Areas 7 and 11, but will not anchor within the defined area for remediation.

    - My current understanding is that the temporary work spaces are for project related marine traffic to transit through the area, anchorage areas, and security vehicles to keep non-project related traffic outside of the work zone. Beyond subsurface disturbance for anchors, no actual subsurface disturbance is required? Is this accurate?

    Response:
    Your understanding is correct. Beyond subsurface disturbance for anchors, no actual subsurface disturbance is required in the temporary work spaces other than the trench for the installation of the proposed pipe.

    - Are areas 7 and 11 considered part of the remediation area and of the slag site proper? The previous statement that areas 7 and 11 are only impacted by temporary work activities doesn't appear to be accurate. The HDD pit for the Morgan Shore approach, as well as the trenching and the pipe line itself will impact Areas 7 and 11. According to the data summary you provided, areas 7 and 11 are not currently planned for remediation by EPA because they fall below the current lead threshold for remediation? Does EPA agree with that? Or are they requiring further action on Transco's part before the pipeline can be installed?

Response:

Areas 7 and 11 are study areas. The area defined by EPA for remediation is shown on Slide 18 (located in Study Area 7). This remediation area is also shown on Figure 12-1 of EPA's Record of Decision (May 2013). EPA estimated that the total volume of sediment to be remediated from Study Area 7 to be 3,136 cubic yards (Table 5-1 of the ROD). The estimate for total volume to be remediated from Study Area 11 was zero.

The proposed excavations for the HDD pit and pipeline trench are completely outside of EPA's remediation areas and greater than 200 feet away.

All sediments excavated for the proposed HDD pit and pipeline within Study Areas 7 and 11 will be characterized and properly disposed of at an approved upland facility.

Transco conducted sediment sampling along the proposed pipeline route and shared these results with EPA.

3. EPA mentions something call PRPS but no definition was given.

Response:

PRPs in this instance refers to Potentially Responsible Parties, those who may be liable for the contamination at a Superfund site.

4. My understanding is that in general, remediation for areas like this, consists of removing the existing polluted materials to upland disposal sites and back filling with clean suitable fill. If that is the case, isn't the installation of the pipeline effectively doing something similar in contaminated areas?

Response:

EPA's Record of Decision (ROD) for this site states "contaminated soils and sediment above the lead remediation cleanup level of 400 mg/kg will be excavated and/or dredged and disposed of at appropriate offsite facilities." (Section 12.0 Selected Remedy). All sediments excavated for the proposed HDD pit and pipeline within EPA Study Areas 7 and 11 would be characterized and properly disposed of upland. Transco would backfill the excavations with clean material. This is effectively the same action that EPA has stated will be done in the area they have identified for remediation.

Potential impacts to the RBS site are mitigated by the following:

- Transco has designed its proposed Raritan Bay Loop portion of the Project to avoid identified remediation (or cleanup) areas presented in EPA's ROD May 2013, only areas specifically designated as Study Areas will be disturbed;
- All excavated material from construction of the Raritan Bay Loop within Study Areas 7 and 11 will be disposed of at appropriately permitted facilities in accordance with Transco's Materials Management Plan. All Raritan Bay Loop excavations in the Study Areas will be backfilled with clean, suitable material from approved sources as required by project permits; and
- During construction, Transco proposes that all anchors disturbances avoid existing remediation areas.

If you have any questions regarding this correspondence, or require additional information, please do not hesitate to contact Mr. Scott Horner at (713) 215-4953 or via e-mail at Scott.Horner@williams.com. Alternatively you can contact Ms. Sara Mochrie, Project Manager at E & E, at (716) 684-8060 or via e-mail at smochrie@ene.com.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Joseph Dean
Manager, Environmental Health and Safety

Attachment

cc: Christopher Jones, NJDEP
Tanya Mitchell Calloway, EPA
Lingard Knutson, EPA
Stephen Kellogg
Blake Clements
Scott Horner
Sara Mochrie
Dave Albers

Northeast Supply Enhancement (NESE) Project

Project Meeting Summary

Date: August 15, 2017, 1:30pm – 2:30pm
RE: RBS Superfund Site and Raritan Bay Loop
Location: U.S. Environmental Protection Agency, New York City

Participants

See attached sign-in sheet.

Meeting Summary

A meeting was held with the U.S. Environmental Protection Agency (EPA) to discuss the requirements and constraints of Superfund, NEPA, and the proposed NESE Project in the area of the RBS site. The following is a summary of what was discussed.

1) Williams and E & E provided EPA with an introduction to the NESE Project as a whole, including an introduction to the Federal Energy Regulatory Commission (FERC) Natural Gas Pipeline permitting process and Project milestones.
    a) The purpose of the NESE Project is to expand existing pipeline facilities in order to meet the demand for additional supply of natural gas to National Grid.
    b) There has been an 18 month-long siting process that has led to the proposed Raritan Bay Loop footprint (i.e. not a straight line). Factors incorporated in the siting of the Raritan Bay Loop include: anchorage areas, clamshell habitat, navigational channels, and bathymetry. Burial depths have been specified by the USACE.
    c) The NESE Project interacts with the Higgins Farm Superfund site, and the project team has previously met with the EPA RPM.
    d) There have been numerous scoping and open house meetings in the vicinity of the Project, as part of the FERC permitting process. The NESE project team has had meetings with local Township officials in New Jersey and has met with NGOs including BayKeeper.

2) EPA raised several concerns regarding Williams' proposed construction through the RBS Site. Among these are (a) the heightened sensitivity of the local community to environmental impacts; (b) changing conditions of the sea bed; and (c) impacts of the new pipeline on the ability to monitor and remediate within the area of the Raritan Bay Loop.
    a) Heightened Sensitivity of the Local Community
        - EPA asked about outreach to State and local agencies and, specifically, the municipalities. Williams indicated that most correspondence to date has been with Franklin Township given the strong opposition to Compressor Station 206.

- EPA asked for the name of the NJDEP permit reviewer for the Project, which Williams provided.

b) Changing Conditions of the Sea bed

- EPA noted that maps and data are "good" at the time of sampling, but may not be accurate at the time of construction due to sediment transport. EPA was concerned this could result in the deposition of contaminated sediments on top of the Raritan Bay Loop post-construction. In the event the sediments above the buried Raritan Bay Loop are above the RBS site cleanup threshold for lead (400 mg/kg) then the area would have to be remediated. However, the remediation method set forth in the Record of Decision is to dredge contaminated sediments, which EPA expressed could not be done overlying the Raritan Bay Loop as it is currently designed.
- Williams indicated that pre and post Sandy sampling were consistent, indicating that storms may not have a significant impact on movement of hazardous substances.
- Williams offered to provide EPA with the results of the Project-specific hydrodynamic sediment modeling results to further inform on potential deposition due to the Project activities in the RBS. EPA indicated they conducted their own hydrodynamic sediment modeling for the RBS and it was available for download from the Administrative Record.

c) Impacts of the Project on Remediation

- While there is no set schedule, EPA provided some estimates. Remediation is taking place in the Margaret's Creek section of the RBS Site (anticipated completion within 12 months). The Sea Wall section of the RBS Site would be addressed next, with the Jetty section being handled last. EPA estimated 3-4 years before work begins on the Jetty section.
- EPA expressed concerned about the ability to sample or perform remediation over the new pipeline. Access would be needed over the pipeline to sample and verify that conditions are the same. Attorneys could work out agreements to allow for sampling in the future.
- EPA asked whether it is feasible for Williams to route the pipeline around the RBS Site or extend the HDD through the Study Area. Transco stated that HDD designs are site specific and conducive to the local geological formations. The geology of the area is critical when considering any changes, and must be further examined before considering moving the HDD location.
- EPA's counsel raised the issue of upsetting the dealings with the PRPs. EPA indicated that there are several PRPs for the RBS site, but that EPA has not formally met with them. This meeting (to discuss settlement) is scheduled for September 2017. No settlement parameters have been set (whether work to be completed by EPA or PRPs has not yet been determined). EPA indicated that it is too soon to reach out to the PRPs, and suggested that Transco follow up with EPA after the September meeting on this point. EPA noted that some PRPs are more aggressive or more involved than others.

3) Other items:
    a) E & E agreed to provide EPA with shapefiles for the Project components that overlap with the RBS site.
    b) In addition to the sediment sample locations provided in the memo to EPA dated July 5, 2017, two bore holes (BHA7-ALT and BHA9-ALT) that were initially sampled for geotechnical analysis were later analyzed for metals.
    c) All materials dredged within the RBS site for the HDD exit pit and 1,000 feet of trenching would be disposed upland, and clean compatible fill material would be brought in to cover the pipeline.
    d) EPA asked for clarification on the construction workspace. The proposed 5,000-foot-wide temporary construction workspace for the offshore Raritan Bay Loop is needed for the anchor spread of the various barges and support vessels during offshore construction and provides room for security and escort boats to monitor and alert non-Project vessels approaching the construction area. The direct disturbance of the seafloor associated with construction of the Raritan Bay Loop is significantly smaller than the 5,000-foot-wide temporary construction workspace. There will be a permanent easement from New Jersey Tide Lands for 30 feet on either side of the Raritan Bay Loop.
    e) EPA indicated that screening levels for lead are currently being reassessed and may be lowered in the near future.

-End Summary-

From: Resnick, Matthew
To: Mason, Jeffrey A.
Cc: Mochrie, Sara
Subject: RE: Northeast Supply Enhancement - Wetland Walkovers
Date: Monday, April 8, 2019 1:27:34 PM
Attachments: T&E Review Updated and Corrected 4 8 19.docx

Attached is the T&E for clarification on how where the 150' TA is. We incorporated your drawing from the previous email.

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Thursday, April 04, 2019 4:17 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: [EXTERNAL] RE: Northeast Supply Enhancement - Wetland Walkovers

Good Afternoon Matt,

Thanks for the call with Transco and E&E this morning. With a little more forensics, we have identified the area you referred to below in your email to be excluded from the 150ft buffer and it makes sense to us now. See attached screen grab of the wetland area in question. It is all the area to the west of the yellow dashed line for W-T01-017A-1 located at MP 11.7. We already have that portion of the PEM wetland that is located above the coastal wetland mapping line (light blue hatched poly) buffered at 50ft for an ordinary value wetland and we would request to keep it that way rather than changing everything east of Gondek to 150ft per the call this morning. Now that we have figured out the specific wetland area you were referring to with that 20 flag sequence, is it acceptable to NJDEP to leave the 50ft buffer as it is currently established?

Give me a call at the cell number below if you would like to discuss this further.

Thanks,

Jeff

Jeffrey A. Mason, PWS, CERP
Chief Environmental Scientist
368 Pleasant View Dr. Lancaster, NY. 14086
Phone: 716-684-8060 • Cell: 716-462-2543
jmason@ene.com • www.ene.com

From: Resnick, Matthew
Sent: Wednesday, March 20, 2019 3:33 PM
To: Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Horner, Scott (Scott.Horner@williams.com) (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>

Subject: errata for NESE

Sara I bumped into Scott at the public hearing the other day, and one of the comments reminded me of something that I had brought up earlier. A portion of the work space in the Raritan Loop crosses the Raritan Bay Slag site. The report mentions that EPA has granted authorization to work in this area since the pipeline is running to the north of this and this will only be for transiting marine construction vessels. Can you confirm that assessment? Also do you have the authorization or other documentation from EPA on this site?

Second, I forwarded the recently received FWGP 12, and Coastal GP 23 to our T&E unit, more as a confirmation that no new T&E species have shown up. Our unit indicated that there arnt as many exceptional resource value wetlands within the Madison Loop cooridor and work areas as originally thought. The comments were as follows;

"Freshwater wetlands depicted on plan sheets 14 (east of Gondek Drive) and 15 (all wetlands exceptional except wetland points 2957 through 2976) titled "Northeast Supply Enhancement Project Proposed 26" Madison Loop-Wetland Permit Plan MP 11.4-11.6 and 11.6-11.9," are documented and suitable habitat for bald eagle and osprey. 150' transition area shall apply in these locations. Proposed horizontal directional drilling (HDD) in this area, no adverse impacts to T+E are anticipated with plans.

Mapped coastal wetlands depicted on plan sheets 14, 15 and 16 titled "Northeast Supply Enhancement Project Proposed 26" Madison Loop-Wetland Permit Plan MP11.4-11.6, Wetland Permit Plan 11.6-11.9 and Wetland Permit Plan 11.9-12.1," are documented and suitable habitat for bald eagle and osprey. Proposed horizontal directional drilling (HDD) in a large portion of this area, no adverse impacts to T+E are anticipated with plans.

Remaining mapped coastal wetlands on sheets 11, 12 and 13 are not suitable T+E habitat."

The upside of this is that it will reduce your transition area impacts for everything that was called out as exceptional west of Gondek drive. The down side is the FWW plan sets will need updating and recalculating of the TA impacts.

THREATENED + ENDANGERED SPECIES REVIEW

FILE NUMBER: 0000-01-1001.3
TYPE: FHA IP / FWW IP
BLOCK: ROW
LOT: ROW
APPLICANT: Transco
COUNTY: Middlesex / Somerset
MUNICIPALITY: Old Bridge, Sayreville / Franklin

PROJECT MANAGER: M. Resnick

FINAL COMMENTS/CONDITIONS:

RIPARIAN ZONE DETERMINATION:

After review of this project area, it has been determined that:

X The Area is *NOT* documented for water dependent and/or NHP listed species

- ❑ The area is documented but ***NOT*** suitable for water dependent and/or NHP listed species
- ❑ The area ***IS*** documented and suitable habitat for the following Water Dependent / NHP species_____

COMMENTS/ CONDITIONS: Not documented for any water dependent species on site or within 1 mile downstream. 50' riparian zone for all FHA regulated areas along the pipeline ROW. No adverse impacts to T+E are anticipated with proposed plans.

FWW ENDANGERED AND THREATENED SPECIES DETERMINATION:

After review of this project area, it has been determined that:

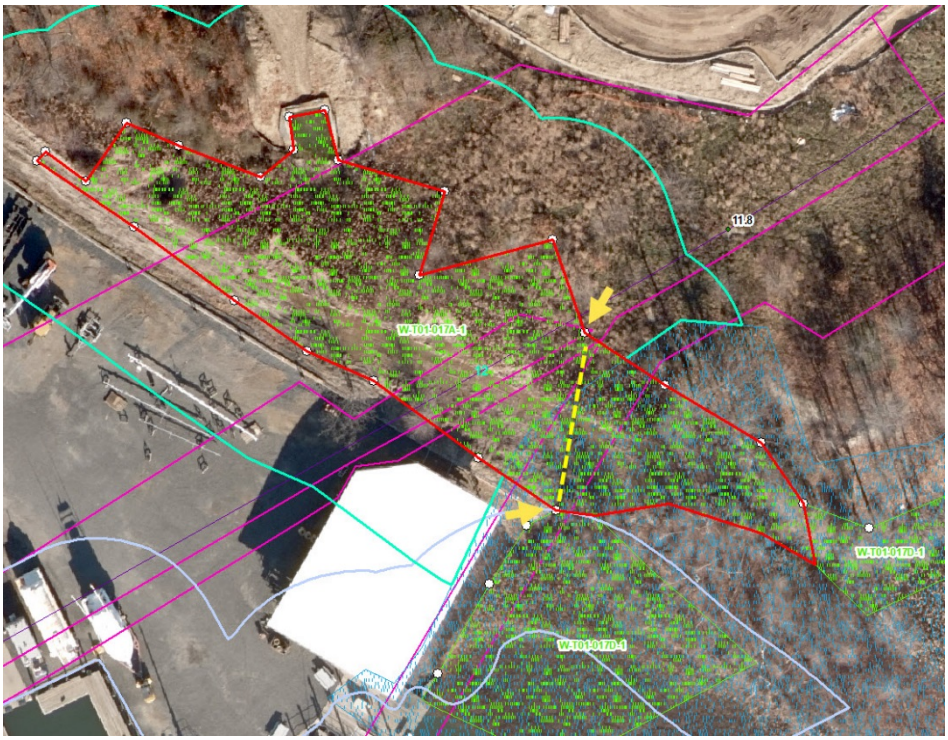
X The area is *NOT* a documented habitat (NET)

X The area is *NOT A SUITABLE* documented habitat (NSH)

- ❑ The area is ***NOT*** a documented habitat ***HOWEVER*** the Dept. reserves the right to conduct future Presence/Absence surveys for E&T species.

X The area IS a documented and suitable habitat for: Bald Eagle, Osprey (see comments) (ET)

COMMENTS/ CONDITIONS: Freshwater wetlands depicted on plan sheets 14 (east of Gondek Drive) and 15 titled "Northeast Supply Enhancement Project Proposed 26" Madison Loop-Wetland Permit Plan MP 11.4-11.6 and 11.6-11.9," are documented and suitable habitat for bald eagle and osprey. 150' transition area shall apply in these locations. Wetlands associated with points labeled W-T01-017-020 through W-T01-017-039 are not suitable/not documented habitat for T+E and a 50' transition area shall apply (see image below). Proposed horizontal directional drilling (HDD) in this area, no adverse impacts to T+E are anticipated with plans.



Freshwater wetlands on remainder of plans are not suitable or not documented habitat for T+E.

WFD ENDANGERED AND THREATENED SPECIES DETERMINATION:

After review of this project area, it has been determined that:
_X Documentation is in Compliance with Special Area Policy 9.36.
___ Documentation is in Compliance with Special Area Policy 9.37.
___ Documentation is not in Compliance with Special Area Policy 9.36.
___ Documentation is not in Compliance with Special Area Policy 9.37.
(See comments below for restrictions or conditions that may apply).

COMMENTS/CONDITIONS: Mapped coastal wetlands depicted on plan sheets 14, 15 and 16 titled "Northeast Supply Enhancement Project Proposed 26" Madison Loop-Wetland Permit Plan MP11.4-11.6, Wetland Permit Plan 11.6-11.9 and Wetland Permit Plan 11.9-12.1," are documented and suitable habitat for bald eagle and osprey. Proposed horizontal directional drilling (HDD) in a large portion of this area, no adverse impacts to T+E are anticipated with plans.

Remaining mapped coastal wetlands on sheets 11, 12 and 13 are not suitable T+E habitat.

Proposed work within the Raritan Bay will not adversely impact T+E species or their habitat provided Transco follow the best management practices listed in their compliance statement addressing 9.36 of the Coastal Zone Management Rules.

Reviewed by: Christina Albizati
Date: 8/21/17
Update 4/8/19

From:	Resnick, Matthew
To:	Mason, Jeffrey A.
Cc:	Albizati, Christina
Subject:	RE: Northeast Supply Enhancement - Wetland Walkovers
Date:	Monday, April 8, 2019 8:02:36 AM
Attachments:	image001.jpg

I wonder how Christina got ahold of those numbers then. I don't recall them being on any of the plan sheets.

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Monday, April 08, 2019 10:00 AM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Albizati, Christina <Christina.Albizati@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] RE: Northeast Supply Enhancement - Wetland Walkovers

Matt,

Thanks for the reply. That is correct, all other wetlands east of Gondeck will be considered exceptional RVC with 150ft transition area.

As for the number sequence "2957 through 2976" they must have come from the civil surveyor's numbering schema on a different plan set that they were reviewing at the time. We actually figured it out through counting the number of flags in the sequence and matching that to this wetland feature which we had already mapped as ordinary resource value with a 50ft transition area. It was the only wetland east of Gondek that was not mapped as exceptional RVC and buffered at 150ft, so it is the only location/wetland where this would have made any logical sense for them to call out as an exception to the rest of the wetland mapping east of Gondeck.

Thanks,

Jeff

Jeffrey A. Mason, PWS, CERP
Chief Environmental Scientist
368 Pleasant View Dr. Lancaster, NY. 14086
Phone: 716-684-8060 • Cell: 716-462-2543
jmason@ene.com • www.ene.com

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Monday, April 8, 2019 9:21 AM
To: Mason, Jeffrey A. <JMason@ene.com>; Albizati, Christina <Christina.Albizati@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: RE: Northeast Supply Enhancement - Wetland Walkovers

Thanks Jeffery, I'm forwarding this to Christina and I showed it to her. I'll let her make the final call, but on a short review, she agreed that calling out this finger of the larger wetland as intermediate RVC with a 50' TA was appropriate given the disturbed nature it has being within the currently cleared ROW.

Can you clarify something? The numbers she had originally cited 2957 through 2976, where did they come from? They don't seem to align with the existing numbering system? I just want to make it clear for the record. If I'm understanding the rest of the email correctly, then we are agreed that the rest of the wetlands east of Gondeck will be exceptional, and Christina will confirm that.

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Thursday, April 04, 2019 4:17 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>
Subject: [EXTERNAL] RE: Northeast Supply Enhancement - Wetland Walkovers

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jmason@ene.com • www.ene.com

From: Resnick, Matthew
Sent: Wednesday, March 20, 2019 3:33 PM
To: Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Horner, Scott (Scott.Horner@williams.com) (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>

Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
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Remaining mapped coastal wetlands on sheets 11, 12 and 13 are not suitable T+E habitat."

The upside of this is that it will reduce your transition area impacts for everything that was called out as exceptional west of Gondek drive. The down side is the FWW plan sets will need updating and recalculating of the TA impacts.

From: Olson, Karen <Karen.Olson@williams.com>
Sent: Monday, April 22, 2019 3:57 PM
To: Olivera, Stephen <Stephen.Olivera@dep.nj.gov>
Cc: Dow, Diane <Diane.Dow@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Horner, Scott <Scott.Horner@williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: RE: Additional information request

Hi Stephen,

Per our discussion last Thursday, we have completed the storm water calculations for water quality assuming the same approach as was completed previously for runoff quantity and groundwater recharge. All of these calculations are included in the attached Supplemental Information Stormwater Management Report. A hard copy of this report, including the updated drawing package, will be delivered to your office tomorrow.

Let us know if you have any questions.

Thanks,
Karen

Karen Olson | Environmental Specialist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Olson, Karen
Sent: Wednesday, April 17, 2019 2:11 PM
To: Olivera, Stephen <Stephen.Olivera@dep.nj.gov>
Cc: Kopkash, Ginger <Ginger.Kopkash@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Horner, Scott <Scott.Horner@williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: RE: Additional information request

Hi Stephen,

Pursuant to our previous discussions pertaining to the type of soils present on site and their corresponding hydrologic soil group, an updated analysis has been performed with respect to the groundwater recharge requirement which follows the previous procedure performed with respect to the peak rate requirements. Two (2) iterations were analyzed: Iteration 1 assumes the presence of the Keyport soil type (HSG D) per the USDA/NRCS mapping and Iteration 2 assumes the presence of the Neshaminy soil type (HSG B) in lieu of the areas mapped Keyport. For each iteration, a pre-construction and post-construction volume for the 2-year storm event was calculated to quantity the volume of stormwater runoff volume generated by the proposed cover types associated with the project. The resulting difference between these pre- and post- volumes represents the increased volume that is to be infiltrated per N.J.A.C. 7:8-5.4 (a).2.i.(2). A hydrologic analysis was then performed for each iteration to evaluate the volume being infiltrated by the proposed infiltration basin. To provide a conservative approach, this analysis used the lowest field measured infiltration rate, applied a factor of safety of 2 per the NJ SW BMP manual, and accounted for the highest observed seasonal high groundwater elevation. For each

iteration, the resulting infiltrated volume is greater that the required volume, the summary of which is provided below. Supporting calculations for each iteration have also been attached.

Iteration 1 - Keyport HSG D (per USDA/NRCS) Pre vs. Post

Pre-Construction Volume (ft^3)	Post-Construction Volume (ft^3)	Required Volume [1] (ft^3)	Infiltrated Volume [2] (ft^3)
129,554	150,980	21,426	59,198

Iteration 2 - Neshaminy HSG B Pre vs. Post

Pre-Construction Volume (ft^3)	Post-Construction Volume (ft^3)	Required Volume [1] (ft^3)	Infiltrated Volume [2] (ft^3)
41,171	75,844	34,674	38,986

1. Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two- year storm is infiltrated, per N.J.A.C. 7:8-5.4 (a).2.i.(2)
2. From hydrologic analysis (HydroCAD) for 2-Year storm event utilizing the lowest field measured infiltration rate (1 in/hr) and applying a factor of safety of 2, resulting in a rate of 0.5 in/hr

Thanks,
Karen

Karen Olson | Environmental Specialist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Olivera, Stephen <Stephen.Olivera@dep.nj.gov>
Sent: Tuesday, April 9, 2019 1:30 PM
To: Olson, Karen <Karen.Olson@williams.com>
Cc: Kopkash, Ginger <Ginger.Kopkash@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Horner, Scott <Scott.Horner@williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: [EXTERNAL] RE: Additional information request

Karen,

I have spoken with my supervisor and manager and we all agree that your approach will suffice in resolving the HSG issue, in lieu of the additional requisite soil testing. However, an additional step of updating the recharge spreadsheet is required to ensure the recharge is still met assuming the Keyport soil (HDS D) is a Neshaminy soil (HSG B).

Stephen Olivera
Environmental Engineer 3
Bureau of Urban Growth & Redevelopment
Division of Land Use Regulation

From: Olson, Karen <Karen.Olson@williams.com>
Sent: Monday, April 08, 2019 1:38 PM
To: Olivera, Stephen <Stephen.Olivera@dep.nj.gov>

Cc: Kopkash, Ginger <Ginger.Kopkash@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Horner, Scott <Scott.Horner@williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: [EXTERNAL] RE: Additional information request

Hi Stephen,

I wanted to check in to see if you have had a chance to review the information discussed on Friday regarding the stormwater calculations for the CS 206 basin.

Thanks!
Karen

Karen Olson | Environmental Scientist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
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From: Olson, Karen
Sent: Friday, April 05, 2019 11:46 AM
To: Olivera, Stephen <Stephen.Olivera@dep.nj.gov>
Cc: Kopkash, Ginger <Ginger.Kopkash@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Horner, Scott <Scott.Horner@williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: RE: Additional information request

Hi Stephen,

Thanks again for taking some time to speak with us this morning (and on short notice) regarding the additional comment with respect to the hydrologic soil groups (HSGs). It was very helpful. As discussed, below we have outlined the design process that was followed in the preparation of the stormwater management calculations (Iteration 1), an additional iteration which takes account for changes in the HSG in vicinity of the basin based on field observations (Iteration 2), as well as a further iteration which takes account for potential changes for the entirety of the soil mapped HSG D area containing the compressor station and the portion of the access road draining to the infiltration basin (Iteration 3). These iterations have been performed to model essentially what the "extreme" ends of the spectrum that additional soil testing would provide (all HSG D or all HSG B), all of which result in the post-development peak runoff rates being less than the pre-development peak runoff rates, as well as less than the allowable peak runoff rates per the % reductions per N.J.A.C. 7:8-5.4(a)3.iii. As such, since additional soil testing would result in peak runoff rates that would fall within the extremes summarized below and not result in changes to the design or functionality of the basin, we would like to propose this as an alternative approach to performing the additional field testing.

Thanks,
Karen

Iteration 1

The stormwater design utilized the USDA/NRCS Soil Survey to determine the onsite soil types and their respective hydrologic soil groups for the determination of runoff curve numbers, per Appendix E, which states "the soil surveys are used to establish the existing soils condition and the associated hydrologic soil group (HSG) for the soil series. The soil type and HSG impact the computations to establish the existing groundwater recharge and existing runoff conditions necessary to evaluate compliance with the recharge and quantity control criteria of the Stormwater Management Rules." For the majority of the site where the compressor station is proposed to be located, this information indicated a classification of HSG D. The comparison of peak runoff rates based on this classification is what was prepared in the stormwater management report, and is summarized below:

HSG D (per USDA/NRCS) Pre vs. Post

Frequency (year)	Pre-Development	Post-Development	Difference from Pre-Development (cfs)	Allowable per % Rate Reductions [1] (%)	
WQ	2.8	1.0	**-1.8**	**-37%**	
1	12.4	4.3	**-8.1**	**-34%**	
2	18.4	6.5	**-11.9**	**-35%**	9.2
5	28.7	10.2	**-18.6**	**-35%**	
10	37.8	14.4	**-23.4**	**-38%**	28.4
25	51.9	21.8	**-30.1**	**-42%**	
50	64.3	28.8	**-35.5**	**-45%**	
100	78.1	37.7	**-40.4**	**-48%**	62.5

Iteration 2

During field based soil investigations in the vicinity of the proposed infiltration basin to determine the soil's suitability for groundwater recharge, observations in the test pits indicated a soil type of HSG B (Neshaminy Silt Loam). This HSG B soil type is also depicted in the USDA/NRCS Soil Survey to the east of the proposed basin, just outside the proposed limit of disturbance. This most likely indicates the boundary for this soil type extends slightly beyond its USDA/NRCS mapping unit into the limit of disturbance where the basin is proposed to be located. Per Appendix E, since this area has not been previously "altered through cuts, fills or other disturbances" the mapped HSG D unit was maintained as a conservative approach for sizing the basin since it generates higher post-development peak runoff rates. However, in consideration of NJDEP's concern that the HSG B soil type yields lower pre-development peak runoff rates (and thus lower allowable post-development peak runoff rates), an analysis has been performed which revises the soil type to HSG B (pre- and post-) within the vicinity of the proposed infiltration basin where these field determinations were observed. This comparison of peak runoff rates is summarized below:

HSG B (Infiltration Basin Area) Pre vs. Post

Frequency (year)	Pre-Development	Post-Development	Difference from Pre-Development (cfs)	Allowable per % Rate Reductions [1] (%)	
WQ	2.4	1.0	**-1.3**	**0%**	
1	11.6	4.2	**-7.3**	**-37%**	
2	17.4	6.4	**-11.0**	**-37%**	8.7
5	27.6	10.0	**-17.6**	**-36%**	
10	36.5	13.9	**-22.7**	**-38%**	27.4
25	50.5	21.0	**-29.5**	**-42%**	
50	62.8	27.7	**-35.1**	**-44%**	
100	76.6	35.5	**-41.1**	**-46%**	61.3

Iteration 3

Additionally, in further consideration of NJDEP's concern that the HSG B soil type is located not only within the area of the proposed infiltration basin where it was field observed, but also extends into the area of the proposed compressor station and the portion of the access road where USDA/NRCS Soil Survey is mapped as HSG D, an additional analysis has been performed which revises the soil type to HSG B (pre- and post-) for the entirety USDA/NRCS mapped HSG D area containing the compressor station and the portion of the access road draining to the infiltration basin. This comparison of peak runoff rates is summarized below:

HSG B (Entire Drainage Area to Infiltration Basin) Pre vs. Post

Frequency (year)	Pre-Development	Post-Development	Difference from Pre-Development (cfs)	Allowable per % Rate Reductions [1] (%)

WQ	0.0	0.0	**0.0**	**0%**	
1	0.9	0.3	**-0.6**	**-36%**	
2	2.4	1.2	**-1.2**	**-51%**	1.2
5	7.0	3.2	**-3.8**	**-46%**	
10	12.4	5.4	**-6.9**	**-44%**	9.3
25	22.0	9.1	**-12.9**	**-41%**	
50	31.3	13.5	**-17.8**	**-43%**	
100	42.3	19.3	**-23.1**	**-45%**	33.9

Karen Olson | Environmental Scientist
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From: Olivera, Stephen [mailto:Stephen.Olivera@dep.nj.gov]
Sent: Thursday, April 04, 2019 3:58 PM
To: Olson, Karen <Karen.Olson@williams.com>
Cc: Kopkash, Ginger <Ginger.Kopkash@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Horner, Scott <Scott.Horner@williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: [EXTERNAL] RE: Additional information request

Karen,

Does 11am work?

From: Olson, Karen <Karen.Olson@williams.com>
Sent: Thursday, April 04, 2019 4:51 PM
To: Olivera, Stephen <Stephen.Olivera@dep.nj.gov>
Cc: Kopkash, Ginger <Ginger.Kopkash@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Horner, Scott <Scott.Horner@williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: [EXTERNAL] RE: Additional information request

Hi Stephen,

Are you available for a call tomorrow morning to discuss comment 1, below? In the interest of time we'd like to discuss as soon as possible.

Thanks,
Karen

Karen Olson | Environmental Scientist
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Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
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Before printing, think about your responsibility and commitment to the environment!

From: Jones, Christopher [mailto:Christopher.Jones@dep.nj.gov]
Sent: Wednesday, April 03, 2019 10:44 AM
To: Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Kopkash, Ginger <Ginger.Kopkash@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Olivera, Stephen <Stephen.Olivera@dep.nj.gov>; Olson, Karen <Karen.Olson@williams.com>; Horner, Scott <Scott.Horner@williams.com>
Subject: [EXTERNAL] Additional information request

All,

Following up on our conversation yesterday, we have 2 more significant public comments that we need responses to.

Comments were made by Princeton Hydro regarding deficiencies with the stormwater management design include the use of the wrong curve numbers in designing the infiltration basin and that the infiltration basin is considered a low dam.

1. Regarding the curve number issue, Princeton Hydro stated that there is a conflict between the mapped soil unit identified in the Soil Survey and the geotechnical investigation that was performed in the vicinity of the infiltration basin; this conflict potentially impacts the area of the compressor station and a portion of the access road. The Soil Survey identifies the soil as a Keyport silt loam, and this information was used in the stormwater design and is referenced it the submitted Stormwater Report, last revised February 2019. On the other hand, the same Stormwater Report concluded that the soils are Neshaminy silt loam. Keyport silt loam belongs to hydrologic soil group (HSG) D, while Neshaminy silt loam, which is HSG B. This discrepancy directly influences the curve numbers chosen, which will impact the peak runoff rates and ultimately the sizing the infiltration basin. Appendix E of the NJ BMP Manual provides two different solutions for situations where the HSG is unknown or inaccurate if the discrepancy cannot be resolved. One option is to perform additional soil testing. Appendix E requires at least one soil profile pit and four soil borings for the first two acres and one additional soil profile pit and two additional soil borings for each additional 2 acres. The area-in-question is approximately 25 acres; therefore, the applicant would be required to conduct 13 soil profile pits and 28 soil borings. It is my understanding that some of this soil data collection has already been accomplished. The explorations should be located generally equidistant from each other and the boundaries of the mapping unit to maximize the ability to interpolate between test locations so as to provide adequate characterization of the mapping unit's soil. In areas where a soil profile pit would substantially disturb the existing area and create an undesirable condition or where significant environmental disturbance will occur in an area that is not intended for future development, two soil borings may be conducted in the place of a required soil profile pit with a soil profile pit located at the closest available location representative of the soil boring locations. The soil profile pits and soil borings must extend to the depth of the seasonal high groundwater table or the deeper six (6) feet below the existing grade. The determination of the soil HSG is based upon the depth of restrictions and the permeability rate of the most restrictive soil horizon above either the restriction or SHGWT. The other option allowed is to assume the pre-existing condition to have an HSG of B and the post-developed condition to have an HSG of D; this is a very conservative assumption and will result in the basin needing to get much larger. For specific guidance or further information, please contact Stephen Olivera of our office at Stephen.Olivera@dep.nj.gov or at (609) 984-6216.

2. The stormwater basin is also classified as a Class IV dam. According to our Division of Dam Safety and Flood Control (Dam Safety), the Dam Safety Rules require local approval for the dam. However, Dam Safety also informs us that if the local government will not approve the dam or if local approval is not needed because FERC preempts, the dam is then required to meet the requirements of a Class III Dam and requires approval from the Division of Dam Safety and Flood Control. I've added the citation from the Dam Safety Rules below that was provided

to us by the Division of Sam Safety. Their contact is Darin Shaffer, Manager (609) 984-0859. You may contact Darin for a better understanding of their role in reviewing and permitting class IV dams.

Dam Safety Rule

N.J.A.C. 7:20-1.3 Permit-by-rule

(a) All dams must be designed, constructed, operated, maintained, or removed in compliance with the rules in this subchapter except as set forth below:

1. Owners and operators of Class IV dams (see N.J.A.C. 7:20-1.8, Dam classification) are not required to file documents with nor obtain a permit from the Department, but must meet the following requirements, in addition to those set forth elsewhere in this subchapter:

i. Design must be based upon a spillway design storm that results in rainfall of 50 percent greater than a 24-hour, 100-year, Type III storm (Later technology adopted by the United States Department of Agriculture, Natural Resources Conservation Service may be substituted for the use of the Type III storm.); and

ii. All necessary local approvals must be obtained;

iii. A New Jersey licensed professional engineer must design the Class IV Dam to meet all technical requirements of this subchapter; and

iv. If the Class IV dam is designed or constructed for stormwater management purposes, the dam shall comply with the Stormwater Management Rules at N.J.A.C. 7:8.

Don't hesitate to contact me if you have any questions. Thank you.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

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SUPPLEMENTAL INFORMATION
STORMWATER MANAGEMENT REPORT

FOR

NORTHEAST SUPPLY ENHANCEMENT PROJECT
COMPRESSOR STATION 206

FRANKLIN TOWNSHIP
SOMERSET COUNTY, NEW JERSEY

APRIL 2019

Prepared for:

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
2800 POST OAK BOULEVARD
HOUSTON, TEXAS 77251-1396

Prepared By:

625 WEST RIDGE PIKE
CONSHOHOCKEN, PENNSYLVANIA 19428
610-832-8832

AECOM Project No. 60537393

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I. BACKGROUND

Transcontinental Gas Pipe Line Company, LLC (Transco) is proposing to construct a Compressor Station (CS 206) in Franklin Township, Somerset County, New Jersey. The project will involve the construction of small buildings, gravel access road and parking areas, equipment pads, and the installation of two gas pipelines (a suction line and a gas discharge line) to connect the proposed compressor station to the existing natural gas transmission line.

This Report provides supplemental information in response to an additional information request issued by the New Jersey Department of Environmental Projection (NJDEP) Land Use division via email dated April 3, 2019 related to the following two (2) items:

- Hydrologic Soil Group
- Dam Safety

Supplemental information and analysis regarding these items can be found below.

II. HYDROLOGIC SOIL GROUP

1. Runoff Quantity

The stormwater design utilized the USDA/NRCS Soil Survey to determine the onsite soil types and their respective hydrologic soil groups for the determination of runoff curve numbers, per Appendix E, which states "the soil surveys are used to establish the existing soils condition and the associated hydrologic soil group (HSG) for the soil series. The soil type and HSG impact the computations to establish the existing groundwater recharge and existing runoff conditions necessary to evaluate compliance with the recharge and quantity control criteria of the Stormwater Management Rules." For the majority of the site where the compressor station is proposed to be located, this information indicated a classification of HSG D (Keyport Silt Loam). The comparison of peak runoff rates based on this classification is what was prepared in the stormwater management report.

During field based soil investigations in the vicinity of the proposed infiltration basin to determine the soil's suitability for groundwater recharge, observations in the test pits indicated a soil type of HSG B (Neshaminy Silt Loam). This HSG B soil type is also depicted in the USDA/NRCS Soil Survey to the east of the proposed basin, just outside the proposed limit of disturbance. Per Appendix E of the NJDEP Manual, since this area has not been previously "altered through cuts, fills or other disturbances" the mapped HSG D unit was maintained as a conservative approach for sizing the basin since it generates higher post-development peak runoff rates. However, in consideration of NJDEP's concern that the HSG B soil type yields lower pre-development peak runoff rates (and thus lower allowable post-development peak runoff rates), an additional analysis has been performed which revises the soil type to Neshaminy Silt Loam (HSG B) for the entirety USDA/NRCS mapped Keyport Silt Loam (HSG D) area draining to the infiltration basin.

These analyses have been performed to model what the "extreme" ends of the spectrum that additional soil testing would provide (all HSG D or all HSG B), all of which result in post-development peak runoff rates that are less than the pre-development peak runoff rates, as well as less than the allowable peak runoff rates per the % reductions per N.J.A.C. 7:8-

5.4(a)3.iii, and are summarized below and supporting calculations can be found within Appendix B.

POI #1 - Keyport HSG D (per USDA/NRCS) Pre vs. Post

Frequency (year)	Pre-Development	Post-Development	Difference from Pre-Development	Allowable per % Rate Reductions [1]
WQ	2.8	1.0	**-1.8**	
1	12.4	4.3	**-8.1**	
2	18.4	6.5	**-11.9**	9.2
5	28.7	10.2	**-18.6**	
10	37.8	14.4	**-23.4**	28.4
25	51.9	21.8	**-30.1**	
50	64.3	28.8	**-35.5**	
100	78.1	41.9	**-37.0**	62.5

POI #1 - Neshaminy HSG B Pre vs. Post

Frequency (year)	Pre-Development	Post-Development	Difference from Pre-Development	Allowable per % Rate Reductions [1]
WQ	0.0	0.0	**0.0**	
1	0.9	0.3	**-0.6**	
2	2.4	1.2	**-1.2**	1.2
5	7.0	3.2	**-3.8**	
10	12.4	5.4	**-6.9**	9.3
25	22.0	9.1	**-12.9**	
50	31.3	13.5	**-17.8**	
100	42.3	19.3	**-23.1**	33.9

1. Post-construction peak runoff rates for the 2-, 10-, and 100-year storm events are less than 50%, 75%, and 80% (respectively) of the pre-construction rates per 7:8-5.4(a)3.iii. All other storm events have an allowable post-construction peak runoff rate equivalent to their respective pre-construction rates.

2. Groundwater Recharge

In addition to considering the impacts that hydrologic soil group could have on peak flow rates, an updated analysis was also performed with respect to the groundwater recharge requirement. Two (2) iterations were analyzed: Iteration 1 assumes the presence of the Keyport soil type (HSG D) per the USDA/NRCS mapping and Iteration 2 assumes the presence of the Neshaminy soil type (HSG B) in lieu of the areas mapped Keyport. For each iteration, a pre-construction and post-construction volume for the 2-year storm event was calculated to quantity the volume of stormwater runoff volume generated by the proposed cover types associated with the project. The resulting difference between these pre- and post- volumes represents the increased volume that is to be infiltrated per N.J.A.C. 7:8-5.4 (a).2.i.(2). A hydrologic analysis was then performed for each iteration to evaluate the volume being infiltrated by the proposed infiltration basin. To provide a conservative approach, this analysis used the lowest field measured infiltration rate, applied a factor of safety of 2 per the NJ SW BMP manual, and accounted for the highest observed seasonal high groundwater elevation. The infiltration modeled was used only to demonstrate the volume being recharged, and is not being used for the quantity/peak rate reductions listed

above which conservatively assume zero infiltration. For each iteration, the resulting infiltrated volume is greater that the required volume which is summarized below and supporting calculations can be found within Appendix C.

Keyport HSG D (per USDA/NRCS) Pre vs. Post

Pre-Construction Volume (ft^3)	Post-Construction Volume (ft^3)	Required Volume [1] (ft^3)	Infiltrated Volume [2] (ft^3)
129,554	150,980	21,426	59,198

Neshaminy HSG B Pre vs. Post

Pre-Construction Volume (ft^3)	Post-Construction Volume (ft^3)	Required Volume [1] (ft^3)	Infiltrated Volume [2] (ft^3)
41,171	75,844	34,674	38,986

1. Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two- year storm is infiltrated, per N.J.A.C. 7:8-5.4 (a).2.i.(2)
2. From hydrologic analysis (HydroCAD) for 2-Year storm event utilizing the lowest field measured infiltration rate (1 in/hr) and applying a factor of safety of 2, resulting in a rate of 0.5 in/hr

3. Runoff Quality

The water quality design storm was also considered for both HSG scenarios. The standards for groundwater recharge found at N.J.A.C. 7:8-5.5 states that stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm by 80 percent of the anticipated load from the developed site, expressed as an annual average. All proposed impervious areas associated with the project are contained with POI #1 and are captured by the infiltration basin. Information contained within the New Jersey Stormwater Best Management Practices Manual shows that an infiltration basin will remove 80 percent of the TSS from the stormwater runoff. Hydrologic modeling for the water quality design storm can be found within Appendix D.

III. DAM SAFETY

The spillway for the proposed infiltration basin has been widened such that it can convey a design storm that results in rainfall of 50 percent greater than the 24-hour, 100-year storm utilizing the NOAA/NRCS Type C distribution (as requested to be utilized by NJDEP which outdates the Type III distribution). The design conservatively assumes no flow through the primary outfall structure (inlet box with orifices, grate, and outfall pipe) and all flow is conveyed over the spillway. Supporting calculations can be found within Appendix E.

APPENDIX A
CURVE NUMBERS

APPENDIX A.1
KEYPORT (HSG D)

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 10/4/2018

Location: **PRE POI#1** Checked: PPH Date: 10/4/2018
(Assumed Keyport HSG D)

Circle One: **Present** Developed

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65				
C	Woods	70			1.29	
C	Meadow	71				
C	Gravel	89				
C	Impervious	98				
D	Brush	73				
D	Woods	77			19.36	
D	Meadow	78			4.69	
D	Gravel	91				
D	Impervious	98				
				Total =	25.33	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 10/4/2018

Location: **POST POI#1 - INFILTRATION BASIN (Assumed Keyport HSG D)** Checked: PPH Date: 10/4/2018

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65				
C	Woods	70				
C	Meadow	71				
C	Gravel	89			0.39	
C	Impervious	98				
D	Brush	73			2.96	
D	Woods	77				
D	Meadow	78			7.24	
D	Gravel	91			4.69	
D	Impervious	98			0.55	
				Total =	15.83	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 10/4/2018

Location: **POST POI#1 - BYPASS (Assumed Keyport HSG D)** Checked: PPH Date: 10/4/2018

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65			0.90	
C	Woods	70				
C	Meadow	71				
C	Gravel	89				
C	Impervious	98				
D	Brush	73			3.16	
D	Woods	77				
D	Meadow	78			5.30	
D	Gravel	91			0.15	
D	Impervious	98				
				Total =	9.50	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 10/4/2018

Location: **PRE POI#2** Checked: PPH Date: 10/4/2018

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65				
C	Woods	70			1.06	
C	Meadow	71			0.06	
C	Gravel	89				
C	Impervious	98				
D	Brush	73				
D	Woods	77			1.24	
D	Meadow	78				
D	Gravel	91				
D	Impervious	98				
				Total =	2.36	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 10/4/2018

Location: **POST POI#2 - BASIN 1** Checked: PPH Date: 10/4/2018

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65				
C	Woods	70				
C	Meadow	71			0.27	
C	Gravel	89			0.06	
C	Impervious	98				
D	Brush	73				
D	Woods	77				
D	Meadow	78				
D	Gravel	91				
D	Impervious	98				
				Total =	0.33	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 10/4/2018

Location: **POST POI#2 - BASIN #2** Checked: PPH Date: 10/4/2018

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65				
C	Woods	70				
C	Meadow	71			0.20	
C	Gravel	89			0.06	
C	Impervious	98				
D	Brush	73				
D	Woods	77				
D	Meadow	78				
D	Gravel	91				
D	Impervious	98				
				Total =	0.26	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 10/4/2018

Location: **POST POI#2 - BYPASS** Checked: PPH Date: 10/4/2018

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65			0.38	
C	Woods	70				
C	Meadow	71				
C	Gravel	89			0.15	
C	Impervious	98				
D	Brush	73			0.94	
D	Woods	77				
D	Meadow	78				
D	Gravel	91			0.30	
D	Impervious	98				
				Total =	1.77	

* Use only one CN source per line.

APPENDIX A.2
NESHAMINY (HSG B)

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 2/4/2019

Location: **PRE POI#1** Checked: PPH Date: 2/4/2019

(Assumed Neshaminy HSG B)

Circle One: **Present** Developed

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55			19.36	
B	Meadow	58			4.69	
B	Gravel	85				
B	Impervious	98				
C	Brush	65				
C	Woods	70			1.29	
C	Meadow	71				
C	Gravel	89				
C	Impervious	98				
D	Brush	73				
D	Woods	77				
D	Meadow	78				
D	Gravel	91				
D	Impervious	98				
				Total =	25.33	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 2/4/2019

Location: **POST POI#1 - INFILTRATION BASIN (Assumed Neshaminy HSG B)** Checked: PPH Date: 2/4/2019

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48			2.96	
B	Woods	55				
B	Meadow	58			7.24	
B	Gravel	85			4.69	
B	Impervious	98			0.55	
C	Brush	65				
C	Woods	70				
C	Meadow	71				
C	Gravel	89			0.39	
C	Impervious	98				
D	Brush	73				
D	Woods	77				
D	Meadow	78				
D	Gravel	91				
D	Impervious	98				
				Total =	15.83	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 2/4/2019

Location: **POST POI#1 - BYPASS (Assumed Neshaminy HSG B)** Checked: PPH Date: 2/4/2019

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48			3.16	
B	Woods	55				
B	Meadow	58			5.30	
B	Gravel	85			0.15	
B	Impervious	98				
C	Brush	65			0.90	
C	Woods	70				
C	Meadow	71				
C	Gravel	89				
C	Impervious	98				
D	Brush	73				
D	Woods	77				
D	Meadow	78				
D	Gravel	91				
D	Impervious	98				
				Total =	9.50	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 2/4/2019

Location: **PRE POI#2** Checked: PPH Date: 2/4/2019

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65				
C	Woods	70			1.06	
C	Meadow	71			0.06	
C	Gravel	89				
C	Impervious	98				
D	Brush	73				
D	Woods	77			1.24	
D	Meadow	78				
D	Gravel	91				
D	Impervious	98				
				Total =	2.36	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 2/4/2019

Location: **POST POI#2 - BASIN 1** Checked: PPH Date: 2/4/2019

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area acres ☐ mi² ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65				
C	Woods	70				
C	Meadow	71			0.27	
C	Gravel	89			0.06	
C	Impervious	98				
D	Brush	73				
D	Woods	77				
D	Meadow	78				
D	Gravel	91				
D	Impervious	98				
				Total =	0.33	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 2/4/2019

Location: **POST POI#2 - BASIN #2** Checked: PPH Date: 2/4/2019

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN *			☒ Area ☐ acres ☐ mi^2 ☐ %	Product of CNxArea
		Table 2-2	Figure 2-3	Figure 2-4		
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65				
C	Woods	70				
C	Meadow	71			0.20	
C	Gravel	89			0.06	
C	Impervious	98				
D	Brush	73				
D	Woods	77				
D	Meadow	78				
D	Gravel	91				
D	Impervious	98				
				Total =	0.26	

* Use only one CN source per line.

Worksheet 2: Runoff Curve Number

Project: **NESE CS 206** By: HMS Date: 2/4/2019

Location: **POST POI#2 - BYPASS** Checked: PPH Date: 2/4/2019

Circle One: Present **Developed**

1. Runoff Curve Number (CN)

Hydrologic Soil Group	Cover Description	CN * Table 2-2	CN * Figure 2-3	CN * Figure 2-4	☒ Area ☐ acres ☐ mi^2 ☐ %	Product of CNxArea
A	Brush	30				Not Applicable (weighted CN not used)
A	Woods	30				
A	Meadow	30				
A	Gravel	76				
A	Impervious	98				
B	Brush	48				
B	Woods	55				
B	Meadow	58				
B	Gravel	85				
B	Impervious	98				
C	Brush	65			0.38	
C	Woods	70				
C	Meadow	71				
C	Gravel	89			0.15	
C	Impervious	98				
D	Brush	73			0.94	
D	Woods	77				
D	Meadow	78				
D	Gravel	91			0.30	
D	Impervious	98				
				Total =	1.77	

* Use only one CN source per line.

APPENDIX B
PEAK RATE ANALYSIS (QUANTITY)

APPENDIX B.1
KEYPORT (HSG D)

Summary of Peak Flow

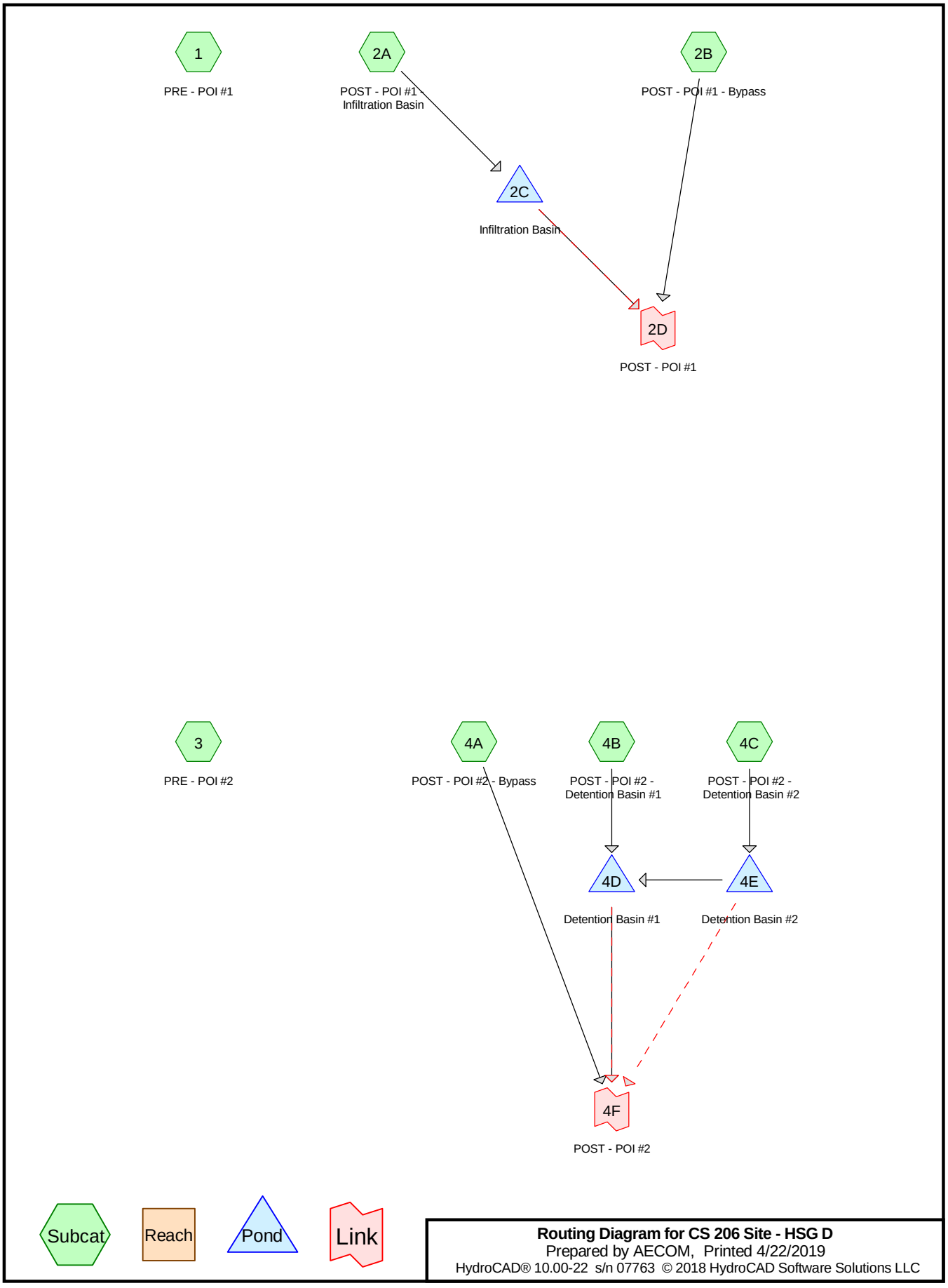
(All Flow Rates in CFS)

Completed by:	PPH	4/4/2019
Check By:	TPF	4/22/2019

POI #1 - Keyport HSG D (per USDA/NRCS) Pre vs. Post

Frequency (year)	Pre-Development	Post-Development	Difference from Pre-Development	Allowable per % Rate Reductions [1]
WQ	2.8	1.0	**-1.8**	
1	12.4	4.3	**-8.1**	
2	18.4	6.5	**-11.9**	9.2
5	28.7	10.2	**-18.6**	
10	37.8	14.4	**-23.4**	28.4
25	51.9	21.8	**-30.1**	
50	64.3	28.8	**-35.5**	
100	78.1	41.9	**-36.2**	62.5

1. Post-construction peak runoff rates for the 2-, 10-, and 100-year storm events are less than 50%, 75%, and 80% (respectively) of the pre-construction rates per 7:8-5.4(a)3.iii. All other storm events have an allowable post-construction peak runoff rate equivalent to their respective pre-construction rates.



Routing Diagram for CS 206 Site - HSG D
Prepared by AECOM, Printed 4/22/2019
HydroCAD® 10.00-22 s/n 07763 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment 1: PRE - POI #1

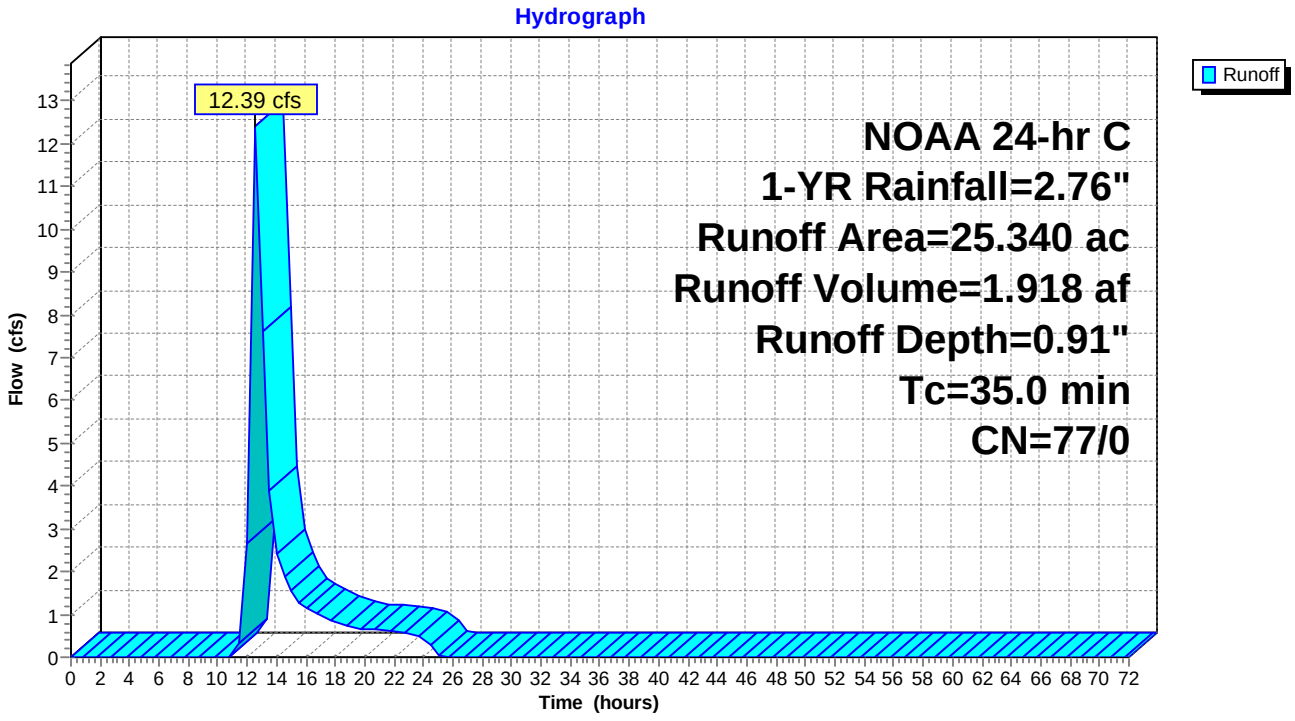
Runoff = 12.39 cfs @ 12.59 hrs, Volume= 1.918 af, Depth= 0.91"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

	Area (ac)	CN	Description
*	1.290	70	Woods C
*	4.690	78	Meadow D
*	19.360	77	Woods D
	25.340	77	Weighted Average
	25.340	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

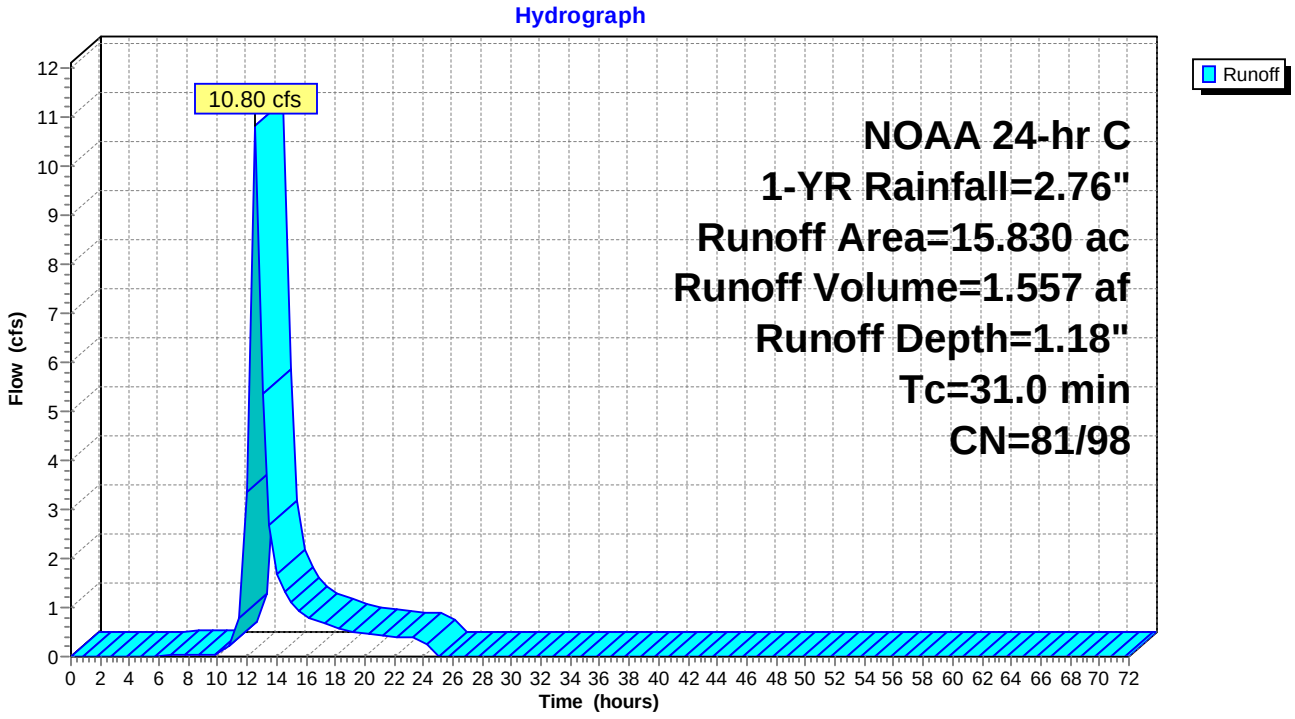
Runoff = 10.80 cfs @ 12.54 hrs, Volume= 1.557 af, Depth= 1.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

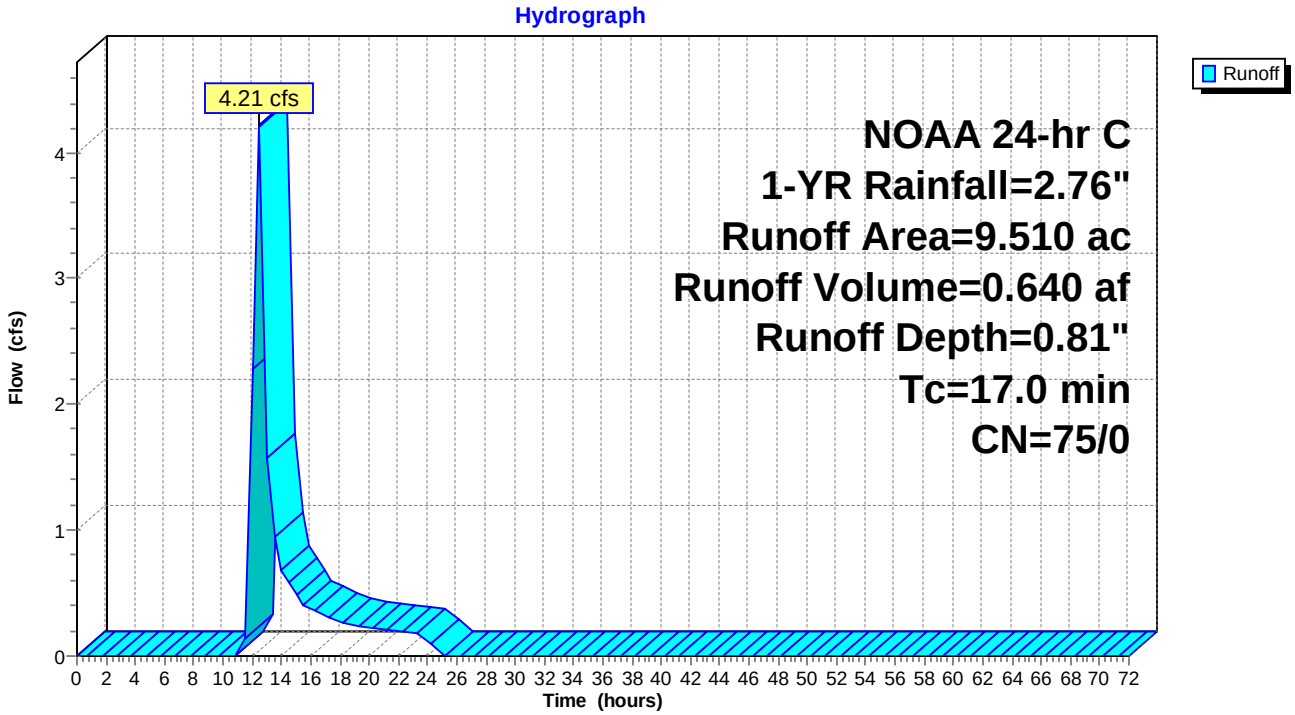
Runoff = 4.21 cfs @ 12.46 hrs, Volume= 0.640 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

	Area (ac)	CN	Description
*	0.000	71	Meadow C
*	5.300	78	Meadow D
*	0.150	91	Gravel D
*	3.160	73	Brush D
*	0.900	65	Brush C
	9.510	75	Weighted Average
	9.510	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

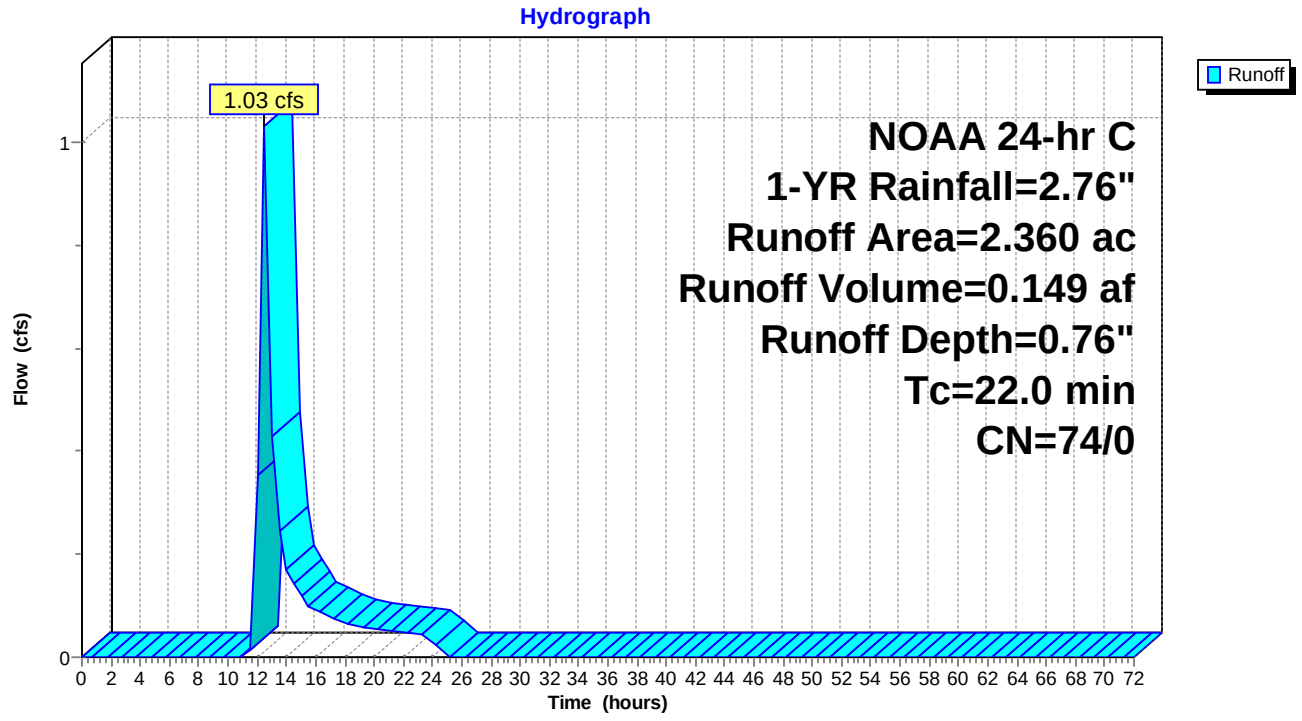
Runoff = 1.03 cfs @ 12.51 hrs, Volume= 0.149 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

	Area (ac)	CN	Description
*	0.060	71	Meadow C
*	1.060	70	Woods C
*	1.240	77	Woods D
	2.360	74	Weighted Average
	2.360	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

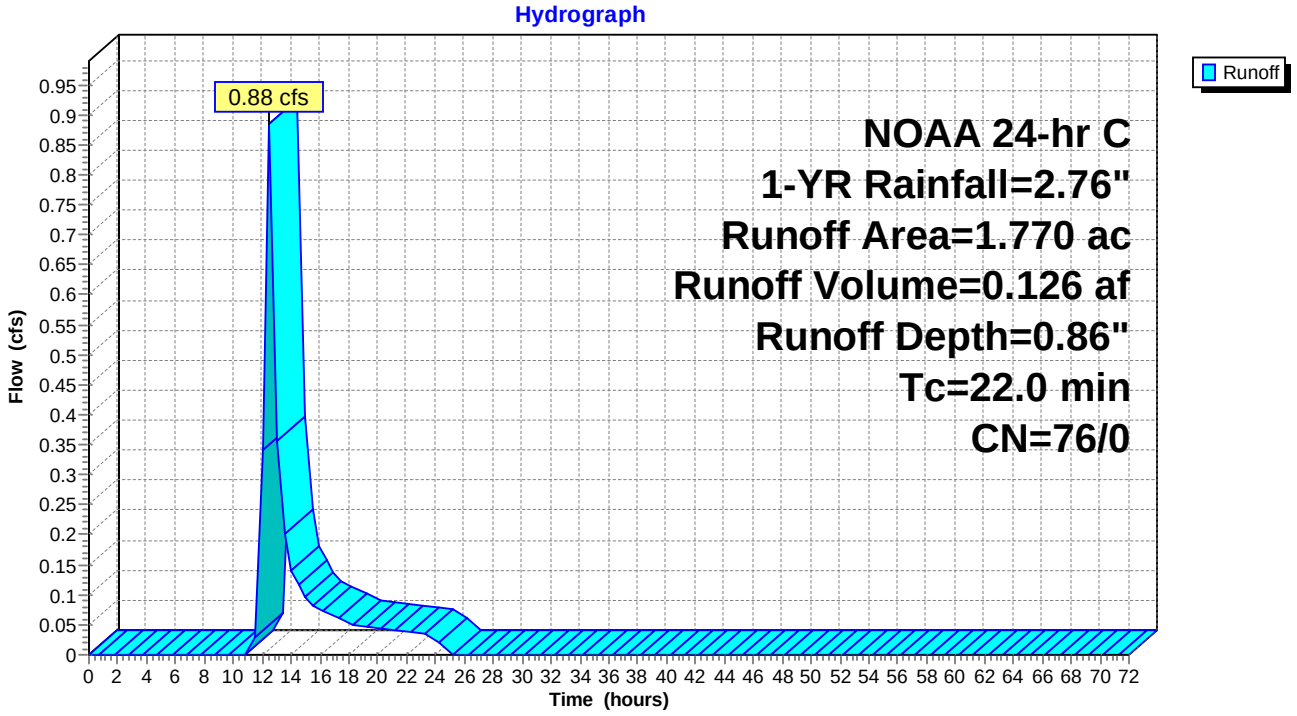
Runoff = 0.88 cfs @ 12.50 hrs, Volume= 0.126 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

	Area (ac)	CN	Description
*	0.380	65	Brush C
*	0.150	89	Gravel C
*	0.940	73	Brush D
*	0.300	91	Gravel D
	1.770	76	Weighted Average
	1.770	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

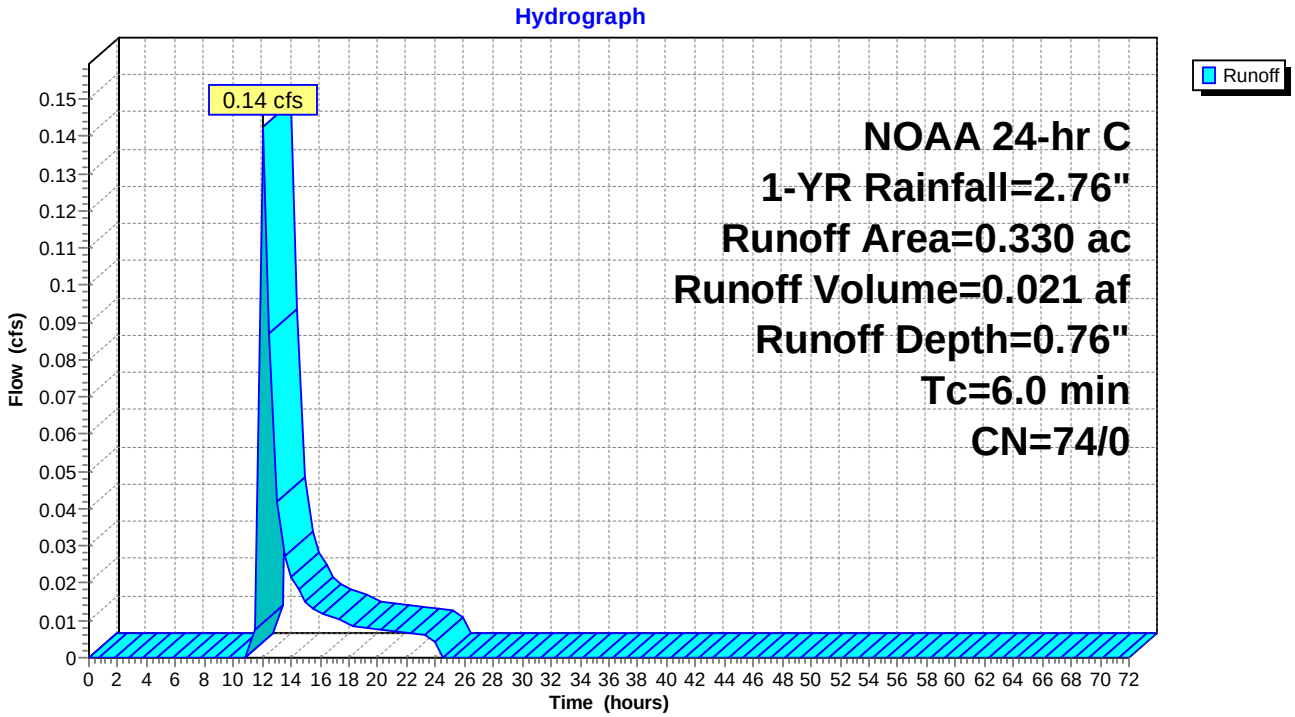
Runoff = 0.14 cfs @ 12.11 hrs, Volume= 0.021 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

	Area (ac)	CN	Description
*	0.270	71	Meadow C
*	0.060	89	Gravel C
	0.330	74	Weighted Average
	0.330	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

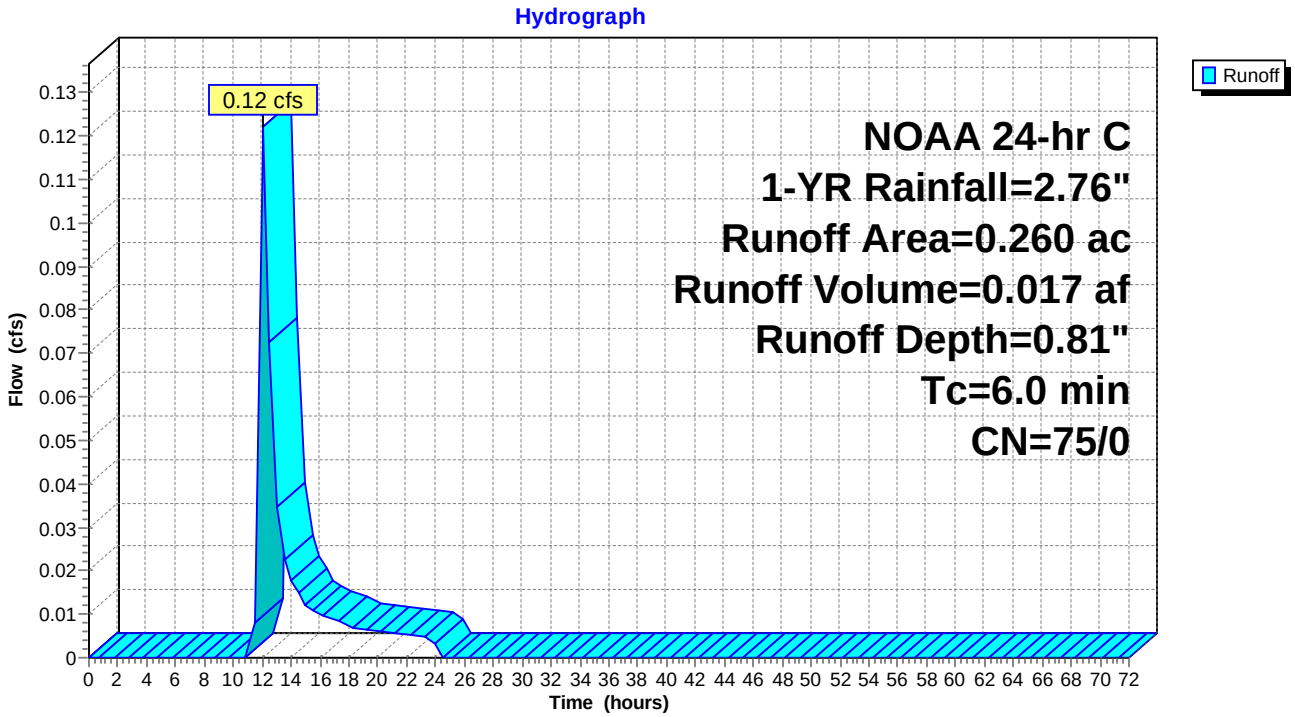
Runoff = 0.12 cfs @ 12.10 hrs, Volume= 0.017 af, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

	Area (ac)	CN	Description
*	0.200	71	Meadow C
*	0.060	89	Gravel C
	0.260	75	Weighted Average
	0.260	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 1.18" for 1-YR event
Inflow = 10.80 cfs @ 12.54 hrs, Volume= 1.557 af
Outflow = 0.69 cfs @ 17.07 hrs, Volume= 1.184 af, Atten= 94%, Lag= 271.7 min
Primary = 0.69 cfs @ 17.07 hrs, Volume= 1.184 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 263.45' @ 17.07 hrs Surf.Area= 34,290 sf Storage= 46,933 cf

Plug-Flow detention time= 970.3 min calculated for 1.175 af (75% of inflow)
Center-of-Mass det. time= 893.3 min (1,760.6 - 867.3)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

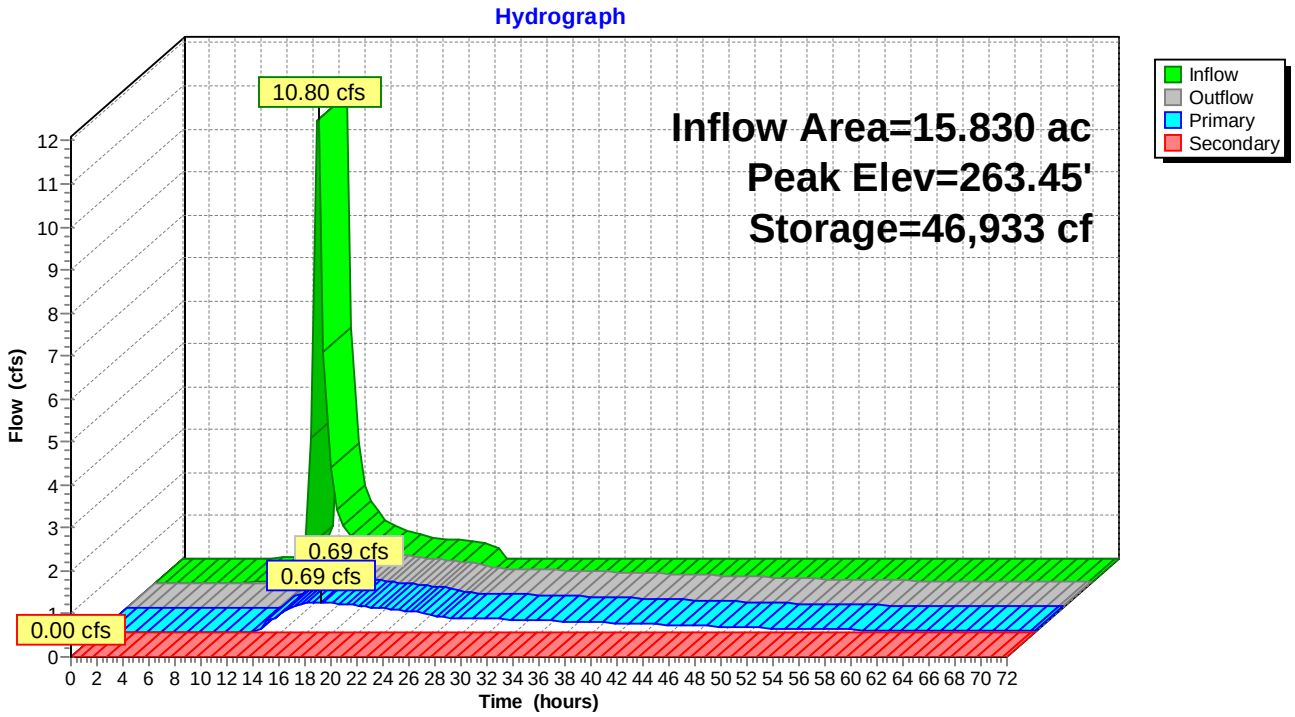
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.69 cfs @ 17.07 hrs HW=263.45' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.69 cfs of 13.19 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.39 cfs @ 4.48 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.30 cfs @ 1.55 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 0.78" for 1-YR event
Inflow = 0.19 cfs @ 12.12 hrs, Volume= 0.038 af
Outflow = 0.10 cfs @ 12.79 hrs, Volume= 0.038 af, Atten= 45%, Lag= 39.6 min
Primary = 0.10 cfs @ 12.79 hrs, Volume= 0.038 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.11' @ 12.79 hrs Surf.Area= 993 sf Storage= 217 cf

Plug-Flow detention time= 20.1 min calculated for 0.038 af (99% of inflow)
Center-of-Mass det. time= 20.2 min (909.0 - 888.8)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

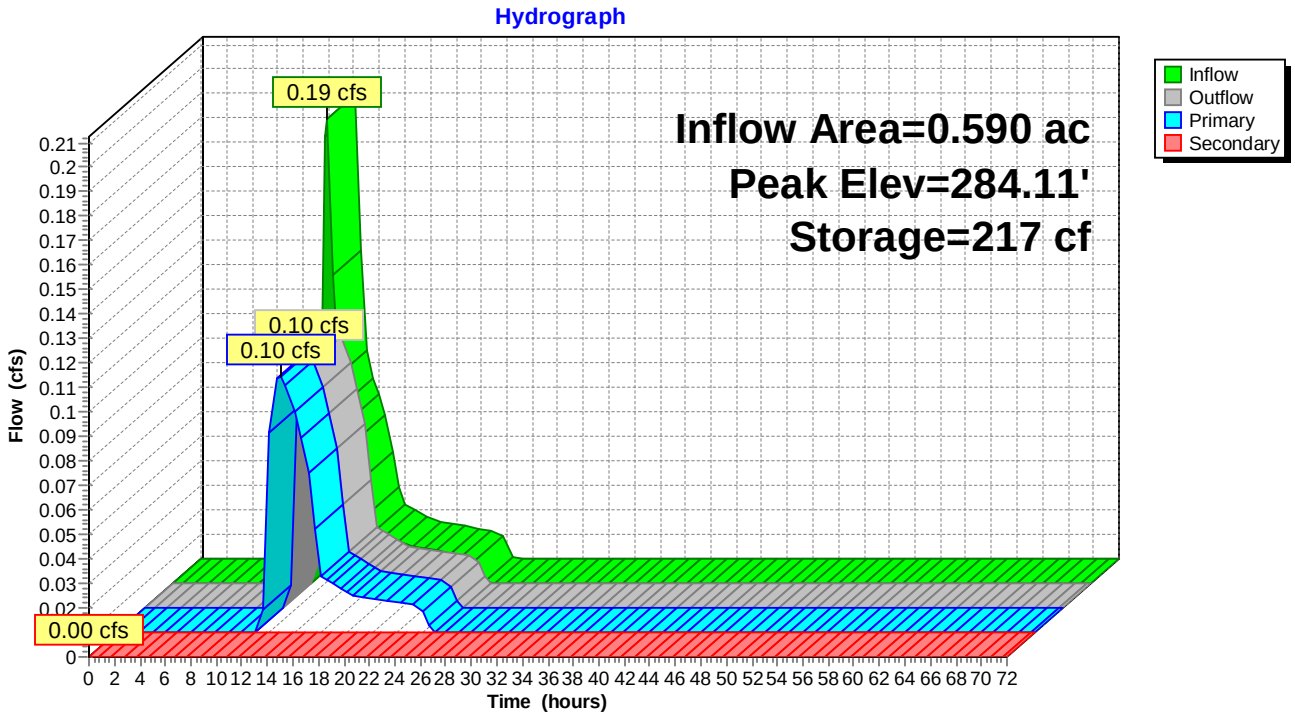
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.10 cfs @ 12.79 hrs HW=284.10' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.10 cfs of 1.15 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.10 cfs @ 3.05 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 0.81" for 1-YR event
Inflow = 0.12 cfs @ 12.10 hrs, Volume= 0.017 af
Outflow = 0.05 cfs @ 13.69 hrs, Volume= 0.018 af, Atten= 62%, Lag= 95.0 min
Primary = 0.05 cfs @ 13.69 hrs, Volume= 0.018 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.18' @ 12.97 hrs Surf.Area= 1,026 sf Storage= 190 cf

Plug-Flow detention time= 33.7 min calculated for 0.017 af (99% of inflow)
Center-of-Mass det. time= 33.9 min (905.1 - 871.3)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

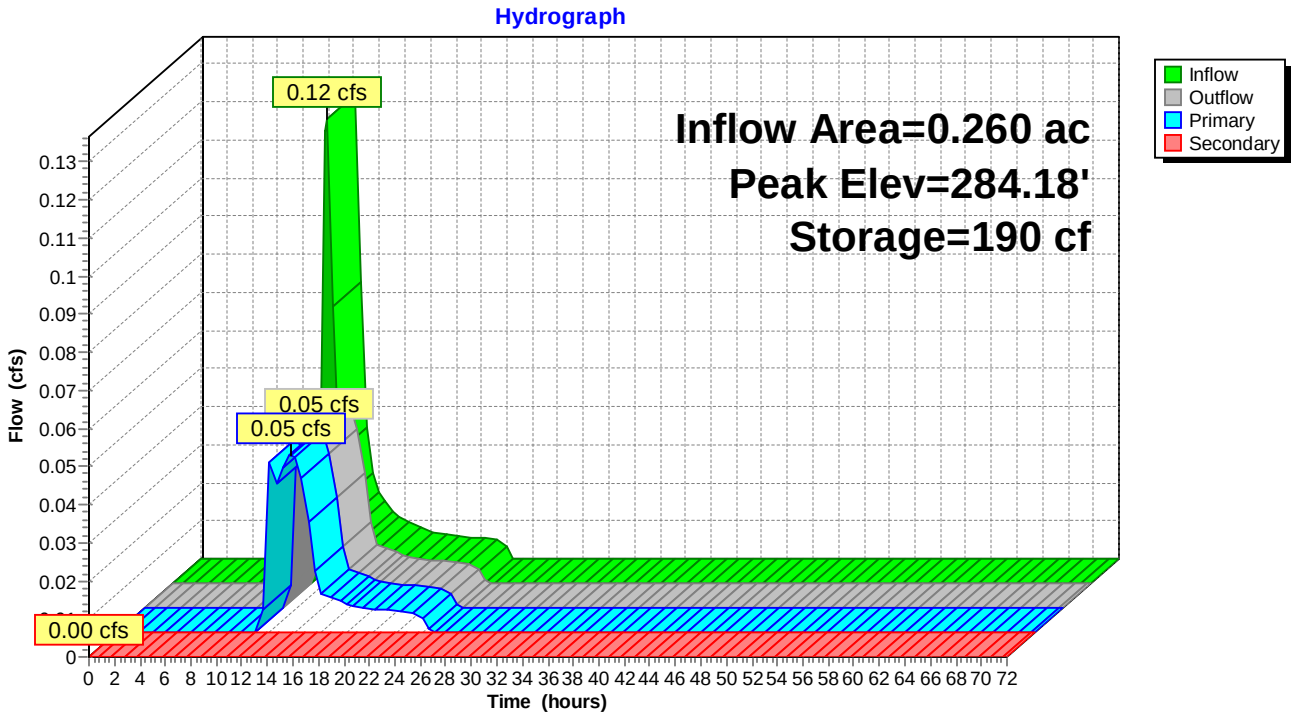
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.05 cfs @ 13.69 hrs HW=284.12' TW=284.04' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.05 cfs of 0.19 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.38 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

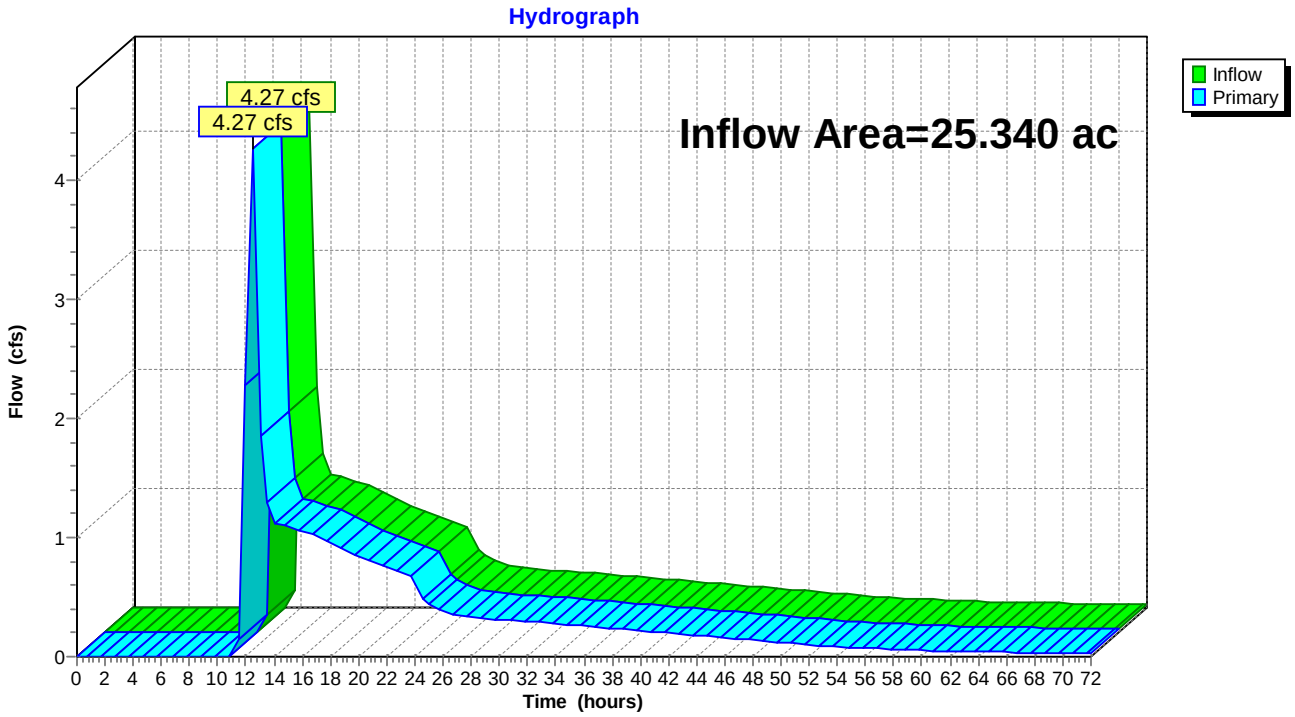
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 0.86" for 1-YR event
Inflow = 4.27 cfs @ 12.48 hrs, Volume= 1.824 af
Primary = 4.27 cfs @ 12.48 hrs, Volume= 1.824 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

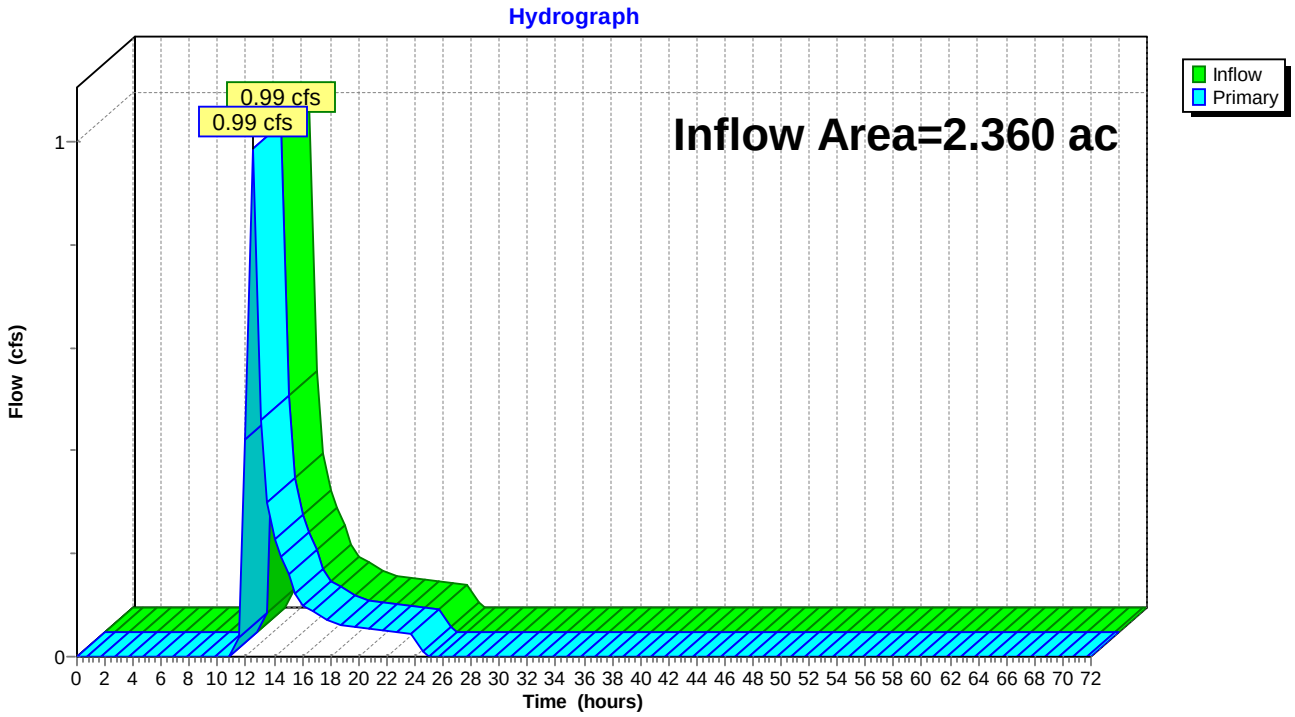


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 0.84" for 1-YR event
Inflow = 0.99 cfs @ 12.51 hrs, Volume= 0.165 af
Primary = 0.99 cfs @ 12.51 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

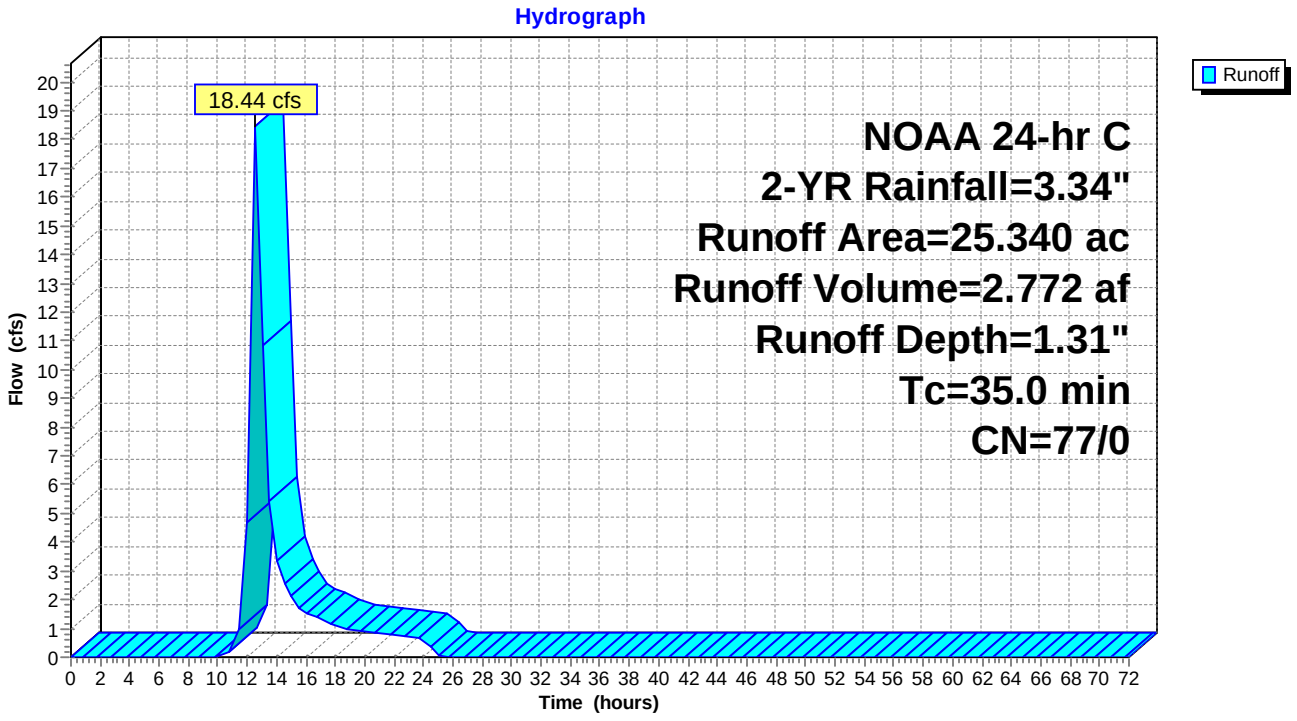
Runoff = 18.44 cfs @ 12.57 hrs, Volume= 2.772 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

	Area (ac)	CN	Description
*	1.290	70	Woods C
*	4.690	78	Meadow D
*	19.360	77	Woods D
	25.340	77	Weighted Average
	25.340	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

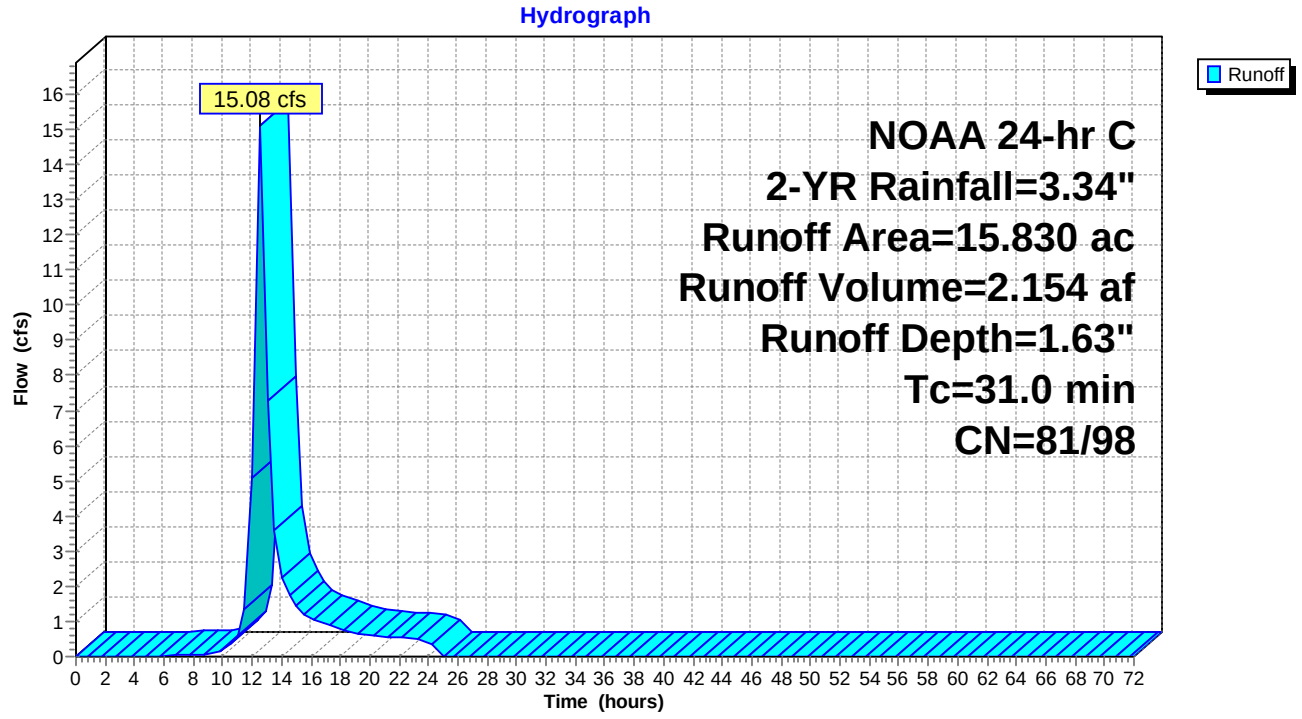
Runoff = 15.08 cfs @ 12.53 hrs, Volume= 2.154 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

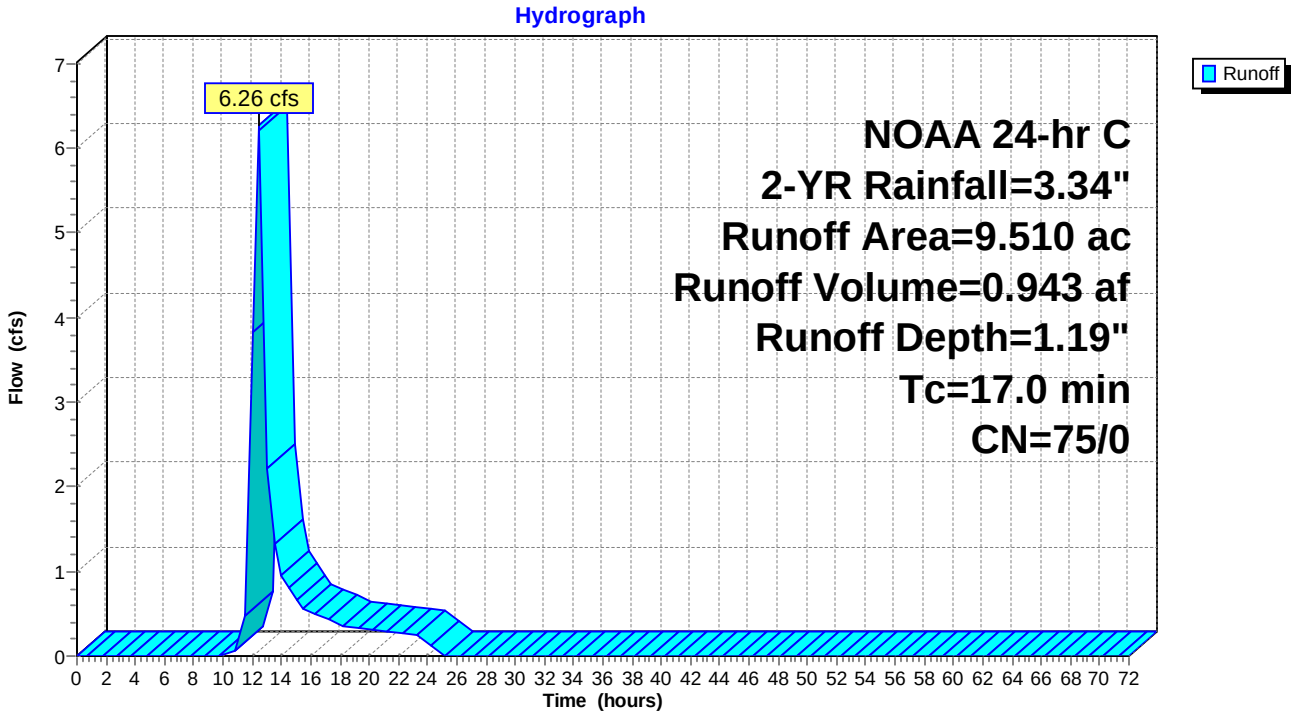
Runoff = 6.26 cfs @ 12.44 hrs, Volume= 0.943 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

	Area (ac)	CN	Description
*	0.000	71	Meadow C
*	5.300	78	Meadow D
*	0.150	91	Gravel D
*	3.160	73	Brush D
*	0.900	65	Brush C
	9.510	75	Weighted Average
	9.510	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

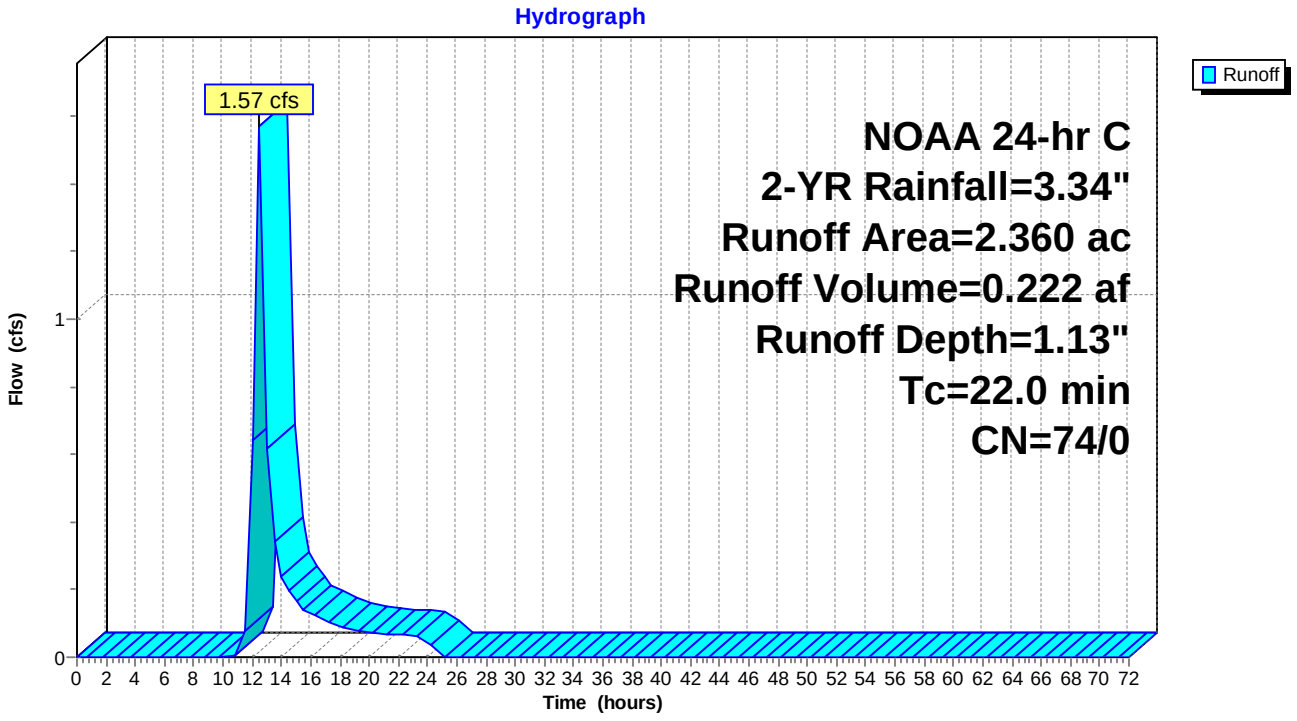
Runoff = 1.57 cfs @ 12.50 hrs, Volume= 0.222 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

	Area (ac)	CN	Description
*	0.060	71	Meadow C
*	1.060	70	Woods C
*	1.240	77	Woods D
	2.360	74	Weighted Average
	2.360	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

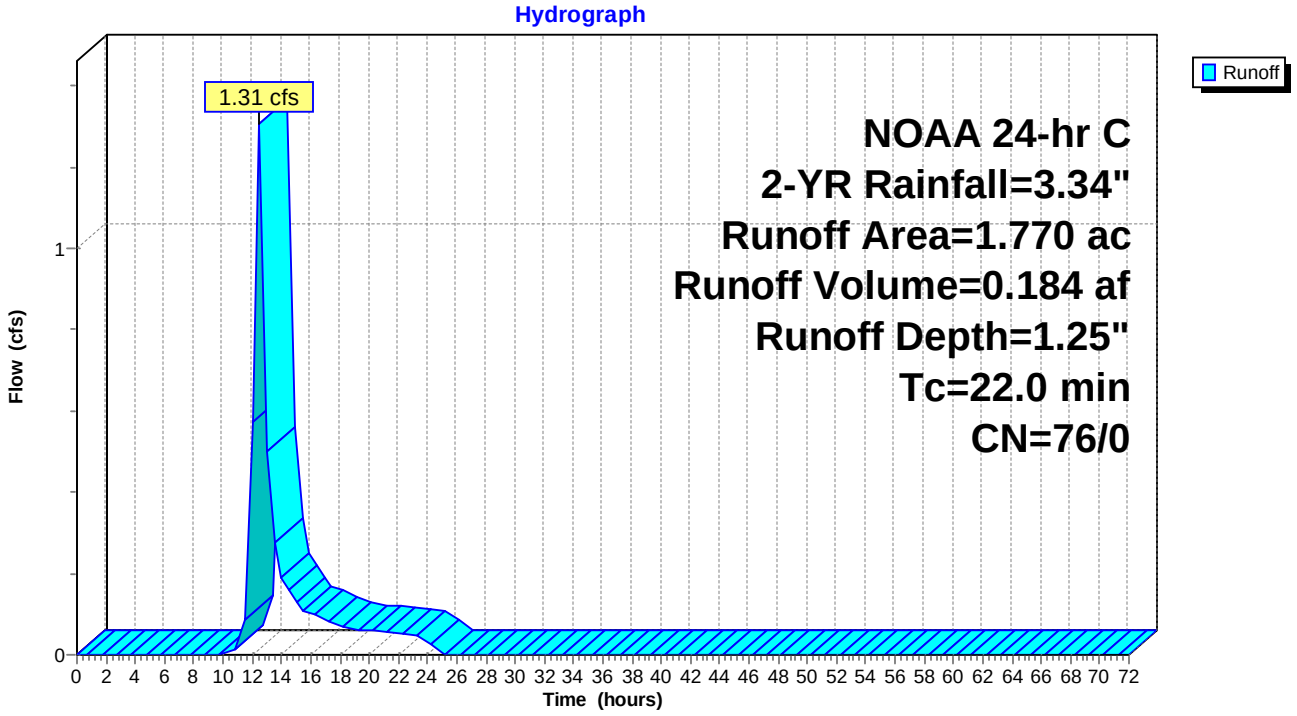
Runoff = 1.31 cfs @ 12.49 hrs, Volume= 0.184 af, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

	Area (ac)	CN	Description
*	0.380	65	Brush C
*	0.150	89	Gravel C
*	0.940	73	Brush D
*	0.300	91	Gravel D
	1.770	76	Weighted Average
	1.770	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

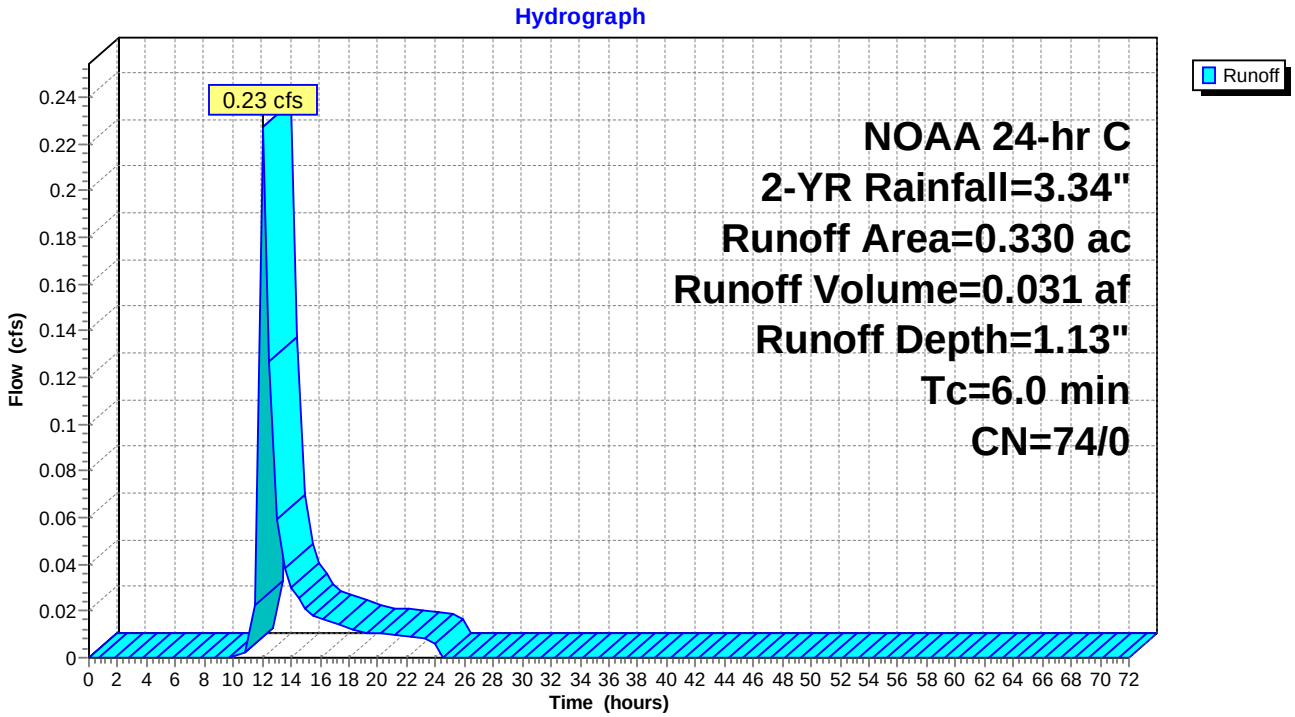
Runoff = 0.23 cfs @ 12.09 hrs, Volume= 0.031 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

	Area (ac)	CN	Description
*	0.270	71	Meadow C
*	0.060	89	Gravel C
	0.330	74	Weighted Average
	0.330	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

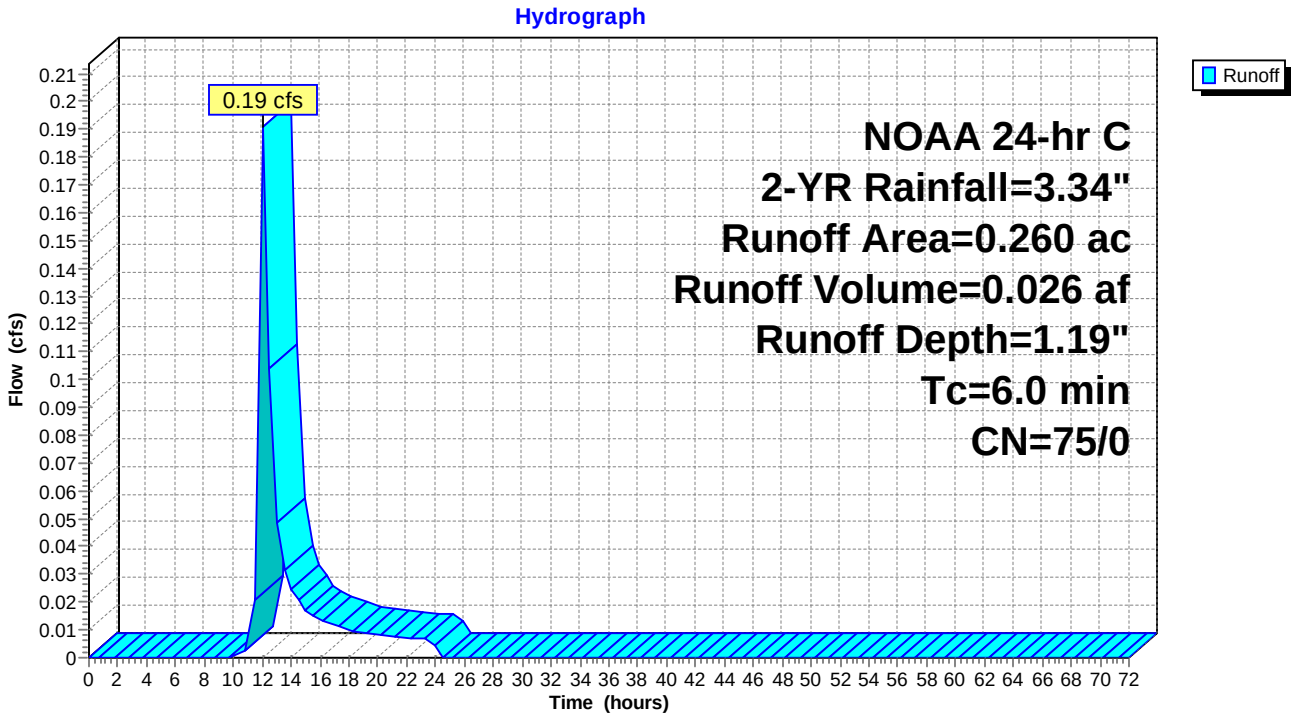
Runoff = 0.19 cfs @ 12.08 hrs, Volume= 0.026 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

	Area (ac)	CN	Description
*	0.200	71	Meadow C
*	0.060	89	Gravel C
	0.260	75	Weighted Average
	0.260	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 1.63" for 2-YR event
Inflow = 15.08 cfs @ 12.53 hrs, Volume= 2.154 af
Outflow = 1.70 cfs @ 14.64 hrs, Volume= 1.778 af, Atten= 89%, Lag= 126.8 min
Primary = 1.70 cfs @ 14.64 hrs, Volume= 1.778 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 263.77' @ 14.64 hrs Surf.Area= 35,215 sf Storage= 57,979 cf

Plug-Flow detention time= 747.2 min calculated for 1.765 af (82% of inflow)
Center-of-Mass det. time= 688.8 min (1,547.3 - 858.5)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

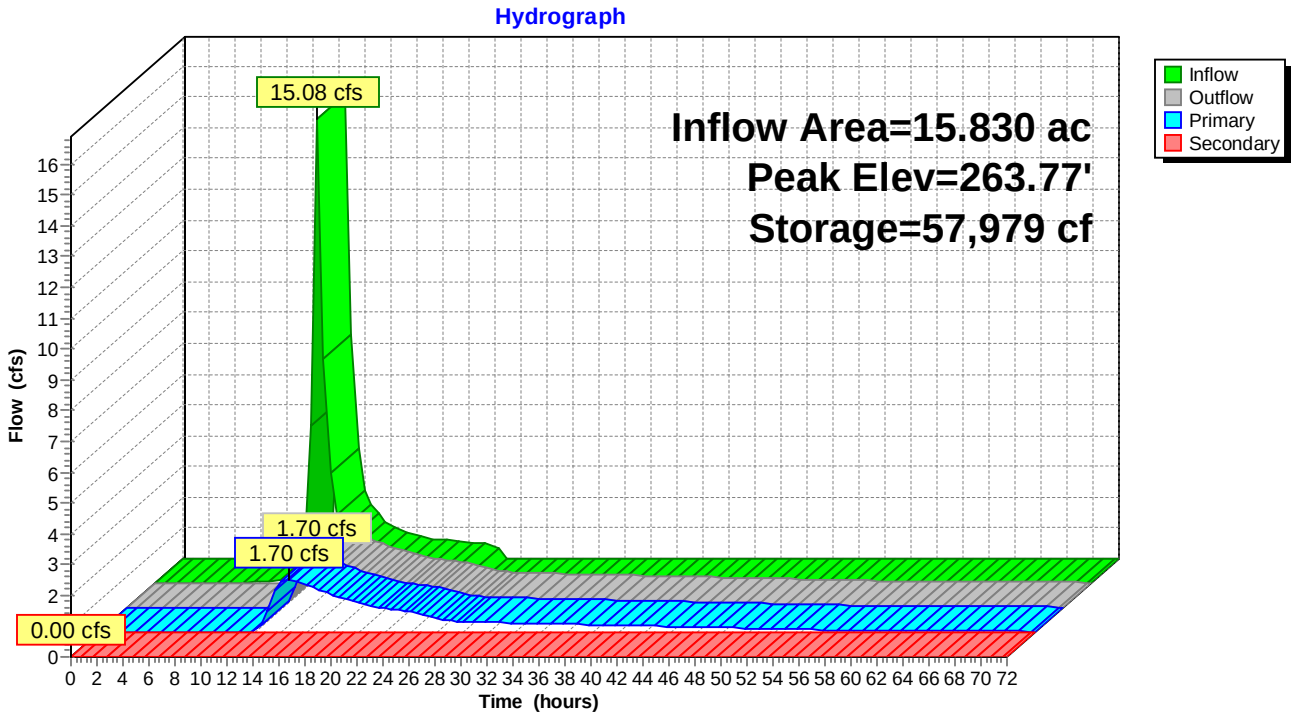
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.69 cfs @ 14.64 hrs HW=263.77' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 1.69 cfs of 14.03 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.24 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.24 cfs @ 2.66 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 1.16" for 2-YR event
Inflow = 0.27 cfs @ 12.10 hrs, Volume= 0.057 af
Outflow = 0.12 cfs @ 12.94 hrs, Volume= 0.057 af, Atten= 55%, Lag= 50.6 min
Primary = 0.12 cfs @ 12.94 hrs, Volume= 0.057 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.25' @ 12.94 hrs Surf.Area= 1,455 sf Storage= 393 cf

Plug-Flow detention time= 30.5 min calculated for 0.057 af (99% of inflow)
Center-of-Mass det. time= 30.6 min (920.3 - 889.7)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

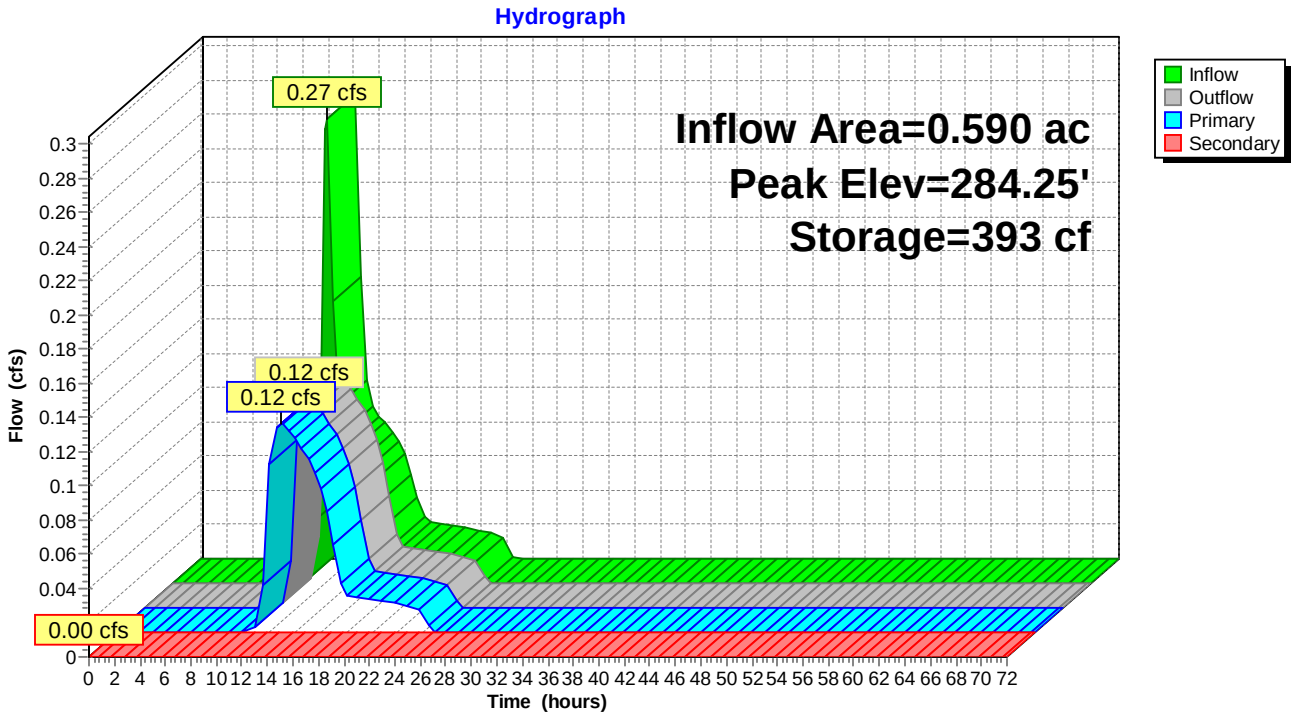
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.12 cfs @ 12.94 hrs HW=284.25' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.12 cfs of 1.20 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 3.56 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 1.19" for 2-YR event
Inflow = 0.19 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.05 cfs @ 14.48 hrs, Volume= 0.026 af, Atten= 71%, Lag= 143.9 min
Primary = 0.05 cfs @ 14.48 hrs, Volume= 0.026 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.33' @ 13.16 hrs Surf.Area= 1,565 sf Storage= 393 cf

Plug-Flow detention time= 64.0 min calculated for 0.026 af (99% of inflow)
Center-of-Mass det. time= 64.0 min (922.9 - 858.9)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

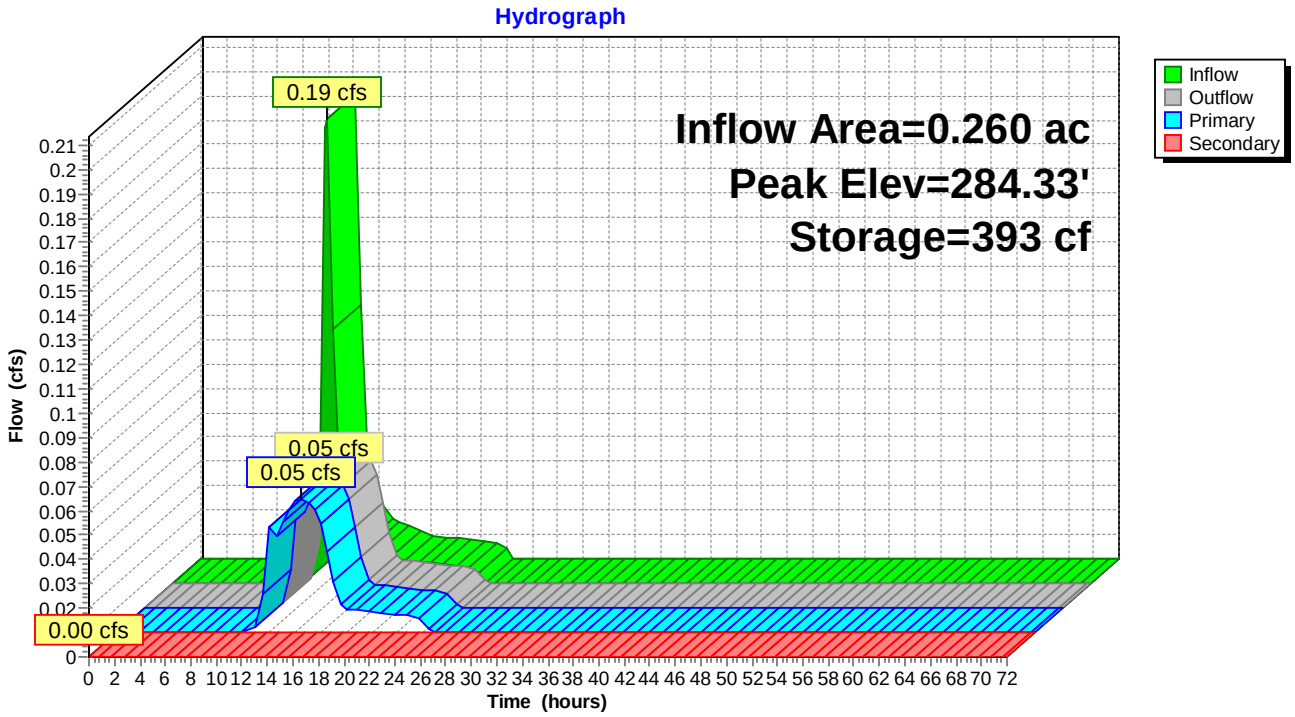
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.05 cfs @ 14.48 hrs HW=284.25' TW=284.14' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.05 cfs of 0.22 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.60 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

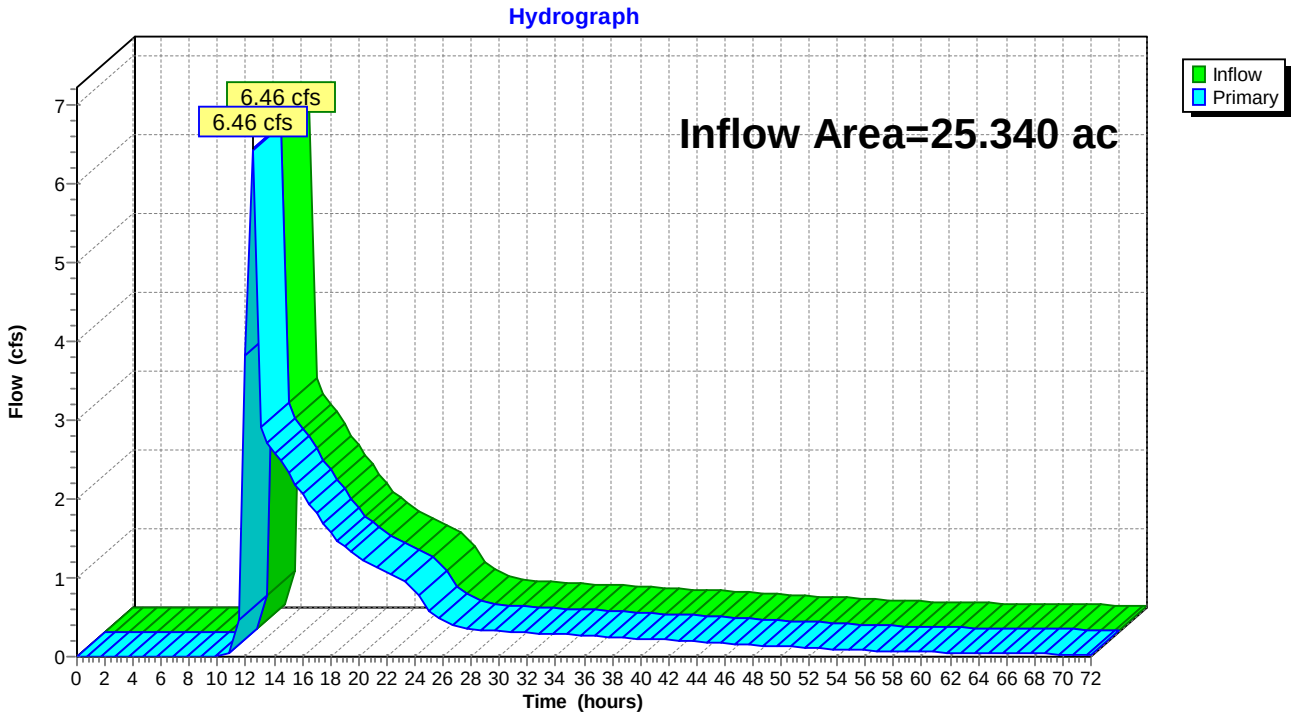
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 1.29" for 2-YR event
Inflow = 6.46 cfs @ 12.46 hrs, Volume= 2.721 af
Primary = 6.46 cfs @ 12.46 hrs, Volume= 2.721 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

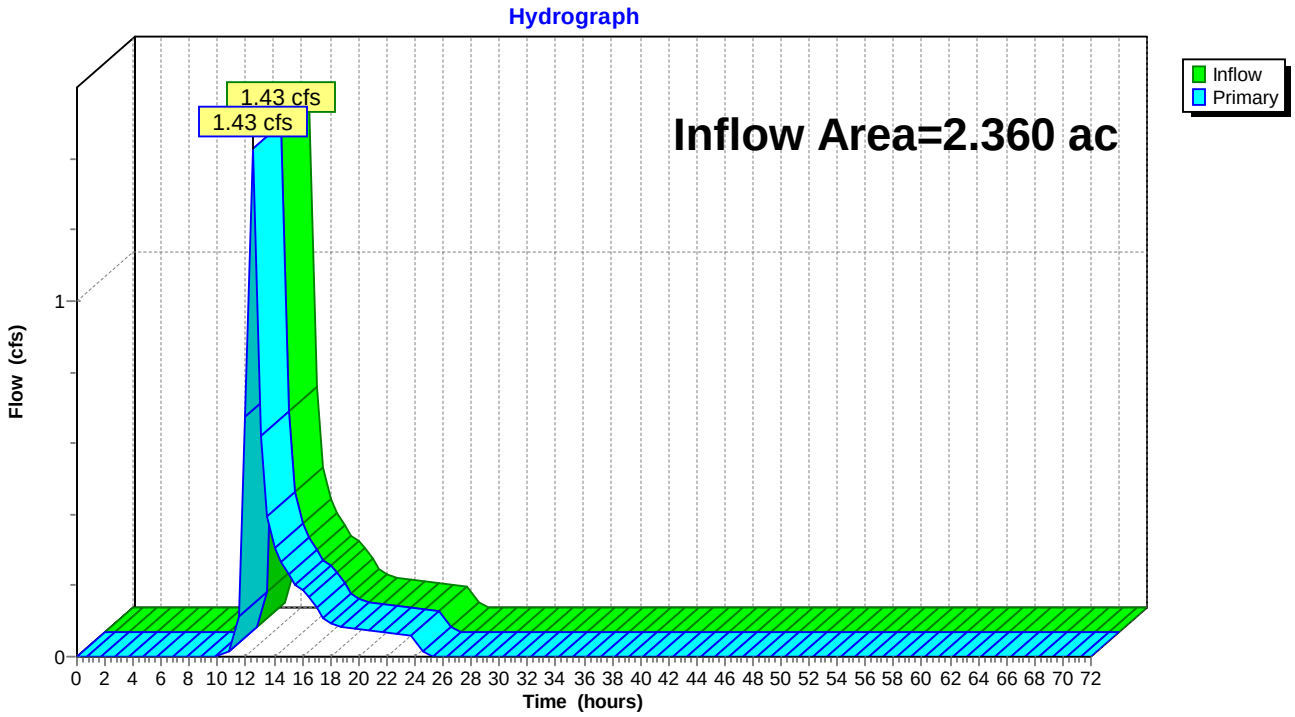


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 1.23" for 2-YR event
Inflow = 1.43 cfs @ 12.49 hrs, Volume= 0.241 af
Primary = 1.43 cfs @ 12.49 hrs, Volume= 0.241 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

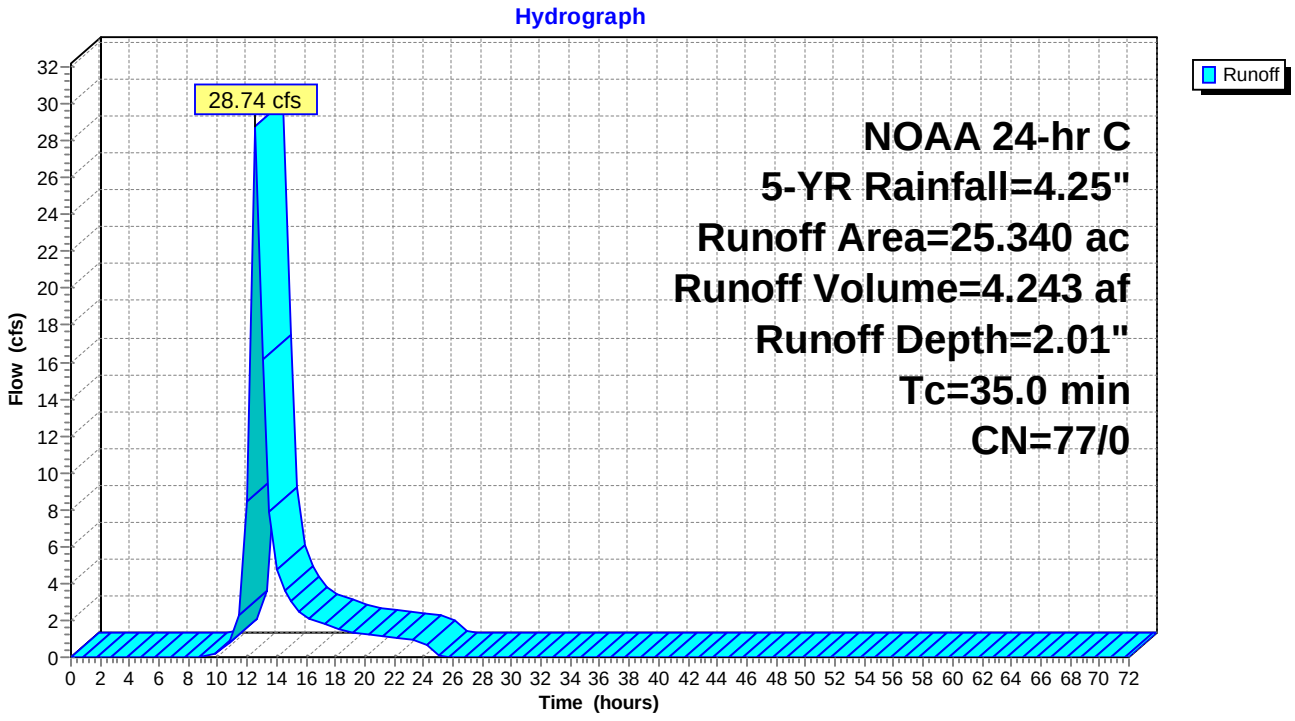
Runoff = 28.74 cfs @ 12.56 hrs, Volume= 4.243 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

	Area (ac)	CN	Description
*	1.290	70	Woods C
*	4.690	78	Meadow D
*	19.360	77	Woods D
	25.340	77	Weighted Average
	25.340	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

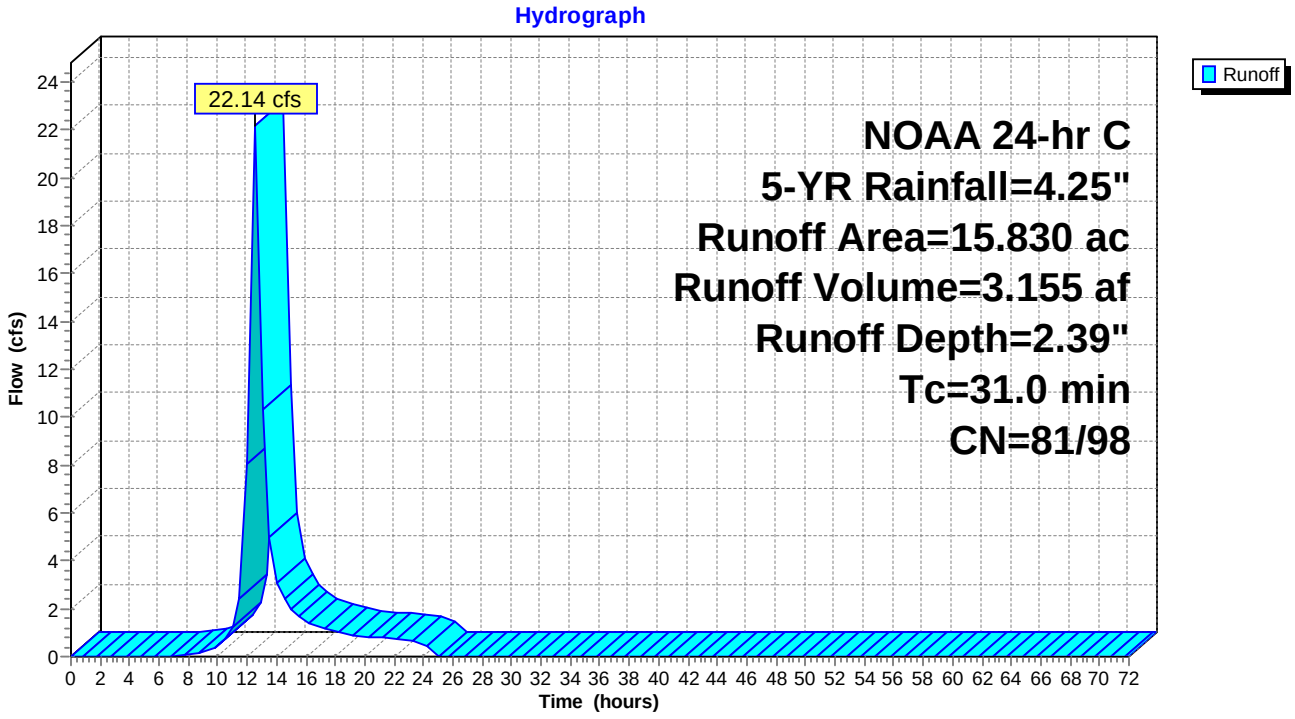
Runoff = 22.14 cfs @ 12.52 hrs, Volume= 3.155 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

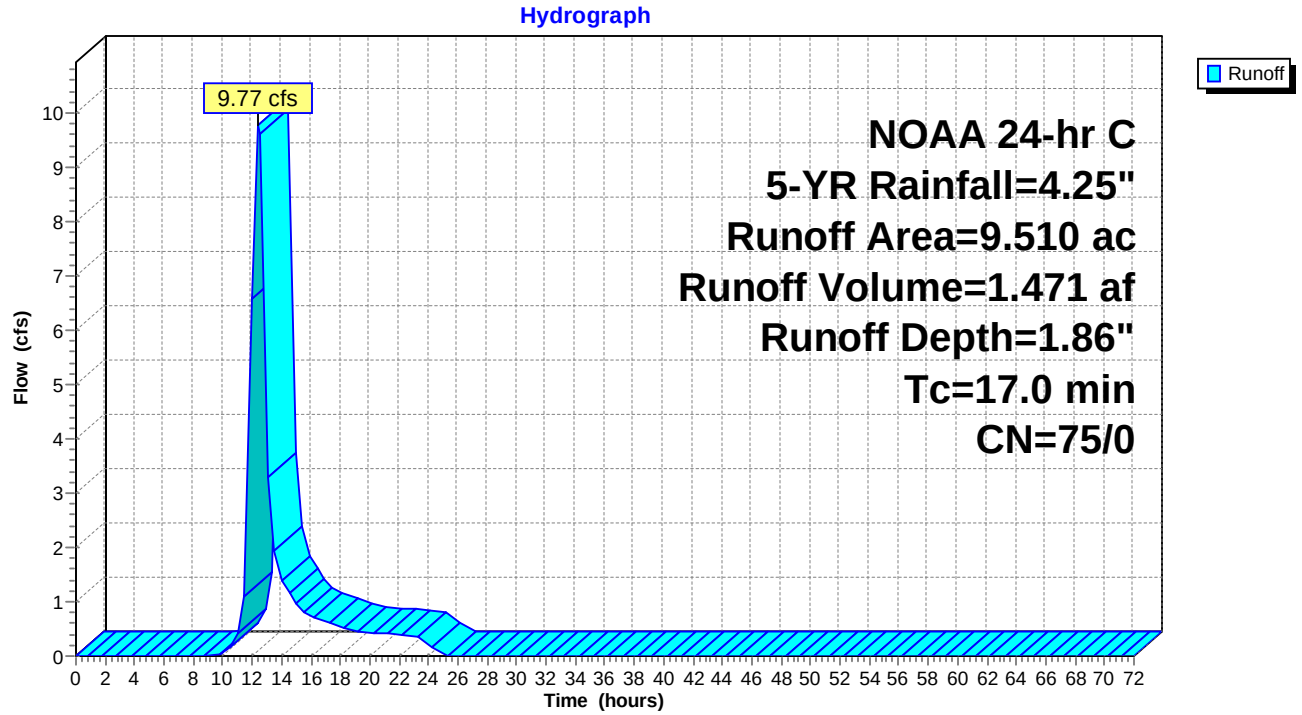
Runoff = 9.77 cfs @ 12.41 hrs, Volume= 1.471 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

	Area (ac)	CN	Description
*	0.000	71	Meadow C
*	5.300	78	Meadow D
*	0.150	91	Gravel D
*	3.160	73	Brush D
*	0.900	65	Brush C
	9.510	75	Weighted Average
	9.510	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

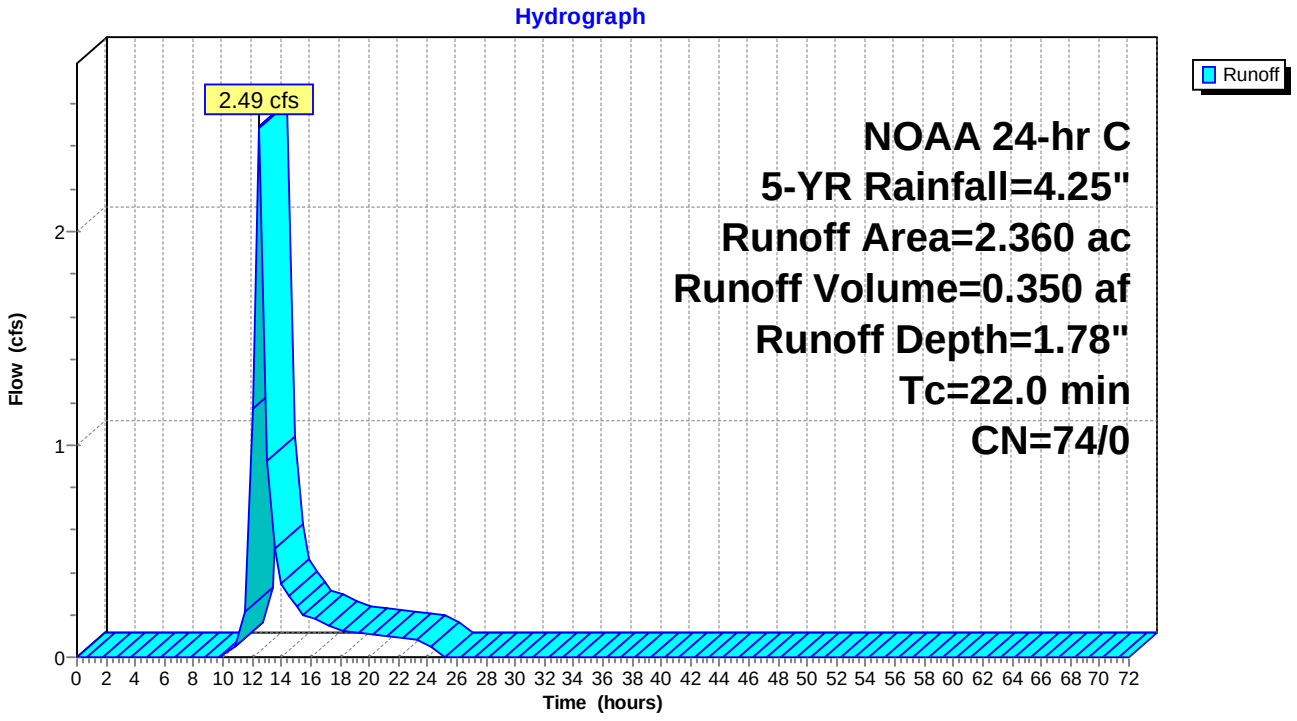
Runoff = 2.49 cfs @ 12.48 hrs, Volume= 0.350 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

	Area (ac)	CN	Description
*	0.060	71	Meadow C
*	1.060	70	Woods C
*	1.240	77	Woods D
	2.360	74	Weighted Average
	2.360	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

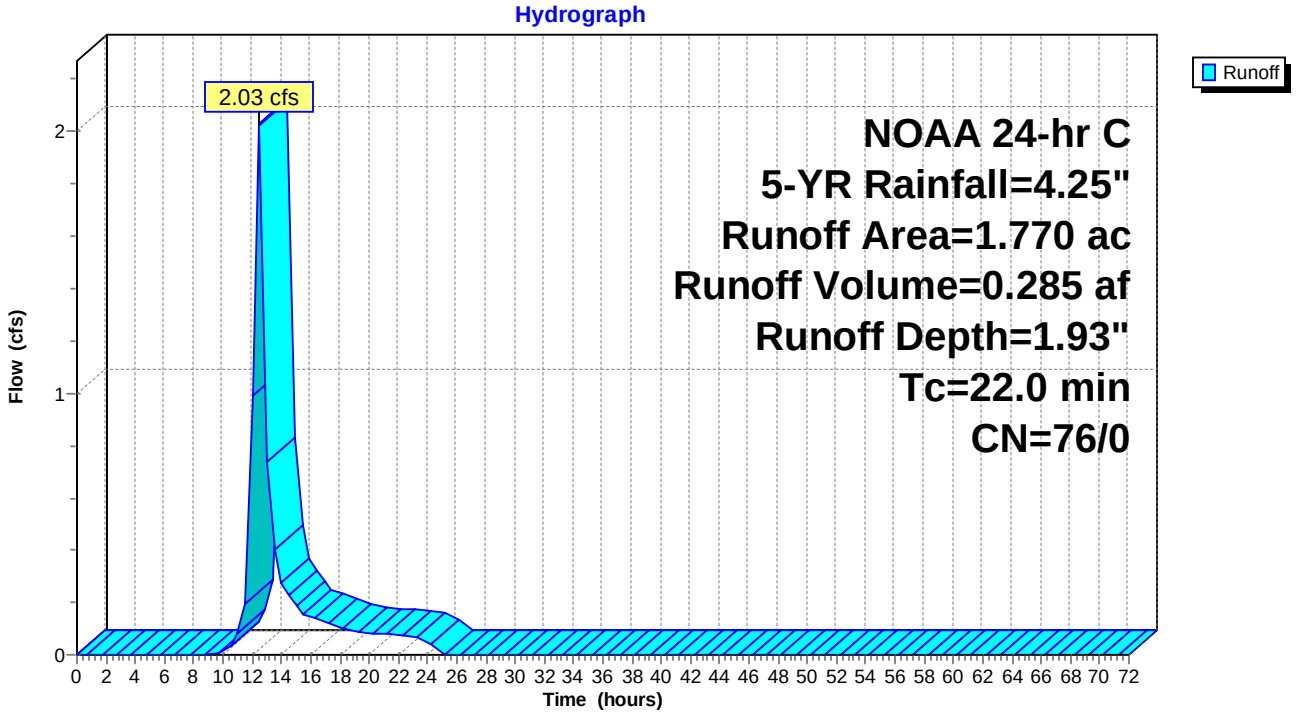
Runoff = 2.03 cfs @ 12.47 hrs, Volume= 0.285 af, Depth= 1.93"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

	Area (ac)	CN	Description
*	0.380	65	Brush C
*	0.150	89	Gravel C
*	0.940	73	Brush D
*	0.300	91	Gravel D
	1.770	76	Weighted Average
	1.770	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

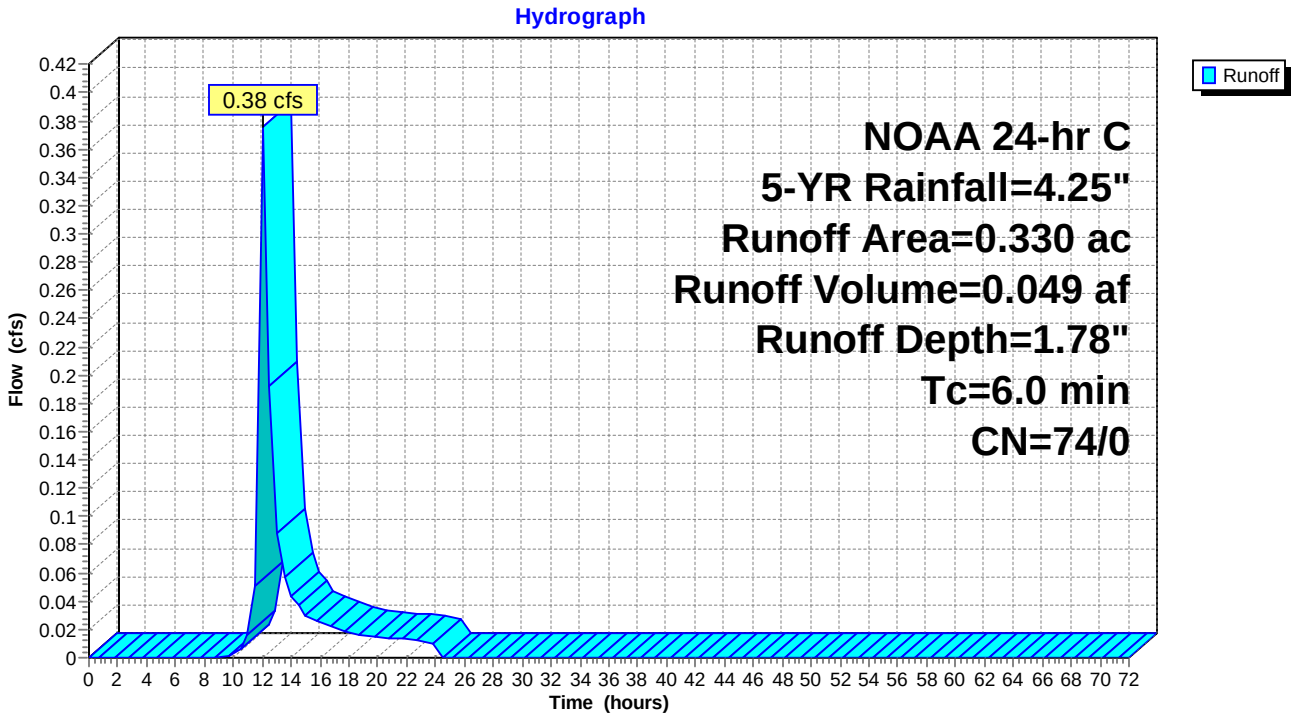
Runoff = 0.38 cfs @ 12.07 hrs, Volume= 0.049 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

	Area (ac)	CN	Description
*	0.270	71	Meadow C
*	0.060	89	Gravel C
	0.330	74	Weighted Average
	0.330	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

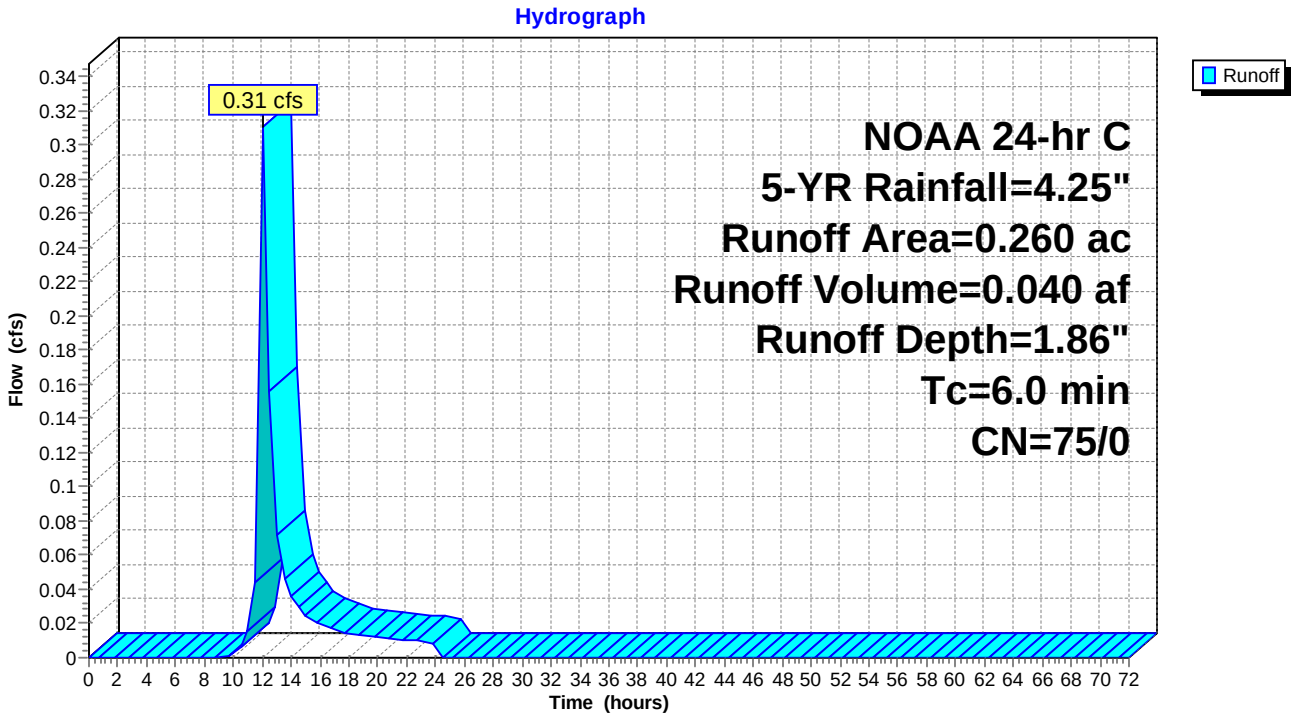
Runoff = 0.31 cfs @ 12.07 hrs, Volume= 0.040 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

	Area (ac)	CN	Description
*	0.200	71	Meadow C
*	0.060	89	Gravel C
	0.260	75	Weighted Average
	0.260	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 2.39" for 5-YR event
Inflow = 22.14 cfs @ 12.52 hrs, Volume= 3.155 af
Outflow = 4.21 cfs @ 13.74 hrs, Volume= 2.776 af, Atten= 81%, Lag= 73.3 min
Primary = 4.21 cfs @ 13.74 hrs, Volume= 2.776 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 264.33' @ 13.74 hrs Surf.Area= 37,387 sf Storage= 78,354 cf

Plug-Flow detention time= 570.4 min calculated for 2.776 af (88% of inflow)
Center-of-Mass det. time= 513.3 min (1,361.5 - 848.2)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

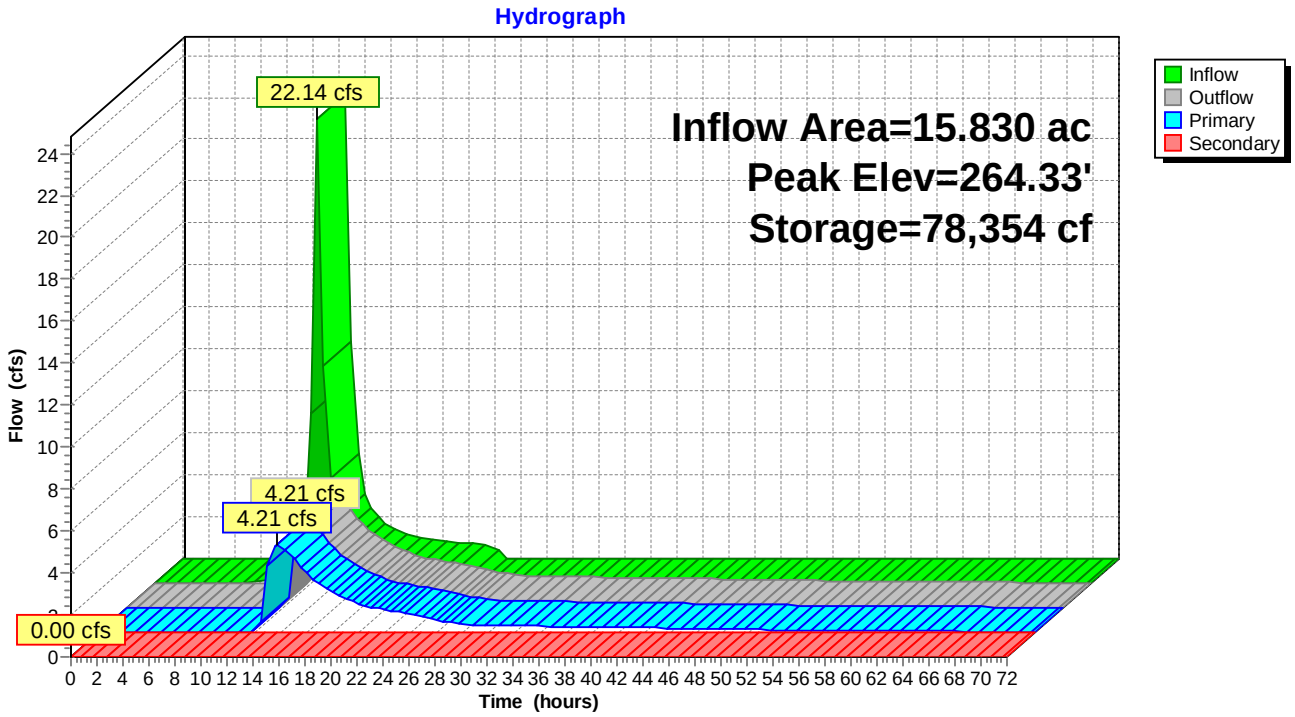
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.09 cfs @ 13.74 hrs HW=264.31' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 4.09 cfs of 15.36 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.55 cfs @ 6.32 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 3.54 cfs @ 4.24 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 1.82" for 5-YR event
Inflow = 0.41 cfs @ 12.07 hrs, Volume= 0.089 af
Outflow = 0.14 cfs @ 13.08 hrs, Volume= 0.089 af, Atten= 66%, Lag= 60.7 min
Primary = 0.14 cfs @ 13.08 hrs, Volume= 0.089 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.45' @ 13.08 hrs Surf.Area= 2,092 sf Storage= 743 cf

Plug-Flow detention time= 49.6 min calculated for 0.089 af (99% of inflow)
Center-of-Mass det. time= 49.6 min (951.3 - 901.8)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

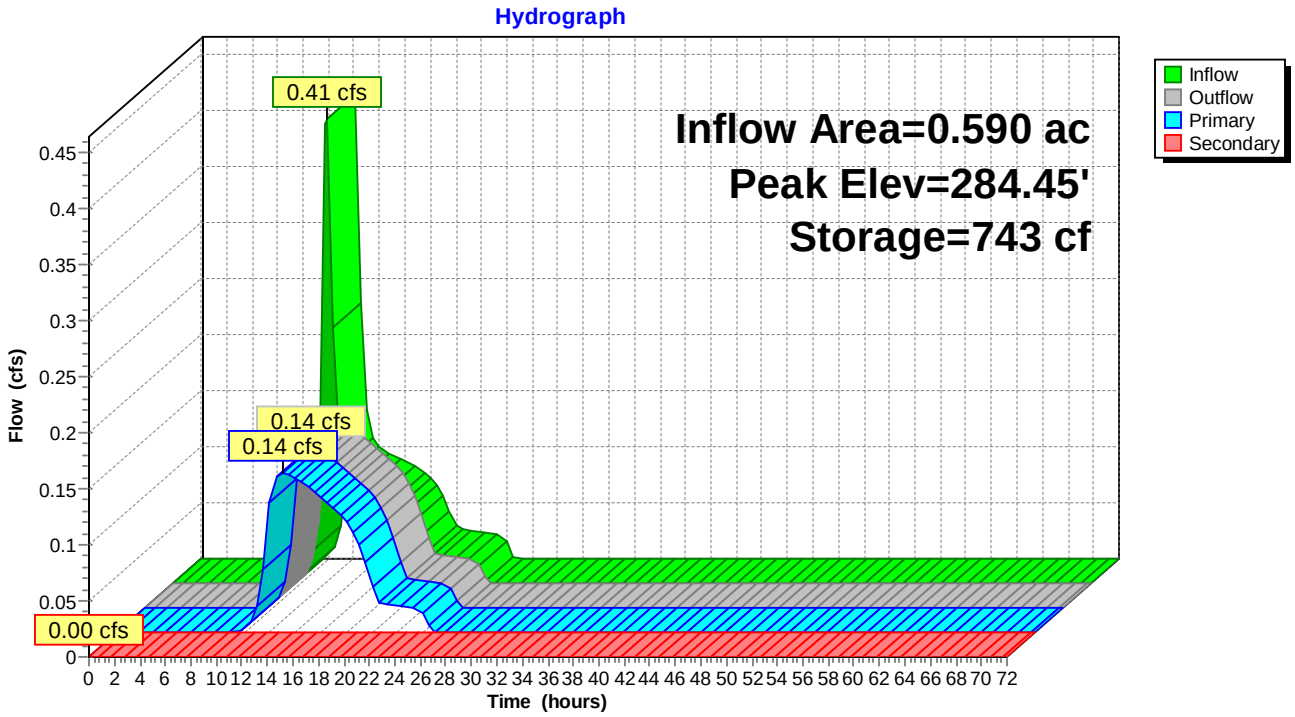
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.14 cfs @ 13.08 hrs HW=284.45' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.14 cfs of 1.25 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 4.15 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 1.86" for 5-YR event
Inflow = 0.31 cfs @ 12.07 hrs, Volume= 0.040 af
Outflow = 0.06 cfs @ 15.79 hrs, Volume= 0.040 af, Atten= 80%, Lag= 223.4 min
Primary = 0.06 cfs @ 15.79 hrs, Volume= 0.040 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.53' @ 13.47 hrs Surf.Area= 2,255 sf Storage= 775 cf

Plug-Flow detention time= 121.8 min calculated for 0.040 af (99% of inflow)
Center-of-Mass det. time= 121.3 min (966.9 - 845.5)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

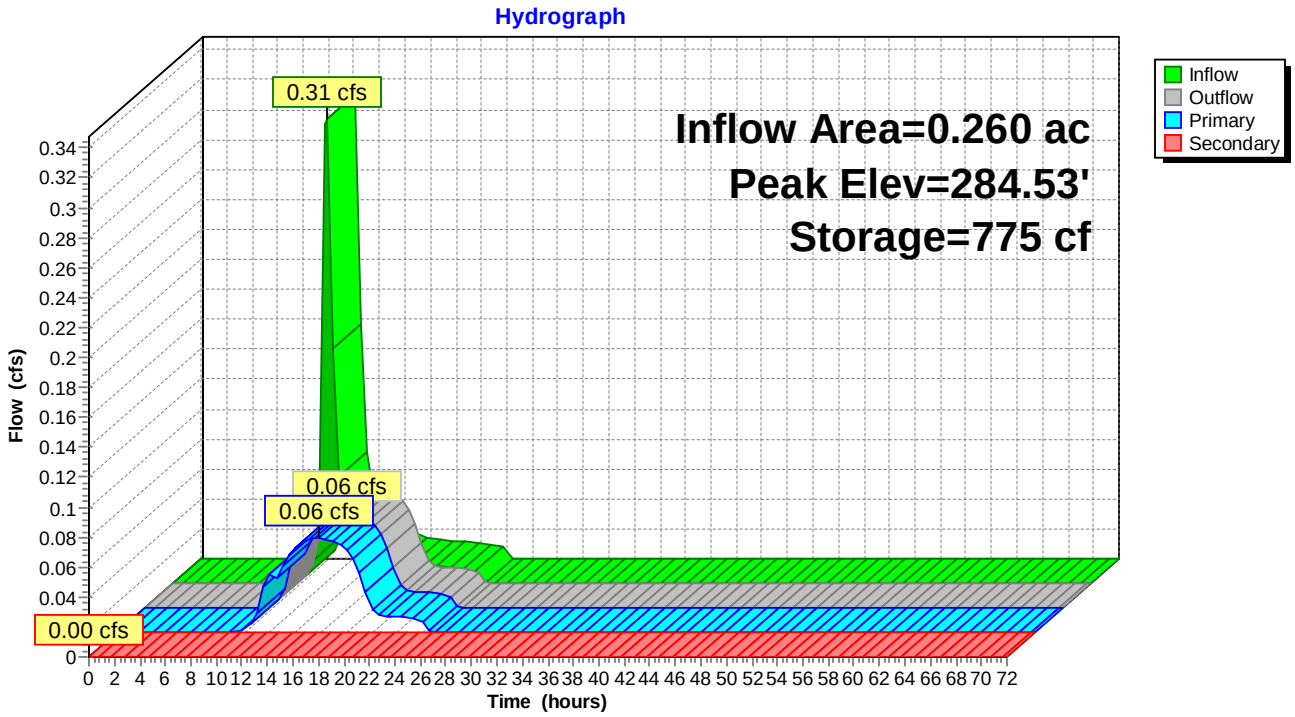
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.06 cfs @ 15.79 hrs HW=284.41' TW=284.26' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.06 cfs of 0.25 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.85 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

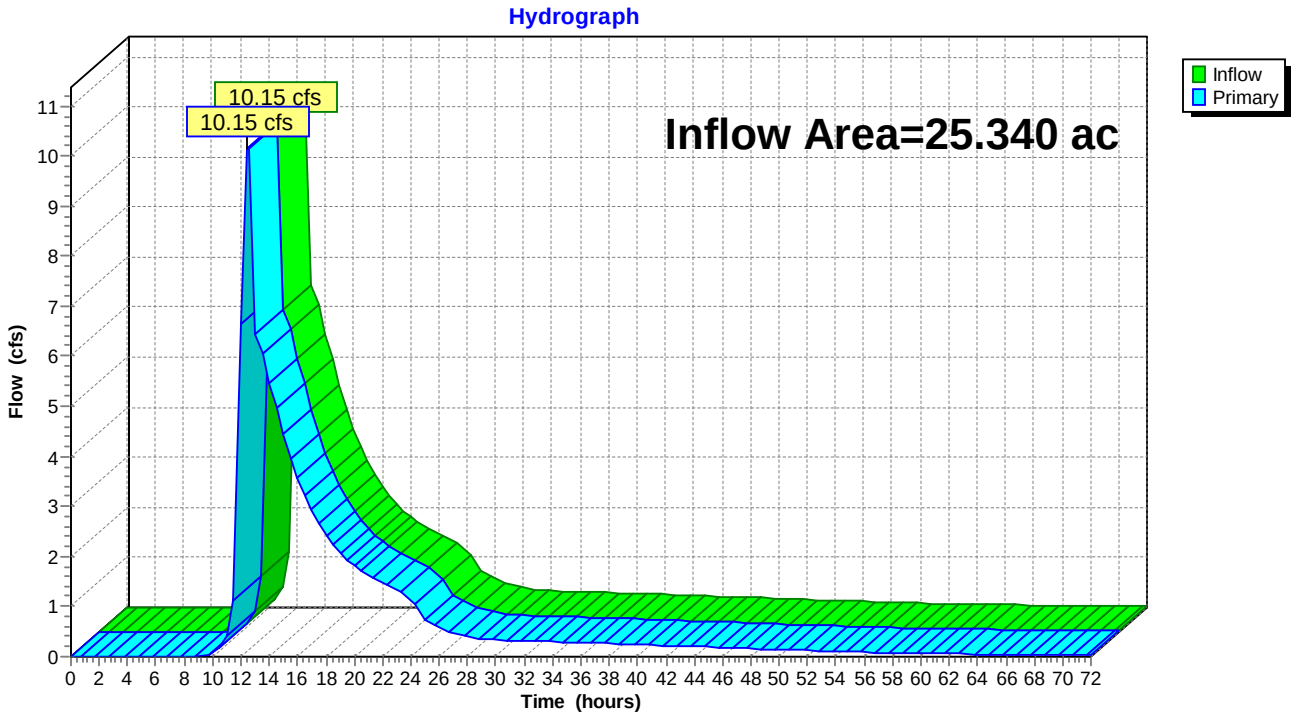
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 2.01" for 5-YR event
Inflow = 10.15 cfs @ 12.49 hrs, Volume= 4.247 af
Primary = 10.15 cfs @ 12.49 hrs, Volume= 4.247 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

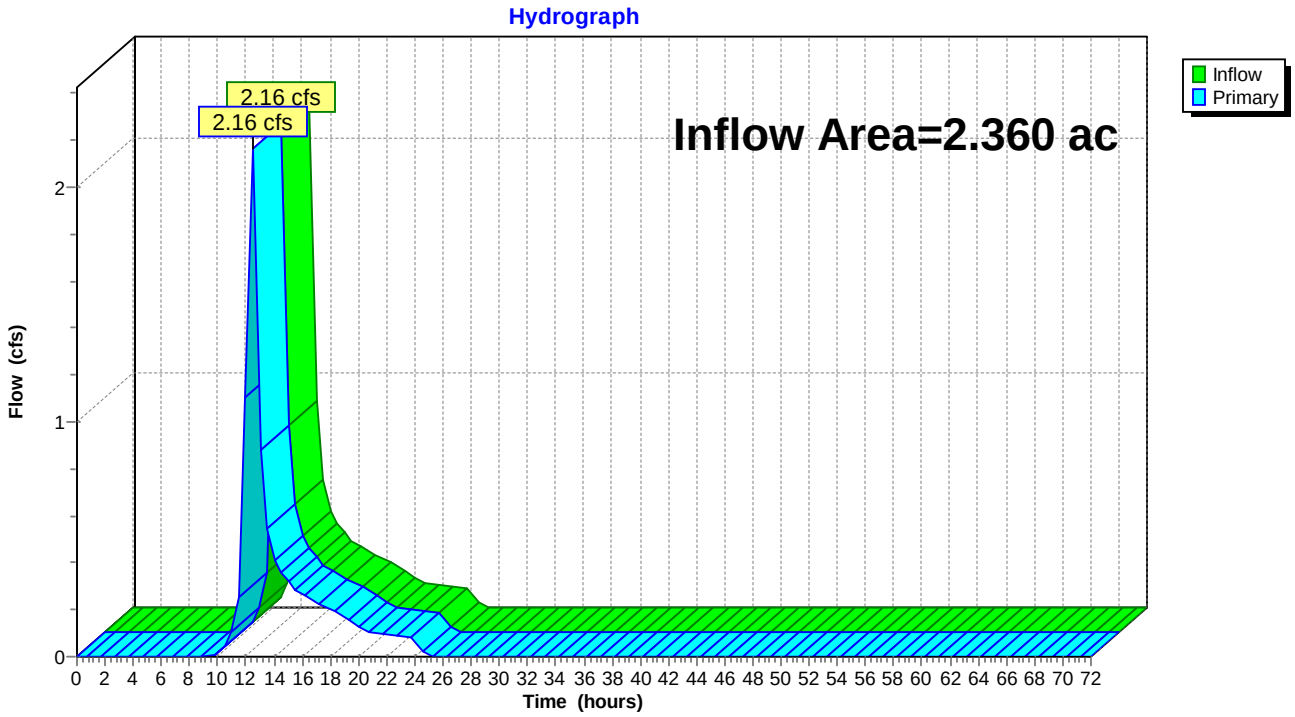


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 1.90" for 5-YR event
Inflow = 2.16 cfs @ 12.48 hrs, Volume= 0.374 af
Primary = 2.16 cfs @ 12.48 hrs, Volume= 0.374 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

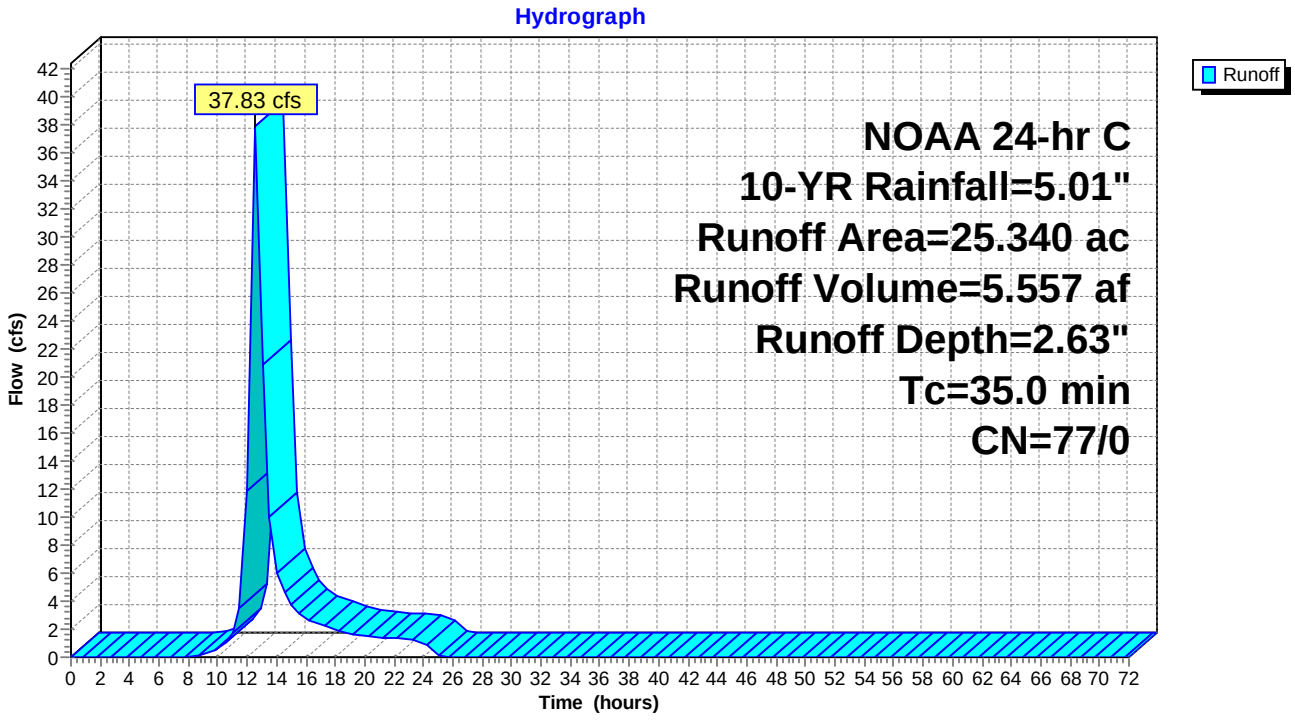
Runoff = 37.83 cfs @ 12.55 hrs, Volume= 5.557 af, Depth= 2.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

	Area (ac)	CN	Description
*	1.290	70	Woods C
*	4.690	78	Meadow D
*	19.360	77	Woods D
	25.340	77	Weighted Average
	25.340	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

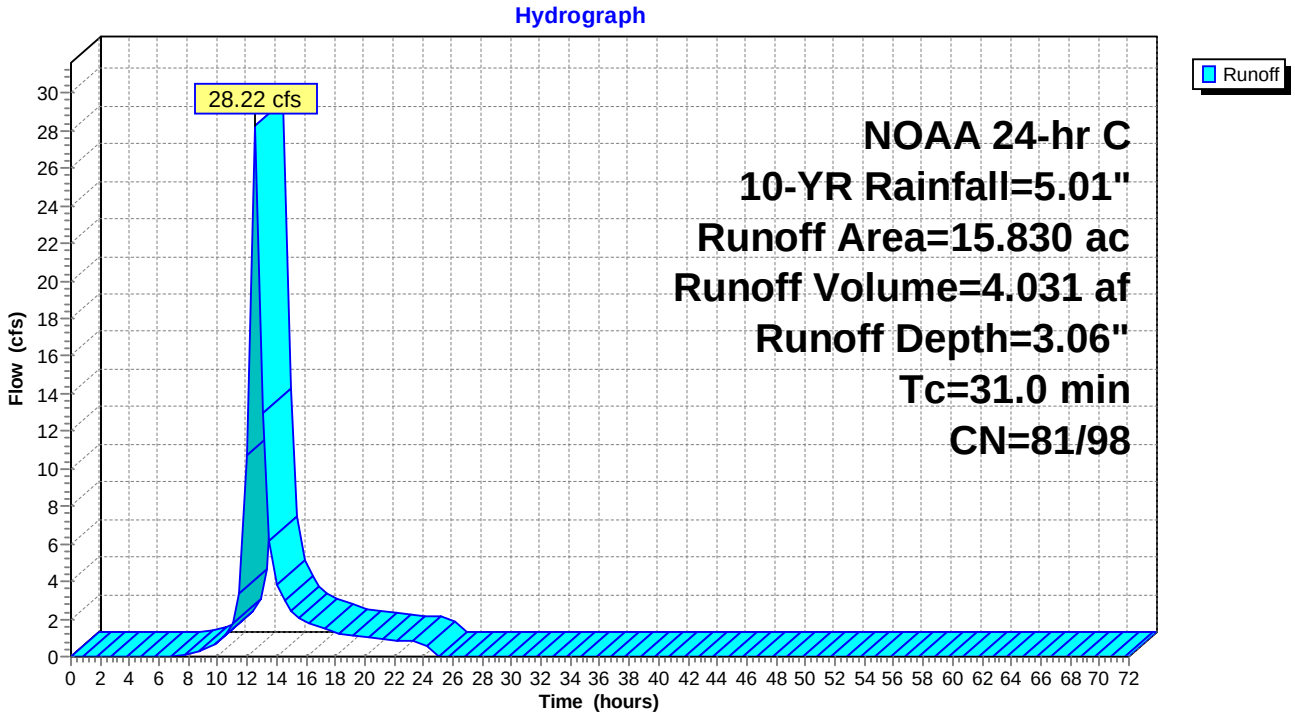
Runoff = 28.22 cfs @ 12.52 hrs, Volume= 4.031 af, Depth= 3.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

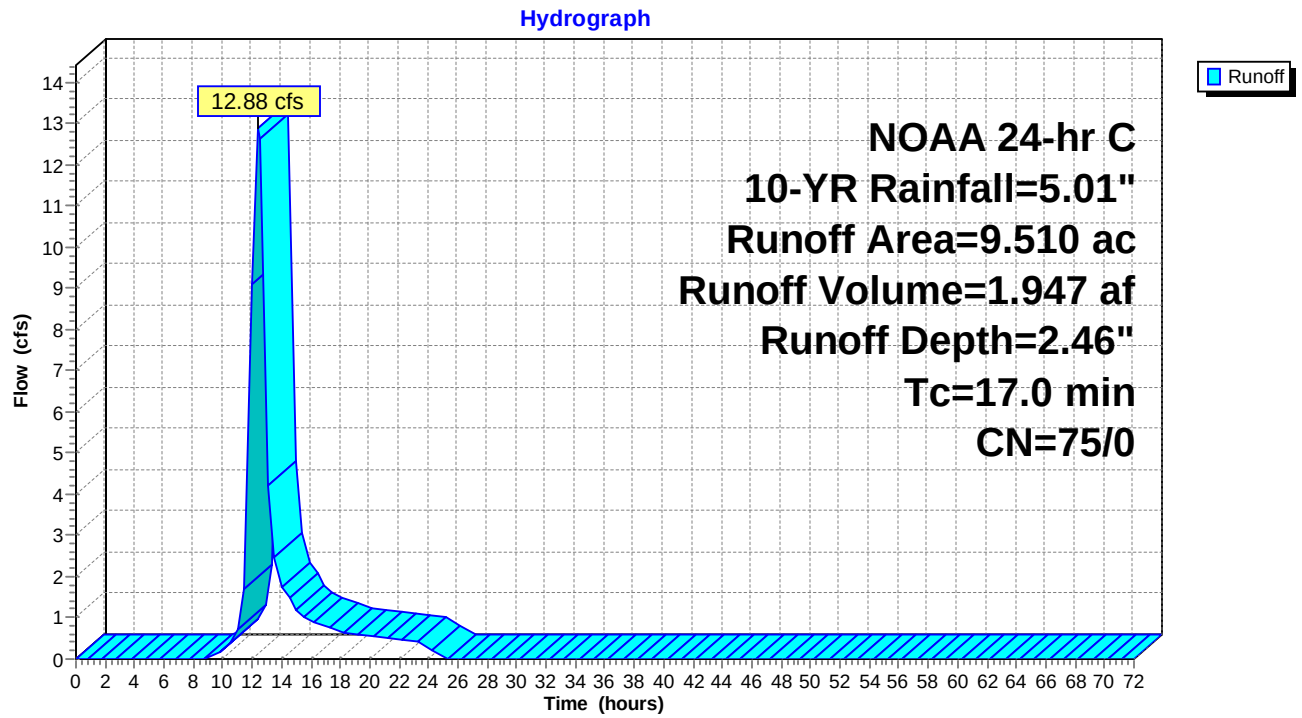
Runoff = 12.88 cfs @ 12.40 hrs, Volume= 1.947 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

	Area (ac)	CN	Description
*	0.000	71	Meadow C
*	5.300	78	Meadow D
*	0.150	91	Gravel D
*	3.160	73	Brush D
*	0.900	65	Brush C
	9.510	75	Weighted Average
	9.510	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

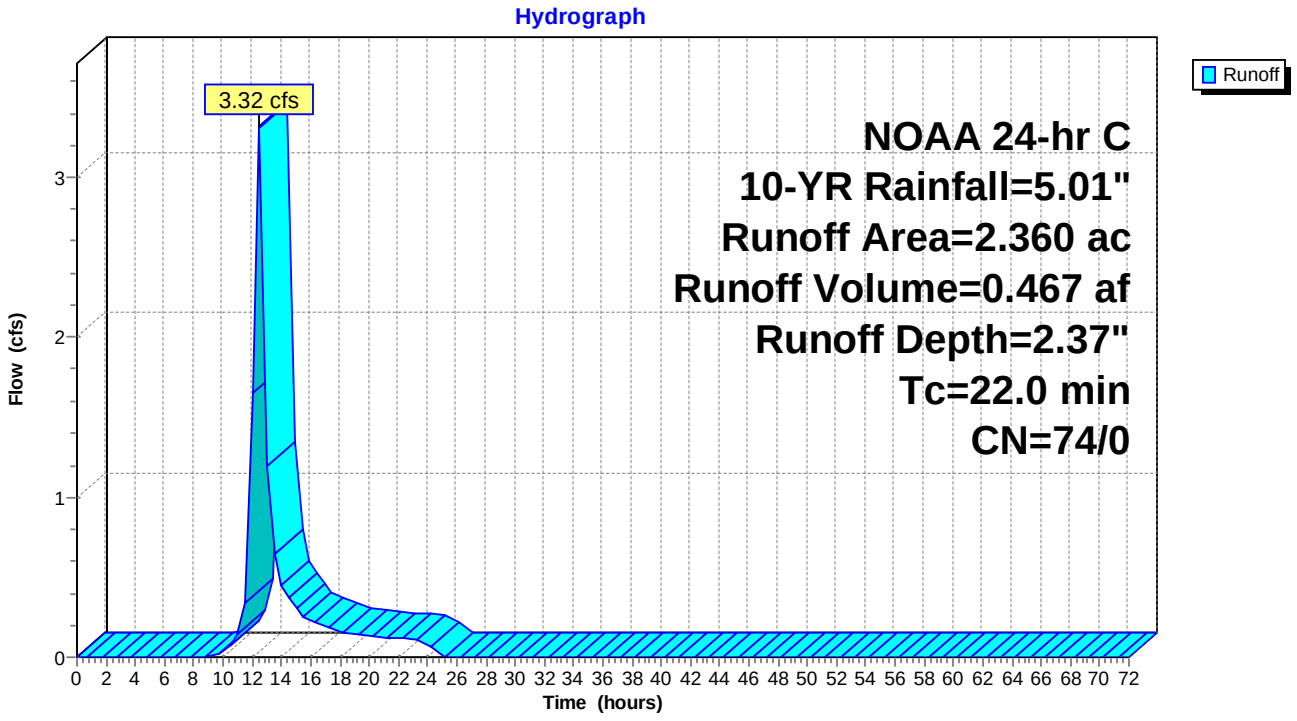
Runoff = 3.32 cfs @ 12.47 hrs, Volume= 0.467 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

	Area (ac)	CN	Description
*	0.060	71	Meadow C
*	1.060	70	Woods C
*	1.240	77	Woods D
	2.360	74	Weighted Average
	2.360	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

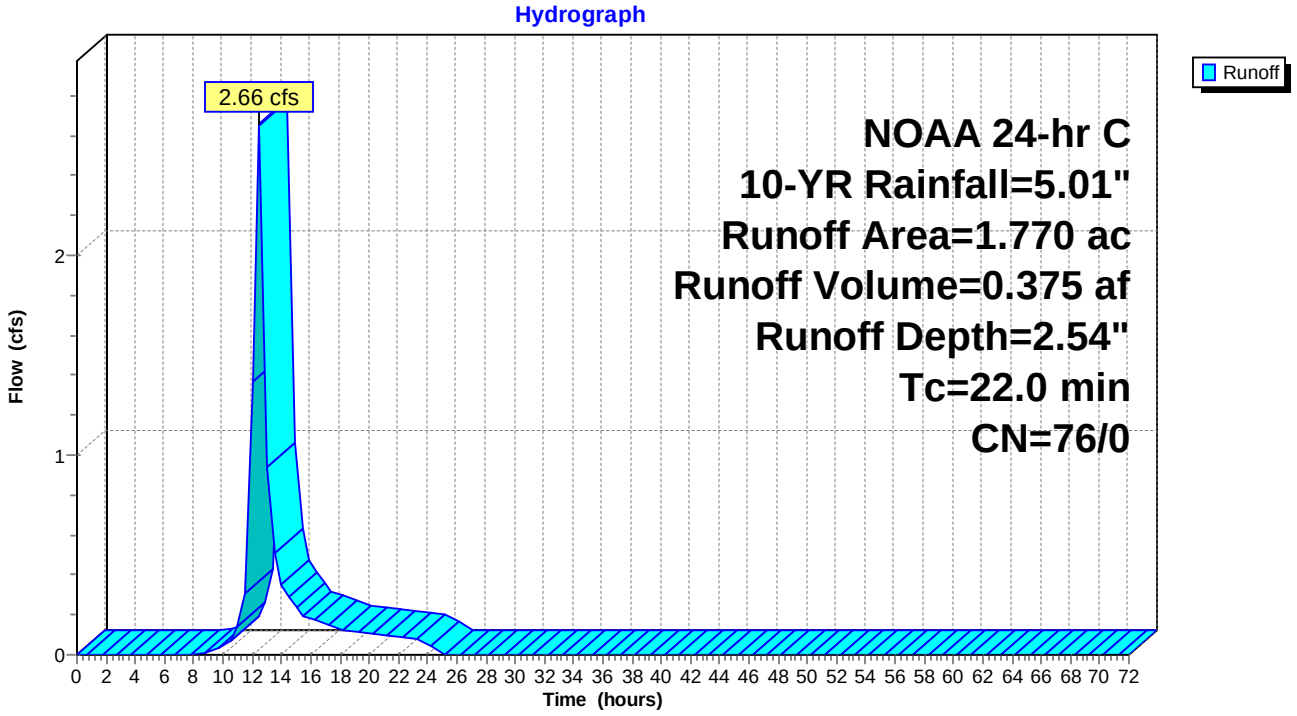
Runoff = 2.66 cfs @ 12.46 hrs, Volume= 0.375 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

	Area (ac)	CN	Description
*	0.380	65	Brush C
*	0.150	89	Gravel C
*	0.940	73	Brush D
*	0.300	91	Gravel D
	1.770	76	Weighted Average
	1.770	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

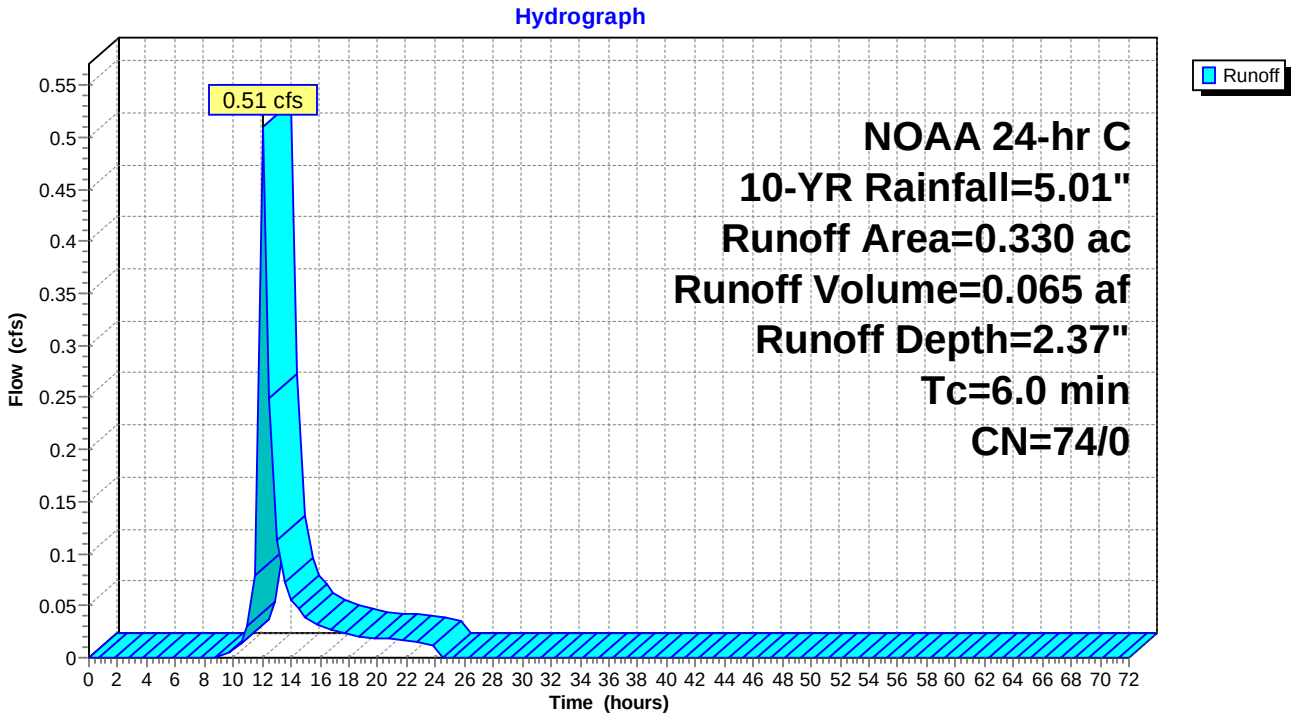
Runoff = 0.51 cfs @ 12.06 hrs, Volume= 0.065 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

	Area (ac)	CN	Description
*	0.270	71	Meadow C
*	0.060	89	Gravel C
	0.330	74	Weighted Average
	0.330	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

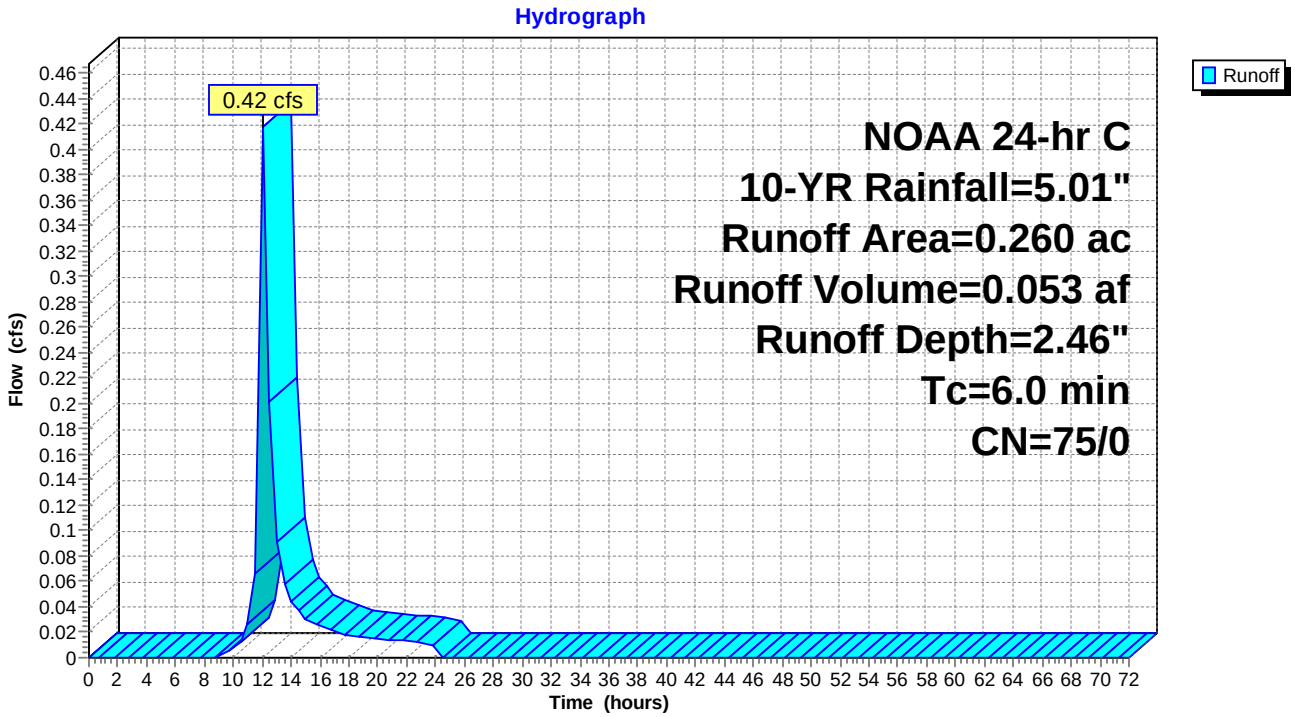
Runoff = 0.42 cfs @ 12.06 hrs, Volume= 0.053 af, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

	Area (ac)	CN	Description
*	0.200	71	Meadow C
*	0.060	89	Gravel C
	0.260	75	Weighted Average
	0.260	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 3.06" for 10-YR event
Inflow = 28.22 cfs @ 12.52 hrs, Volume= 4.031 af
Outflow = 6.52 cfs @ 13.61 hrs, Volume= 3.651 af, Atten= 77%, Lag= 65.8 min
Primary = 6.52 cfs @ 13.61 hrs, Volume= 3.651 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 264.78' @ 13.61 hrs Surf.Area= 39,388 sf Storage= 95,422 cf

Plug-Flow detention time= 461.4 min calculated for 3.626 af (90% of inflow)
Center-of-Mass det. time= 431.3 min (1,272.7 - 841.5)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

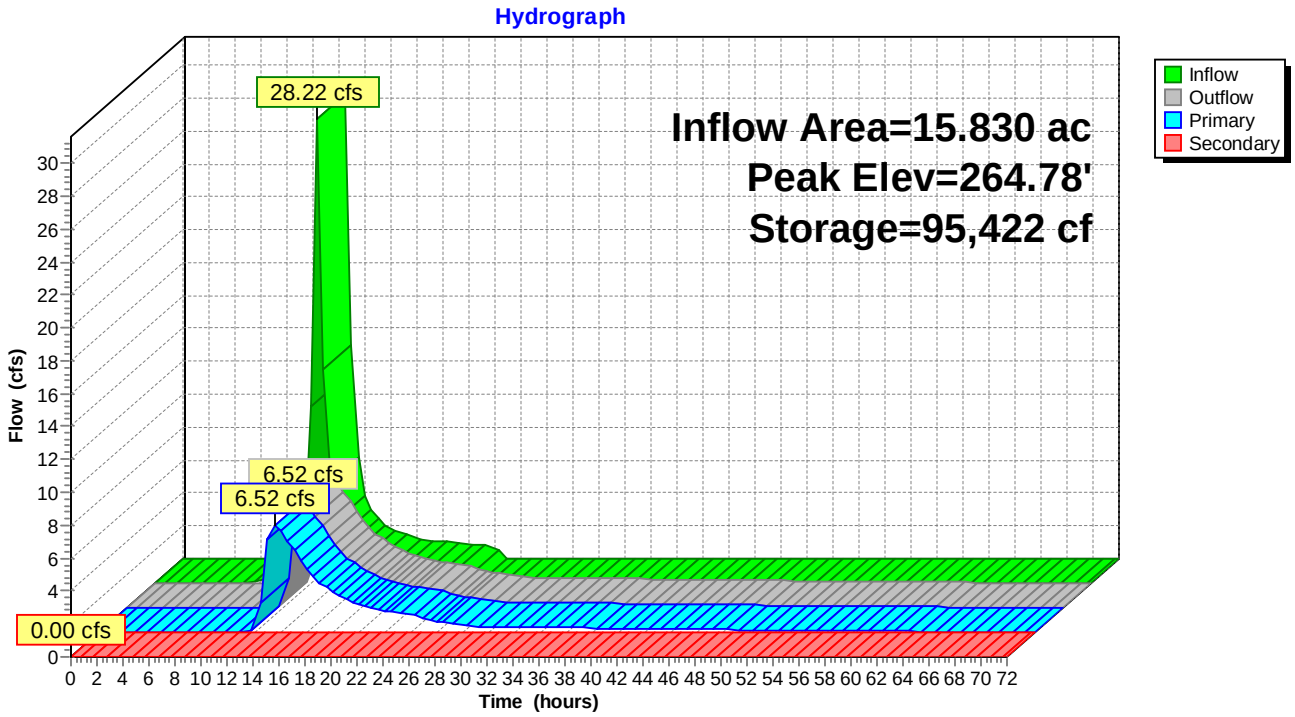
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=6.42 cfs @ 13.61 hrs HW=264.76' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 6.42 cfs of 16.39 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.62 cfs @ 7.10 fps)
3=Sharp-Crested Rectangular Weir (Weir Controls 5.80 cfs @ 5.50 fps)
4=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 2.41" for 10-YR event
Inflow = 0.54 cfs @ 12.06 hrs, Volume= 0.119 af
Outflow = 0.16 cfs @ 13.16 hrs, Volume= 0.119 af, Atten= 71%, Lag= 65.7 min
Primary = 0.16 cfs @ 13.16 hrs, Volume= 0.119 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.60' @ 13.15 hrs Surf.Area= 2,571 sf Storage= 1,090 cf

Plug-Flow detention time= 67.4 min calculated for 0.118 af (99% of inflow)
Center-of-Mass det. time= 67.2 min (984.9 - 917.7)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

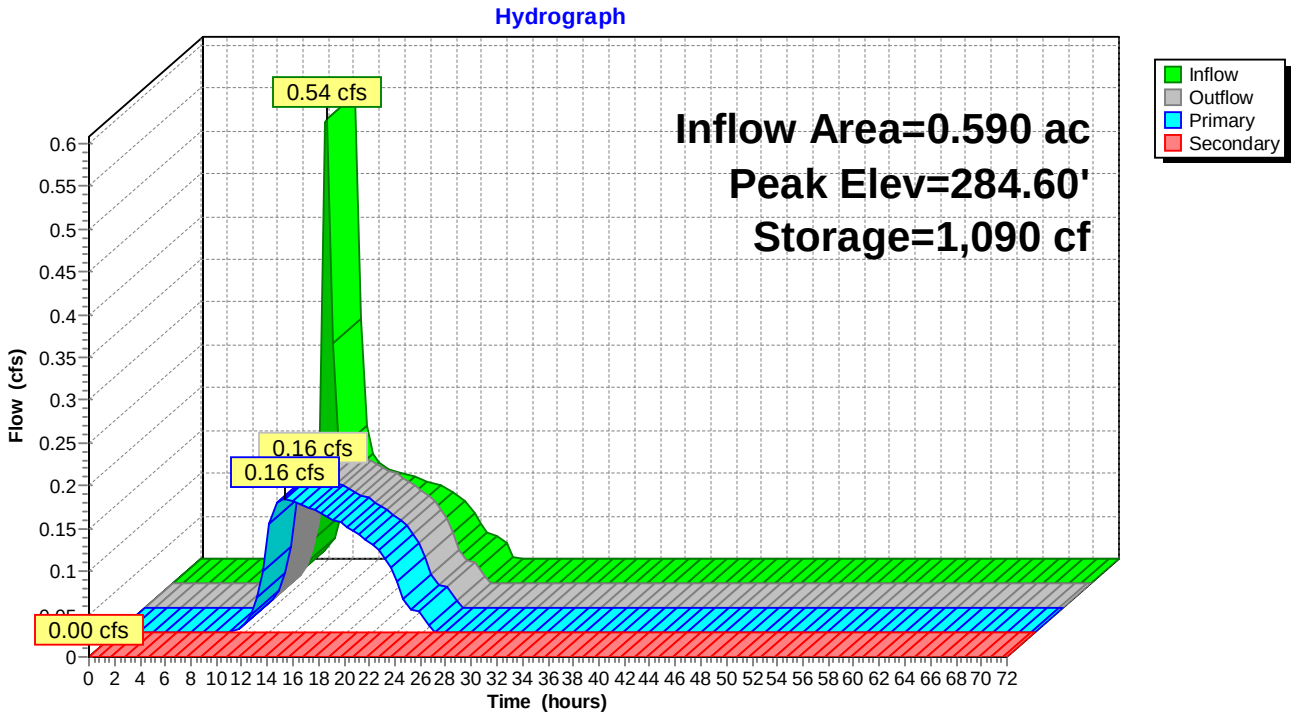
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.15 cfs @ 13.16 hrs HW=284.59' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.15 cfs of 1.29 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 4.54 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 2.46" for 10-YR event
Inflow = 0.42 cfs @ 12.06 hrs, Volume= 0.053 af
Outflow = 0.07 cfs @ 16.90 hrs, Volume= 0.053 af, Atten= 84%, Lag= 290.7 min
Primary = 0.07 cfs @ 16.90 hrs, Volume= 0.053 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.68' @ 13.72 hrs Surf.Area= 2,776 sf Storage= 1,156 cf

Plug-Flow detention time= 176.7 min calculated for 0.053 af (99% of inflow)
Center-of-Mass det. time= 175.8 min (1,013.1 - 837.3)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

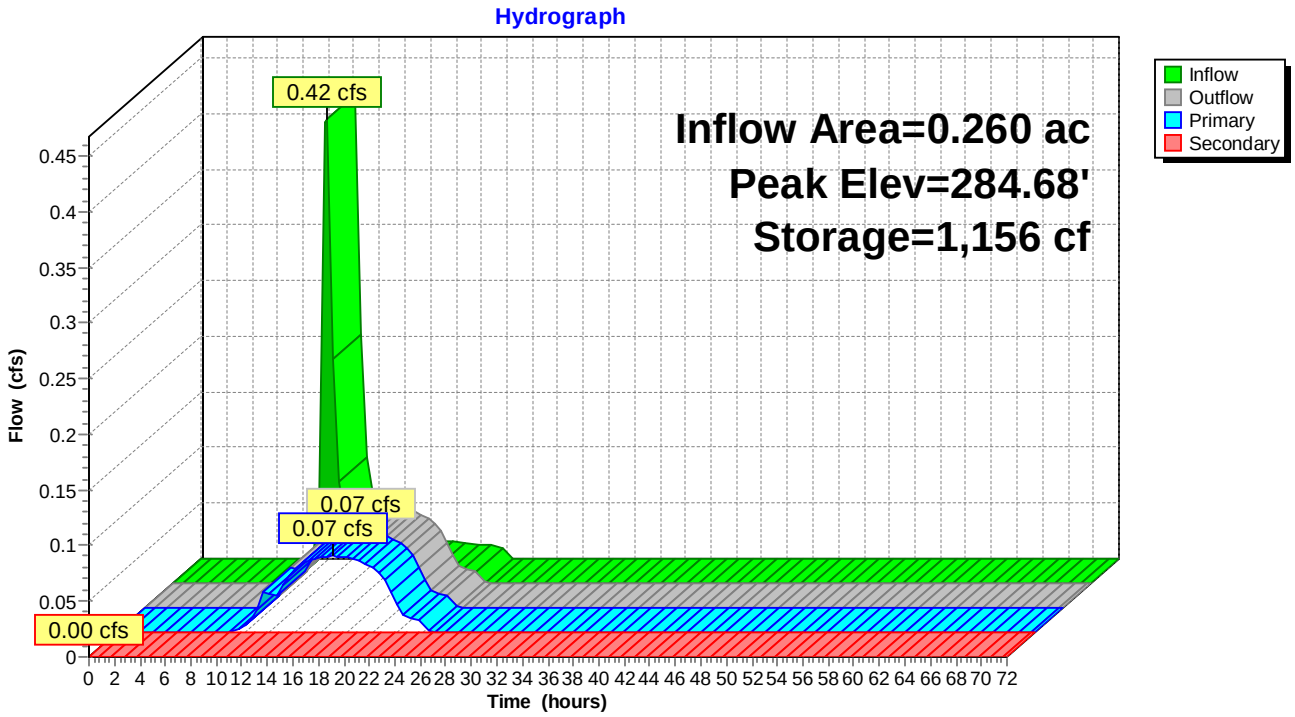
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.07 cfs @ 16.90 hrs HW=284.53' TW=284.36' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.07 cfs of 0.27 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 2.01 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

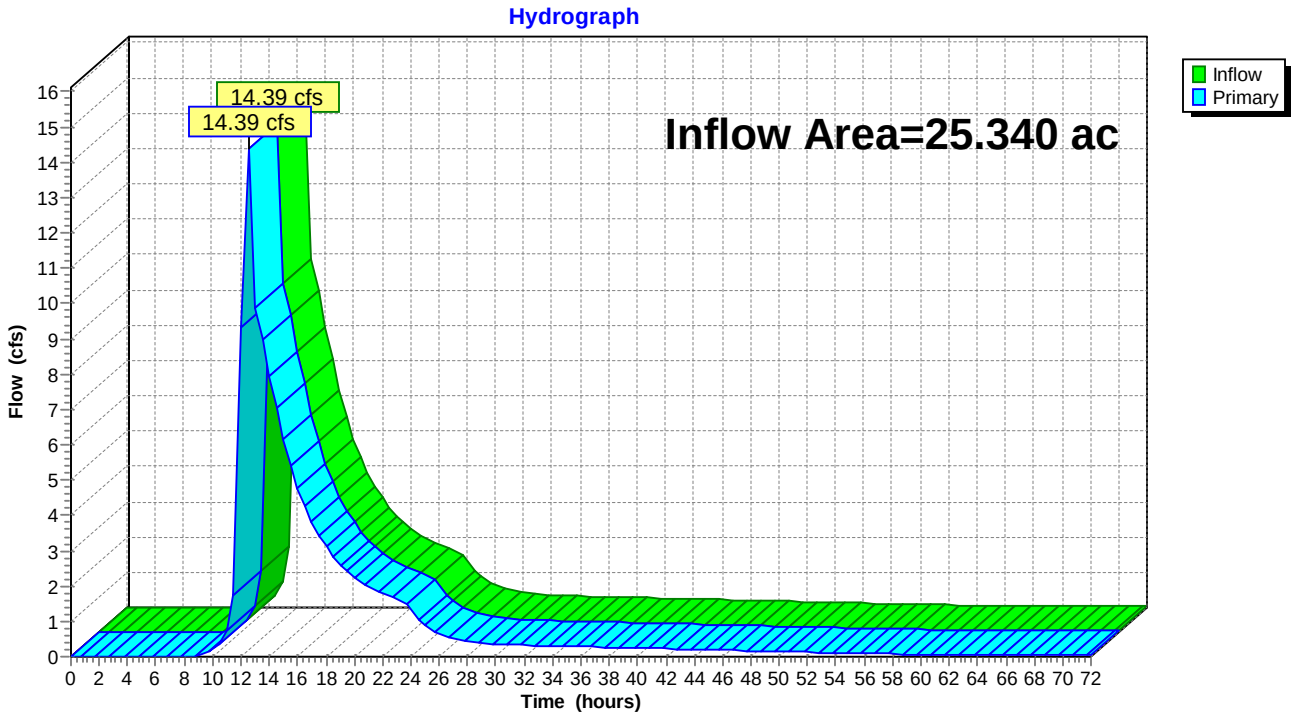
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 2.65" for 10-YR event
Inflow = 14.39 cfs @ 12.51 hrs, Volume= 5.598 af
Primary = 14.39 cfs @ 12.51 hrs, Volume= 5.598 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

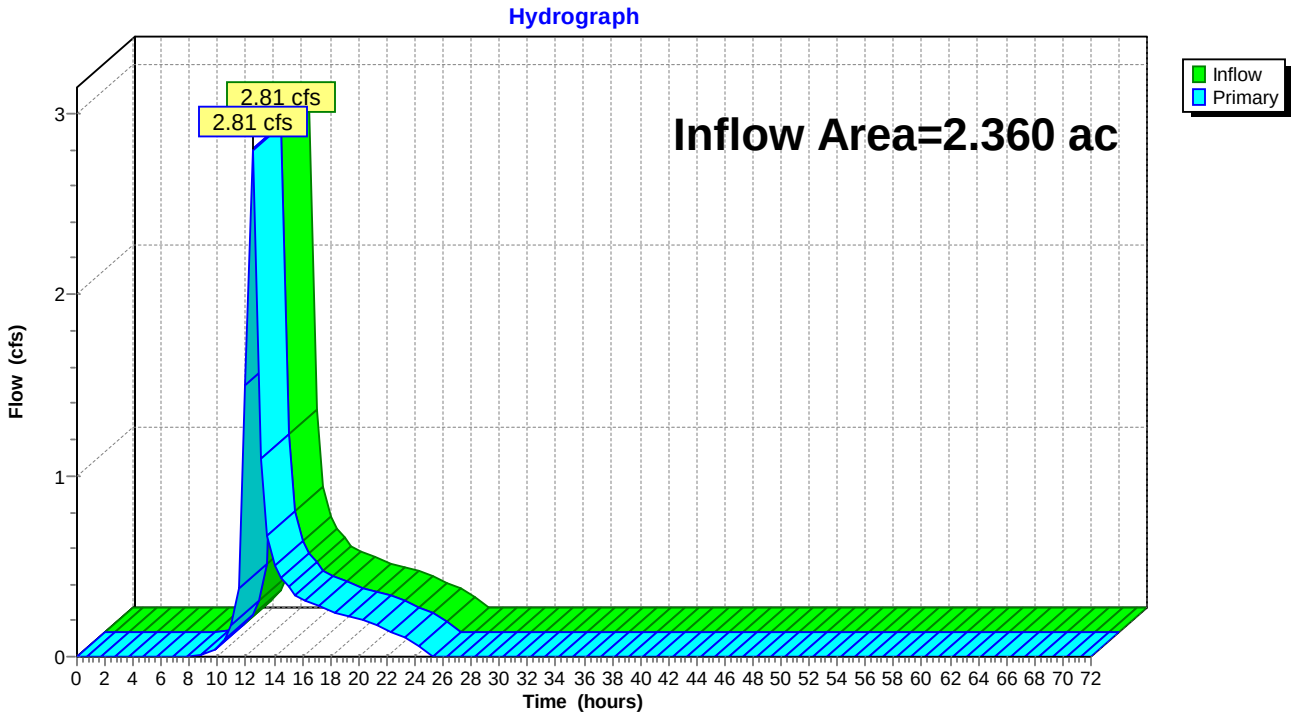


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 2.51" for 10-YR event
Inflow = 2.81 cfs @ 12.47 hrs, Volume= 0.494 af
Primary = 2.81 cfs @ 12.47 hrs, Volume= 0.494 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

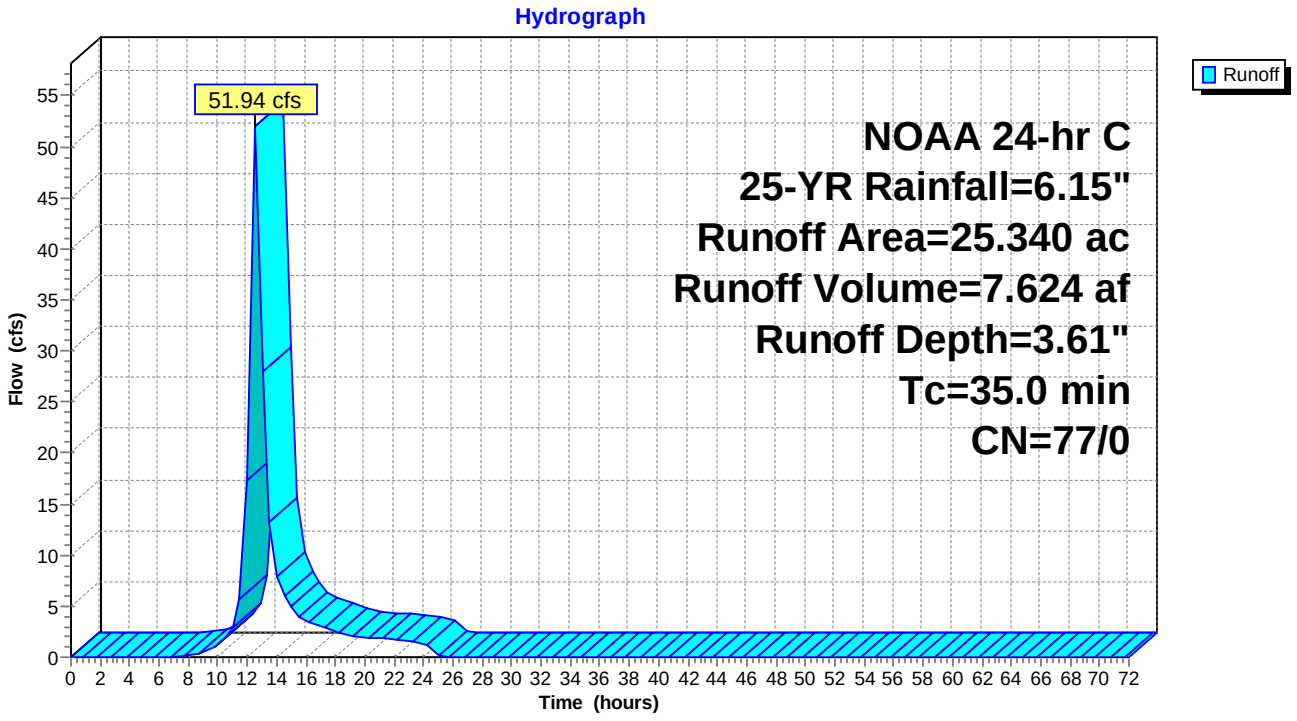
Runoff = 51.94 cfs @ 12.55 hrs, Volume= 7.624 af, Depth= 3.61"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

	Area (ac)	CN	Description
*	1.290	70	Woods C
*	4.690	78	Meadow D
*	19.360	77	Woods D
	25.340	77	Weighted Average
	25.340	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

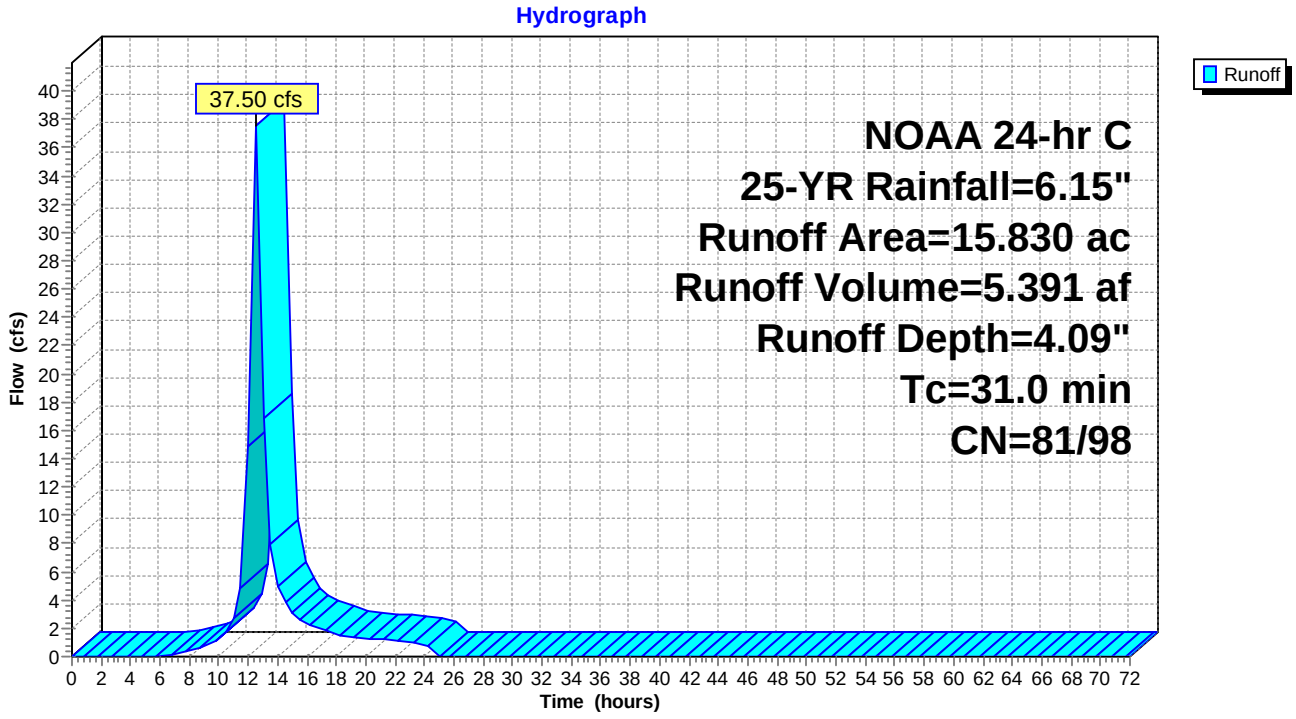
Runoff = 37.50 cfs @ 12.51 hrs, Volume= 5.391 af, Depth= 4.09"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

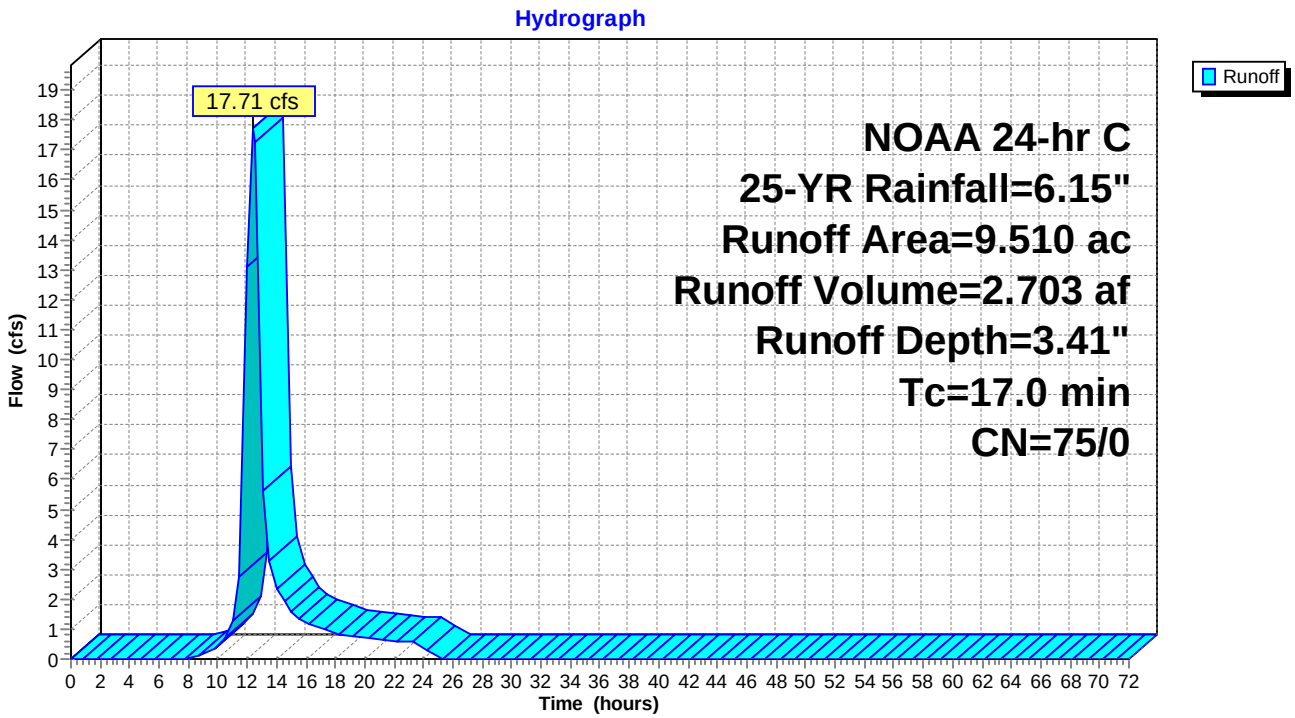
Runoff = 17.71 cfs @ 12.38 hrs, Volume= 2.703 af, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

	Area (ac)	CN	Description
*	0.000	71	Meadow C
*	5.300	78	Meadow D
*	0.150	91	Gravel D
*	3.160	73	Brush D
*	0.900	65	Brush C
	9.510	75	Weighted Average
	9.510	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

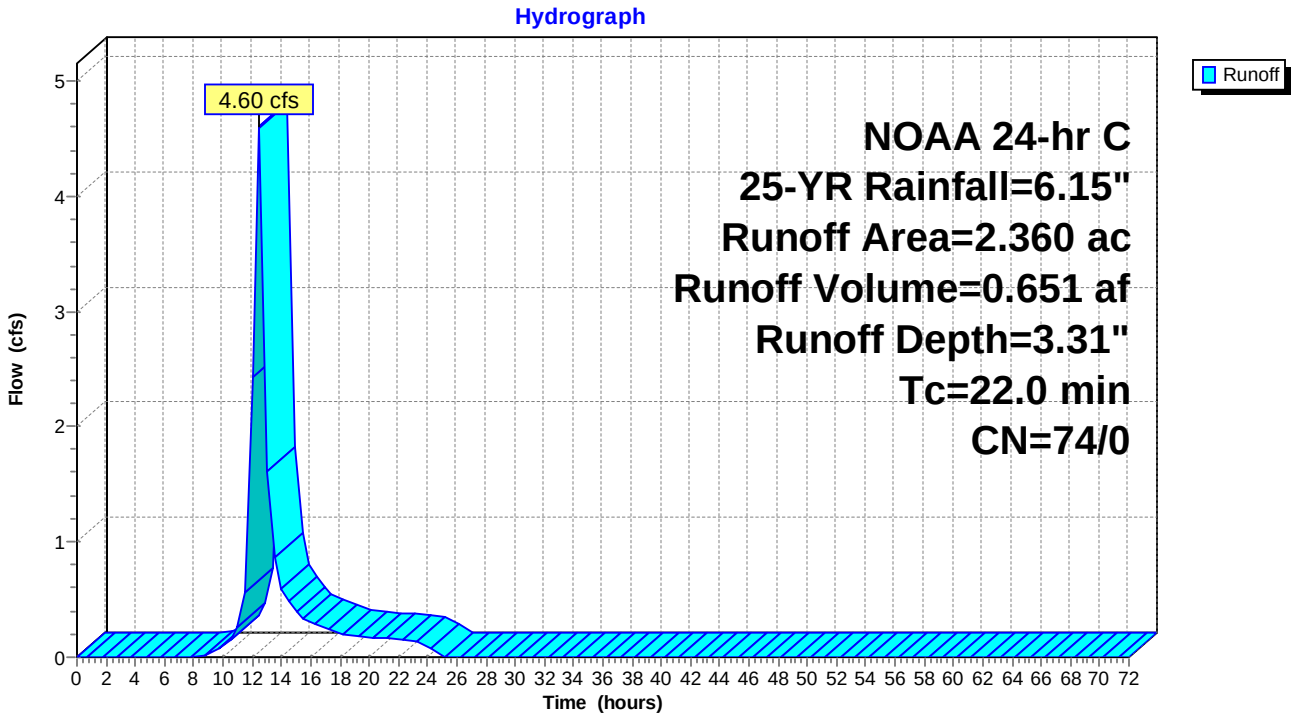
Runoff = 4.60 cfs @ 12.46 hrs, Volume= 0.651 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

	Area (ac)	CN	Description
*	0.060	71	Meadow C
*	1.060	70	Woods C
*	1.240	77	Woods D
	2.360	74	Weighted Average
	2.360	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

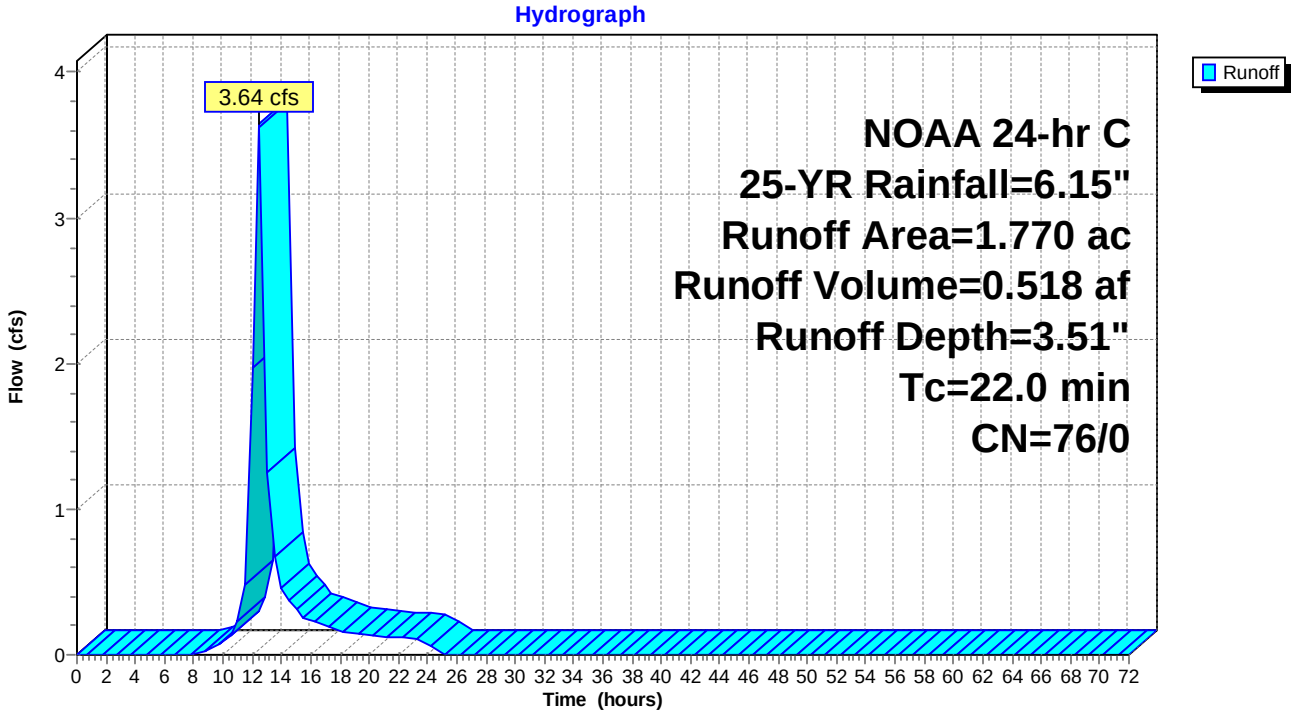
Runoff = 3.64 cfs @ 12.46 hrs, Volume= 0.518 af, Depth= 3.51"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

	Area (ac)	CN	Description
*	0.380	65	Brush C
*	0.150	89	Gravel C
*	0.940	73	Brush D
*	0.300	91	Gravel D
	1.770	76	Weighted Average
	1.770	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

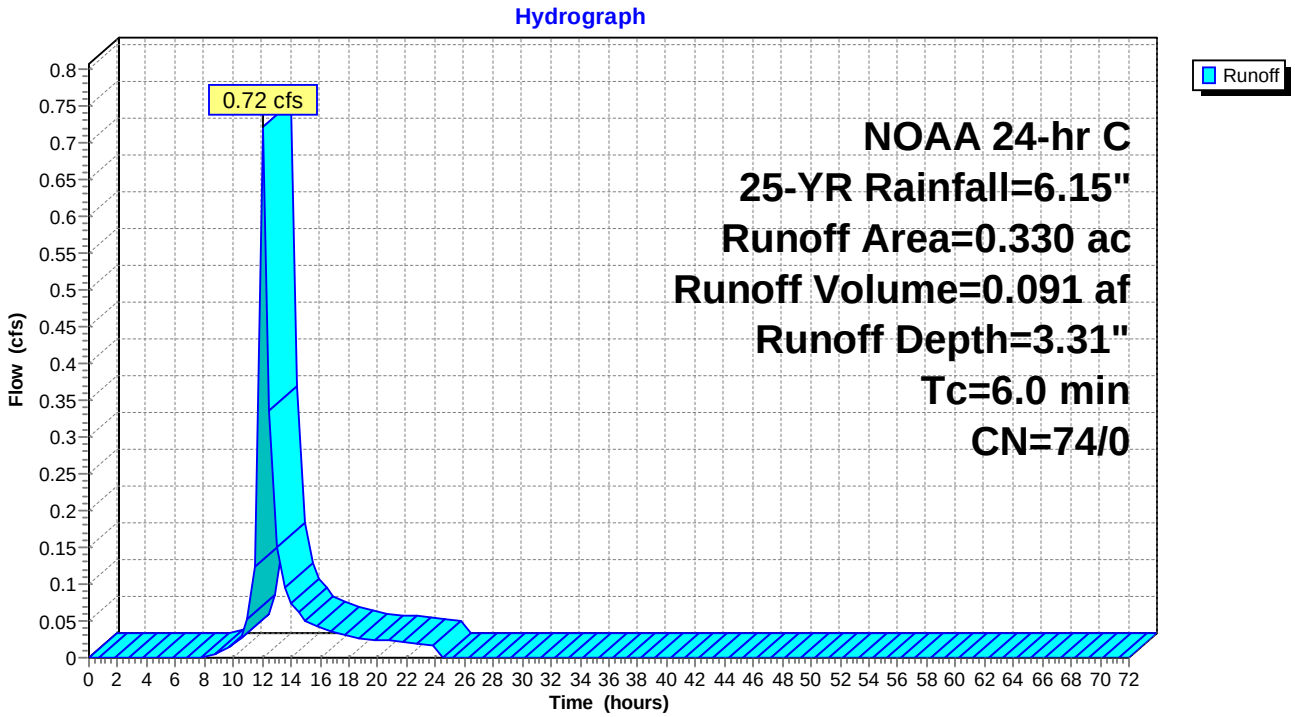
Runoff = 0.72 cfs @ 12.05 hrs, Volume= 0.091 af, Depth= 3.31"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

	Area (ac)	CN	Description
*	0.270	71	Meadow C
*	0.060	89	Gravel C
	0.330	74	Weighted Average
	0.330	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

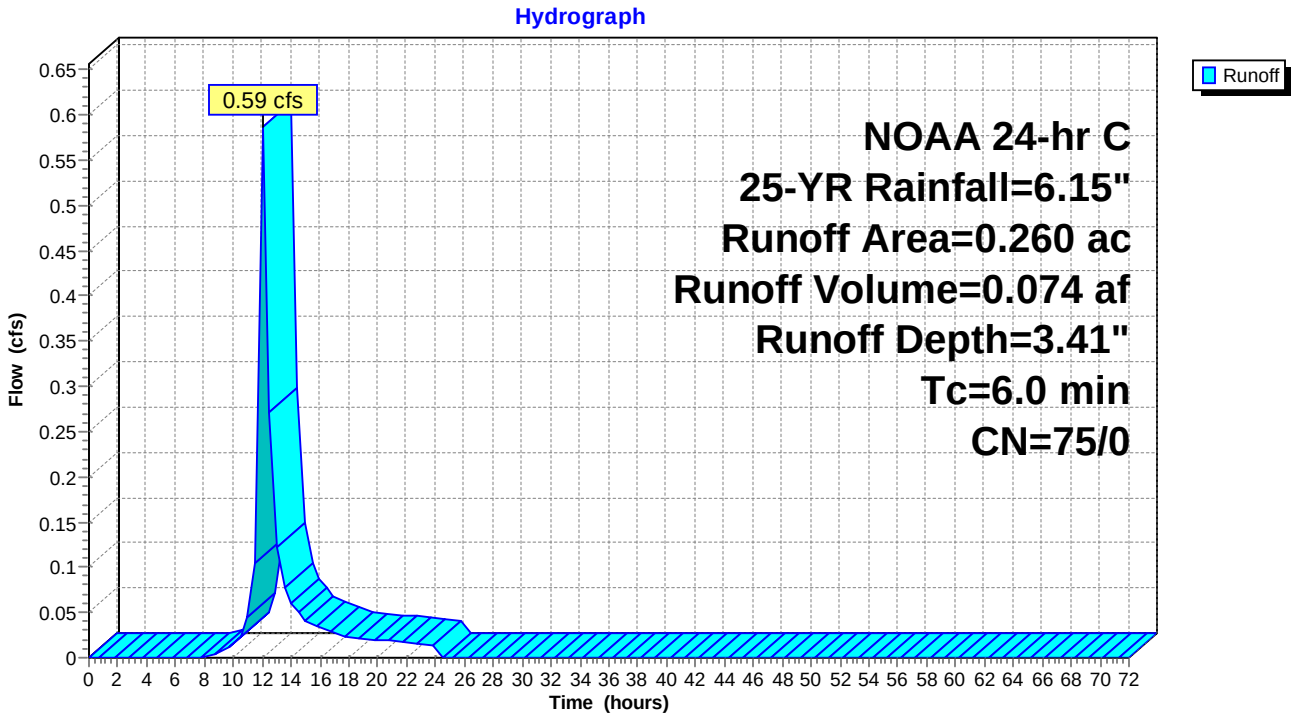
Runoff = 0.59 cfs @ 12.05 hrs, Volume= 0.074 af, Depth= 3.41"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

	Area (ac)	CN	Description
*	0.200	71	Meadow C
*	0.060	89	Gravel C
	0.260	75	Weighted Average
	0.260	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 4.09" for 25-YR event
Inflow = 37.50 cfs @ 12.51 hrs, Volume= 5.391 af
Outflow = 9.86 cfs @ 13.49 hrs, Volume= 5.008 af, Atten= 74%, Lag= 58.7 min
Primary = 9.86 cfs @ 13.49 hrs, Volume= 5.008 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 265.44' @ 13.49 hrs Surf.Area= 42,582 sf Storage= 122,470 cf

Plug-Flow detention time= 379.8 min calculated for 4.974 af (92% of inflow)
Center-of-Mass det. time= 359.3 min (1,192.8 - 833.5)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

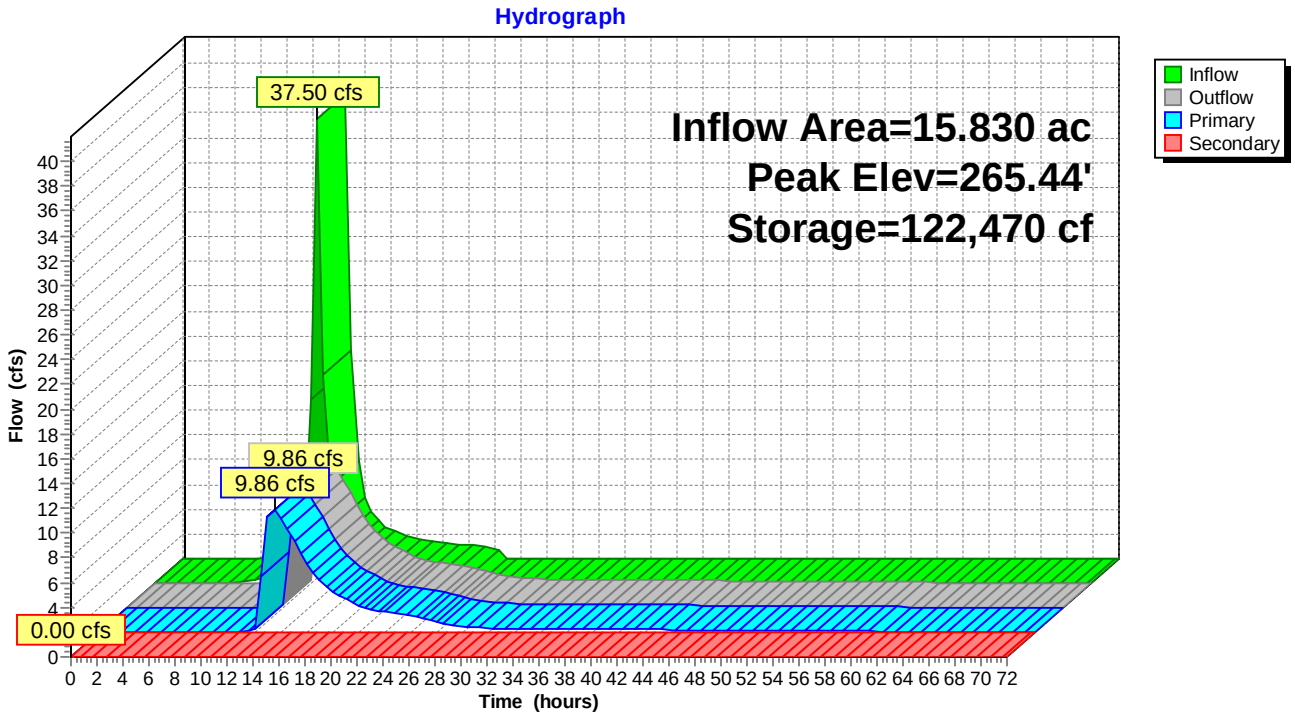
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9.84 cfs @ 13.49 hrs HW=265.44' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 9.84 cfs of 17.82 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.71 cfs @ 8.13 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 9.14 cfs @ 7.42 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 3.36" for 25-YR event
Inflow = 0.75 cfs @ 12.05 hrs, Volume= 0.165 af
Outflow = 0.17 cfs @ 13.23 hrs, Volume= 0.165 af, Atten= 77%, Lag= 70.6 min
Primary = 0.17 cfs @ 13.23 hrs, Volume= 0.165 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.80' @ 13.23 hrs Surf.Area= 3,222 sf Storage= 1,674 cf

Plug-Flow detention time= 95.4 min calculated for 0.164 af (99% of inflow)
Center-of-Mass det. time= 95.5 min (1,042.8 - 947.3)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

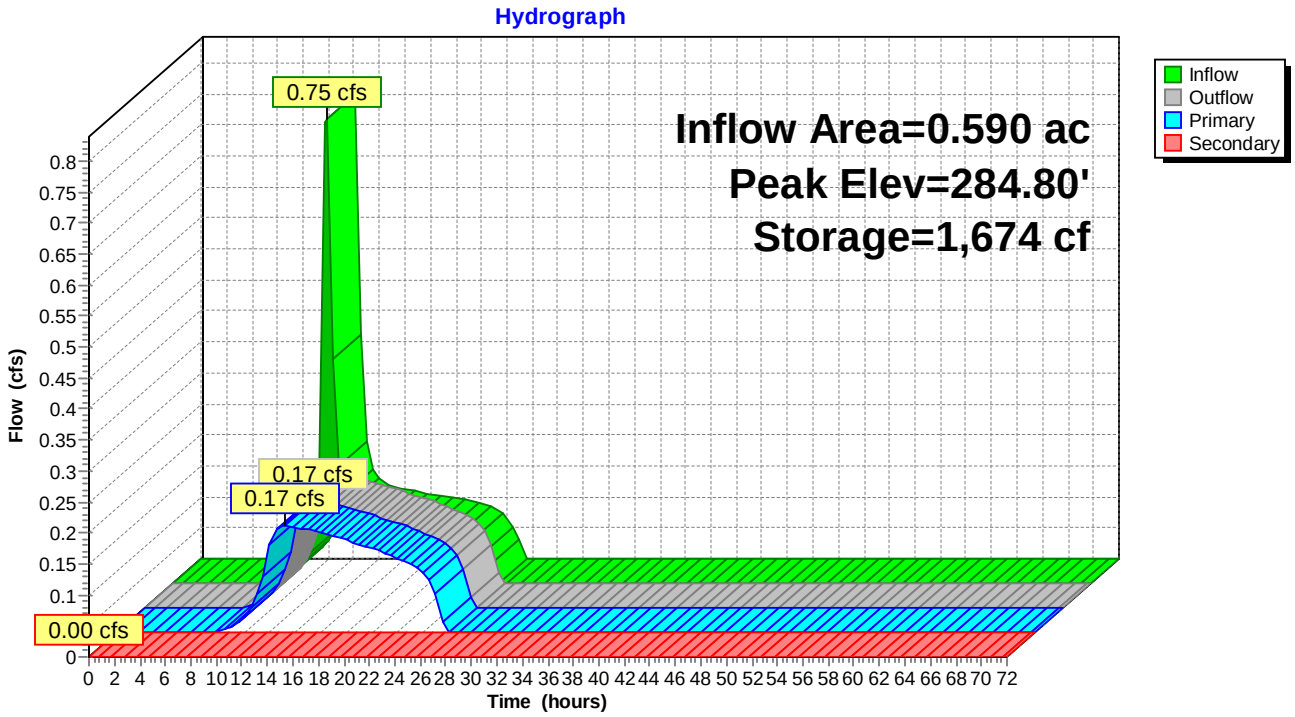
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.17 cfs @ 13.23 hrs HW=284.79' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.17 cfs of 1.35 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 5.03 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 3.41" for 25-YR event
Inflow = 0.59 cfs @ 12.05 hrs, Volume= 0.074 af
Outflow = 0.08 cfs @ 18.64 hrs, Volume= 0.074 af, Atten= 87%, Lag= 395.3 min
Primary = 0.08 cfs @ 18.64 hrs, Volume= 0.074 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.89' @ 14.16 hrs Surf.Area= 3,478 sf Storage= 1,792 cf

Plug-Flow detention time= 265.2 min calculated for 0.073 af (99% of inflow)
Center-of-Mass det. time= 263.9 min (1,091.7 - 827.7)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

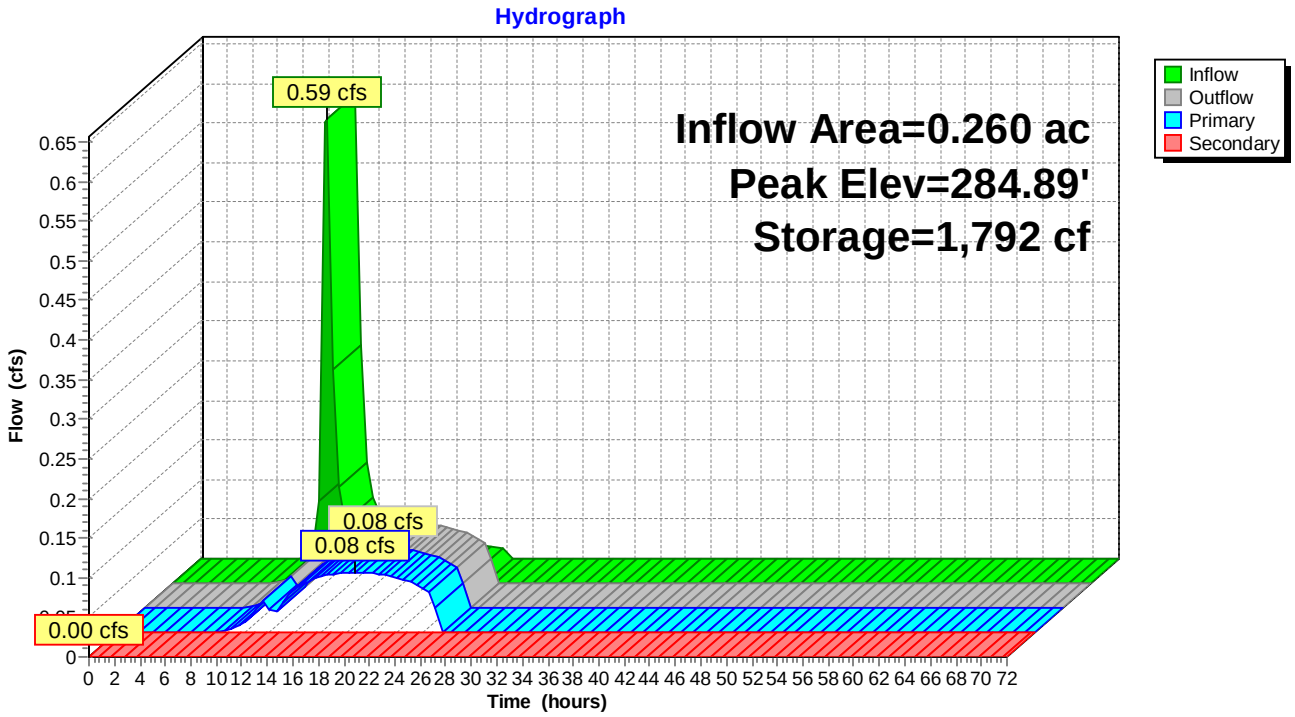
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.08 cfs @ 18.64 hrs HW=284.69' TW=284.48' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.08 cfs of 0.30 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 2.22 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

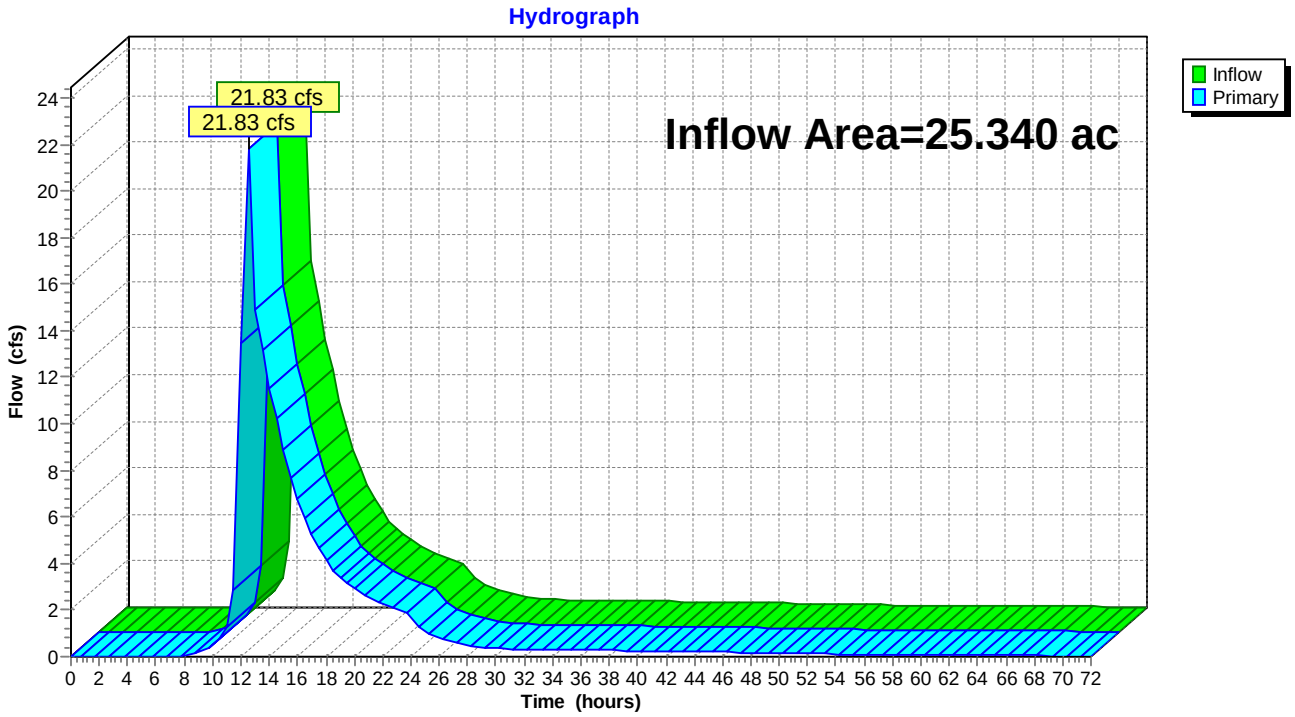
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 3.65" for 25-YR event
Inflow = 21.83 cfs @ 12.52 hrs, Volume= 7.711 af
Primary = 21.83 cfs @ 12.52 hrs, Volume= 7.711 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

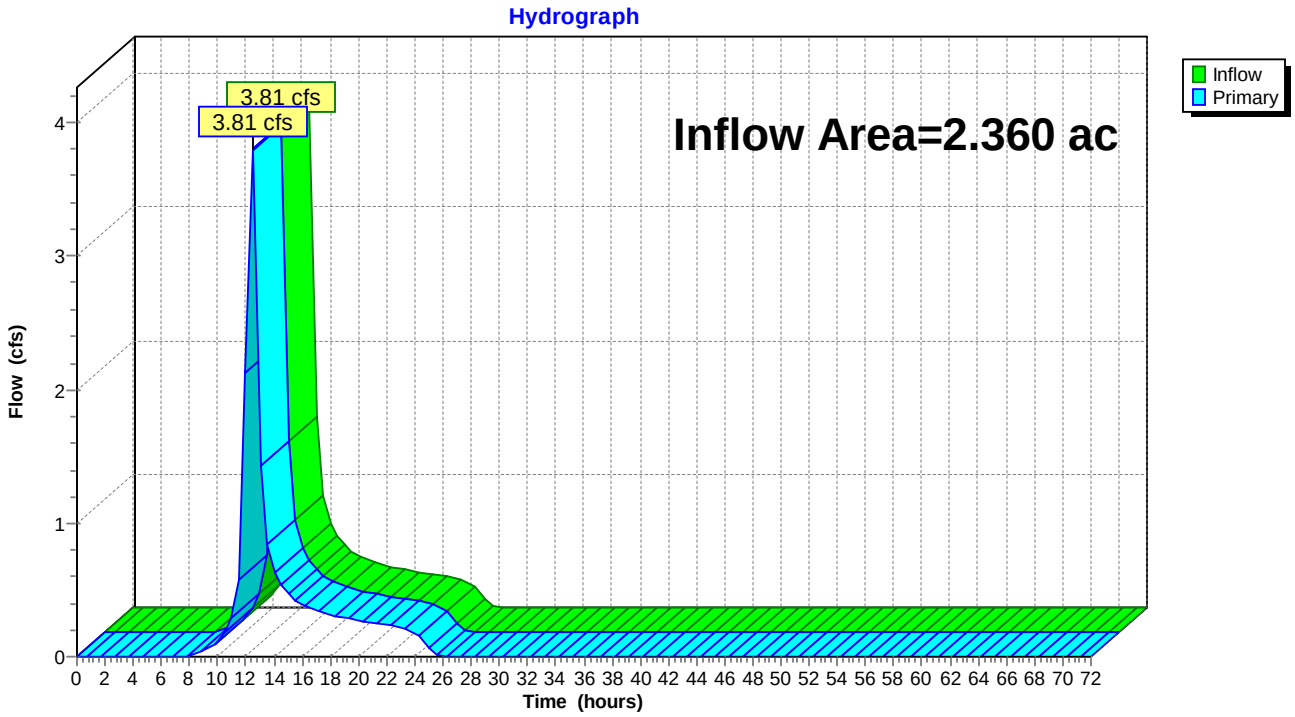


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 3.47" for 25-YR event
Inflow = 3.81 cfs @ 12.46 hrs, Volume= 0.683 af
Primary = 3.81 cfs @ 12.46 hrs, Volume= 0.683 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

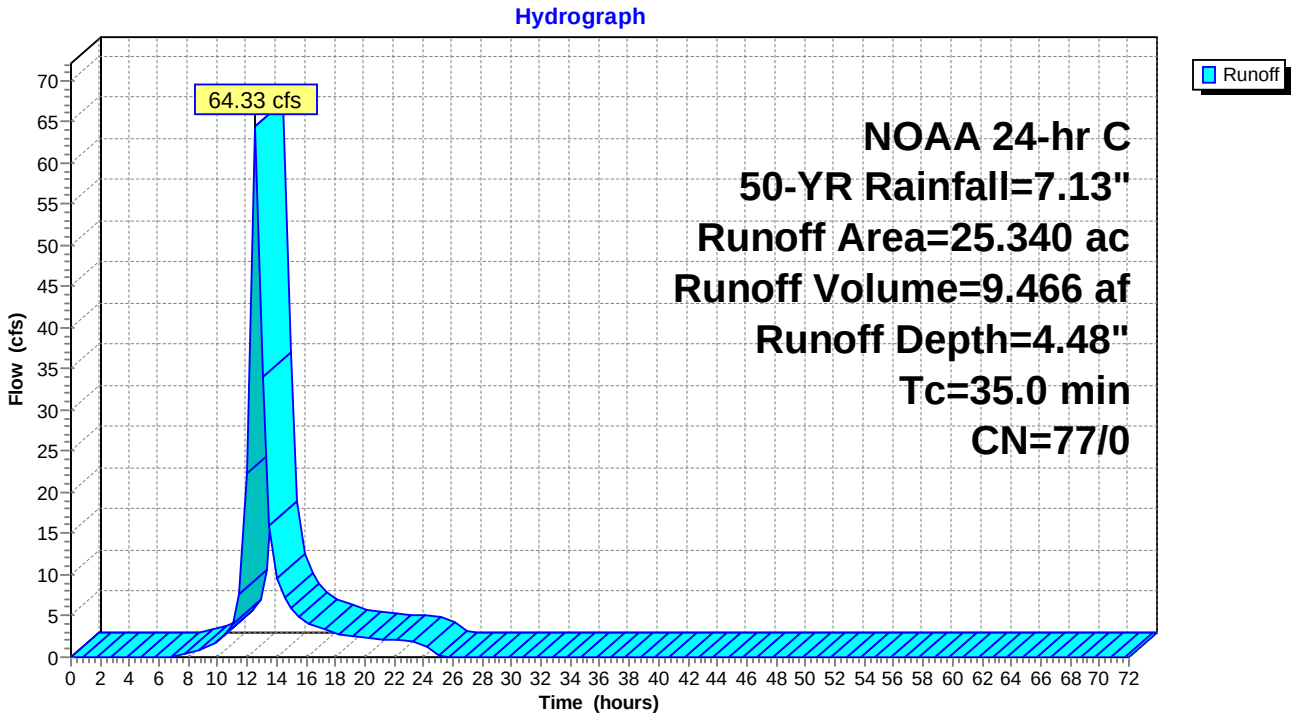
Runoff = 64.33 cfs @ 12.54 hrs, Volume= 9.466 af, Depth= 4.48"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

	Area (ac)	CN	Description
*	1.290	70	Woods C
*	4.690	78	Meadow D
*	19.360	77	Woods D
	25.340	77	Weighted Average
	25.340	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

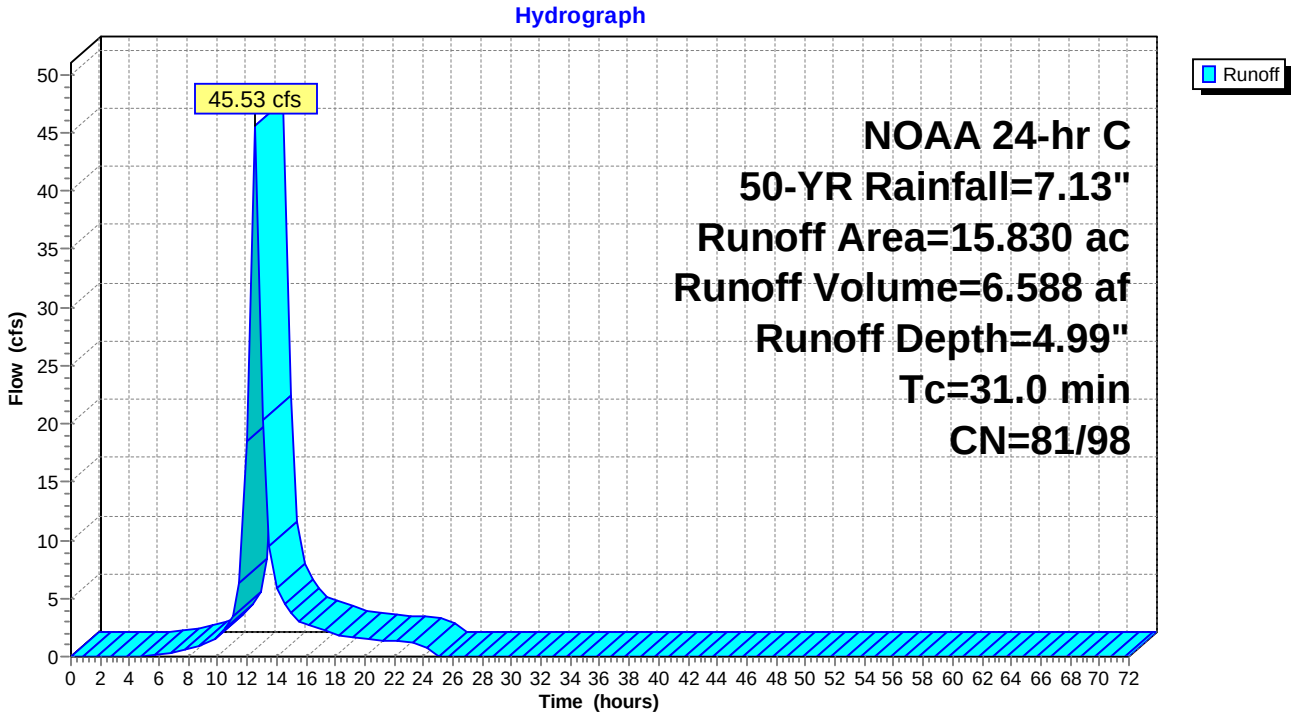
Runoff = 45.53 cfs @ 12.51 hrs, Volume= 6.588 af, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

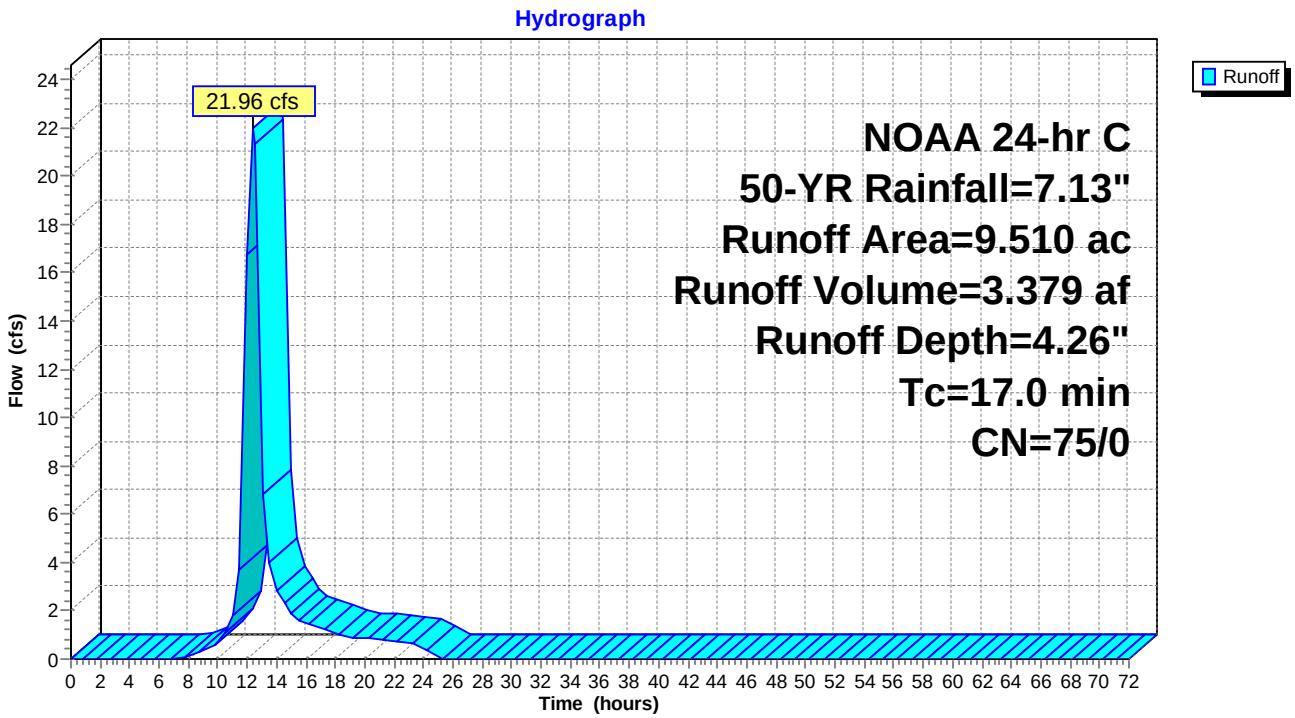
Runoff = 21.96 cfs @ 12.37 hrs, Volume= 3.379 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

	Area (ac)	CN	Description
*	0.000	71	Meadow C
*	5.300	78	Meadow D
*	0.150	91	Gravel D
*	3.160	73	Brush D
*	0.900	65	Brush C
	9.510	75	Weighted Average
	9.510	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

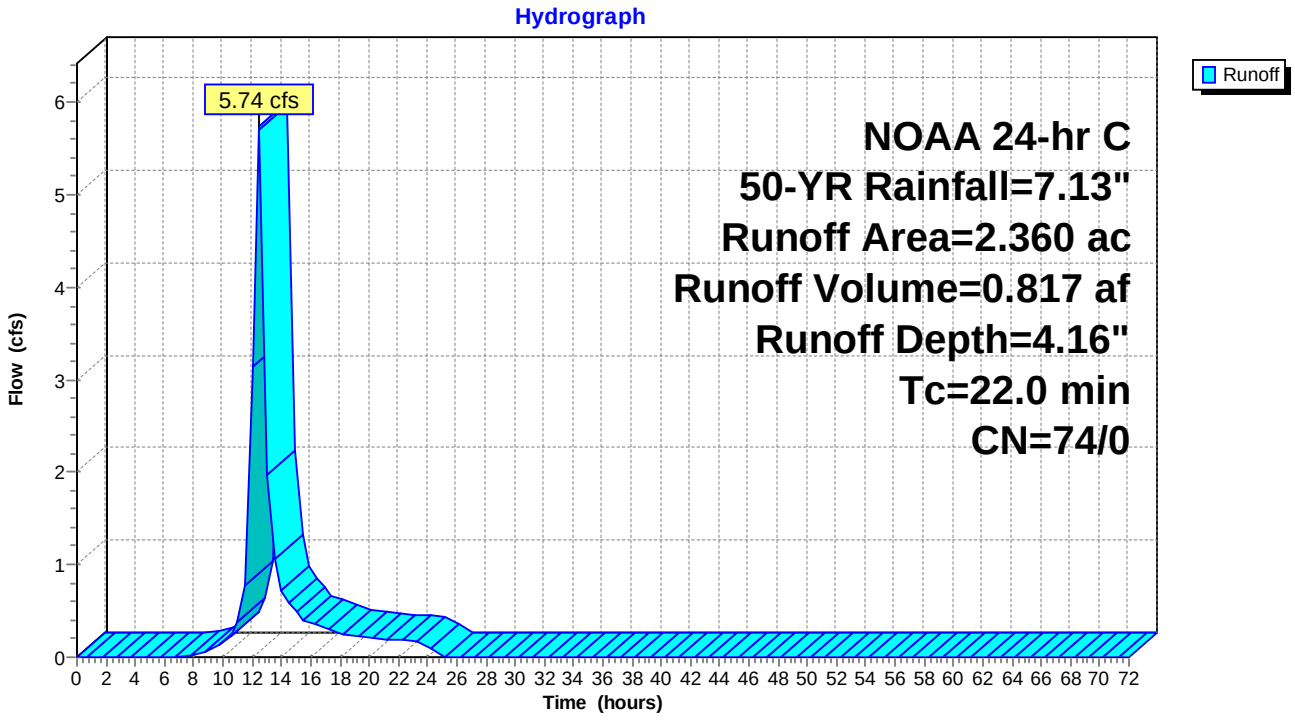
Runoff = 5.74 cfs @ 12.45 hrs, Volume= 0.817 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

	Area (ac)	CN	Description
*	0.060	71	Meadow C
*	1.060	70	Woods C
*	1.240	77	Woods D
	2.360	74	Weighted Average
	2.360	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

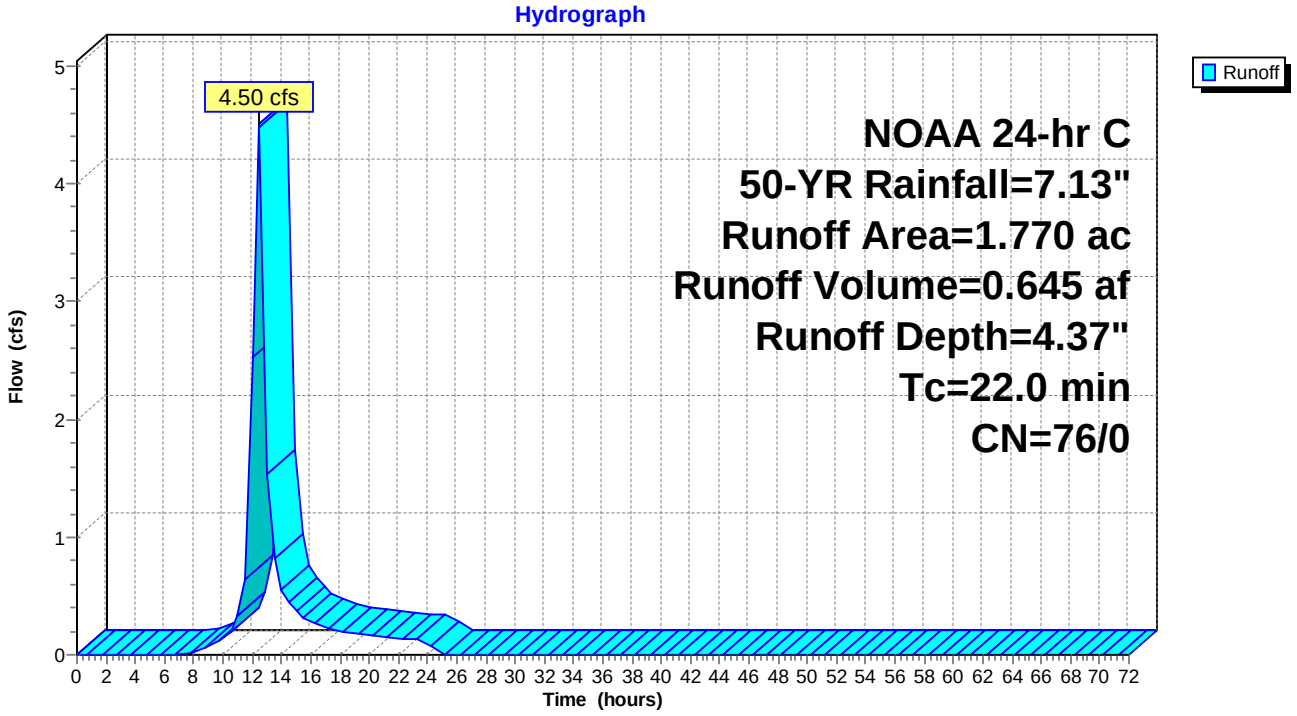
Runoff = 4.50 cfs @ 12.45 hrs, Volume= 0.645 af, Depth= 4.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

	Area (ac)	CN	Description
*	0.380	65	Brush C
*	0.150	89	Gravel C
*	0.940	73	Brush D
*	0.300	91	Gravel D
	1.770	76	Weighted Average
	1.770	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

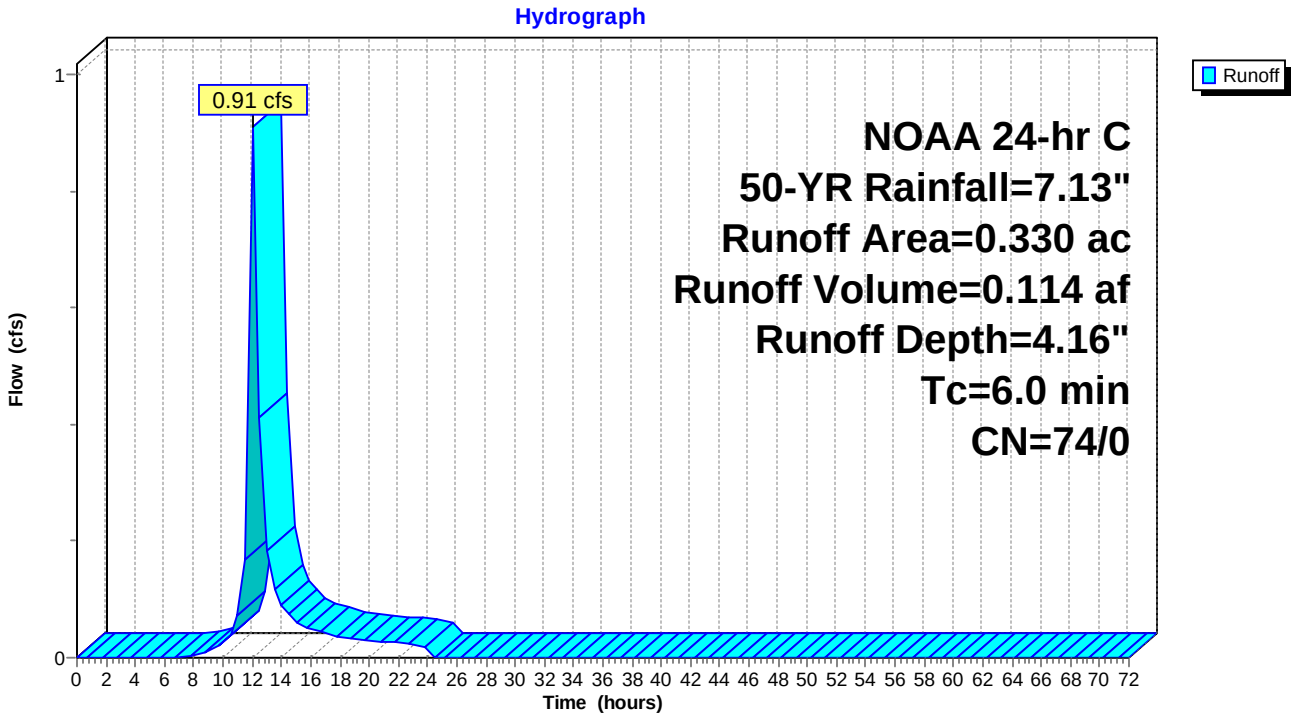
Runoff = 0.91 cfs @ 12.05 hrs, Volume= 0.114 af, Depth= 4.16"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

	Area (ac)	CN	Description
*	0.270	71	Meadow C
*	0.060	89	Gravel C
	0.330	74	Weighted Average
	0.330	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

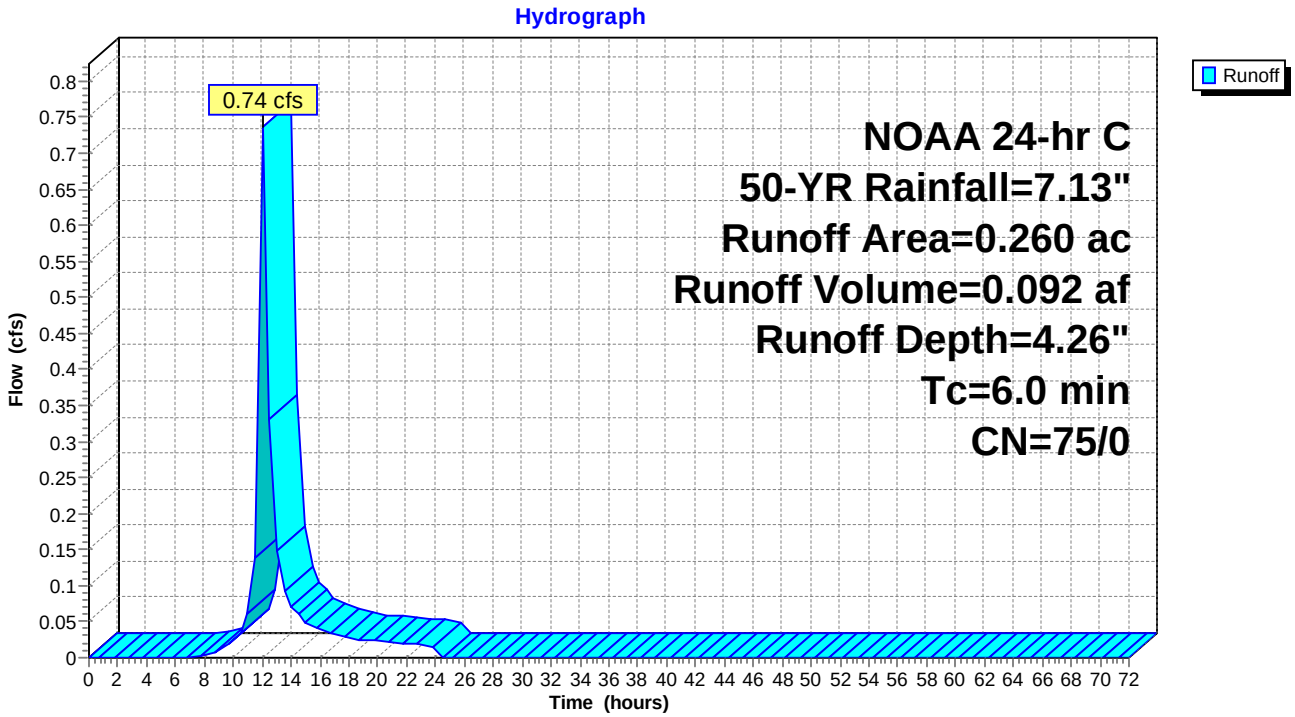
Runoff = 0.74 cfs @ 12.05 hrs, Volume= 0.092 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

	Area (ac)	CN	Description
*	0.200	71	Meadow C
*	0.060	89	Gravel C
	0.260	75	Weighted Average
	0.260	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 4.99" for 50-YR event
Inflow = 45.53 cfs @ 12.51 hrs, Volume= 6.588 af
Outflow = 17.97 cfs @ 13.17 hrs, Volume= 6.205 af, Atten= 61%, Lag= 39.5 min
Primary = 17.97 cfs @ 13.17 hrs, Volume= 6.205 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 265.87' @ 13.22 hrs Surf.Area= 44,748 sf Storage= 141,368 cf

Plug-Flow detention time= 328.1 min calculated for 6.162 af (94% of inflow)
Center-of-Mass det. time= 313.1 min (1,141.1 - 827.9)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

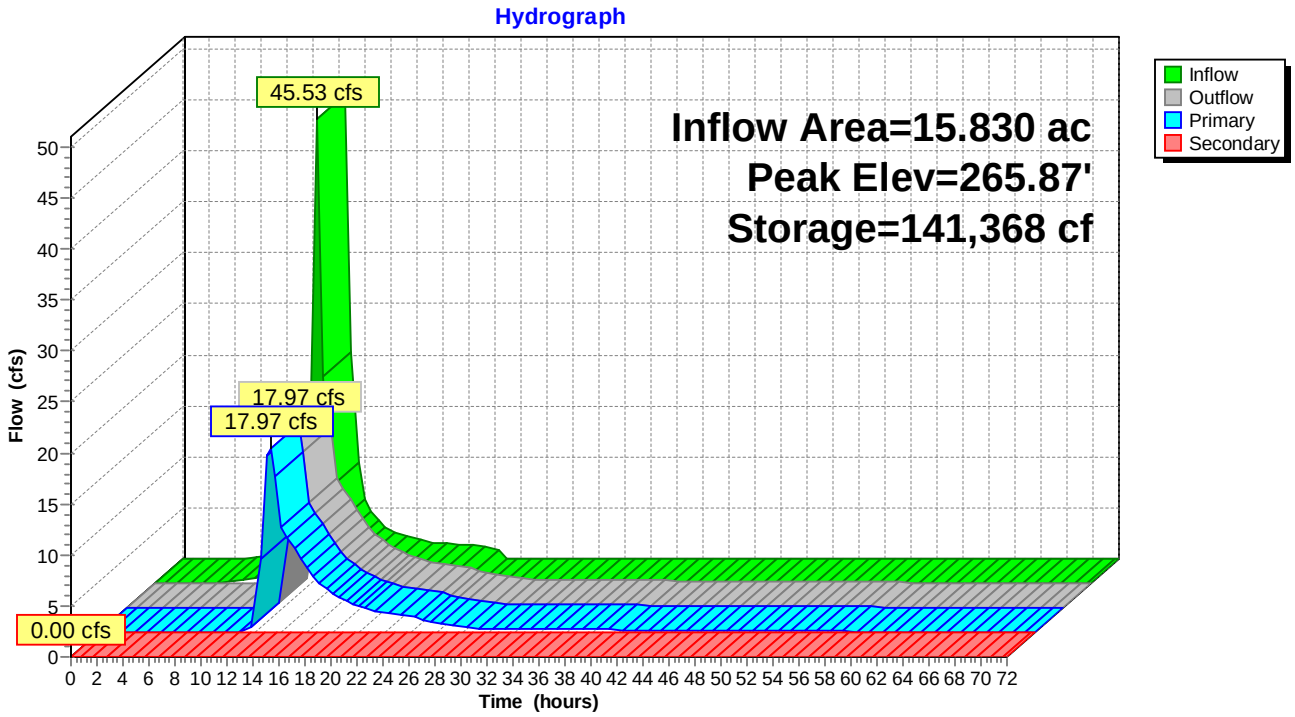
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=16.56 cfs @ 13.17 hrs HW=265.76' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 16.56 cfs of 18.47 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.75 cfs @ 8.58 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 10.52 cfs @ 8.37 fps)
—**4=Orifice/Grate** (Weir Controls 5.29 cfs @ 1.68 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 4.37" for 50-YR event
Inflow = 1.02 cfs @ 12.06 hrs, Volume= 0.215 af
Outflow = 0.19 cfs @ 13.22 hrs, Volume= 0.215 af, Atten= 82%, Lag= 69.8 min
Primary = 0.19 cfs @ 13.22 hrs, Volume= 0.215 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 285.02' @ 13.22 hrs Surf.Area= 3,885 sf Storage= 2,455 cf

Plug-Flow detention time= 126.3 min calculated for 0.214 af (99% of inflow)
Center-of-Mass det. time= 126.0 min (1,104.5 - 978.5)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

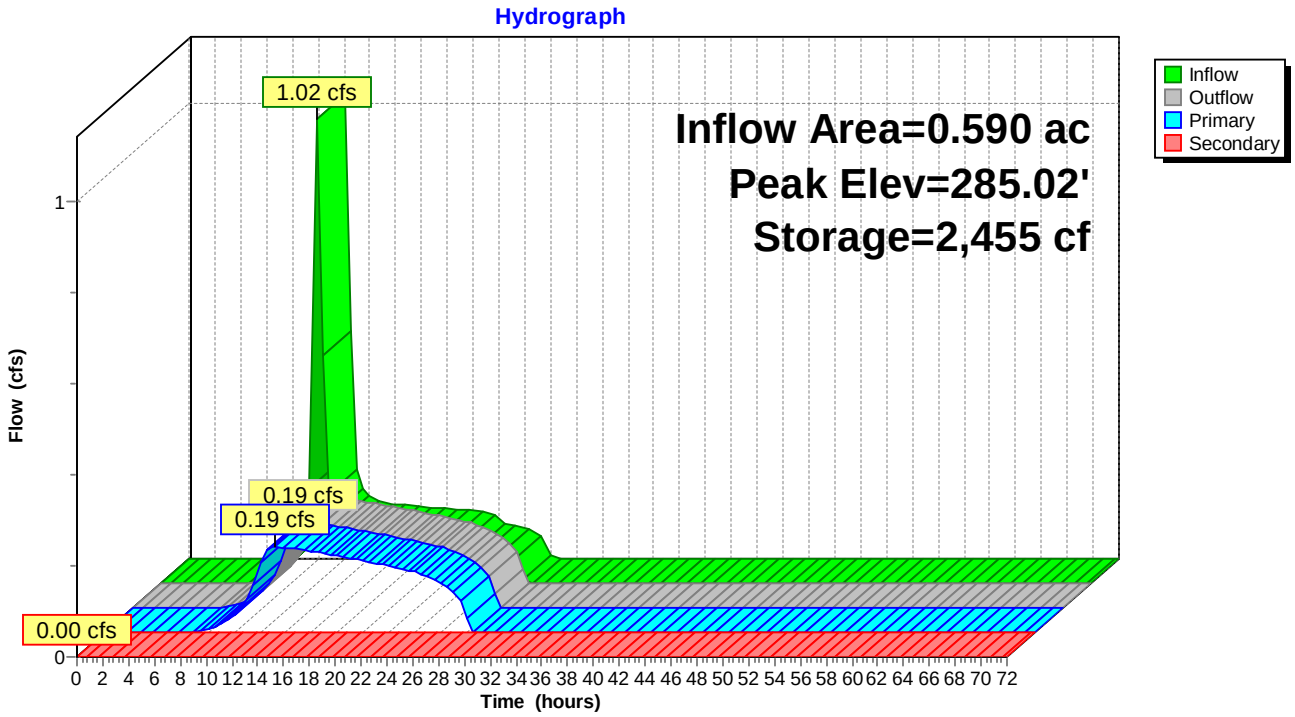
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.19 cfs @ 13.22 hrs HW=285.01' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.19 cfs of 1.40 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 5.50 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 4.26" for 50-YR event
Inflow = 0.74 cfs @ 12.05 hrs, Volume= 0.092 af
Outflow = 0.08 cfs @ 20.35 hrs, Volume= 0.092 af, Atten= 89%, Lag= 497.8 min
Primary = 0.11 cfs @ 12.13 hrs, Volume= 0.101 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 285.08' @ 14.60 hrs Surf.Area= 3,966 sf Storage= 2,539 cf

Plug-Flow detention time= 370.9 min calculated for 0.092 af (99% of inflow)
Center-of-Mass det. time= 370.6 min (1,191.8 - 821.2)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

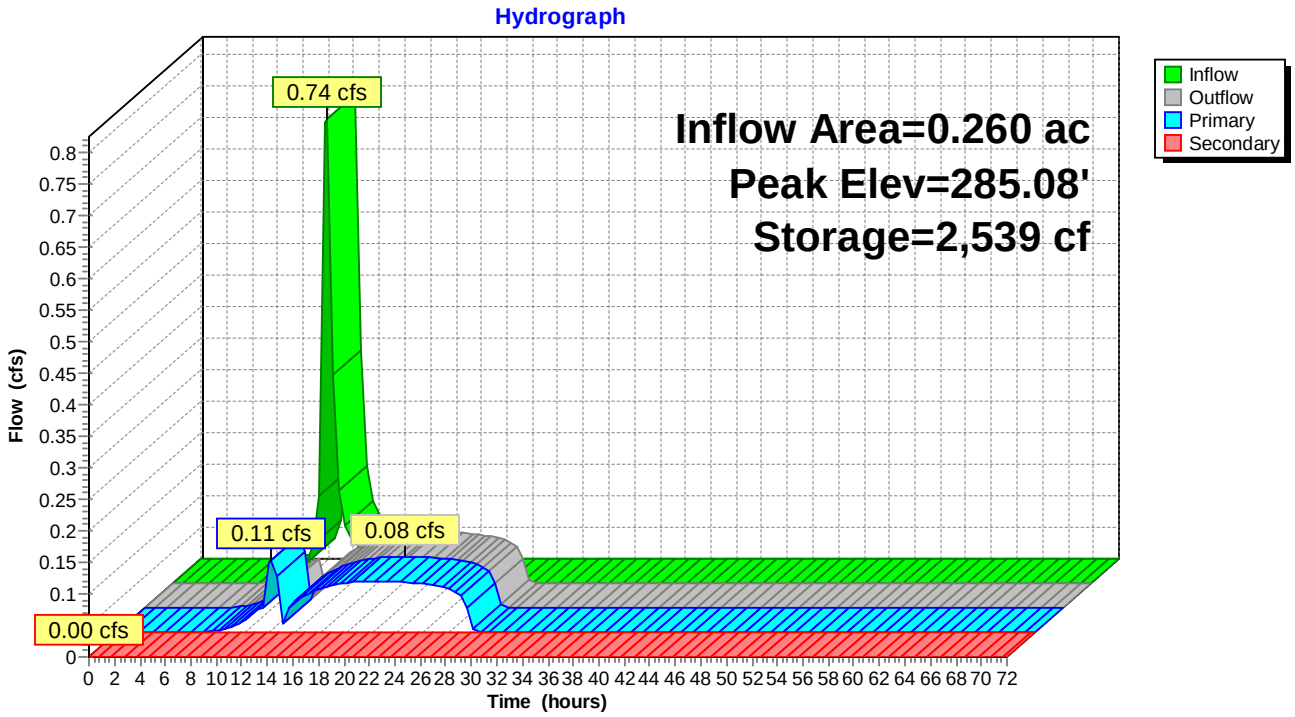
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 12.13 hrs HW=284.67' TW=284.68' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)
  └**2=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

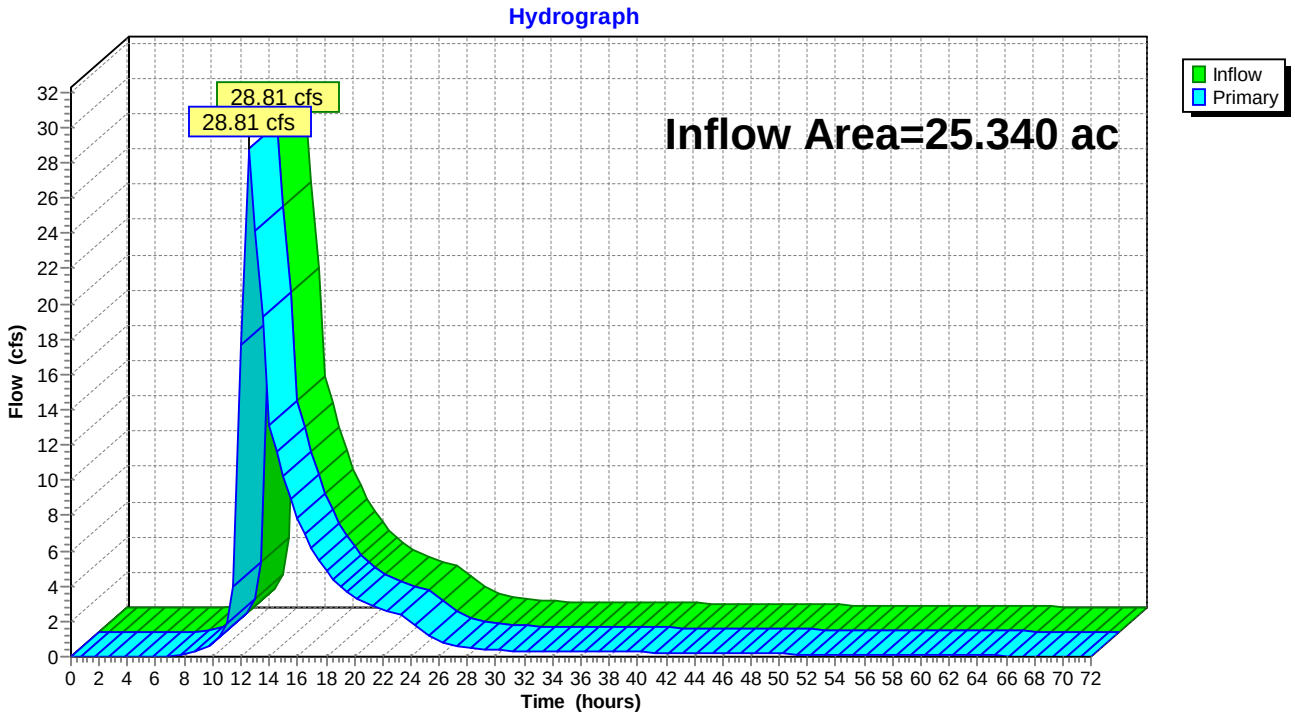
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 4.54" for 50-YR event
Inflow = 28.81 cfs @ 12.61 hrs, Volume= 9.585 af
Primary = 28.81 cfs @ 12.61 hrs, Volume= 9.585 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

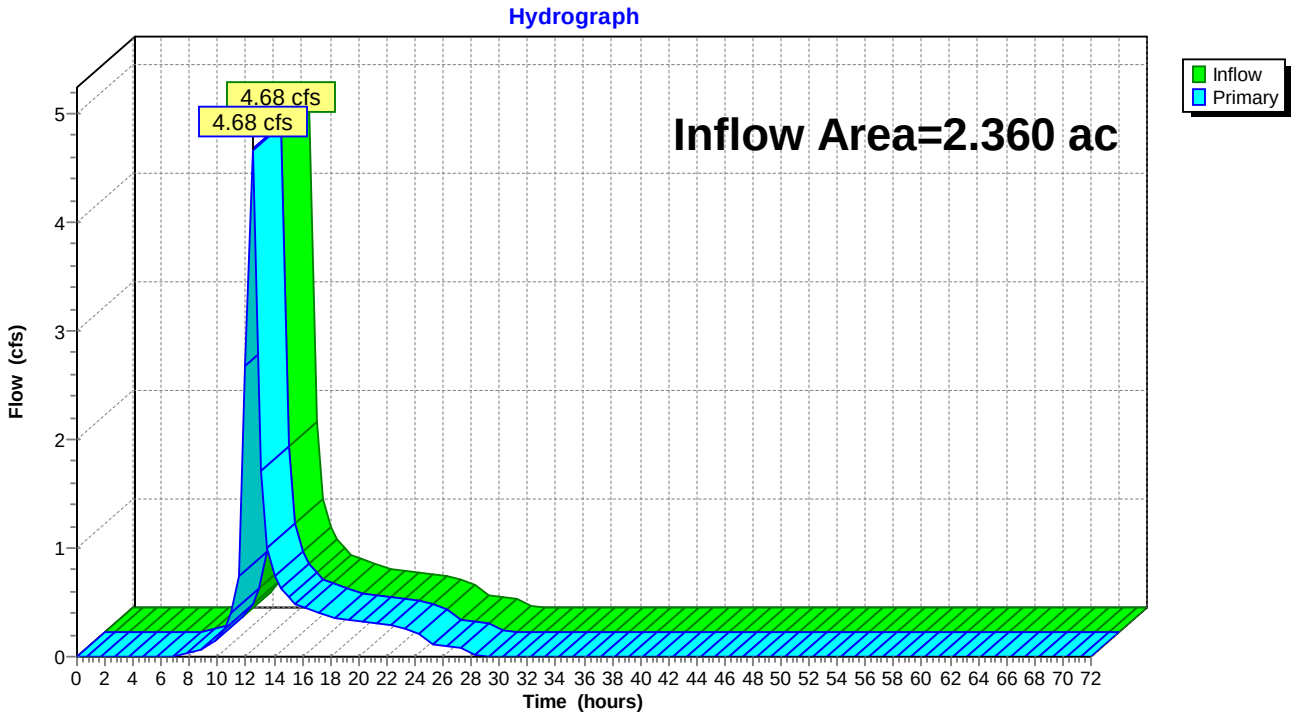


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 4.37" for 50-YR event
Inflow = 4.68 cfs @ 12.45 hrs, Volume= 0.860 af
Primary = 4.68 cfs @ 12.45 hrs, Volume= 0.860 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

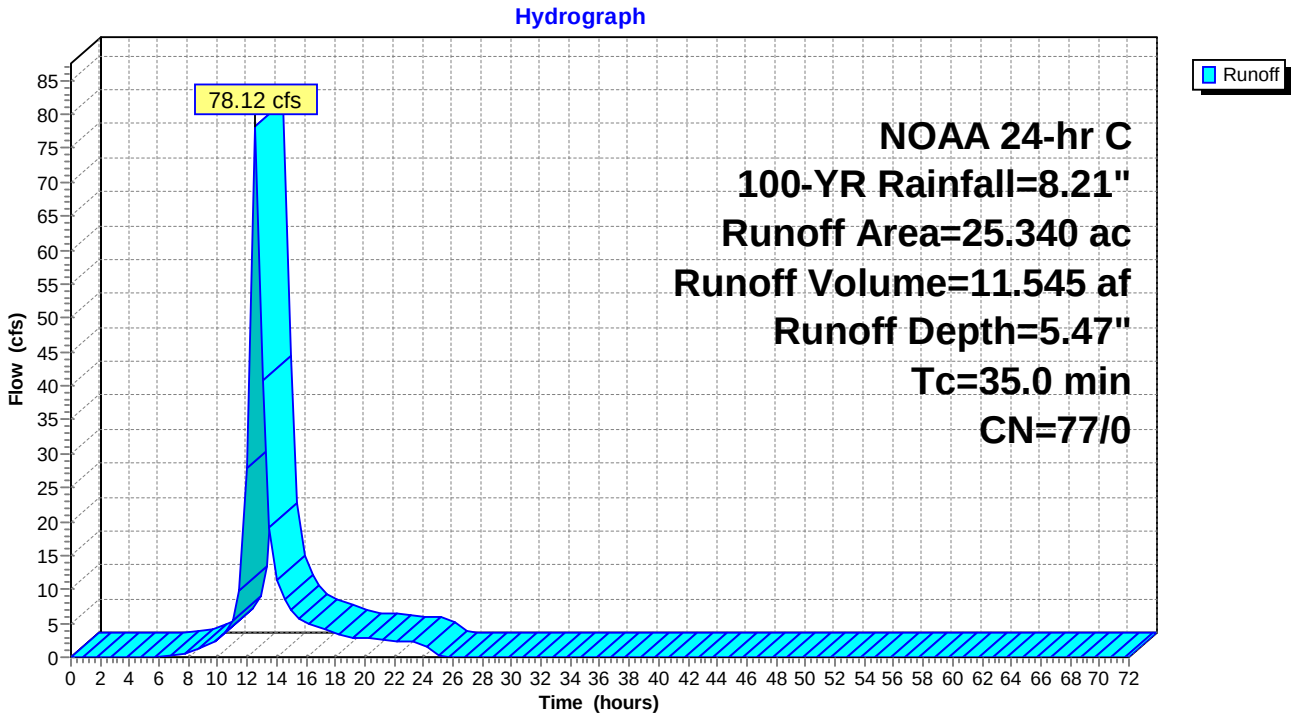
Runoff = 78.12 cfs @ 12.54 hrs, Volume= 11.545 af, Depth= 5.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

	Area (ac)	CN	Description
*	1.290	70	Woods C
*	4.690	78	Meadow D
*	19.360	77	Woods D
	25.340	77	Weighted Average
	25.340	77	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

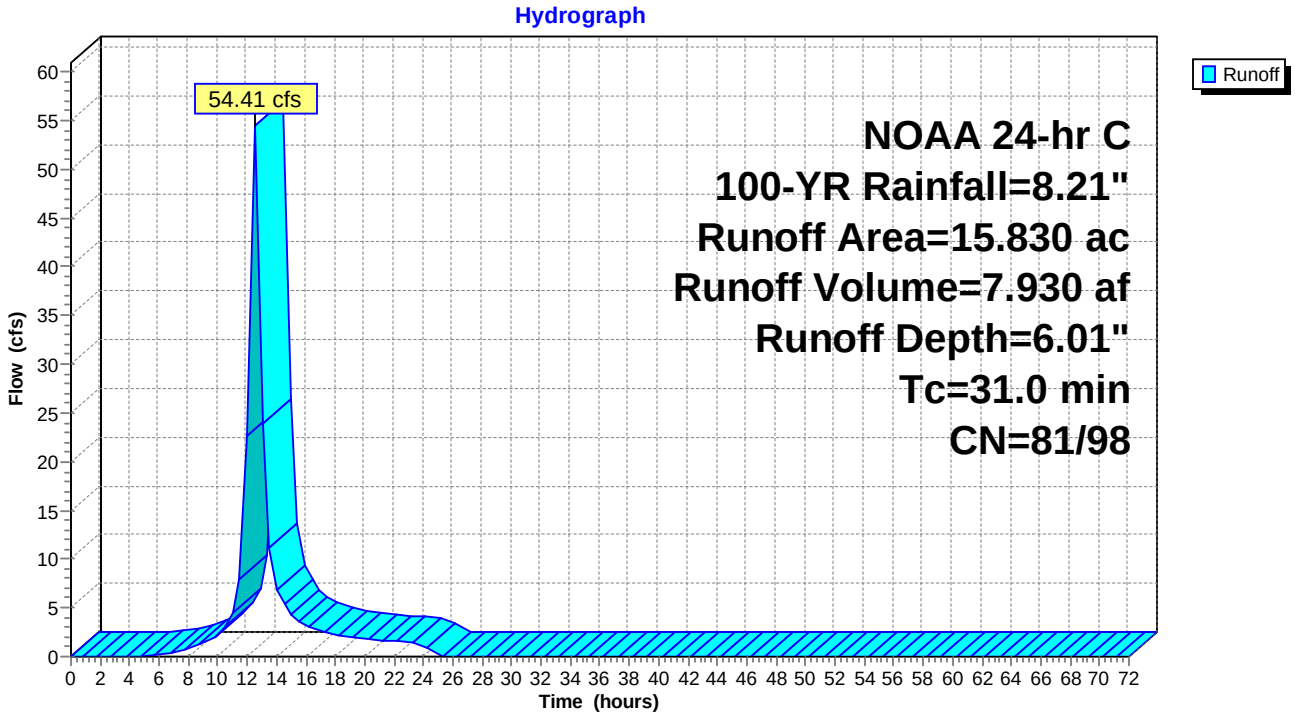
Runoff = 54.41 cfs @ 12.51 hrs, Volume= 7.930 af, Depth= 6.01"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

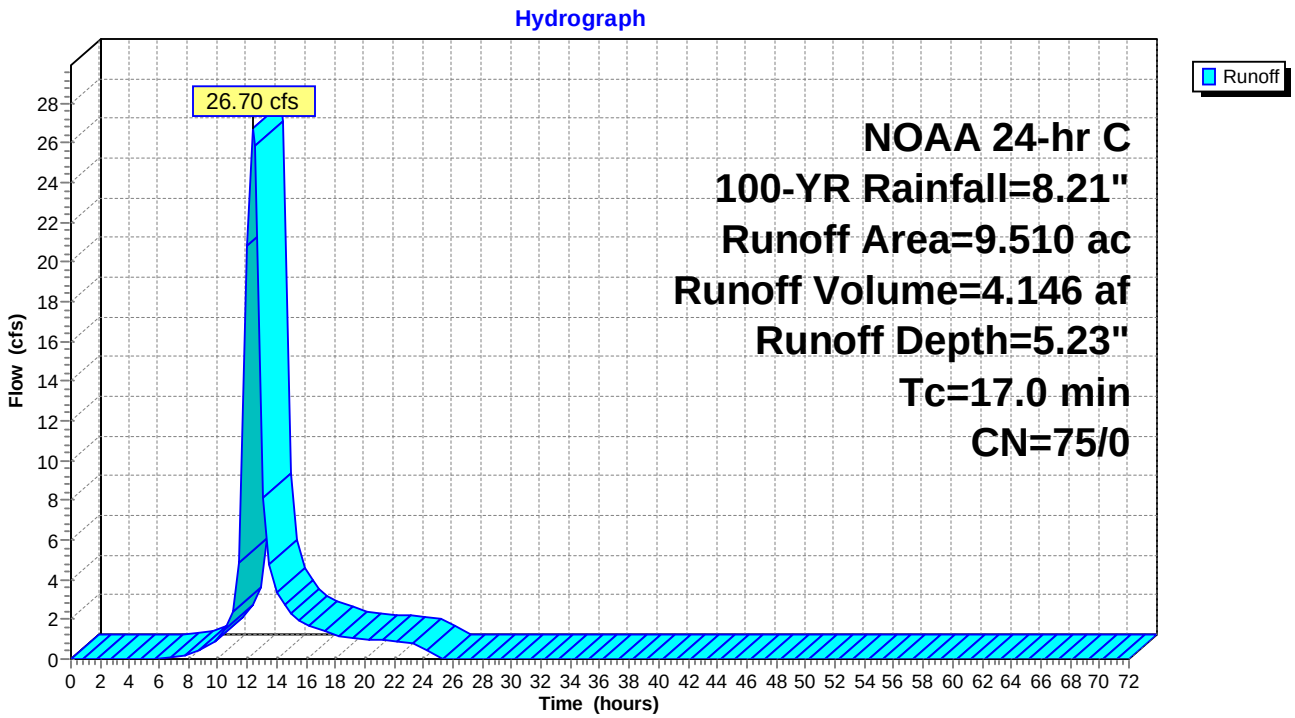
Runoff = 26.70 cfs @ 12.36 hrs, Volume= 4.146 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

	Area (ac)	CN	Description
*	0.000	71	Meadow C
*	5.300	78	Meadow D
*	0.150	91	Gravel D
*	3.160	73	Brush D
*	0.900	65	Brush C
	9.510	75	Weighted Average
	9.510	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

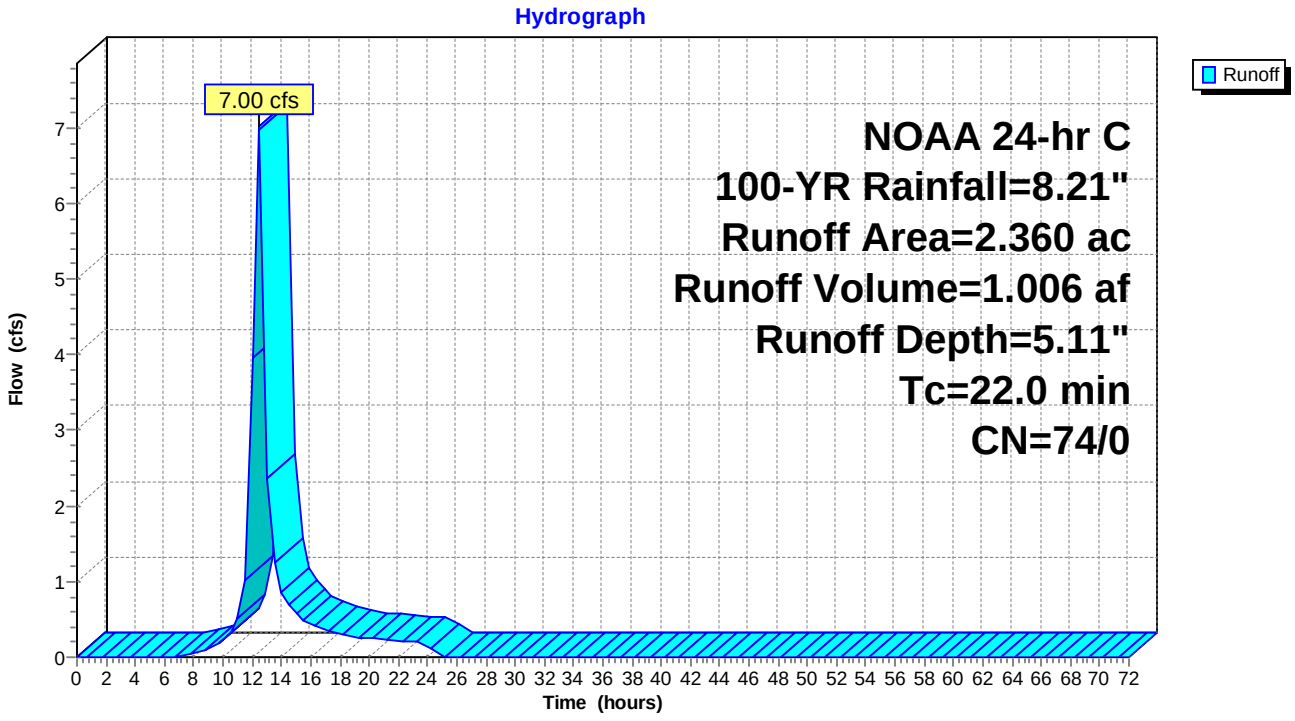
Runoff = 7.00 cfs @ 12.45 hrs, Volume= 1.006 af, Depth= 5.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

	Area (ac)	CN	Description
*	0.060	71	Meadow C
*	1.060	70	Woods C
*	1.240	77	Woods D
	2.360	74	Weighted Average
	2.360	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

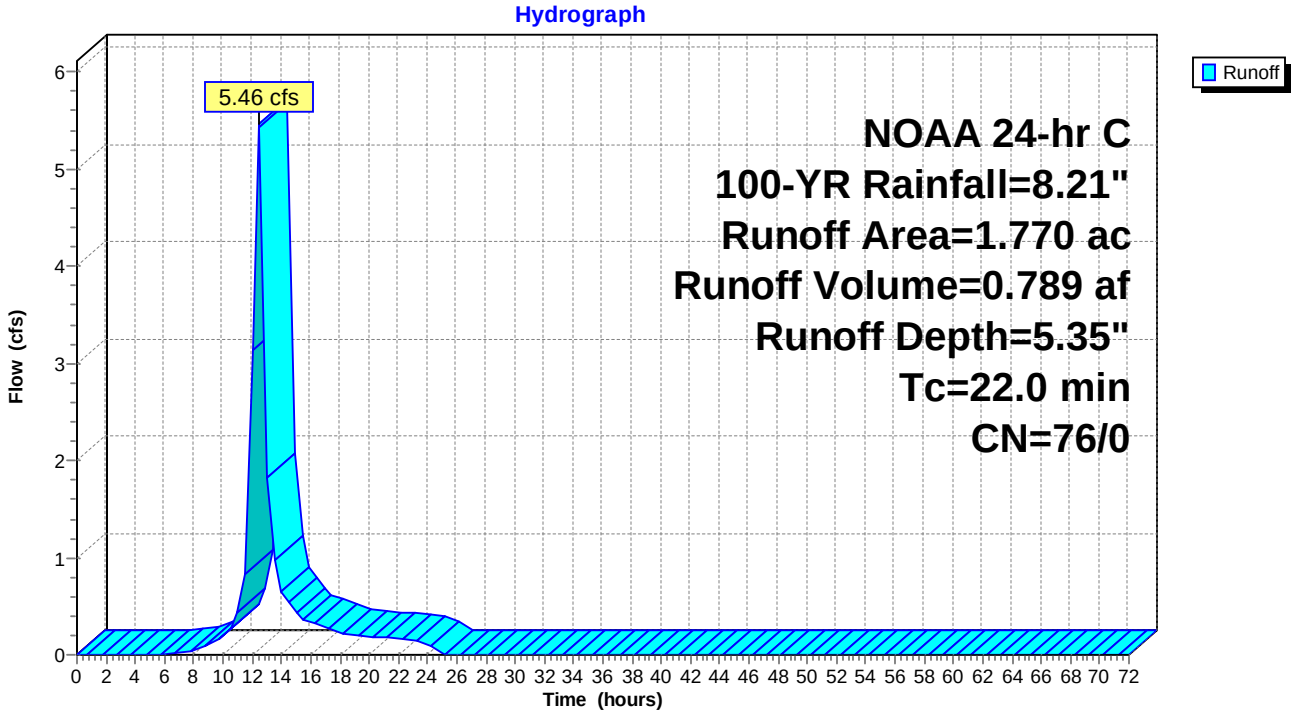
Runoff = 5.46 cfs @ 12.44 hrs, Volume= 0.789 af, Depth= 5.35"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

	Area (ac)	CN	Description
*	0.380	65	Brush C
*	0.150	89	Gravel C
*	0.940	73	Brush D
*	0.300	91	Gravel D
	1.770	76	Weighted Average
	1.770	76	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

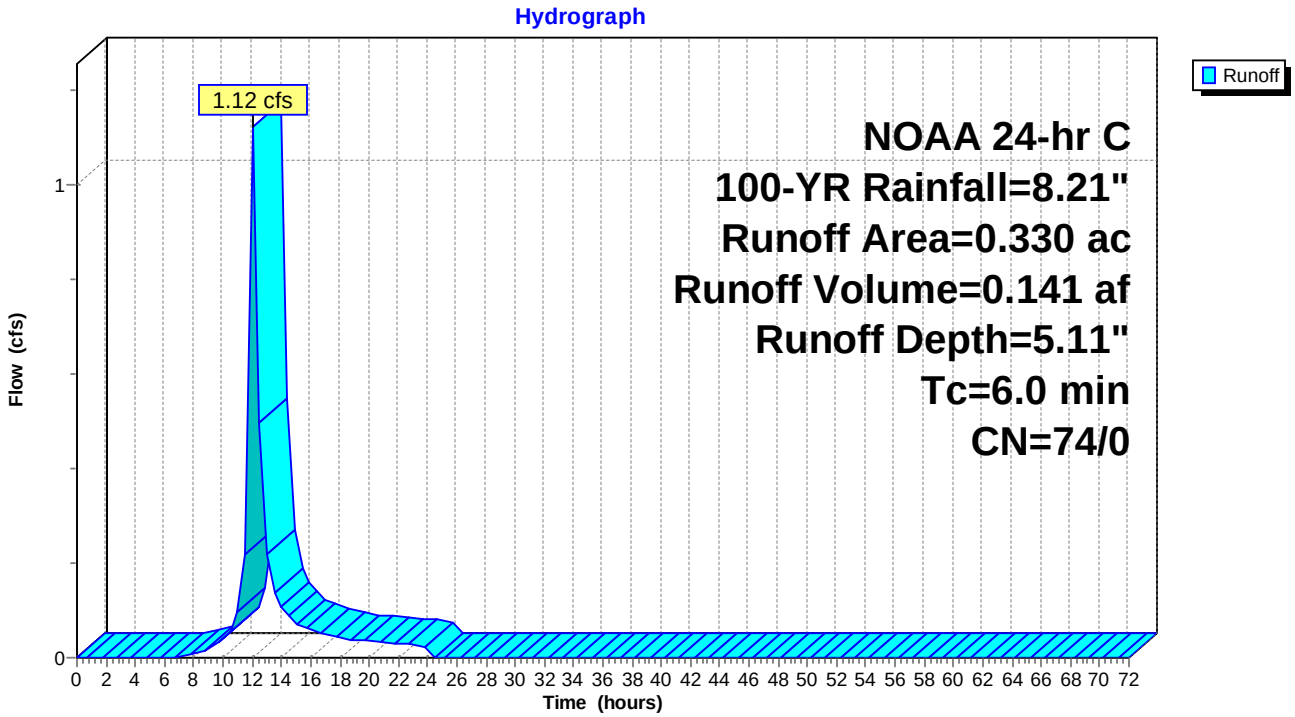
Runoff = 1.12 cfs @ 12.05 hrs, Volume= 0.141 af, Depth= 5.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

	Area (ac)	CN	Description
*	0.270	71	Meadow C
*	0.060	89	Gravel C
	0.330	74	Weighted Average
	0.330	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

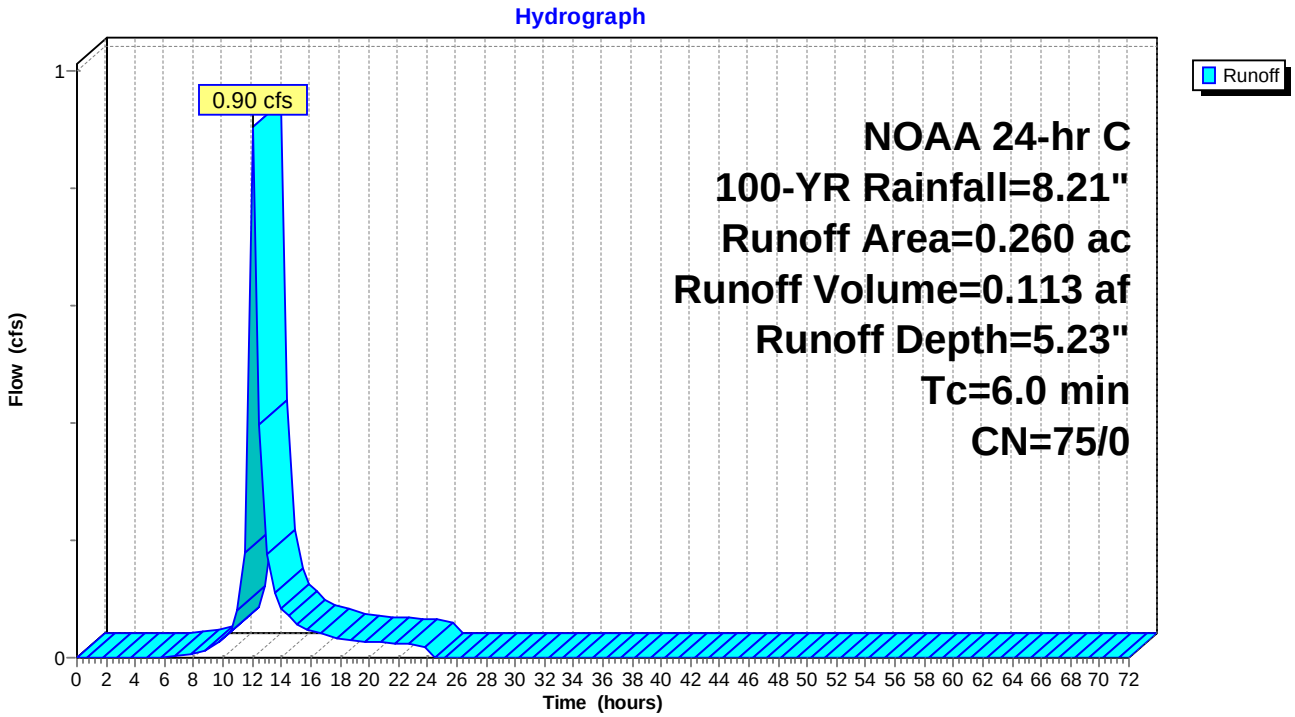
Runoff = 0.90 cfs @ 12.04 hrs, Volume= 0.113 af, Depth= 5.23"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

	Area (ac)	CN	Description
*	0.200	71	Meadow C
*	0.060	89	Gravel C
	0.260	75	Weighted Average
	0.260	75	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 6.01" for 100-YR event
Inflow = 54.41 cfs @ 12.51 hrs, Volume= 7.930 af
Outflow = 33.17 cfs @ 13.06 hrs, Volume= 7.546 af, Atten= 39%, Lag= 33.2 min
Primary = 20.16 cfs @ 13.22 hrs, Volume= 6.979 af
Secondary = 13.72 cfs @ 13.00 hrs, Volume= 0.567 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 266.16' @ 13.10 hrs Surf.Area= 46,085 sf Storage= 154,286 cf

Plug-Flow detention time= 284.3 min calculated for 7.494 af (94% of inflow)
Center-of-Mass det. time= 273.7 min (1,096.6 - 822.8)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

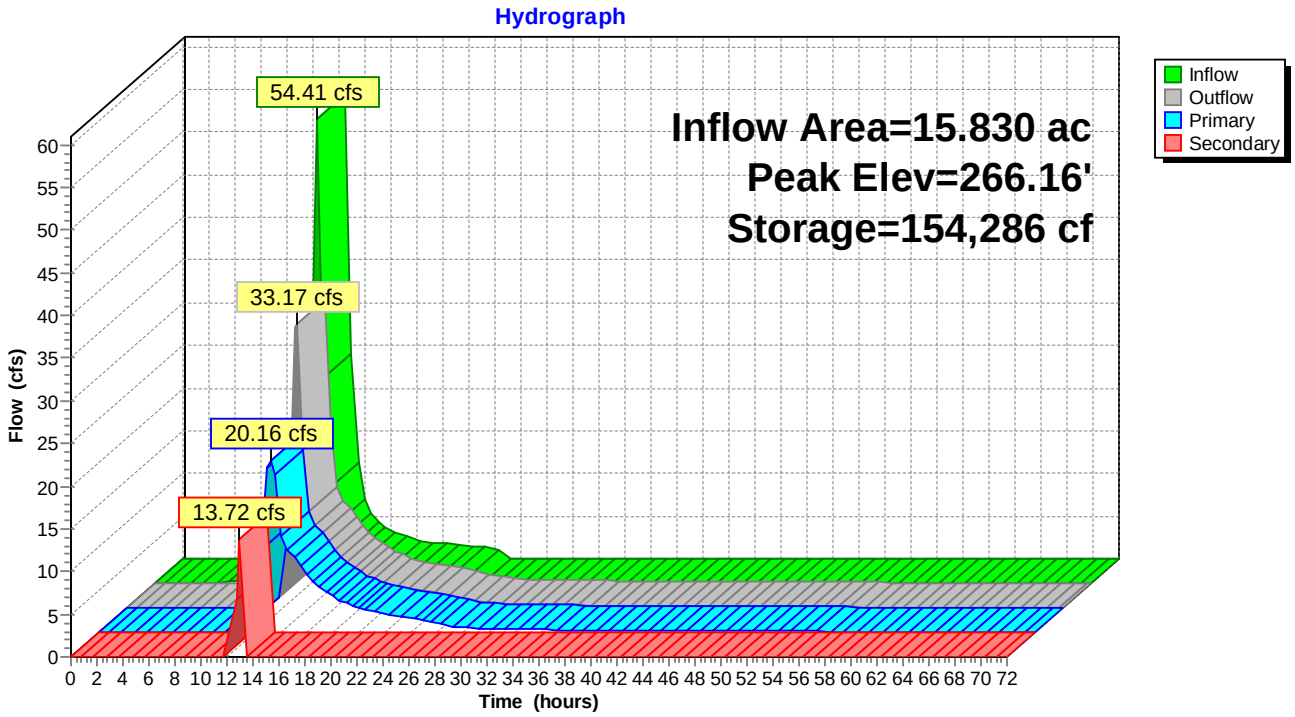
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=18.92 cfs @ 13.22 hrs HW=266.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 18.92 cfs @ 10.71 fps)
↑—**2=Orifice/Grate** (Passes < 0.78 cfs potential flow)
—**3=Sharp-Crested Rectangular Weir** (Passes < 12.44 cfs potential flow)
—**4=Orifice/Grate** (Passes < 13.70 cfs potential flow)

Secondary OutFlow Max=13.72 cfs @ 13.00 hrs HW=266.14' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Weir Controls 13.72 cfs @ 1.00 fps)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 5.17" for 100-YR event
Inflow = 1.14 cfs @ 12.04 hrs, Volume= 0.254 af
Outflow = 0.20 cfs @ 13.49 hrs, Volume= 0.254 af, Atten= 83%, Lag= 87.2 min
Primary = 0.20 cfs @ 13.49 hrs, Volume= 0.254 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 285.12' @ 13.49 hrs Surf.Area= 3,999 sf Storage= 2,838 cf

Plug-Flow detention time= 144.9 min calculated for 0.252 af (99% of inflow)
Center-of-Mass det. time= 144.5 min (1,148.8 - 1,004.3)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

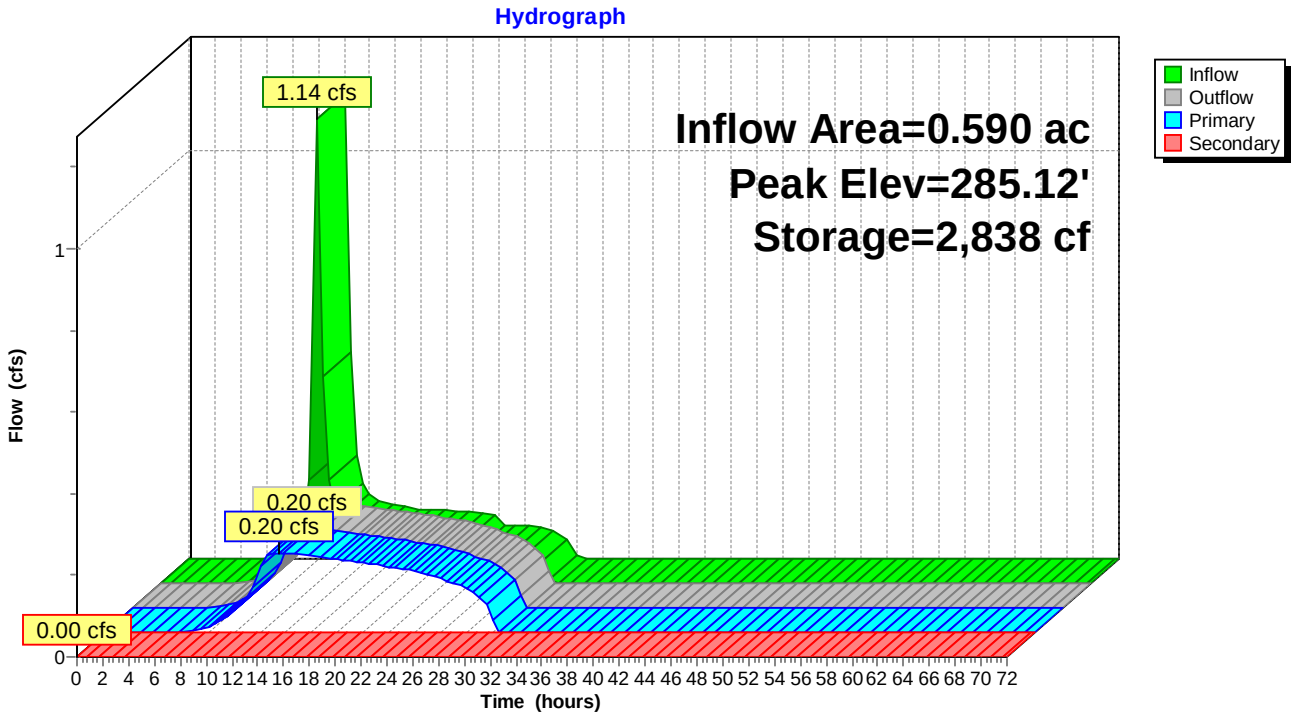
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.20 cfs @ 13.49 hrs HW=285.12' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.20 cfs of 1.43 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.20 cfs @ 5.72 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 5.23" for 100-YR event
Inflow = 0.90 cfs @ 12.04 hrs, Volume= 0.113 af
Outflow = 0.09 cfs @ 21.74 hrs, Volume= 0.113 af, Atten= 91%, Lag= 581.6 min
Primary = 0.09 cfs @ 21.74 hrs, Volume= 0.113 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 285.22' @ 14.82 hrs Surf.Area= 4,123 sf Storage= 3,099 cf

Plug-Flow detention time= 420.7 min calculated for 0.113 af (99% of inflow)
Center-of-Mass det. time= 420.6 min (1,236.0 - 815.3)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

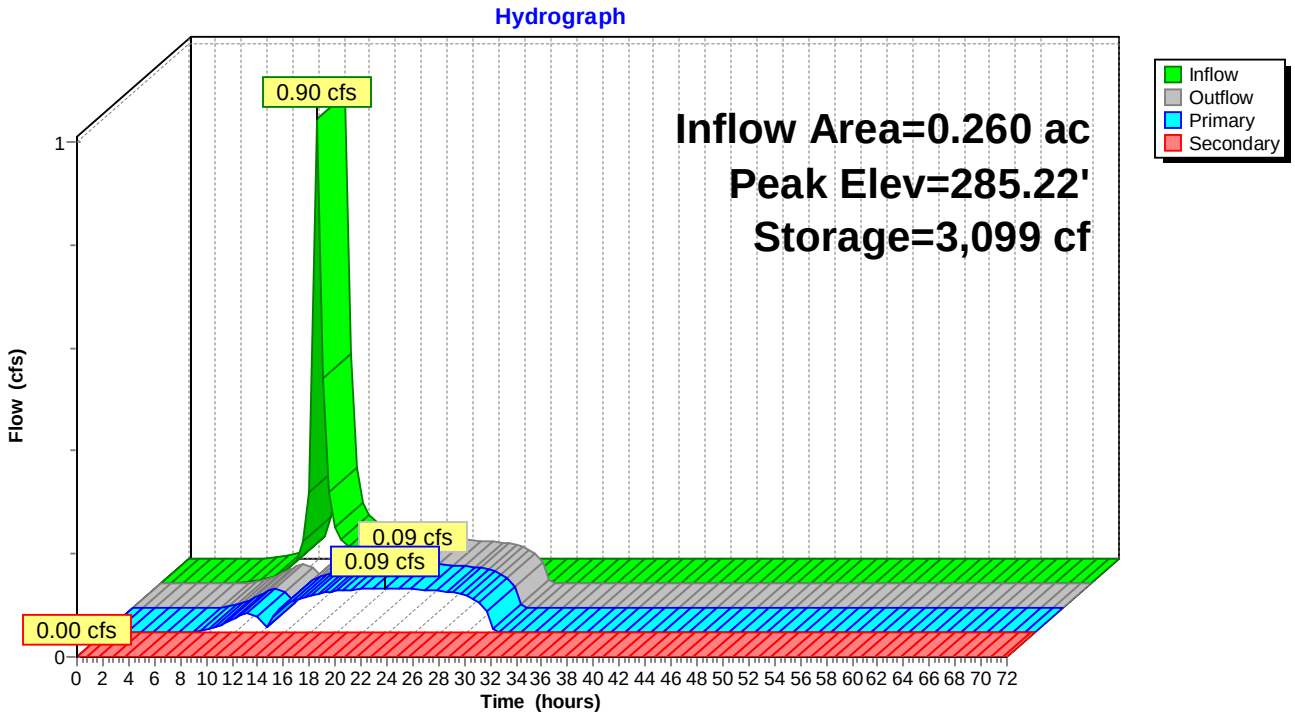
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.09 cfs @ 21.74 hrs HW=284.95' TW=284.68' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.09 cfs of 0.34 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 2.50 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

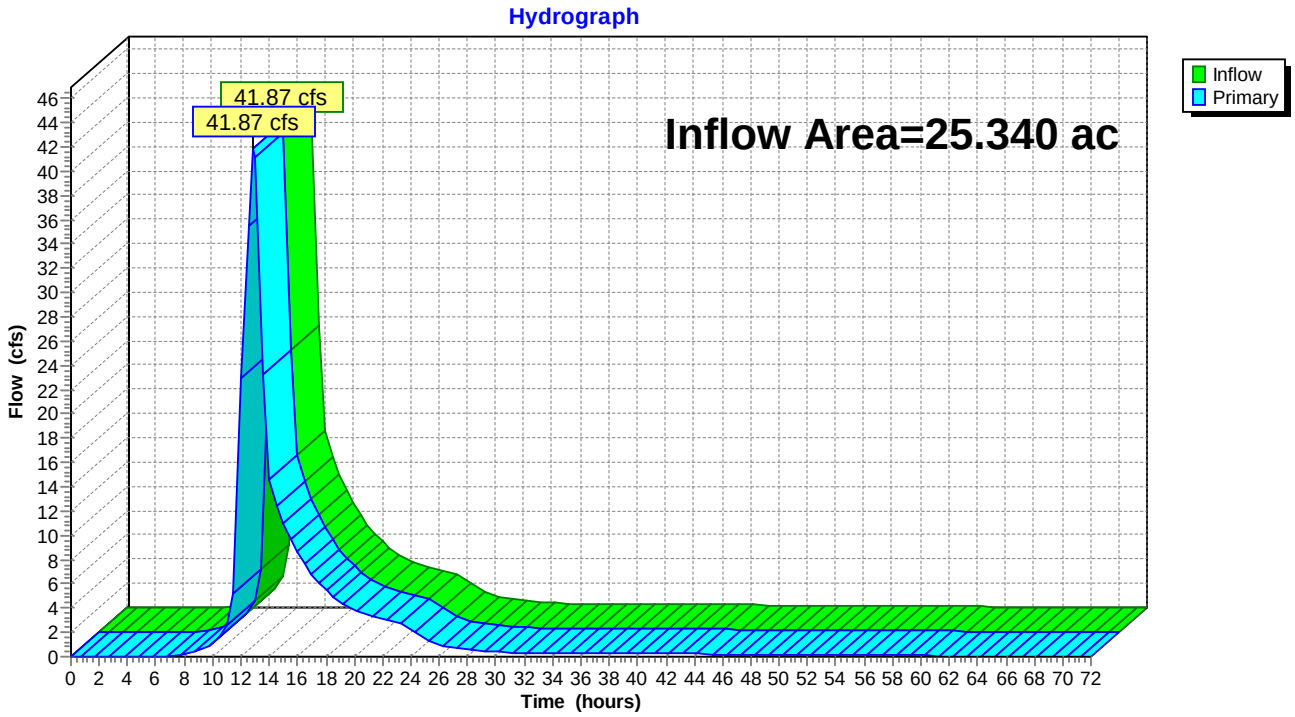
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 5.54" for 100-YR event
Inflow = 41.87 cfs @ 12.87 hrs, Volume= 11.692 af
Primary = 41.87 cfs @ 12.87 hrs, Volume= 11.692 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

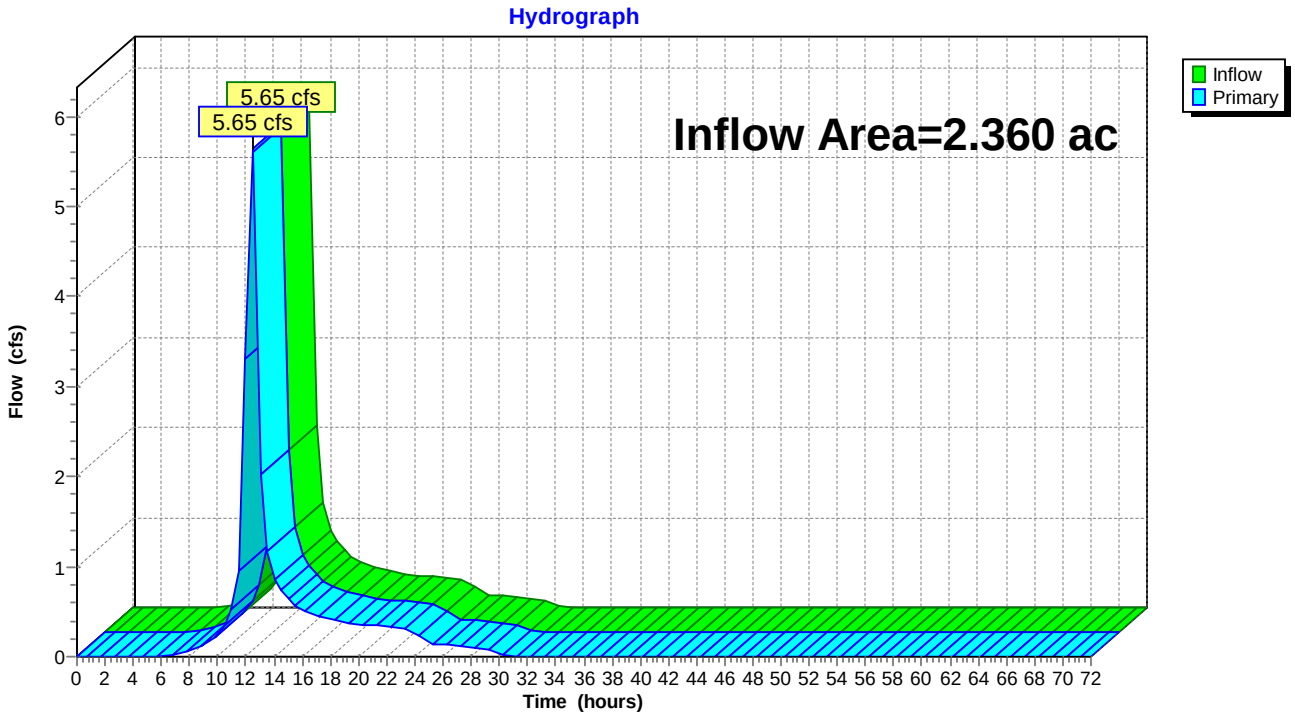


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 5.30" for 100-YR event
Inflow = 5.65 cfs @ 12.45 hrs, Volume= 1.043 af
Primary = 5.65 cfs @ 12.45 hrs, Volume= 1.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



APPENDIX B.2
NESHAMINY (HSG B)

Summary of Peak Flow

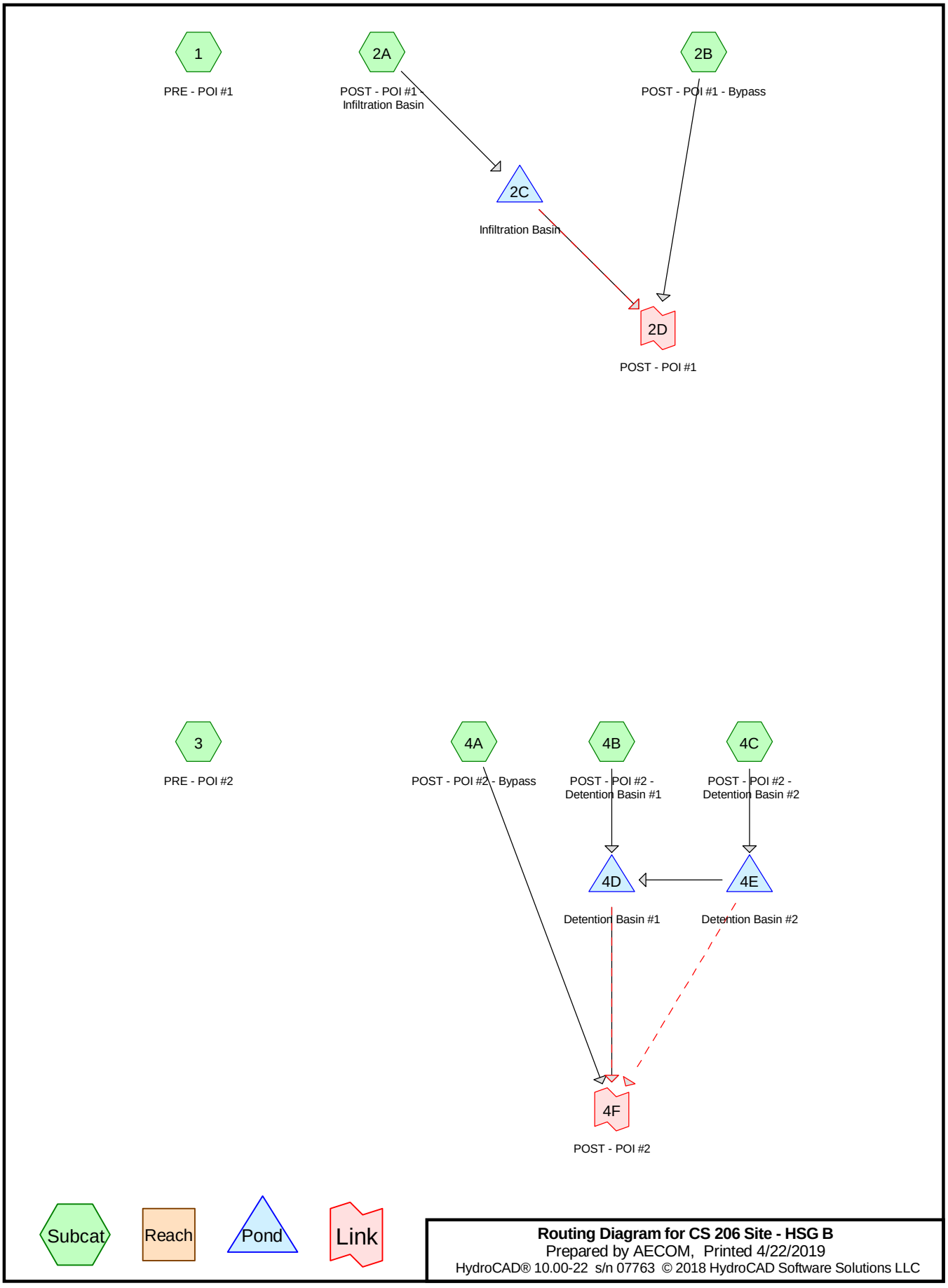
(All Flow Rates in CFS)

Completed by:	PPH	4/4/2019
Check By:	TPF	4/22/2019

POI #1 - Neshaminy HSG B Pre vs. Post

Frequency (year)	Pre-Development	Post-Development	Difference from Pre-Development	Allowable per % Rate Reductions [1]
WQ	0.0	0.0	**0.0**	
1	0.9	0.3	**-0.6**	
2	2.4	1.2	**-1.2**	1.2
5	7.0	3.2	**-3.8**	
10	12.4	5.4	**-6.9**	9.3
25	22.0	9.1	**-12.9**	
50	31.3	13.5	**-17.8**	
100	42.3	19.3	**-23.1**	33.9

1. Post-construction peak runoff rates for the 2-, 10-, and 100-year storm events are less than 50%, 75%, and 80% (respectively) of the pre-construction rates per 7:8-5.4(a)3.iii. All other storm events have an allowable post-construction peak runoff rate equivalent to their respective pre-construction rates.



Routing Diagram for CS 206 Site - HSG B
Prepared by AECOM, Printed 4/22/2019
HydroCAD® 10.00-22 s/n 07763 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment 1: PRE - POI #1

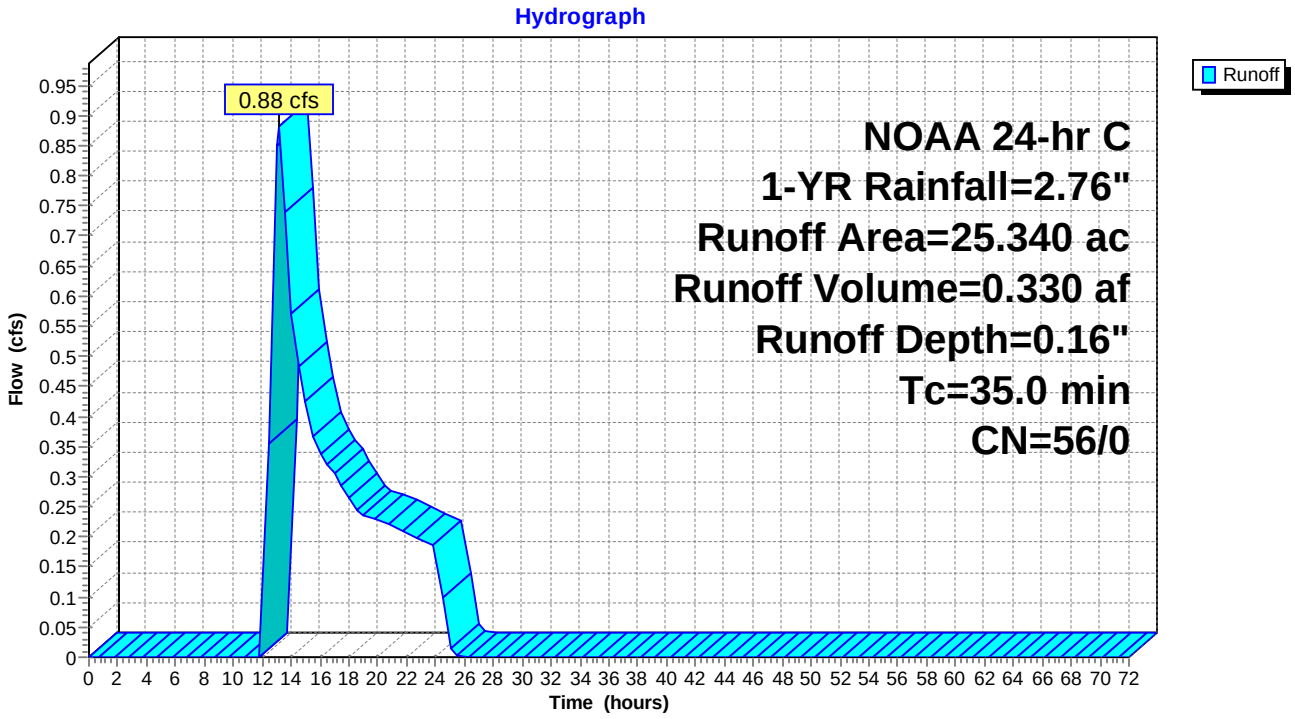
Runoff = 0.88 cfs @ 13.16 hrs, Volume= 0.330 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

Area (ac)	CN	Description
1.290	70	Woods, Good, HSG C
4.690	58	Meadow, non-grazed, HSG B
19.360	55	Woods, Good, HSG B
25.340	56	Weighted Average
25.340	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

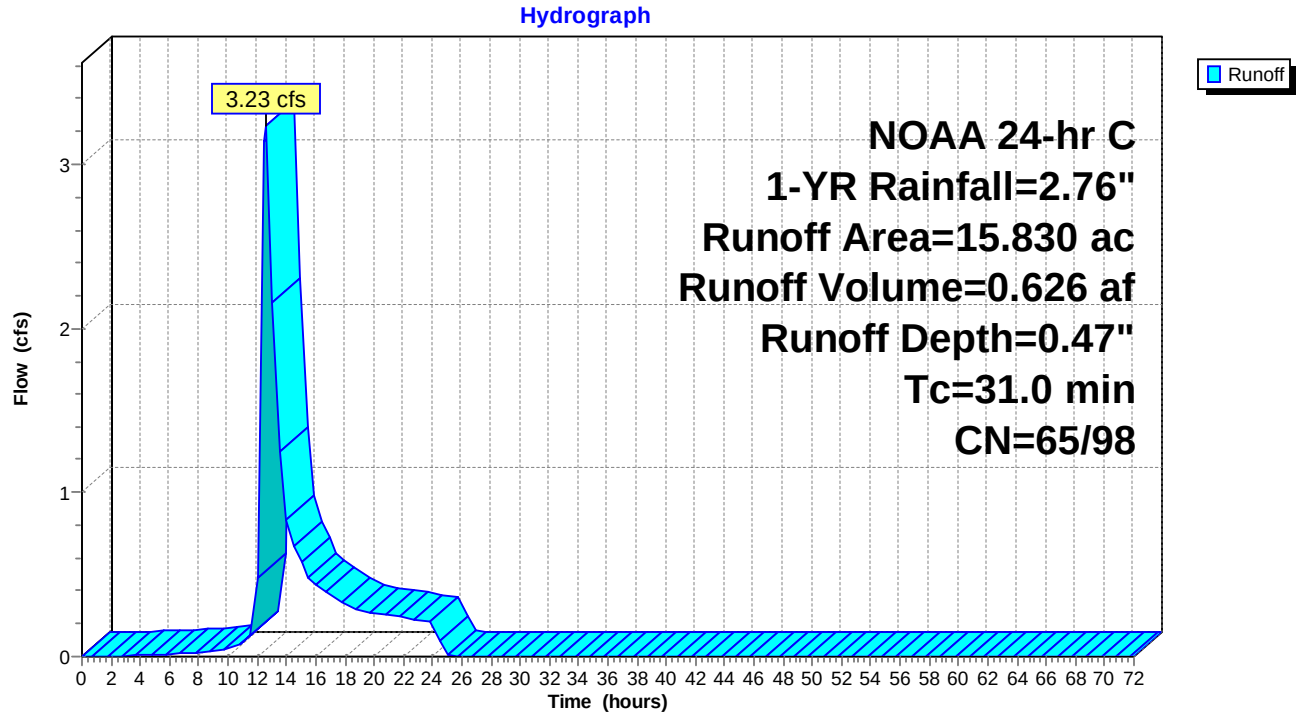
Runoff = 3.23 cfs @ 12.62 hrs, Volume= 0.626 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

Area (ac)	CN	Description
0.390	89	Gravel roads, HSG C
0.550	98	Unconnected pavement, HSG B
4.690	85	Gravel roads, HSG B
7.240	58	Meadow, non-grazed, HSG B
2.960	48	Brush, Good, HSG B
15.830	66	Weighted Average
15.280	65	96.53% Pervious Area
0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

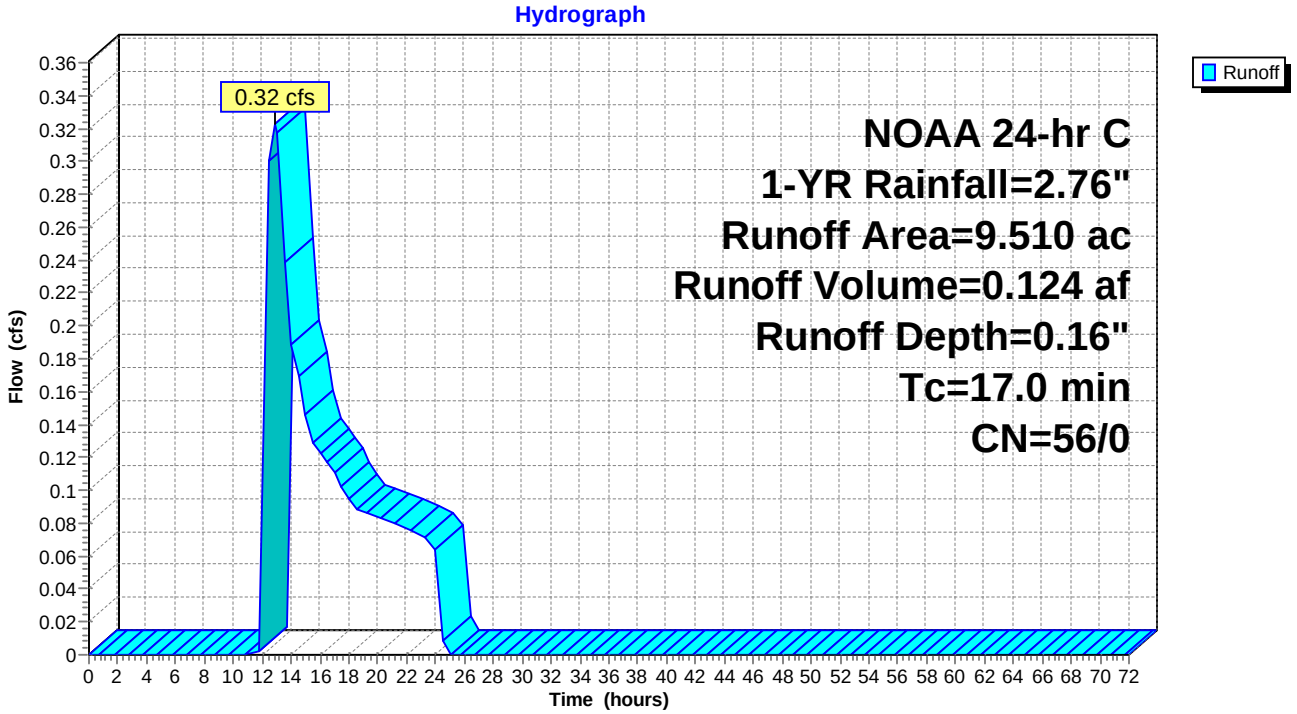
Runoff = 0.32 cfs @ 12.84 hrs, Volume= 0.124 af, Depth= 0.16"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

Area (ac)	CN	Description
5.300	58	Meadow, non-grazed, HSG B
0.150	85	Gravel roads, HSG B
3.160	48	Brush, Good, HSG B
0.900	65	Brush, Good, HSG C
9.510	56	Weighted Average
9.510	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

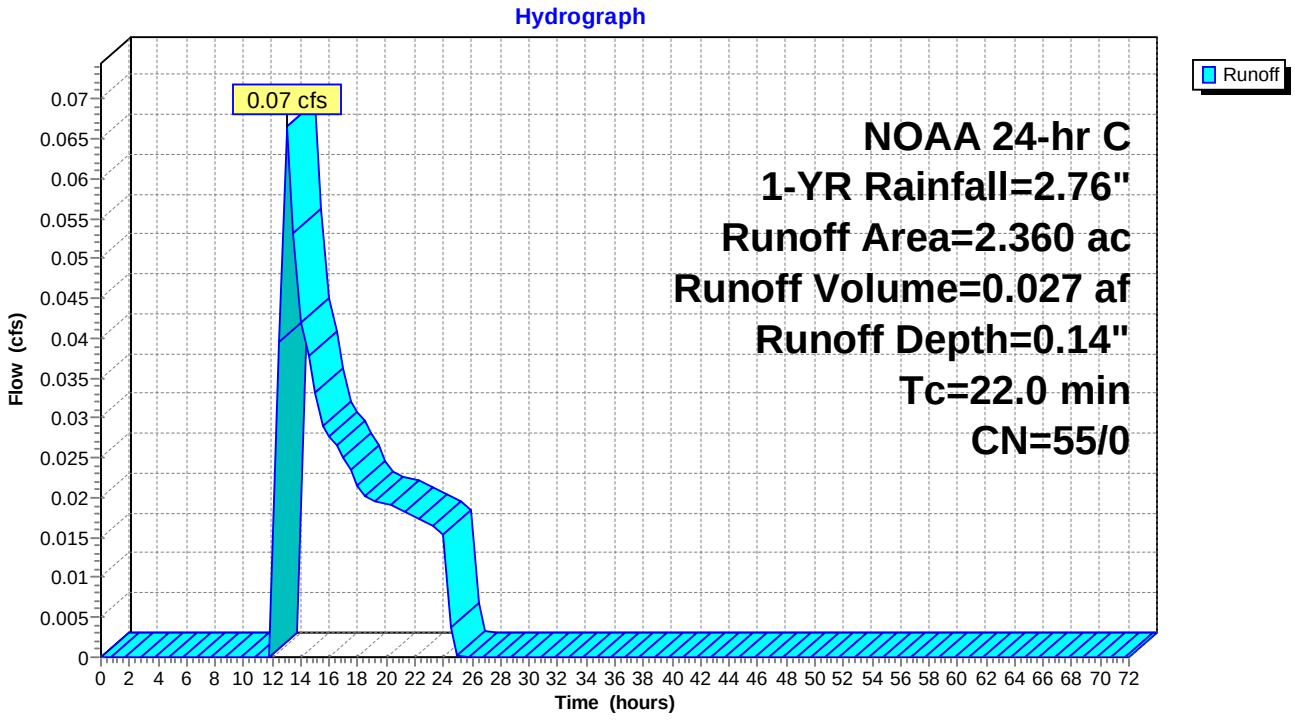
Runoff = 0.07 cfs @ 13.09 hrs, Volume= 0.027 af, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

Area (ac)	CN	Description
0.060	58	Meadow, non-grazed, HSG B
1.060	55	Woods, Good, HSG B
1.240	55	Woods, Good, HSG B
2.360	55	Weighted Average
2.360	55	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

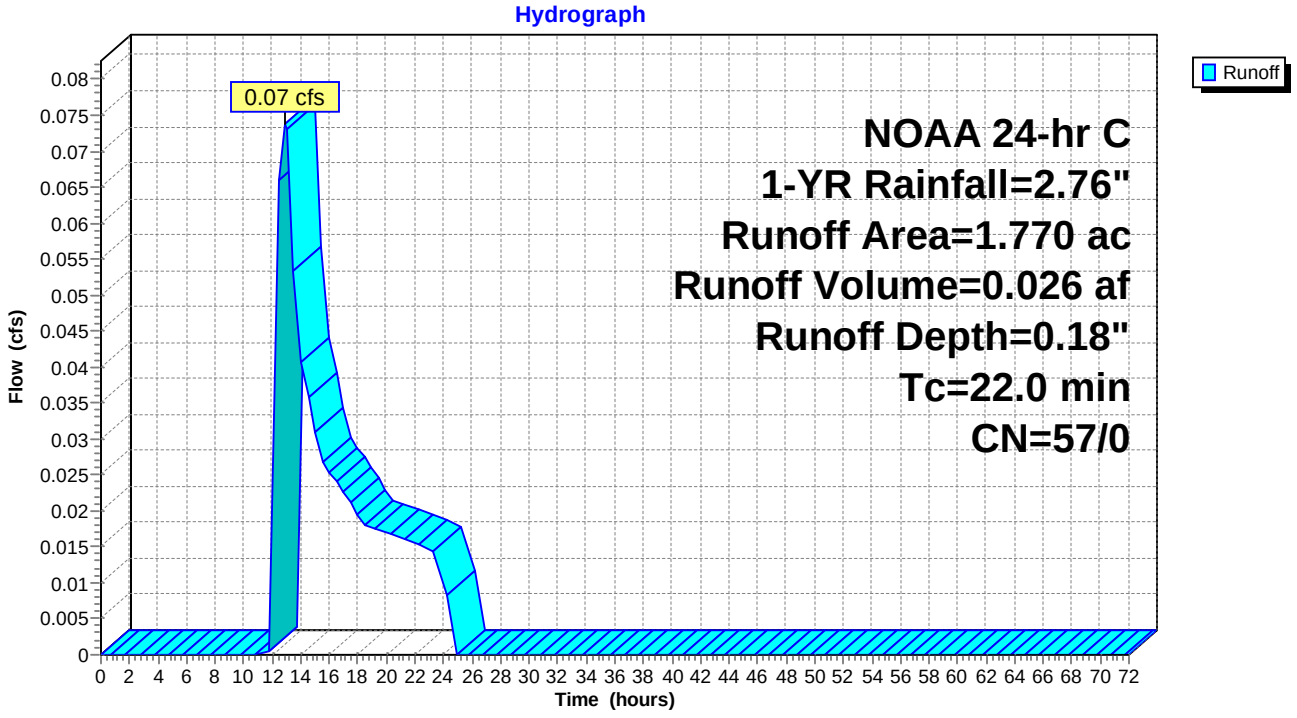
Runoff = 0.07 cfs @ 12.88 hrs, Volume= 0.026 af, Depth= 0.18"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

Area (ac)	CN	Description
0.380	48	Brush, Good, HSG B
0.150	85	Gravel roads, HSG B
0.940	48	Brush, Good, HSG B
0.300	85	Gravel roads, HSG B
1.770	57	Weighted Average
1.770	57	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

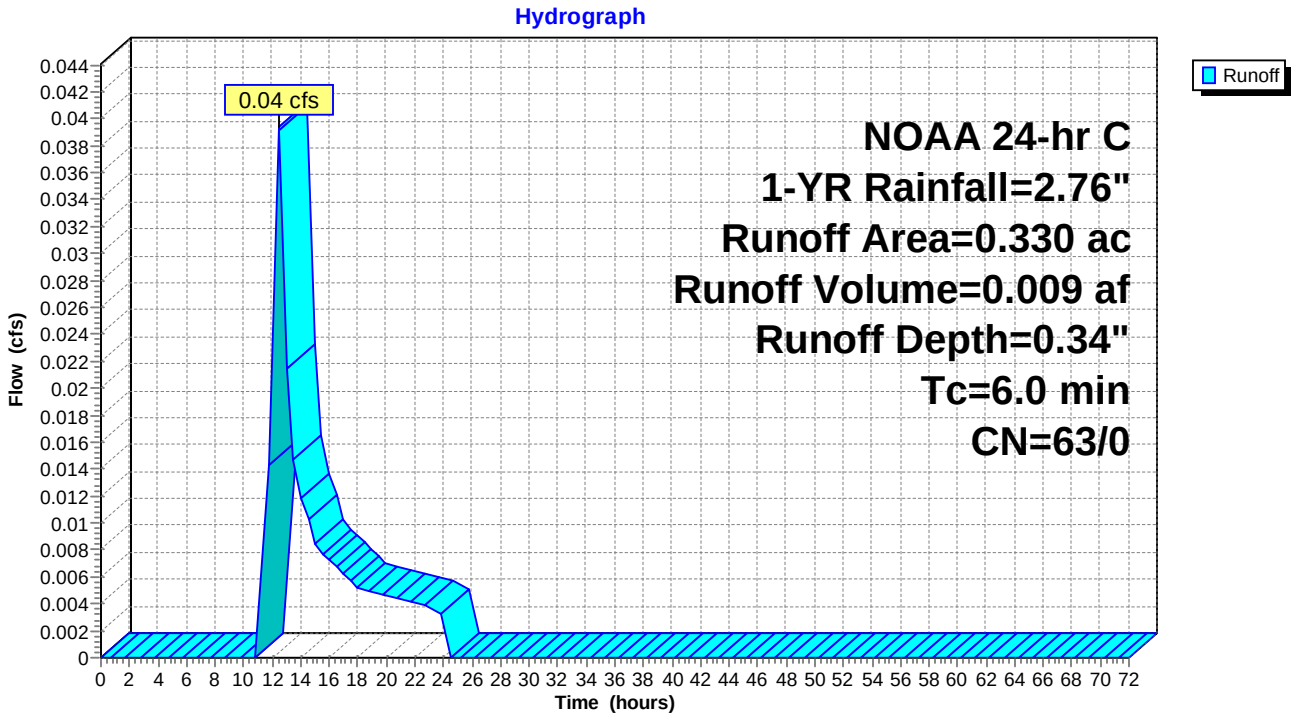
Runoff = 0.04 cfs @ 12.44 hrs, Volume= 0.009 af, Depth= 0.34"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

Area (ac)	CN	Description
0.270	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.330	63	Weighted Average
0.330	63	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

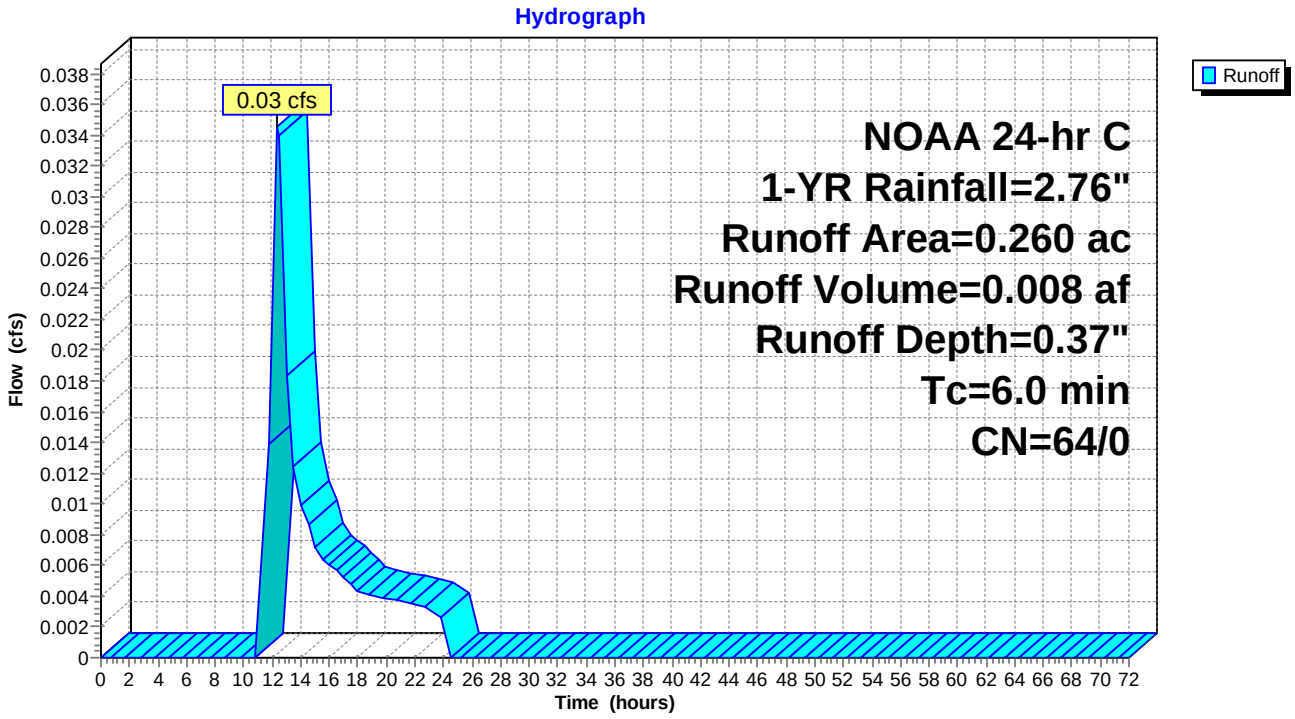
Runoff = 0.03 cfs @ 12.39 hrs, Volume= 0.008 af, Depth= 0.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 1-YR Rainfall=2.76"

Area (ac)	CN	Description
0.200	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.260	64	Weighted Average
0.260	64	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 0.47" for 1-YR event
Inflow = 3.23 cfs @ 12.62 hrs, Volume= 0.626 af
Outflow = 0.16 cfs @ 24.15 hrs, Volume= 0.281 af, Atten= 95%, Lag= 691.8 min
Primary = 0.16 cfs @ 24.15 hrs, Volume= 0.281 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 262.73' @ 24.14 hrs Surf.Area= 32,270 sf Storage= 22,934 cf

Plug-Flow detention time= 1,145.0 min calculated for 0.279 af (45% of inflow)
Center-of-Mass det. time= 995.1 min (1,906.3 - 911.2)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

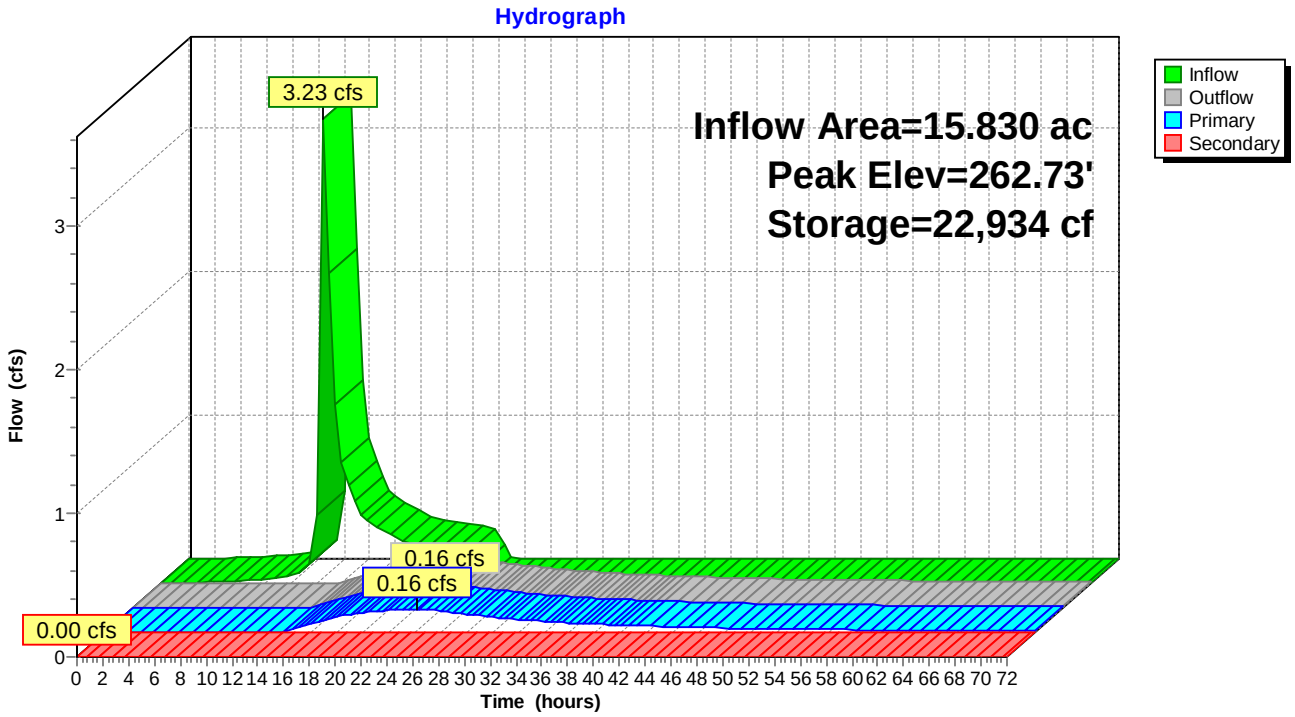
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.16 cfs @ 24.15 hrs HW=262.73' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.16 cfs of 11.04 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 1.90 fps)
—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 0.35" for 1-YR event
Inflow = 0.07 cfs @ 12.49 hrs, Volume= 0.017 af
Outflow = 0.06 cfs @ 12.75 hrs, Volume= 0.017 af, Atten= 13%, Lag= 15.6 min
Primary = 0.06 cfs @ 12.75 hrs, Volume= 0.017 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 283.83' @ 12.75 hrs Surf.Area= 372 sf Storage= 43 cf

Plug-Flow detention time= 8.9 min calculated for 0.017 af (99% of inflow)
Center-of-Mass det. time= 9.2 min (938.4 - 929.2)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

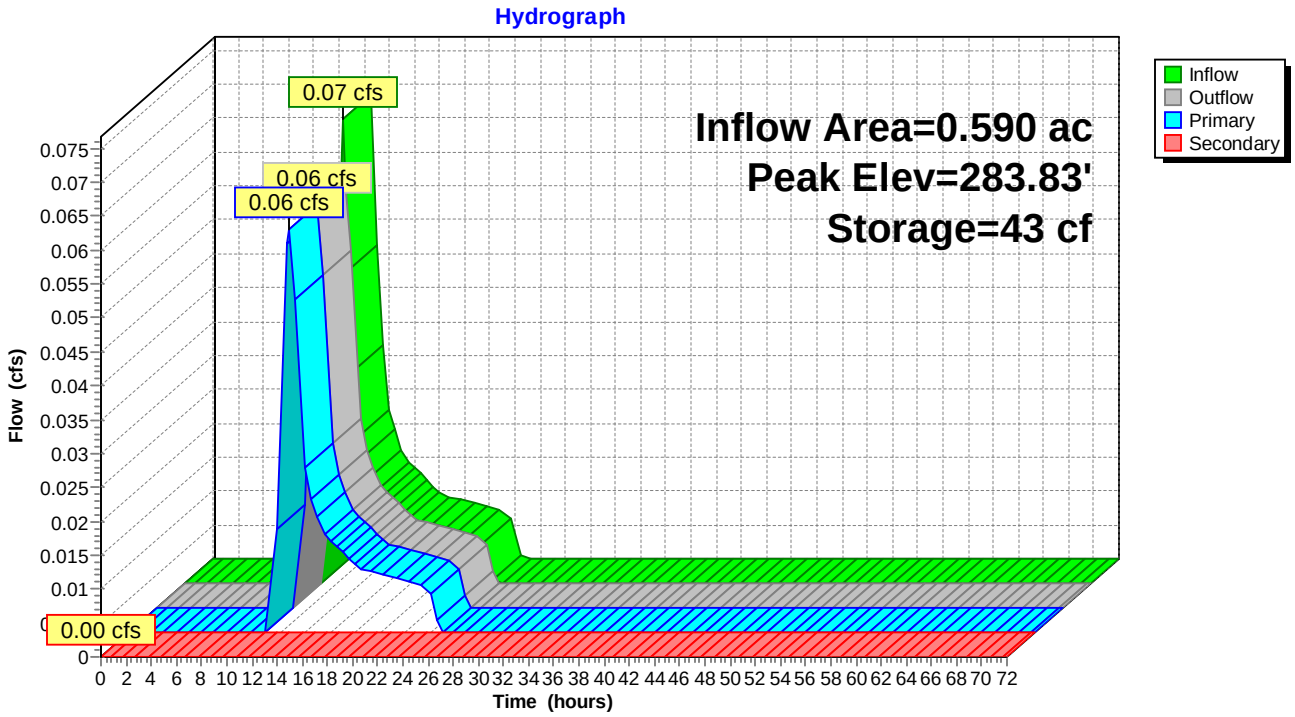
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.06 cfs @ 12.75 hrs HW=283.83' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.06 cfs of 1.06 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.68 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 0.37" for 1-YR event
Inflow = 0.03 cfs @ 12.39 hrs, Volume= 0.008 af
Outflow = 0.03 cfs @ 12.60 hrs, Volume= 0.008 af, Atten= 14%, Lag= 12.3 min
Primary = 0.03 cfs @ 12.60 hrs, Volume= 0.008 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 283.87' @ 12.70 hrs Surf.Area= 244 sf Storage= 21 cf

Plug-Flow detention time= 7.9 min calculated for 0.008 af (99% of inflow)
Center-of-Mass det. time= 8.4 min (930.4 - 922.0)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

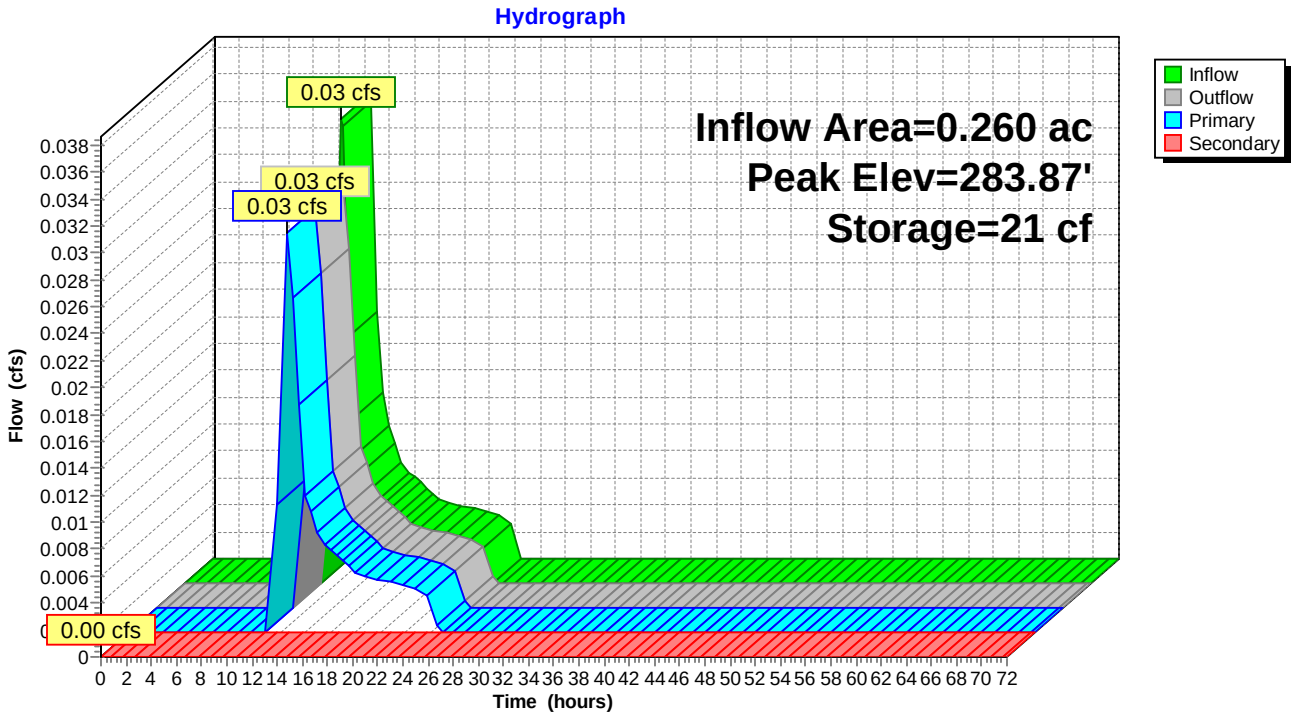
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.03 cfs @ 12.60 hrs HW=283.87' TW=283.83' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.03 cfs of 0.13 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.96 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

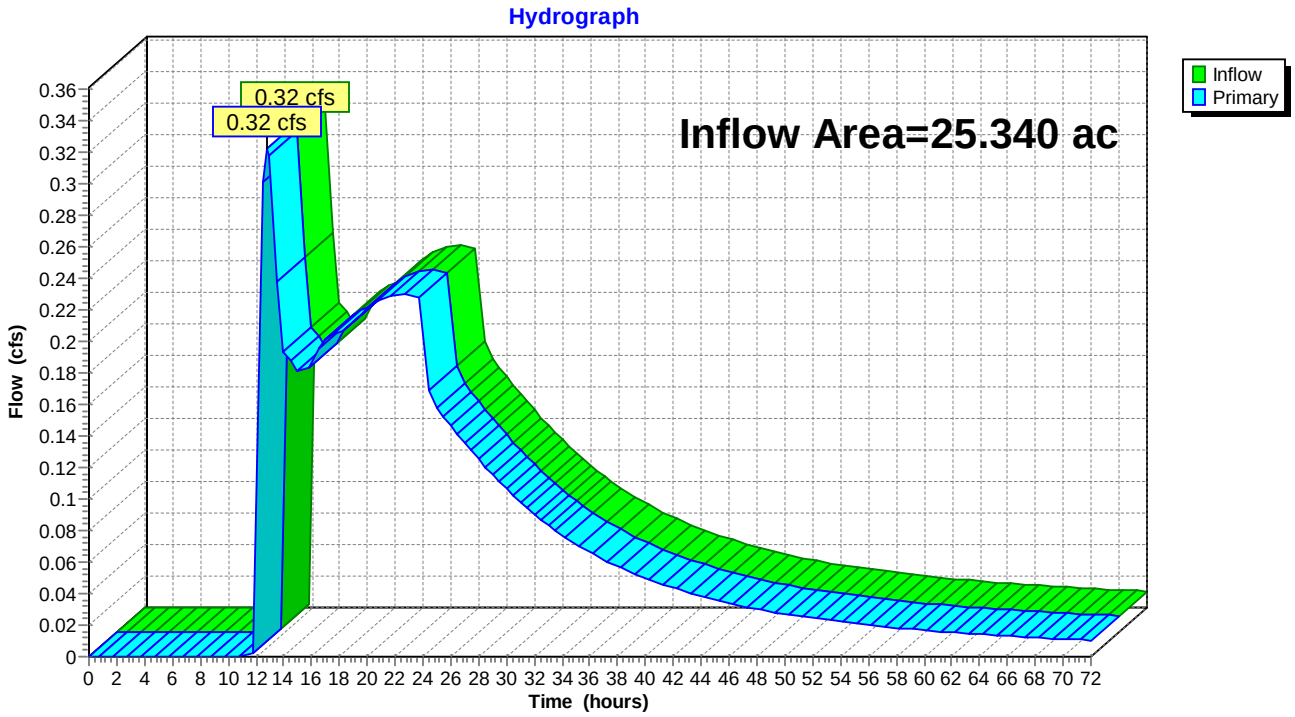
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 0.19" for 1-YR event
Inflow = 0.32 cfs @ 12.84 hrs, Volume= 0.405 af
Primary = 0.32 cfs @ 12.84 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

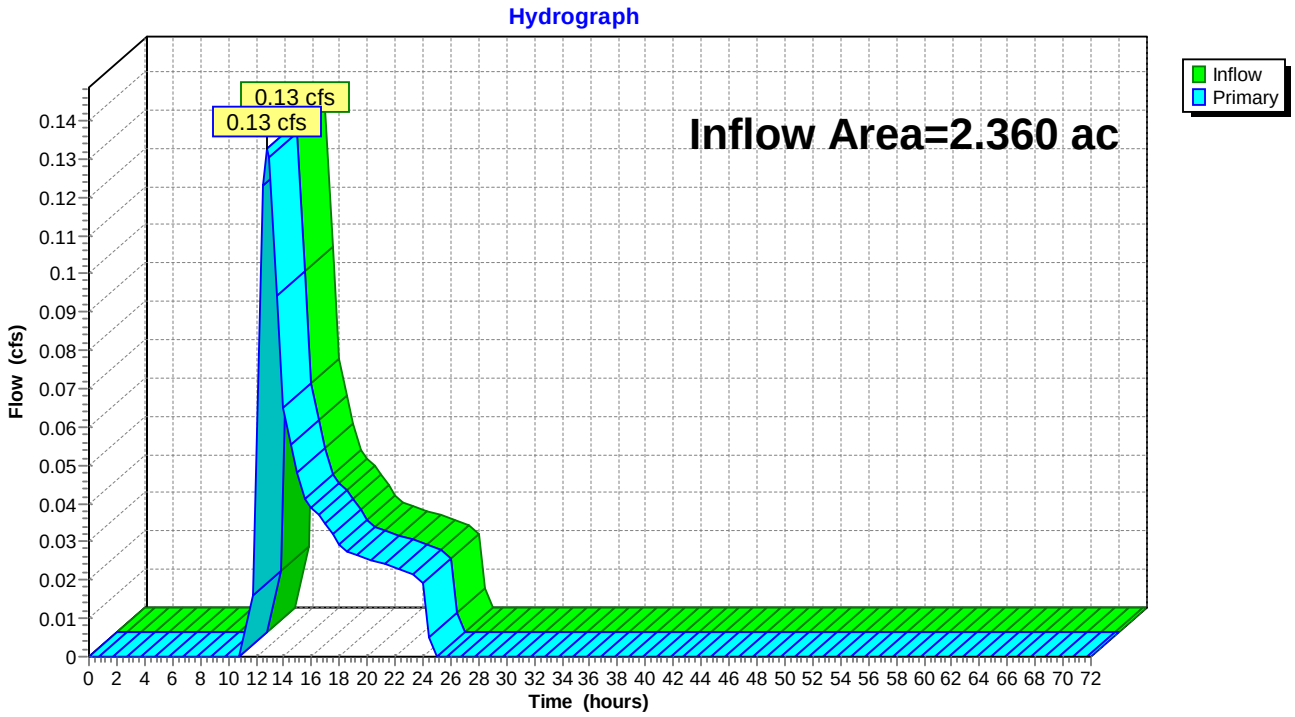


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 0.22" for 1-YR event
Inflow = 0.13 cfs @ 12.83 hrs, Volume= 0.044 af
Primary = 0.13 cfs @ 12.83 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

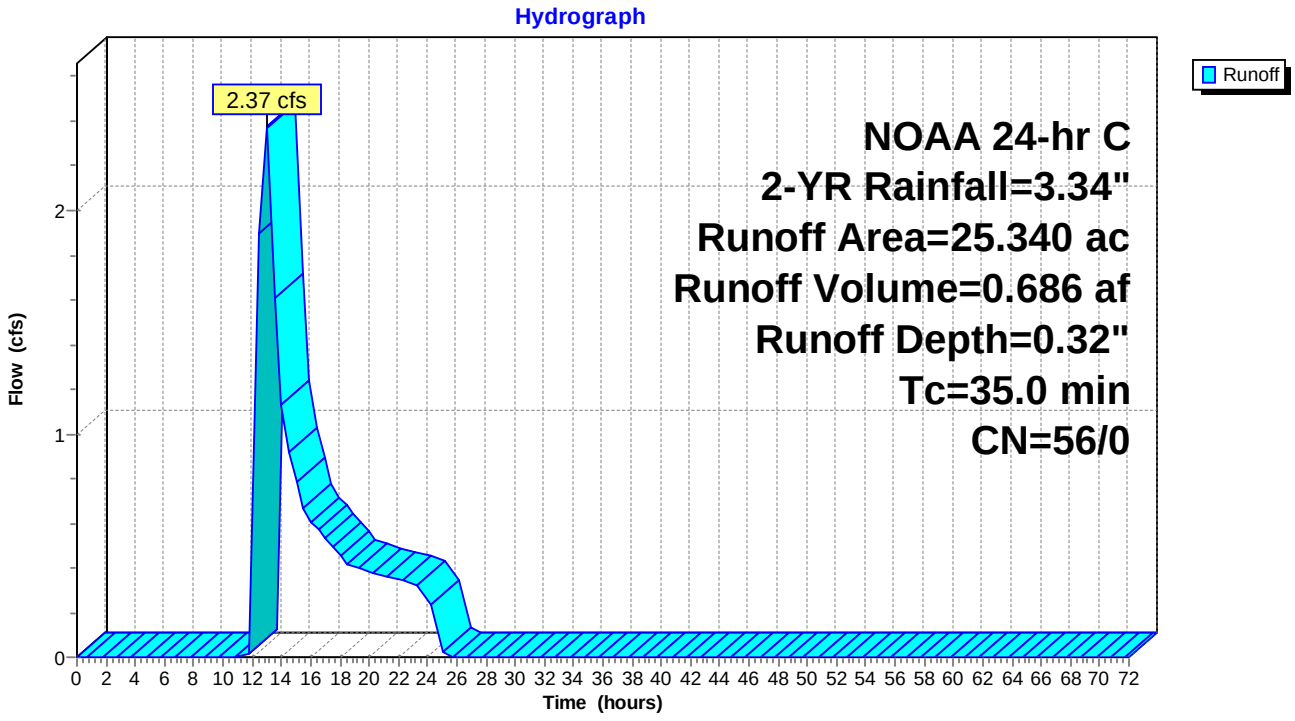
Runoff = 2.37 cfs @ 12.94 hrs, Volume= 0.686 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

Area (ac)	CN	Description
1.290	70	Woods, Good, HSG C
4.690	58	Meadow, non-grazed, HSG B
19.360	55	Woods, Good, HSG B
25.340	56	Weighted Average
25.340	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

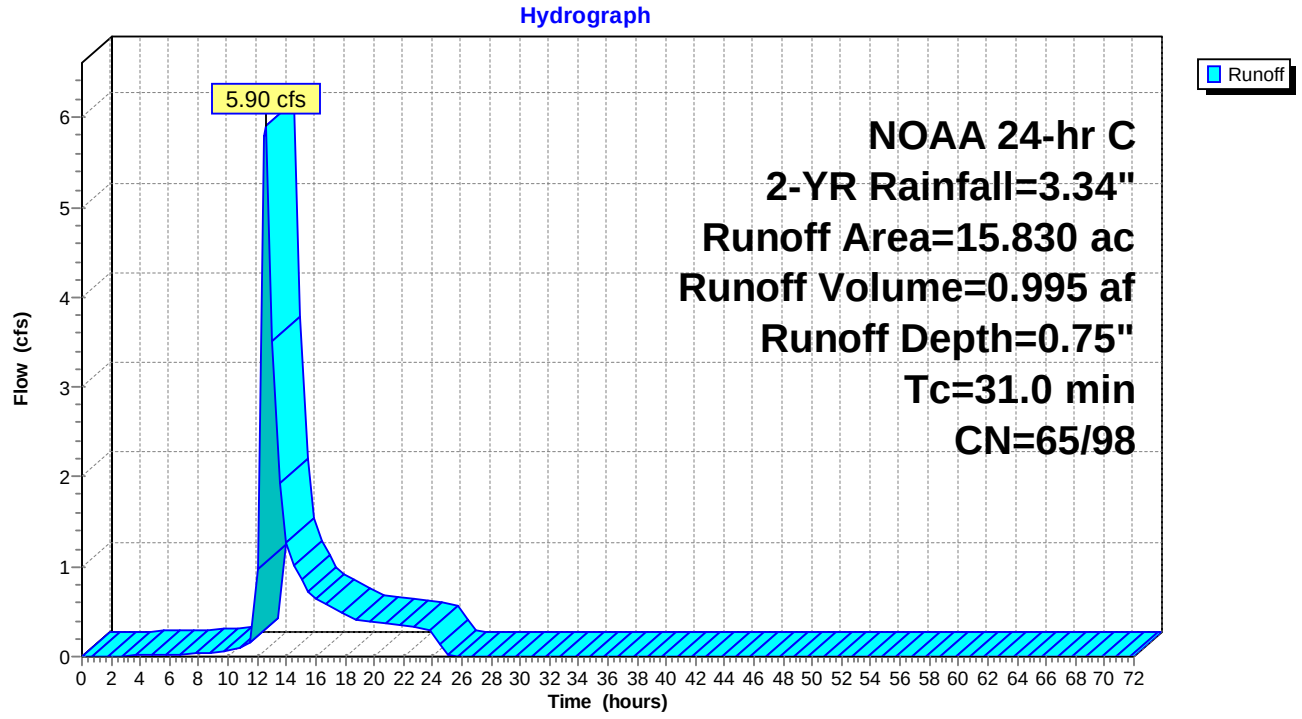
Runoff = 5.90 cfs @ 12.59 hrs, Volume= 0.995 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

Area (ac)	CN	Description
0.390	89	Gravel roads, HSG C
0.550	98	Unconnected pavement, HSG B
4.690	85	Gravel roads, HSG B
7.240	58	Meadow, non-grazed, HSG B
2.960	48	Brush, Good, HSG B
15.830	66	Weighted Average
15.280	65	96.53% Pervious Area
0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

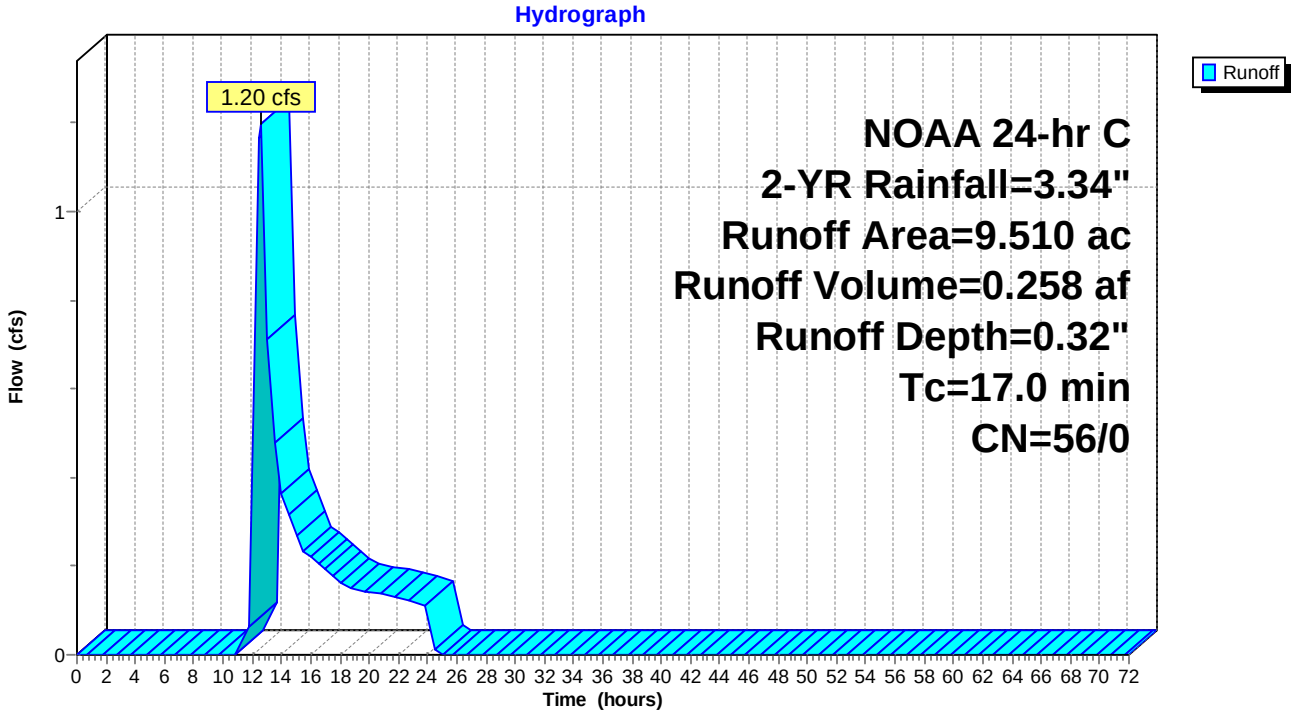
Runoff = 1.20 cfs @ 12.60 hrs, Volume= 0.258 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

Area (ac)	CN	Description
5.300	58	Meadow, non-grazed, HSG B
0.150	85	Gravel roads, HSG B
3.160	48	Brush, Good, HSG B
0.900	65	Brush, Good, HSG C
9.510	56	Weighted Average
9.510	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

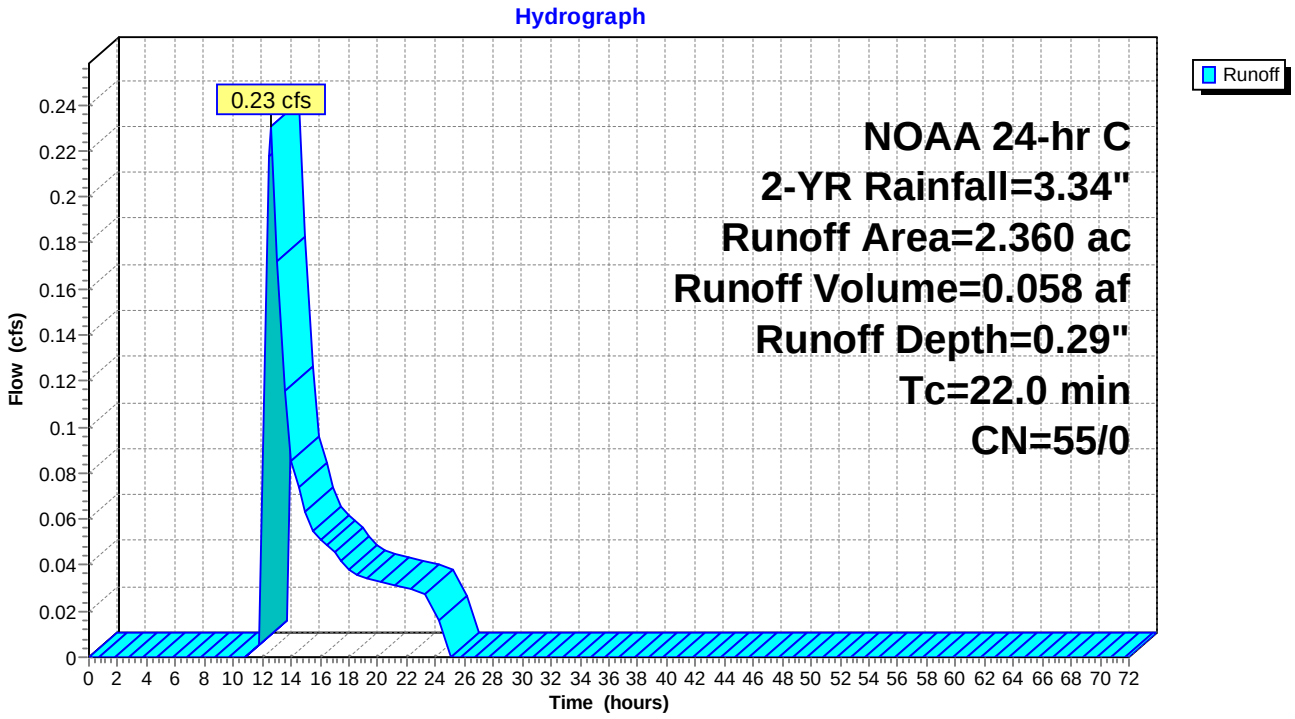
Runoff = 0.23 cfs @ 12.66 hrs, Volume= 0.058 af, Depth= 0.29"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

Area (ac)	CN	Description
0.060	58	Meadow, non-grazed, HSG B
1.060	55	Woods, Good, HSG B
1.240	55	Woods, Good, HSG B
2.360	55	Weighted Average
2.360	55	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

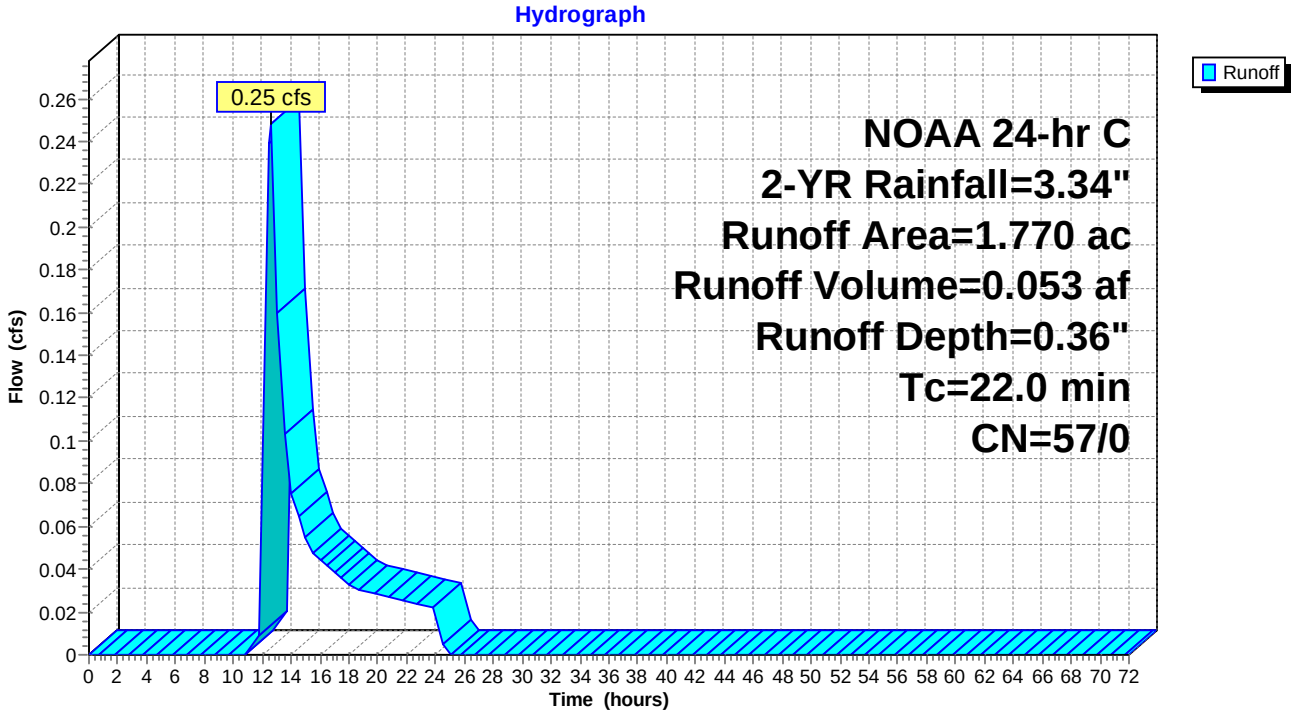
Runoff = 0.25 cfs @ 12.62 hrs, Volume= 0.053 af, Depth= 0.36"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

Area (ac)	CN	Description
0.380	48	Brush, Good, HSG B
0.150	85	Gravel roads, HSG B
0.940	48	Brush, Good, HSG B
0.300	85	Gravel roads, HSG B
1.770	57	Weighted Average
1.770	57	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

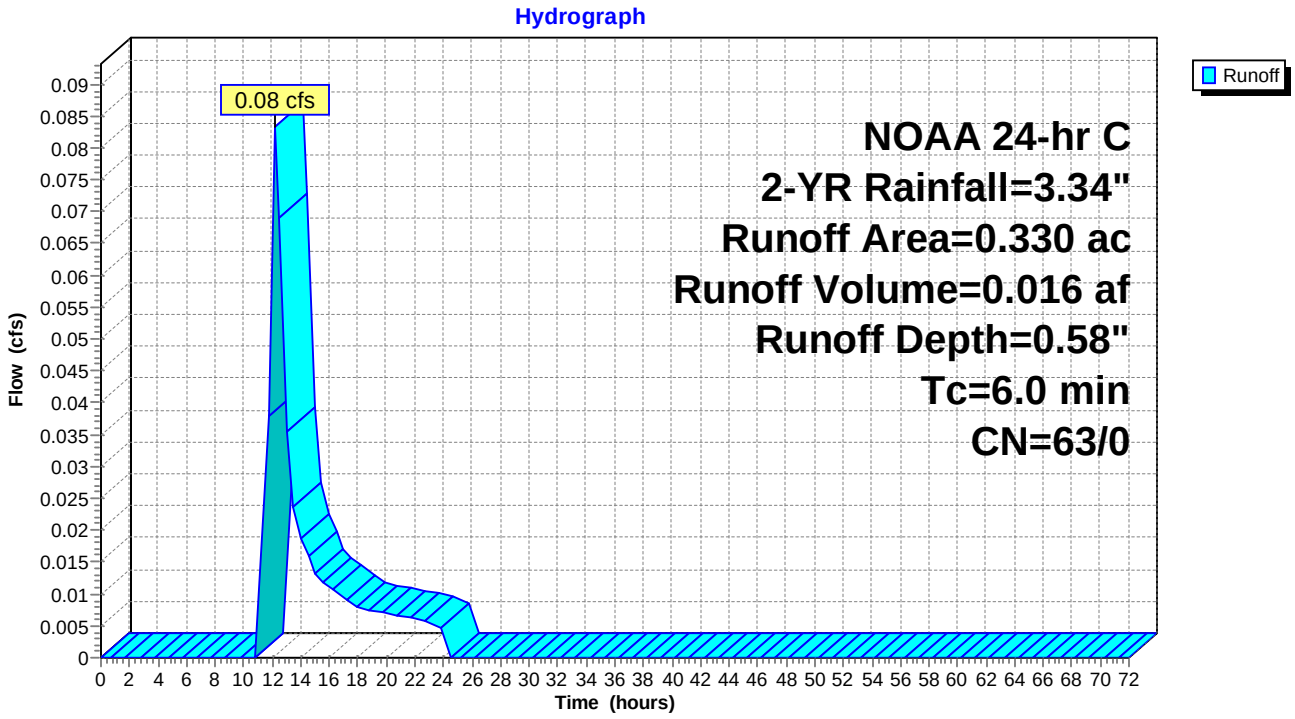
Runoff = 0.08 cfs @ 12.21 hrs, Volume= 0.016 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

Area (ac)	CN	Description
0.270	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.330	63	Weighted Average
0.330	63	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

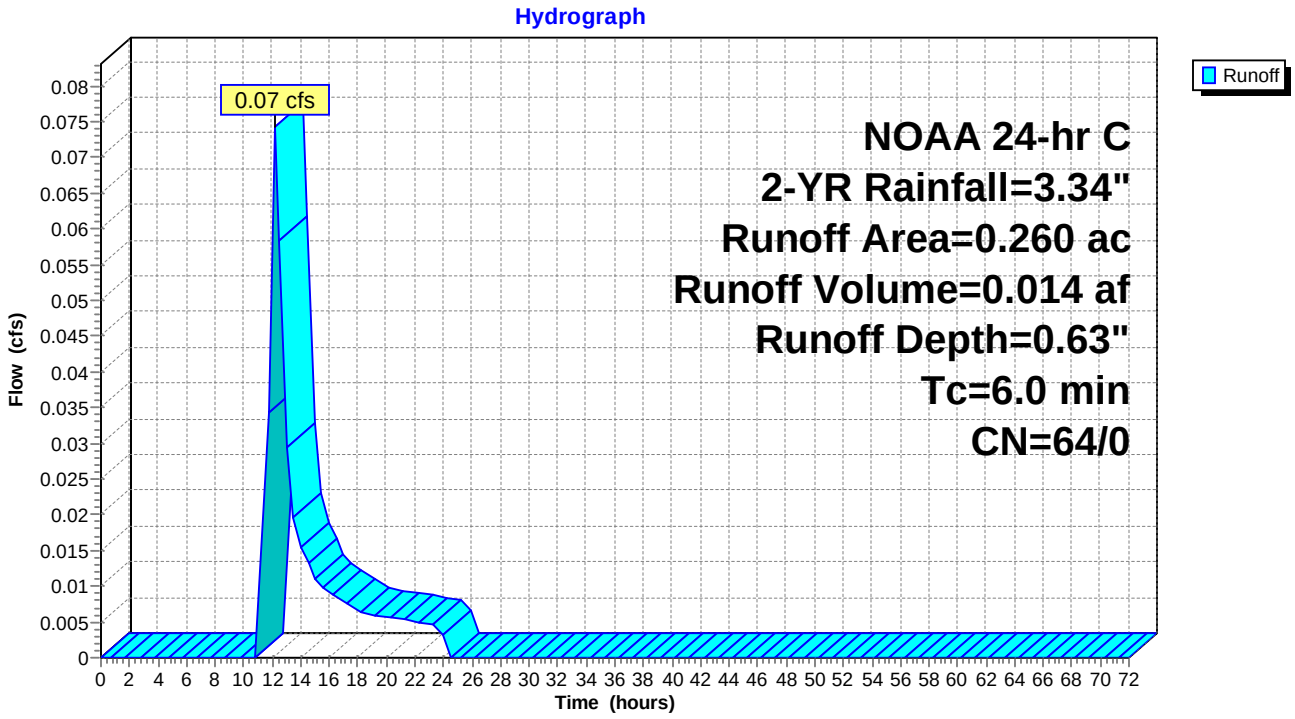
Runoff = 0.07 cfs @ 12.18 hrs, Volume= 0.014 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

Area (ac)	CN	Description
0.200	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.260	64	Weighted Average
0.260	64	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 0.75" for 2-YR event
Inflow = 5.90 cfs @ 12.59 hrs, Volume= 0.995 af
Outflow = 0.28 cfs @ 23.85 hrs, Volume= 0.636 af, Atten= 95%, Lag= 675.7 min
Primary = 0.28 cfs @ 23.85 hrs, Volume= 0.636 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 263.04' @ 23.85 hrs Surf.Area= 33,087 sf Storage= 33,015 cf

Plug-Flow detention time= 1,066.8 min calculated for 0.632 af (64% of inflow)
Center-of-Mass det. time= 954.3 min (1,853.3 - 899.0)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

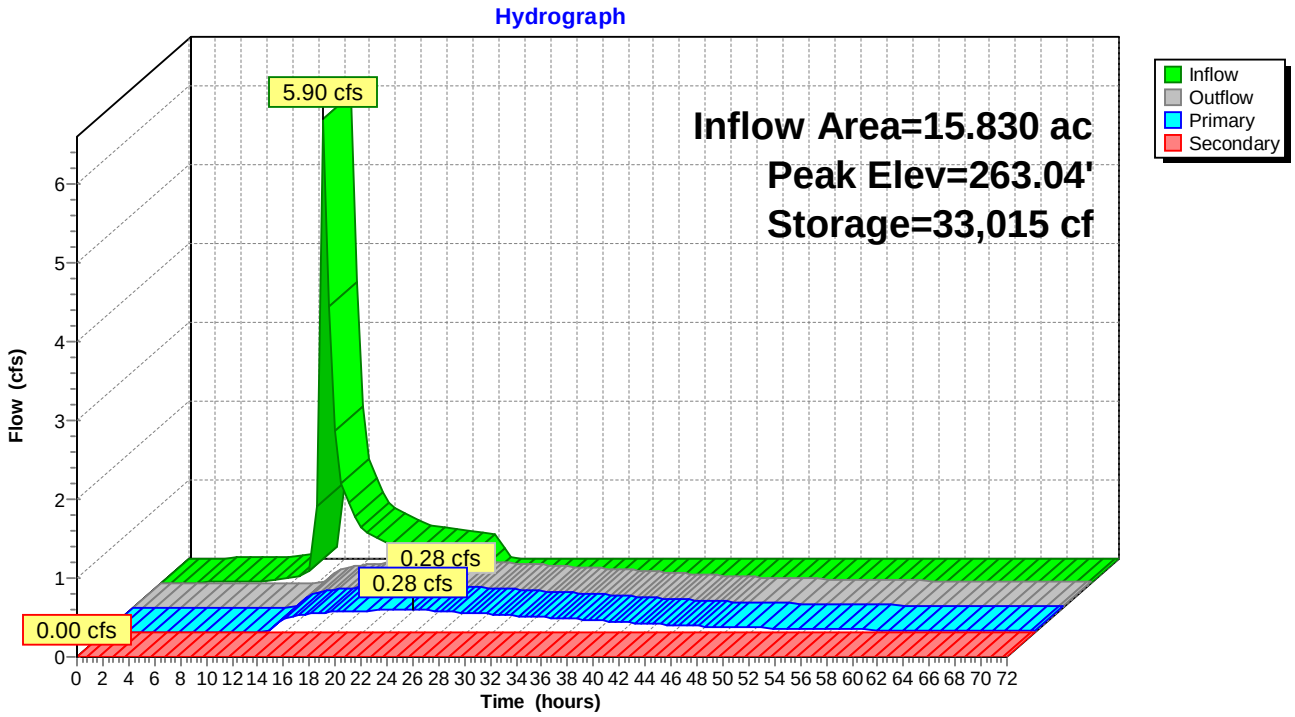
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.28 cfs @ 23.85 hrs HW=263.04' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.28 cfs of 12.00 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 3.24 fps)
—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 0.60" for 2-YR event
Inflow = 0.13 cfs @ 12.22 hrs, Volume= 0.030 af
Outflow = 0.09 cfs @ 12.83 hrs, Volume= 0.030 af, Atten= 30%, Lag= 36.6 min
Primary = 0.09 cfs @ 12.83 hrs, Volume= 0.030 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 283.99' @ 12.83 hrs Surf.Area= 624 sf Storage= 122 cf

Plug-Flow detention time= 13.8 min calculated for 0.029 af (99% of inflow)
Center-of-Mass det. time= 14.0 min (923.7 - 909.7)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

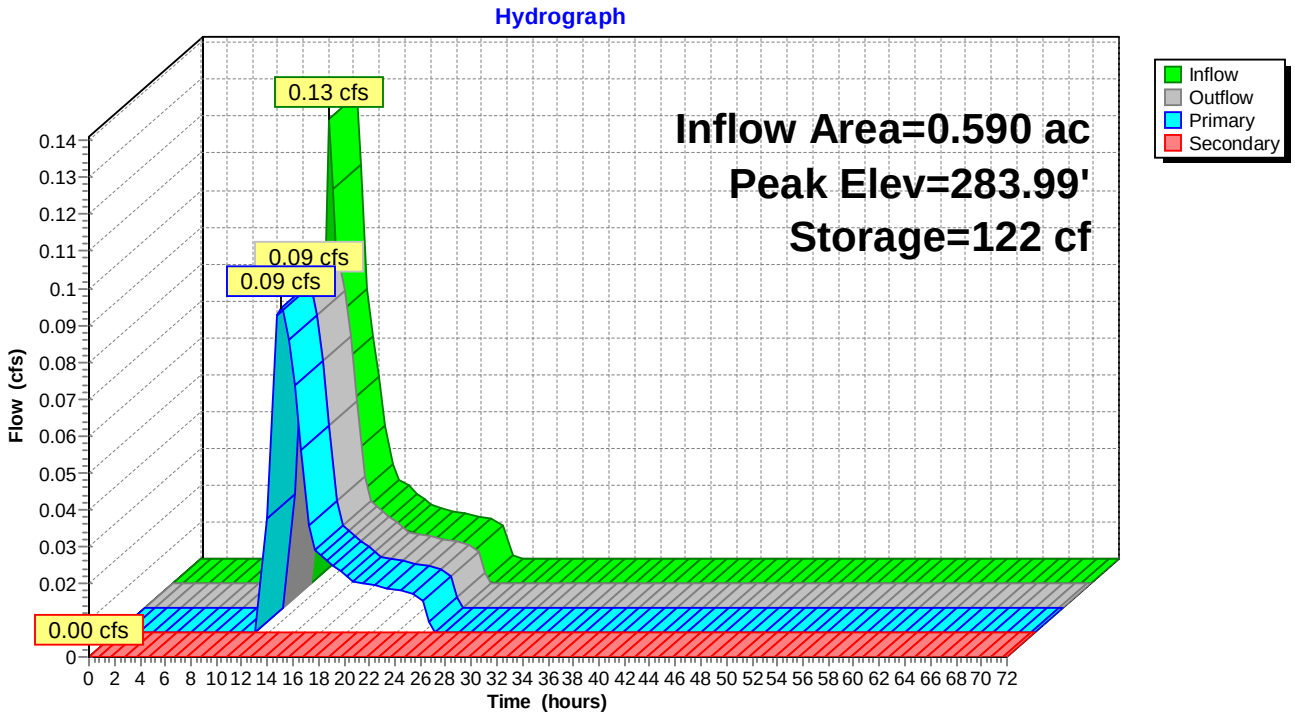
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.09 cfs @ 12.83 hrs HW=283.99' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.09 cfs of 1.11 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.09 cfs @ 2.55 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 0.63" for 2-YR event
Inflow = 0.07 cfs @ 12.18 hrs, Volume= 0.014 af
Outflow = 0.04 cfs @ 12.00 hrs, Volume= 0.014 af, Atten= 49%, Lag= 0.0 min
Primary = 0.04 cfs @ 12.00 hrs, Volume= 0.014 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.04' @ 12.90 hrs Surf.Area= 570 sf Storage= 85 cf

Plug-Flow detention time= 17.1 min calculated for 0.013 af (99% of inflow)
Center-of-Mass det. time= 17.5 min (916.7 - 899.2)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

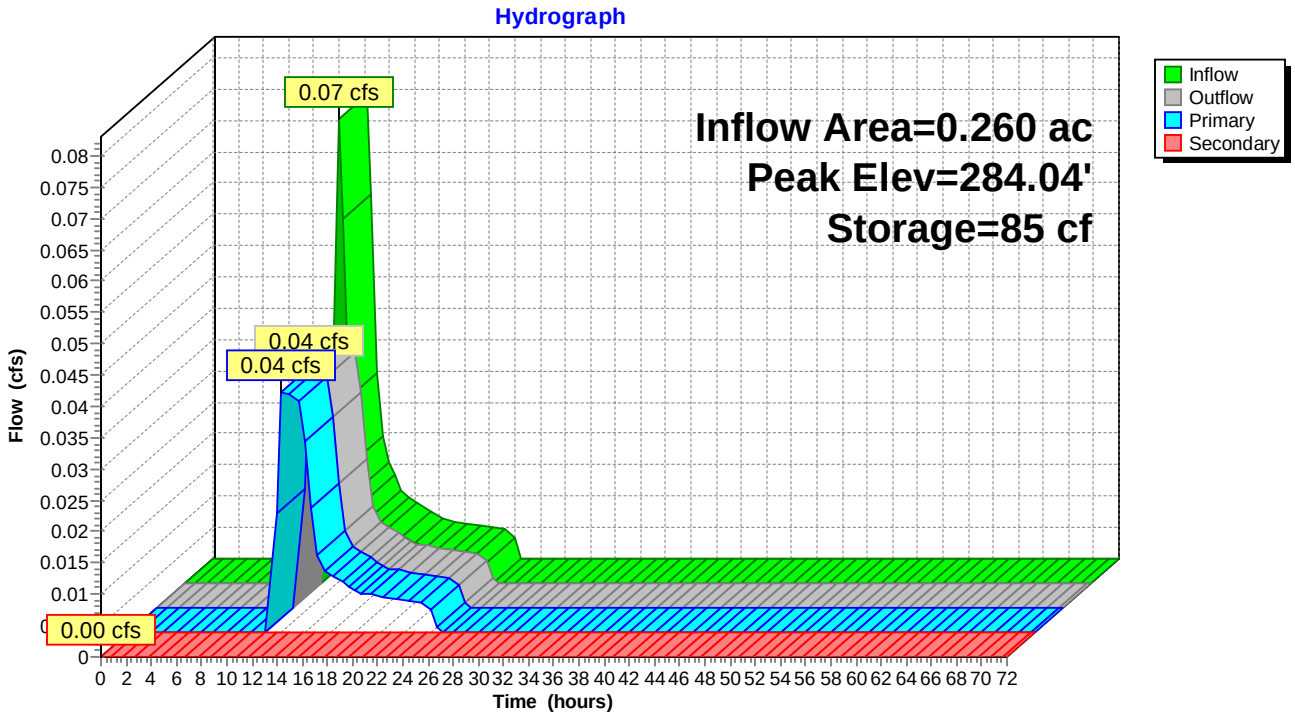
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.04 cfs @ 12.00 hrs HW=283.90' TW=283.84' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.04 cfs of 0.15 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 1.11 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

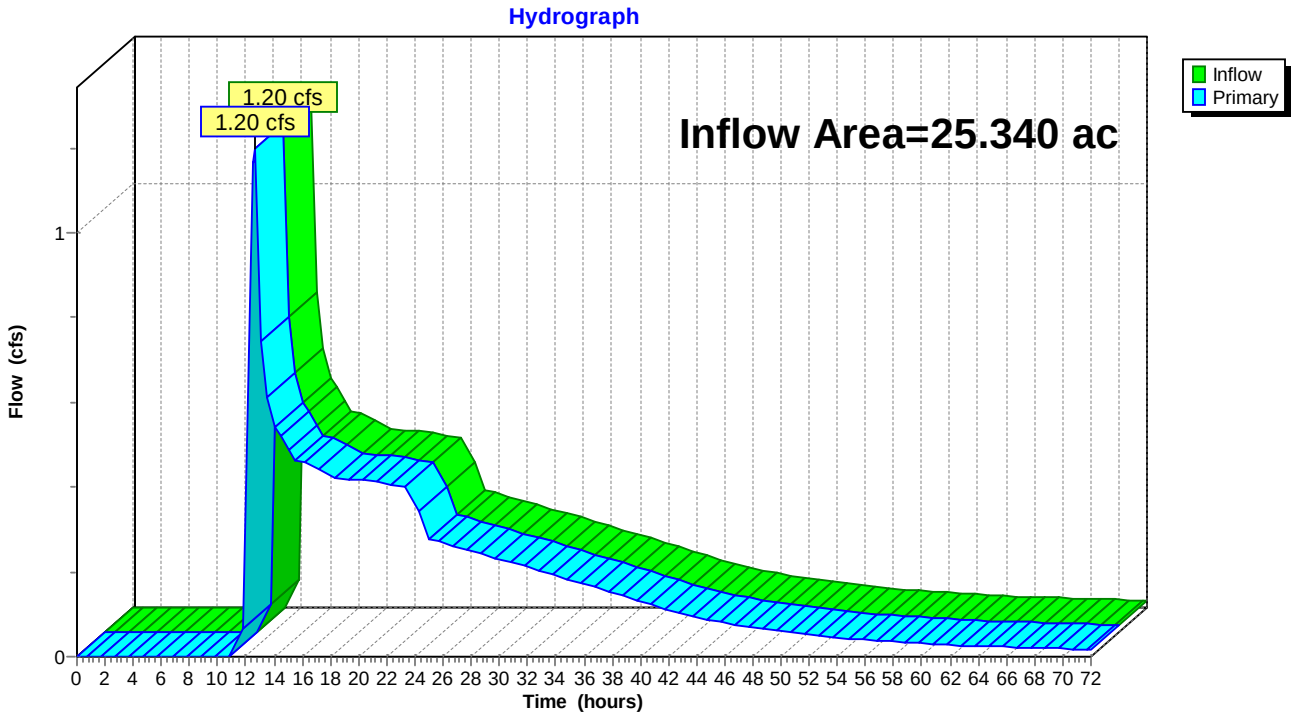
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 0.42" for 2-YR event
Inflow = 1.20 cfs @ 12.61 hrs, Volume= 0.894 af
Primary = 1.20 cfs @ 12.61 hrs, Volume= 0.894 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

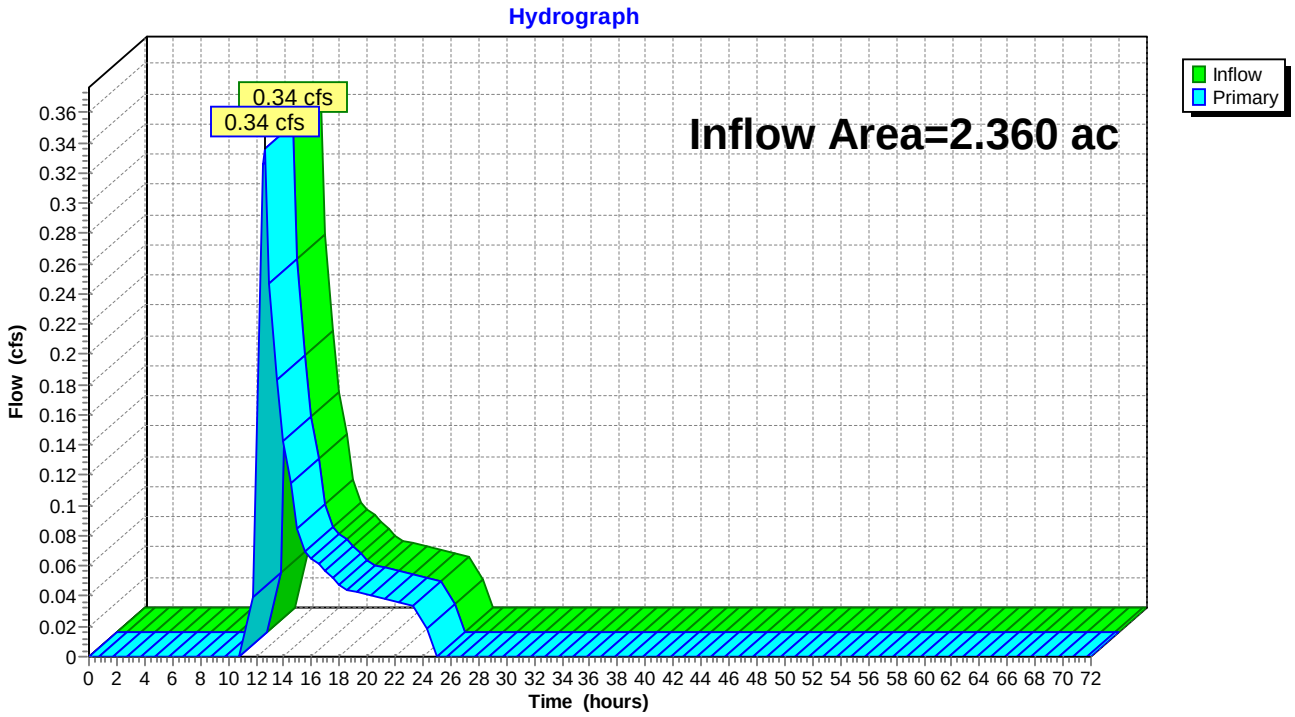


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 0.42" for 2-YR event
Inflow = 0.34 cfs @ 12.63 hrs, Volume= 0.082 af
Primary = 0.34 cfs @ 12.63 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

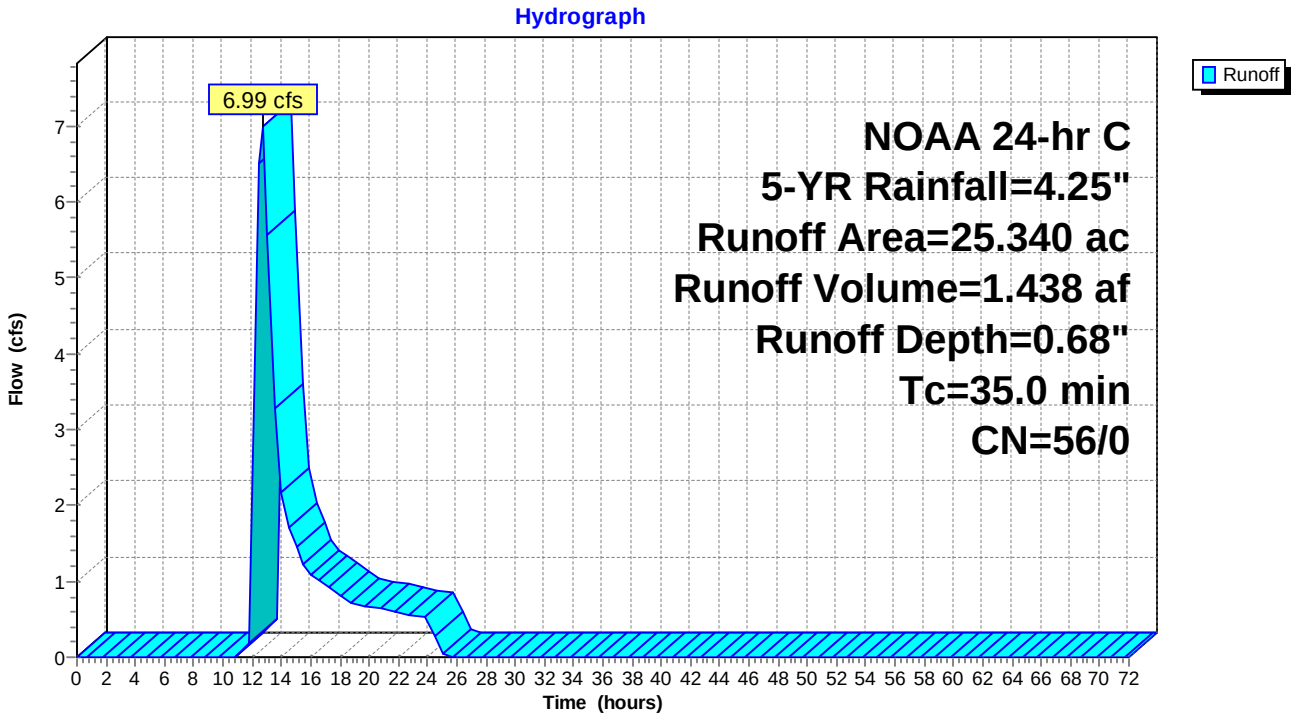
Runoff = 6.99 cfs @ 12.68 hrs, Volume= 1.438 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

Area (ac)	CN	Description
1.290	70	Woods, Good, HSG C
4.690	58	Meadow, non-grazed, HSG B
19.360	55	Woods, Good, HSG B
25.340	56	Weighted Average
25.340	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

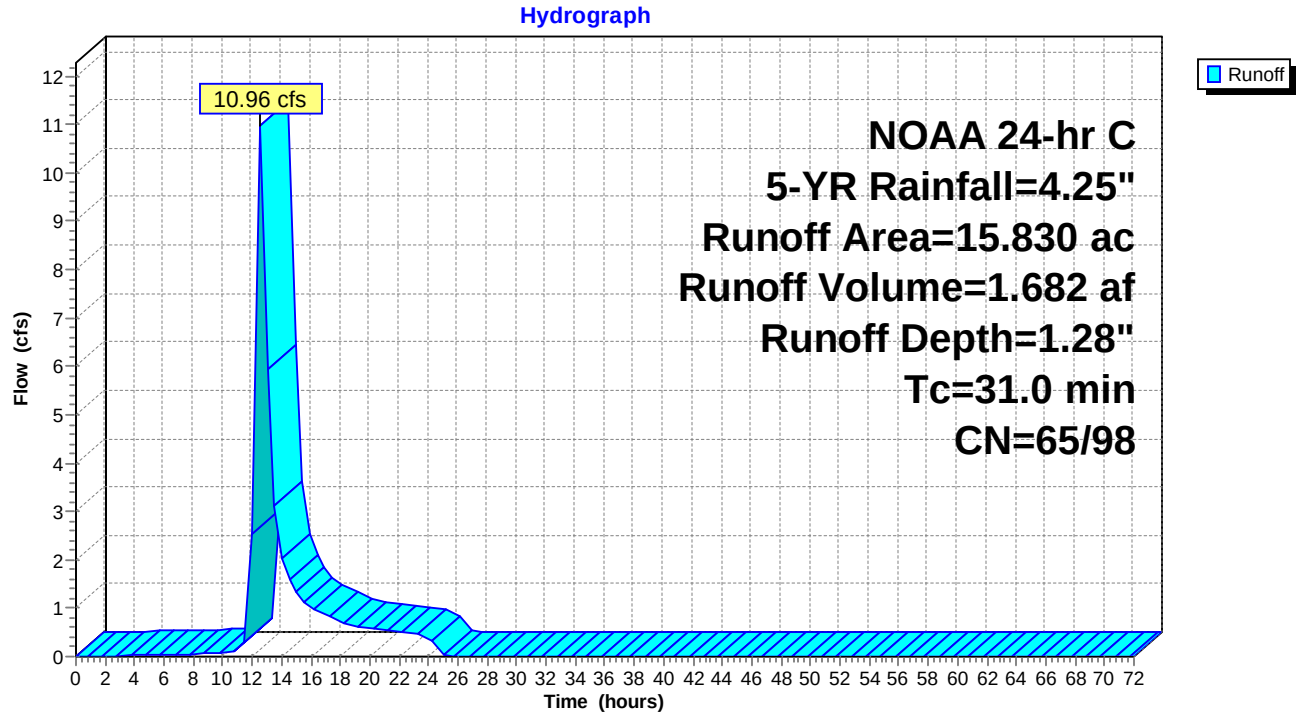
Runoff = 10.96 cfs @ 12.56 hrs, Volume= 1.682 af, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

Area (ac)	CN	Description
0.390	89	Gravel roads, HSG C
0.550	98	Unconnected pavement, HSG B
4.690	85	Gravel roads, HSG B
7.240	58	Meadow, non-grazed, HSG B
2.960	48	Brush, Good, HSG B
15.830	66	Weighted Average
15.280	65	96.53% Pervious Area
0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

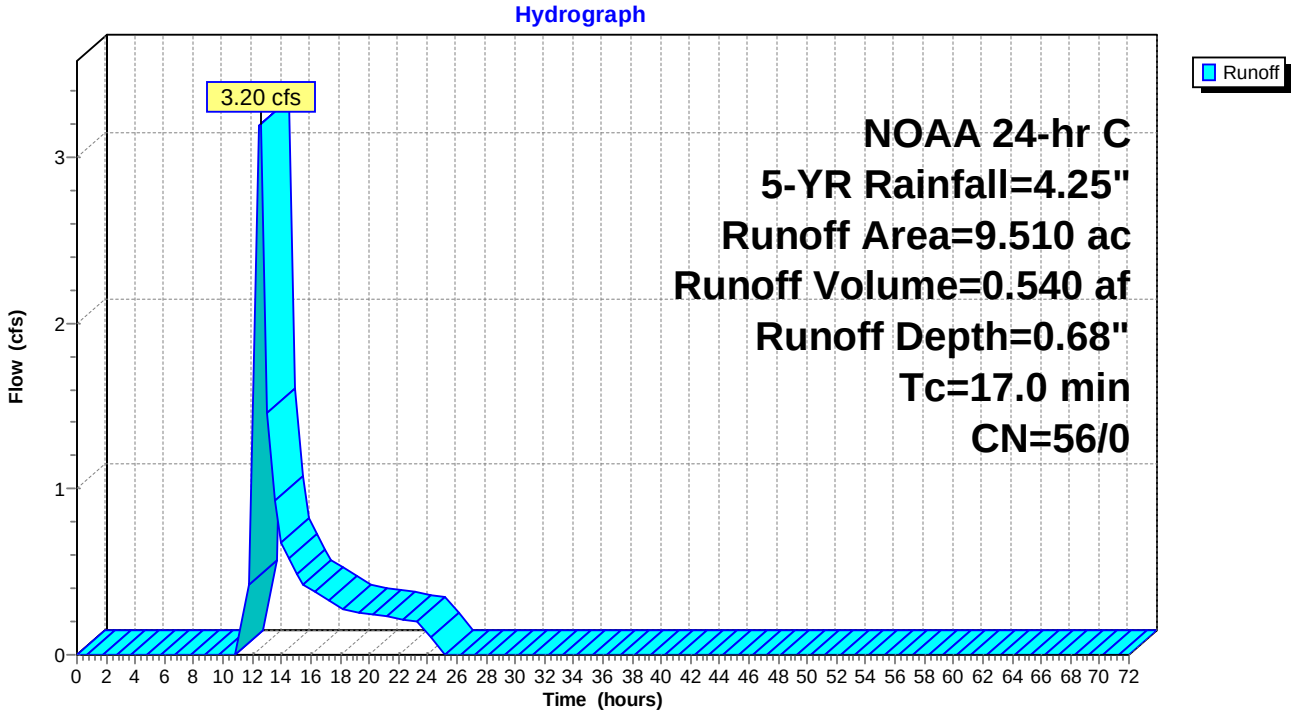
Runoff = 3.20 cfs @ 12.54 hrs, Volume= 0.540 af, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

Area (ac)	CN	Description
5.300	58	Meadow, non-grazed, HSG B
0.150	85	Gravel roads, HSG B
3.160	48	Brush, Good, HSG B
0.900	65	Brush, Good, HSG C
9.510	56	Weighted Average
9.510	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

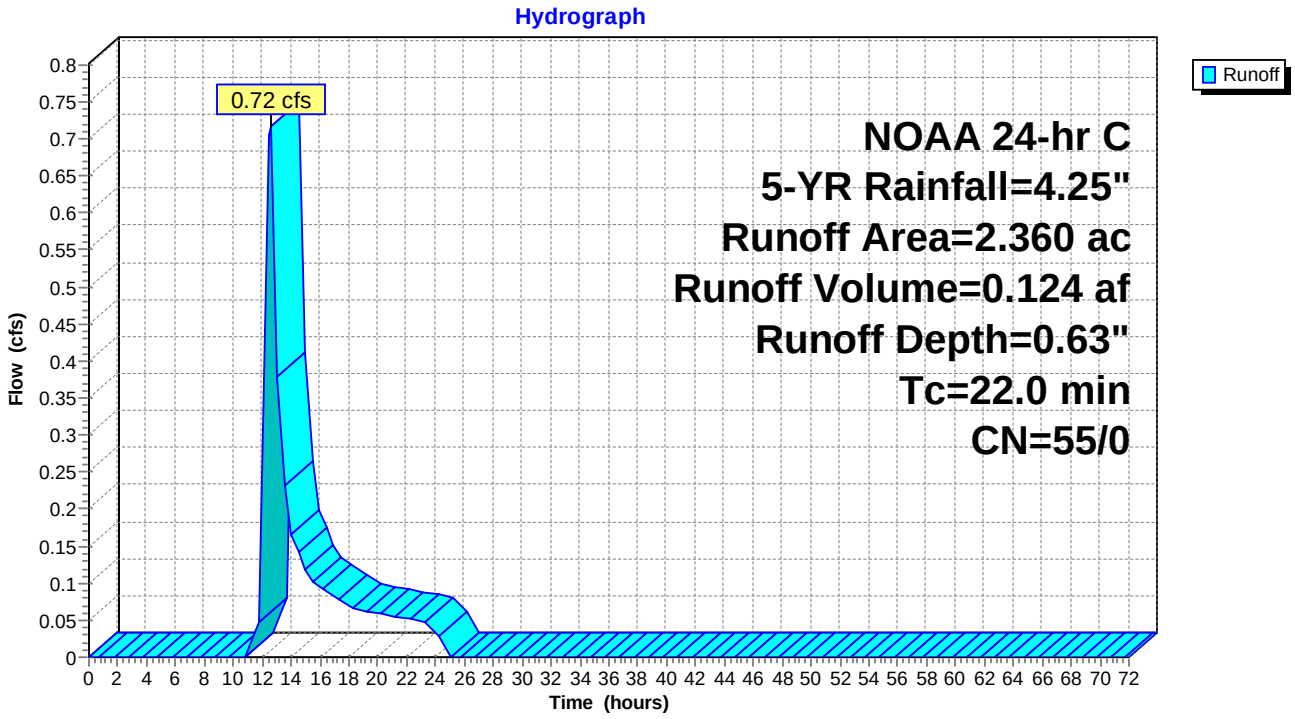
Runoff = 0.72 cfs @ 12.58 hrs, Volume= 0.124 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

Area (ac)	CN	Description
0.060	58	Meadow, non-grazed, HSG B
1.060	55	Woods, Good, HSG B
1.240	55	Woods, Good, HSG B
2.360	55	Weighted Average
2.360	55	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

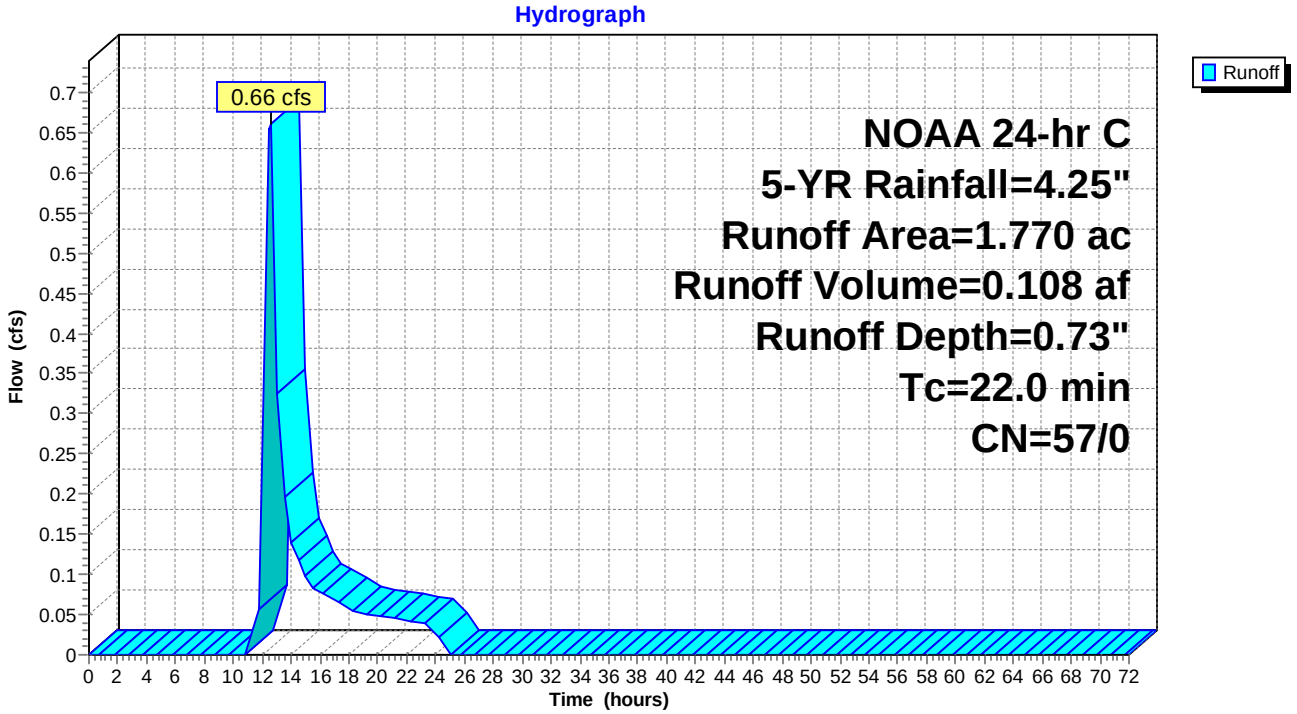
Runoff = 0.66 cfs @ 12.56 hrs, Volume= 0.108 af, Depth= 0.73"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

Area (ac)	CN	Description
0.380	48	Brush, Good, HSG B
0.150	85	Gravel roads, HSG B
0.940	48	Brush, Good, HSG B
0.300	85	Gravel roads, HSG B
1.770	57	Weighted Average
1.770	57	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

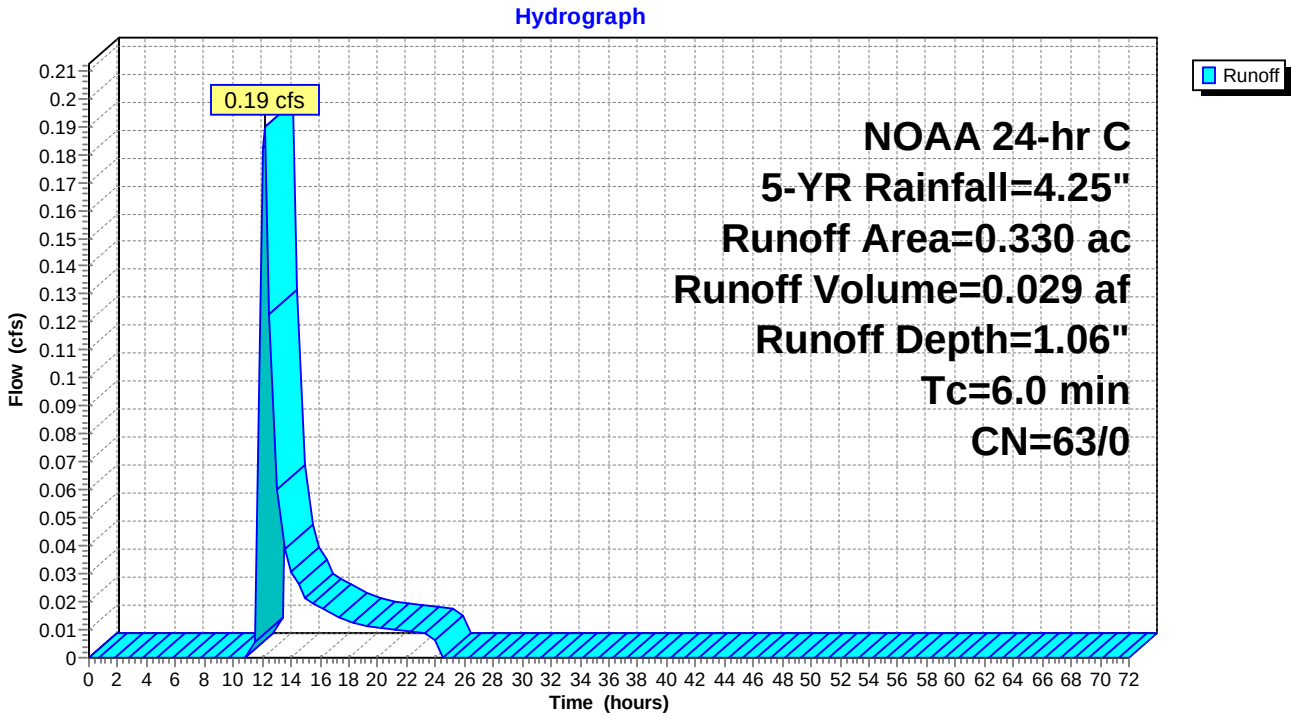
Runoff = 0.19 cfs @ 12.12 hrs, Volume= 0.029 af, Depth= 1.06"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

Area (ac)	CN	Description
0.270	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.330	63	Weighted Average
0.330	63	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

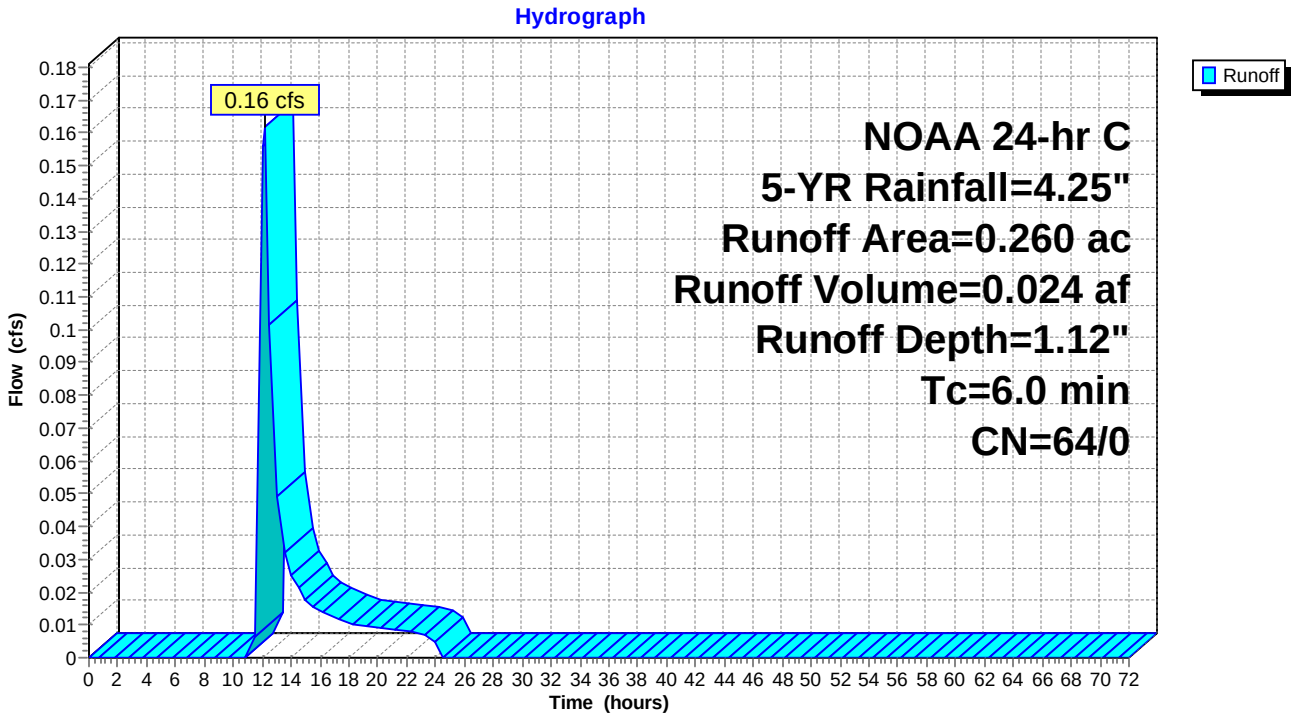
Runoff = 0.16 cfs @ 12.12 hrs, Volume= 0.024 af, Depth= 1.12"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 5-YR Rainfall=4.25"

Area (ac)	CN	Description
0.200	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.260	64	Weighted Average
0.260	64	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 1.28" for 5-YR event
Inflow = 10.96 cfs @ 12.56 hrs, Volume= 1.682 af
Outflow = 0.82 cfs @ 17.33 hrs, Volume= 1.307 af, Atten= 93%, Lag= 286.2 min
Primary = 0.82 cfs @ 17.33 hrs, Volume= 1.307 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 263.50' @ 17.33 hrs Surf.Area= 34,427 sf Storage= 48,552 cf

Plug-Flow detention time= 942.9 min calculated for 1.307 af (78% of inflow)
Center-of-Mass det. time= 850.3 min (1,735.5 - 885.3)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

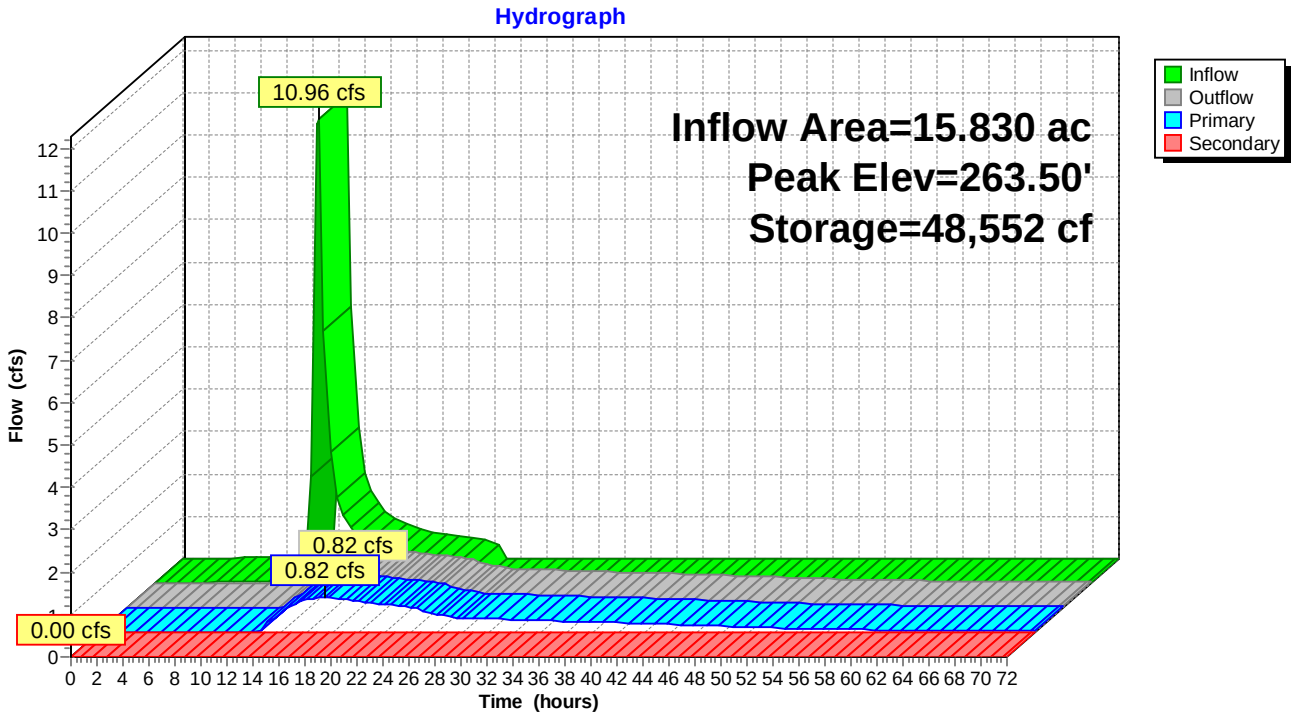
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.82 cfs @ 17.33 hrs HW=263.50' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.82 cfs of 13.32 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.40 cfs @ 4.60 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.41 cfs @ 1.74 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 1.08" for 5-YR event
Inflow = 0.24 cfs @ 12.13 hrs, Volume= 0.053 af
Outflow = 0.12 cfs @ 12.99 hrs, Volume= 0.053 af, Atten= 51%, Lag= 51.6 min
Primary = 0.12 cfs @ 12.99 hrs, Volume= 0.053 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.21' @ 12.99 hrs Surf.Area= 1,310 sf Storage= 331 cf

Plug-Flow detention time= 26.9 min calculated for 0.053 af (99% of inflow)
Center-of-Mass det. time= 27.0 min (931.1 - 904.1)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

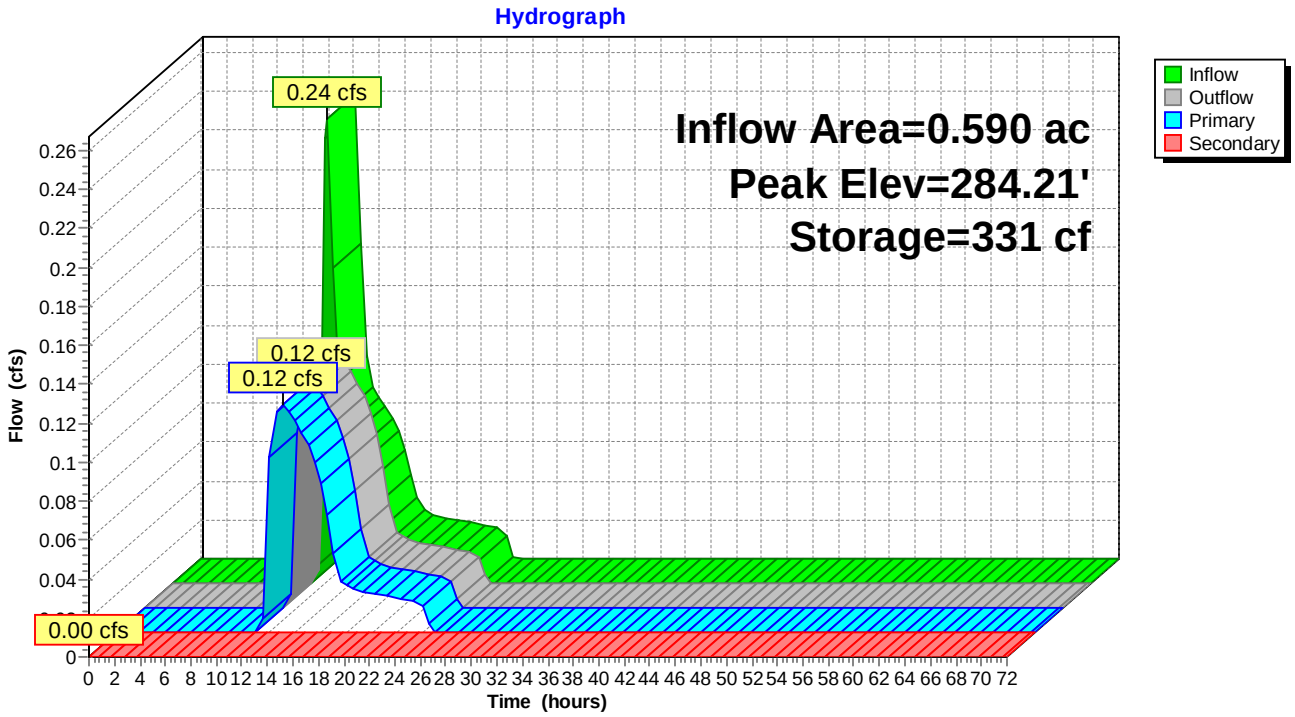
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.12 cfs @ 12.99 hrs HW=284.21' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.12 cfs of 1.18 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 3.42 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 1.12" for 5-YR event
Inflow = 0.16 cfs @ 12.12 hrs, Volume= 0.024 af
Outflow = 0.05 cfs @ 14.31 hrs, Volume= 0.024 af, Atten= 68%, Lag= 131.9 min
Primary = 0.05 cfs @ 14.31 hrs, Volume= 0.024 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.28' @ 13.18 hrs Surf.Area= 1,402 sf Storage= 323 cf

Plug-Flow detention time= 53.3 min calculated for 0.024 af (99% of inflow)
Center-of-Mass det. time= 53.4 min (931.4 - 878.0)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

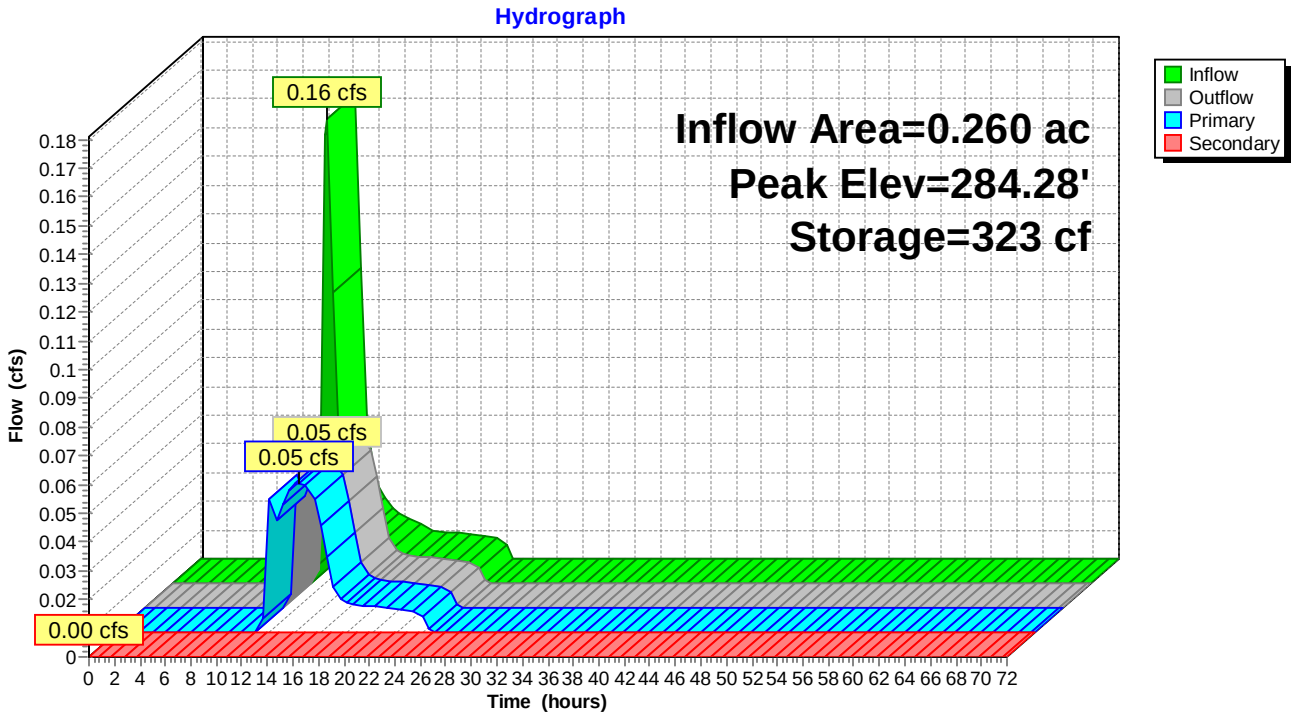
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.05 cfs @ 14.31 hrs HW=284.22' TW=284.11' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.05 cfs of 0.21 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.53 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

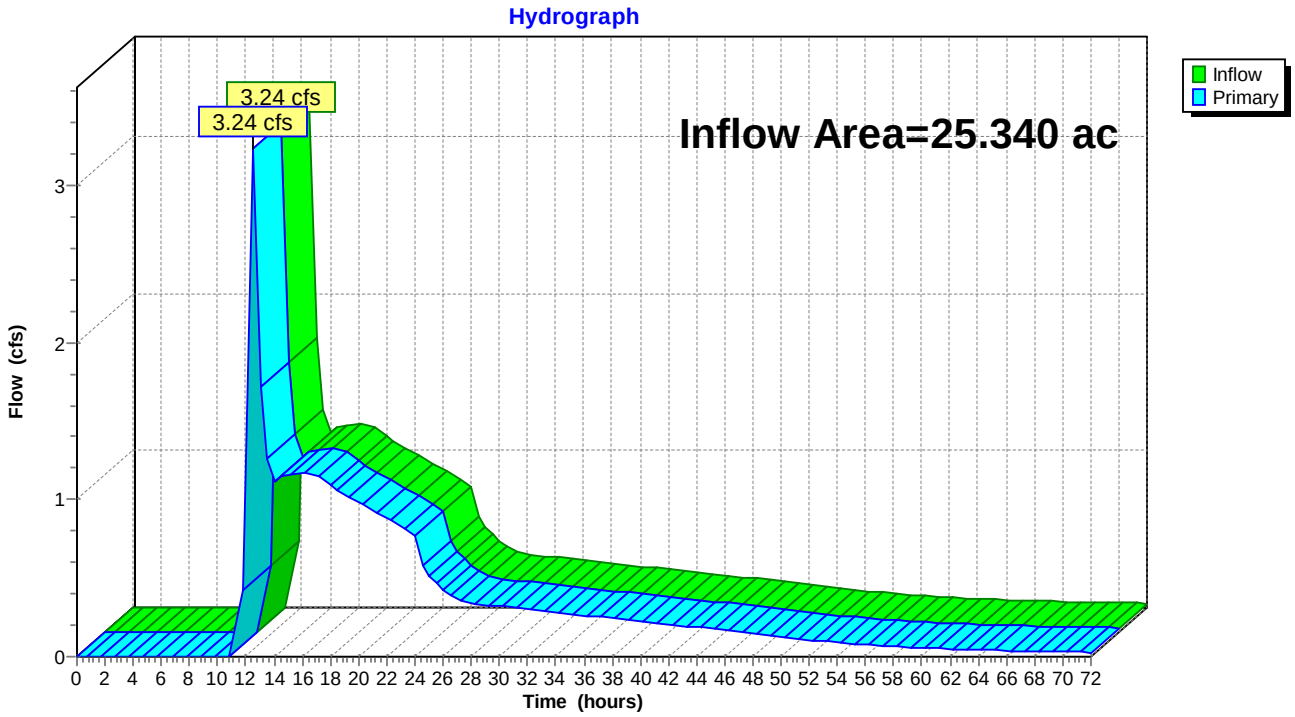
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 0.87" for 5-YR event
Inflow = 3.24 cfs @ 12.56 hrs, Volume= 1.846 af
Primary = 3.24 cfs @ 12.56 hrs, Volume= 1.846 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

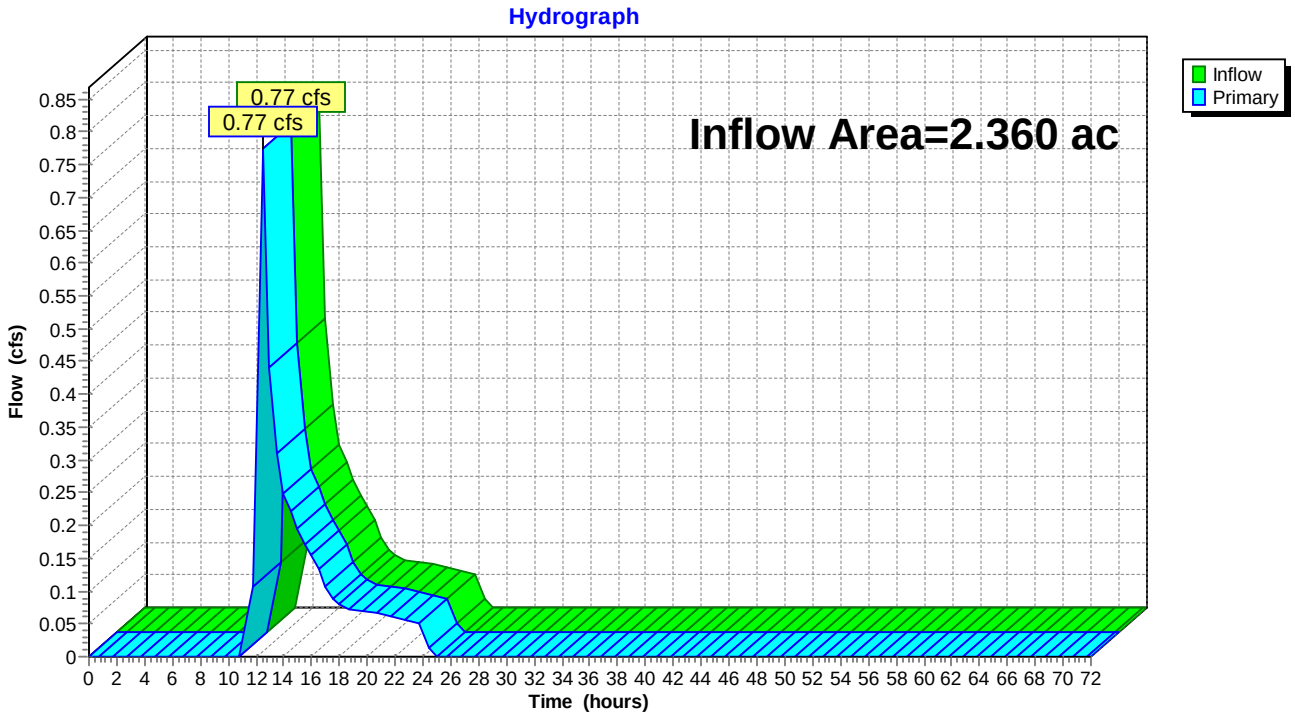


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 0.82" for 5-YR event
Inflow = 0.77 cfs @ 12.57 hrs, Volume= 0.161 af
Primary = 0.77 cfs @ 12.57 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

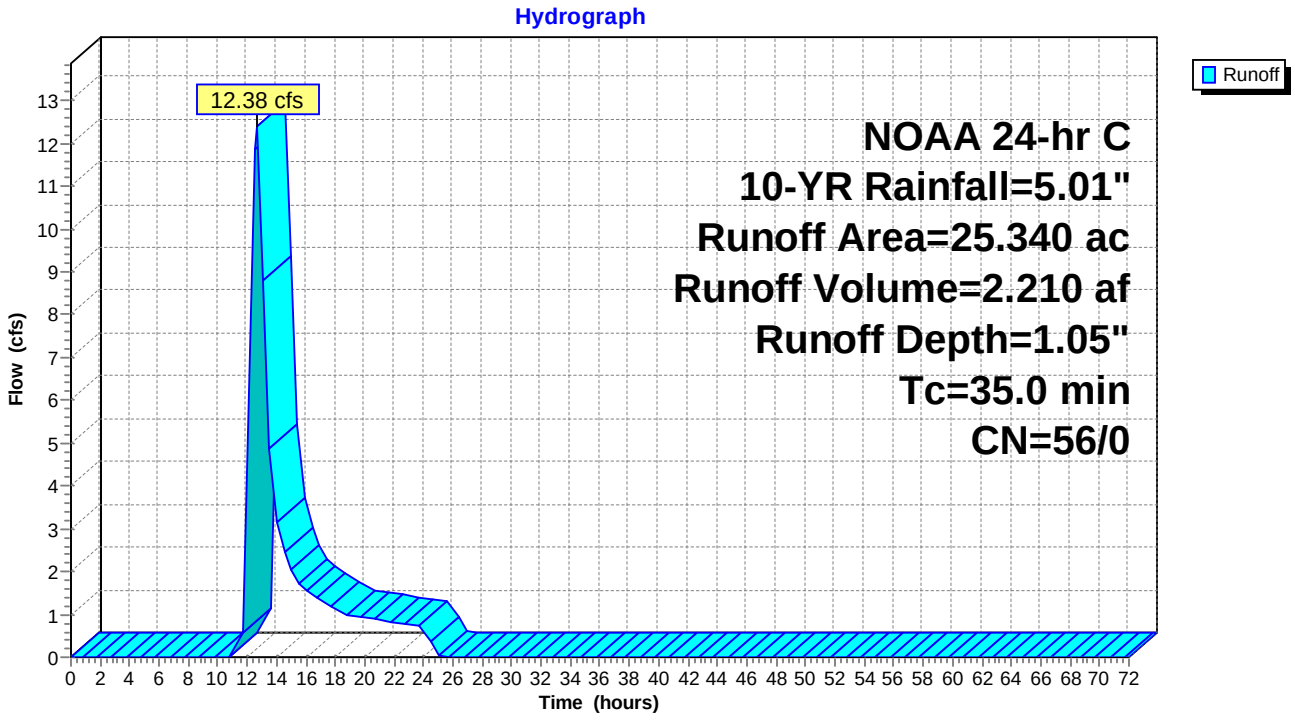
Runoff = 12.38 cfs @ 12.64 hrs, Volume= 2.210 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

Area (ac)	CN	Description
1.290	70	Woods, Good, HSG C
4.690	58	Meadow, non-grazed, HSG B
19.360	55	Woods, Good, HSG B
25.340	56	Weighted Average
25.340	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

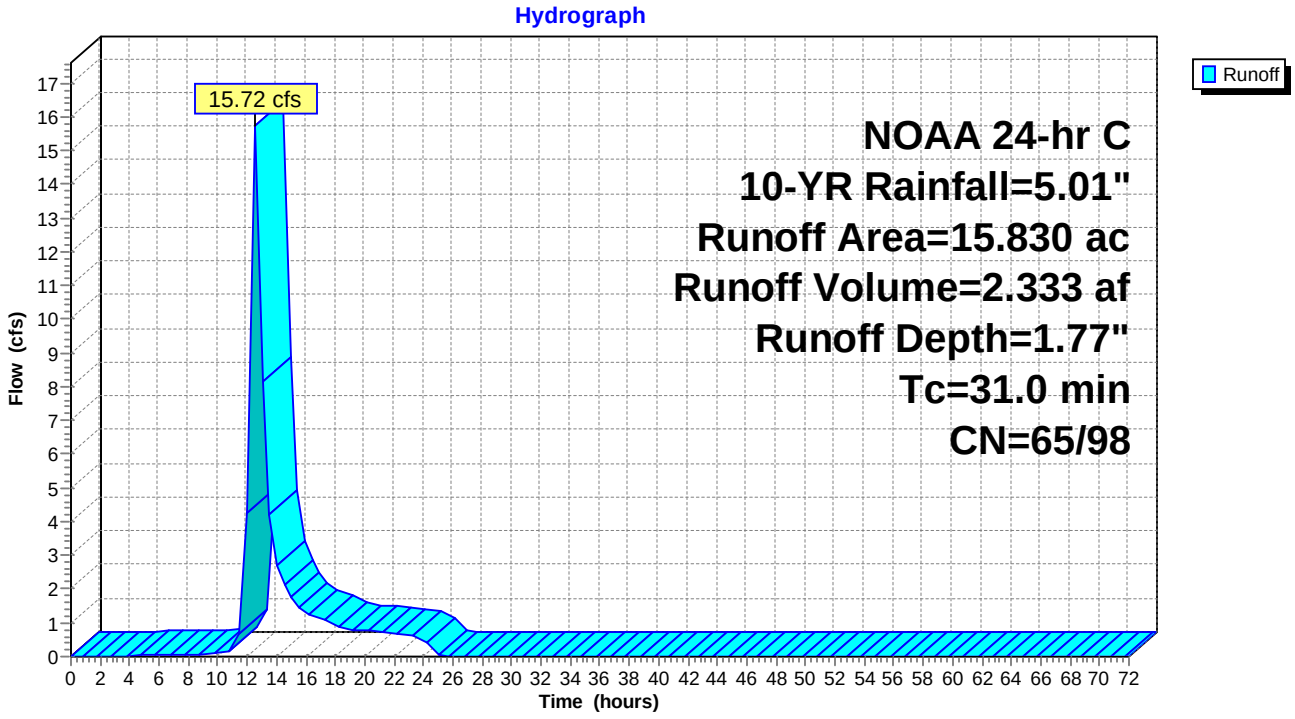
Runoff = 15.72 cfs @ 12.55 hrs, Volume= 2.333 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

Area (ac)	CN	Description
0.390	89	Gravel roads, HSG C
0.550	98	Unconnected pavement, HSG B
4.690	85	Gravel roads, HSG B
7.240	58	Meadow, non-grazed, HSG B
2.960	48	Brush, Good, HSG B
15.830	66	Weighted Average
15.280	65	96.53% Pervious Area
0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

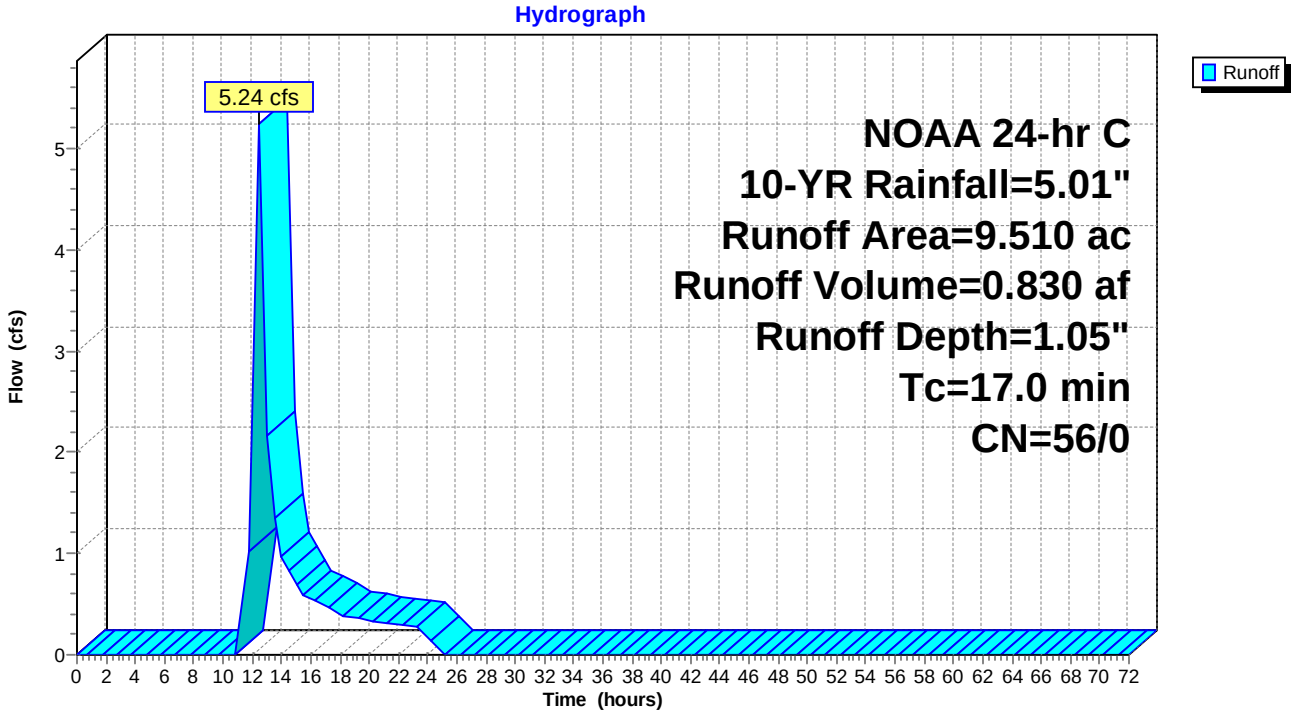
Runoff = 5.24 cfs @ 12.51 hrs, Volume= 0.830 af, Depth= 1.05"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

Area (ac)	CN	Description
5.300	58	Meadow, non-grazed, HSG B
0.150	85	Gravel roads, HSG B
3.160	48	Brush, Good, HSG B
0.900	65	Brush, Good, HSG C
9.510	56	Weighted Average
9.510	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

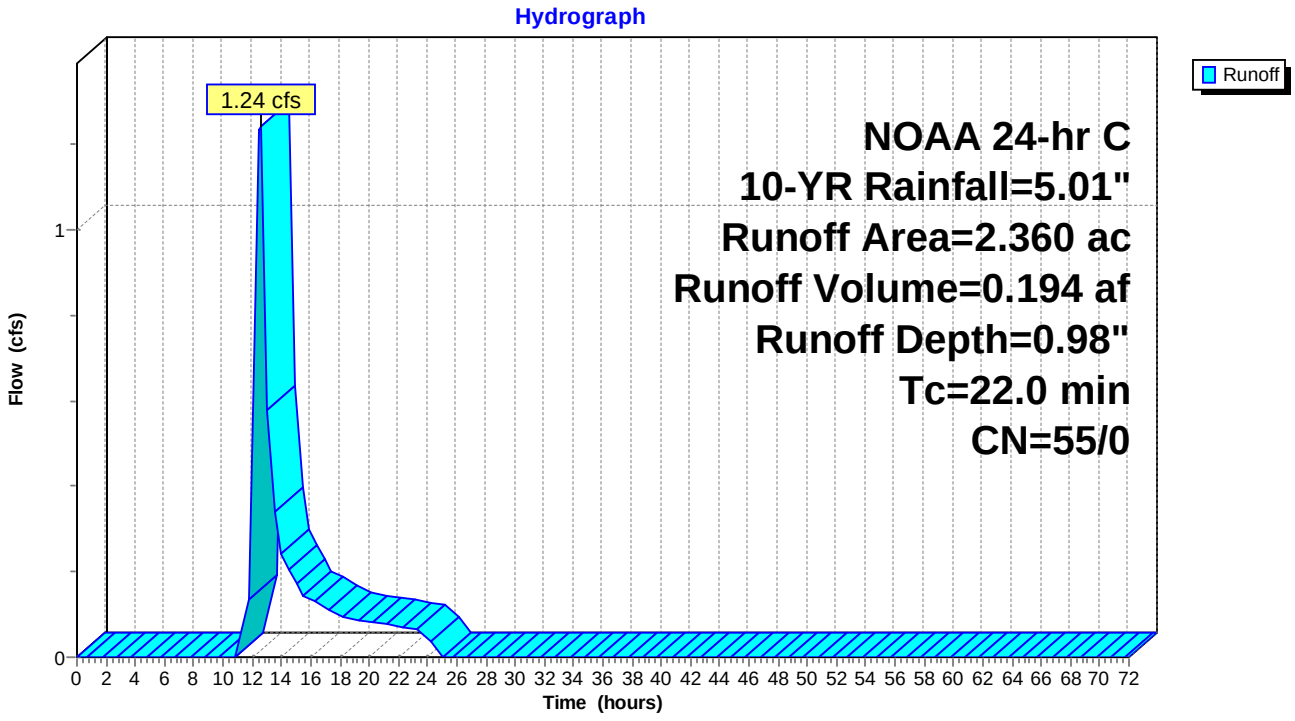
Runoff = 1.24 cfs @ 12.55 hrs, Volume= 0.194 af, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

Area (ac)	CN	Description
0.060	58	Meadow, non-grazed, HSG B
1.060	55	Woods, Good, HSG B
1.240	55	Woods, Good, HSG B
2.360	55	Weighted Average
2.360	55	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

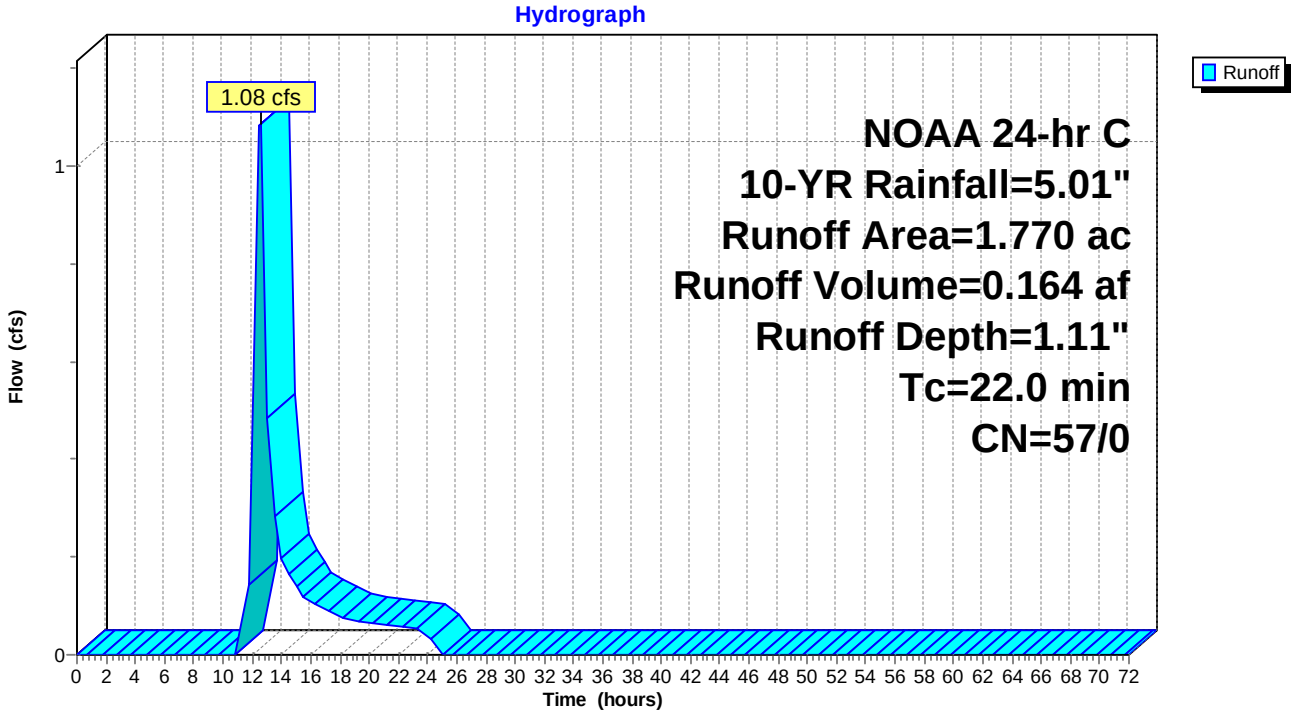
Runoff = 1.08 cfs @ 12.54 hrs, Volume= 0.164 af, Depth= 1.11"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

Area (ac)	CN	Description
0.380	48	Brush, Good, HSG B
0.150	85	Gravel roads, HSG B
0.940	48	Brush, Good, HSG B
0.300	85	Gravel roads, HSG B
1.770	57	Weighted Average
1.770	57	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

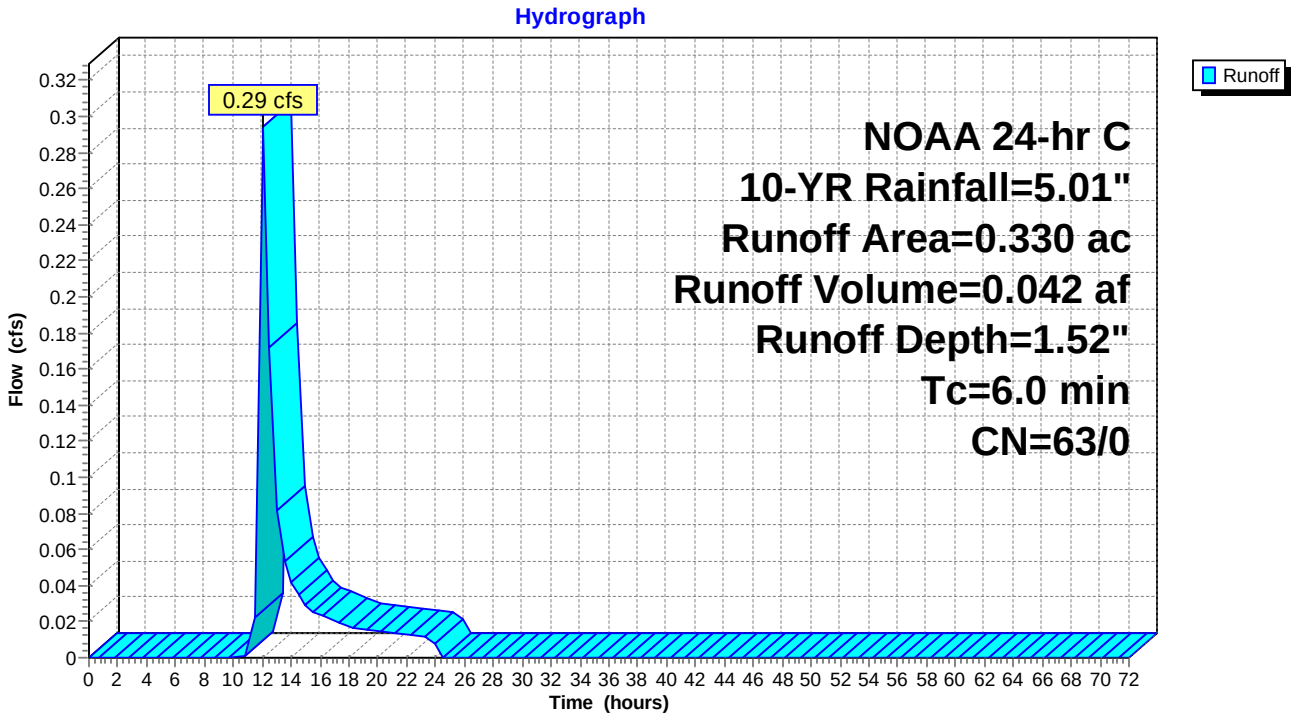
Runoff = 0.29 cfs @ 12.10 hrs, Volume= 0.042 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

Area (ac)	CN	Description
0.270	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.330	63	Weighted Average
0.330	63	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

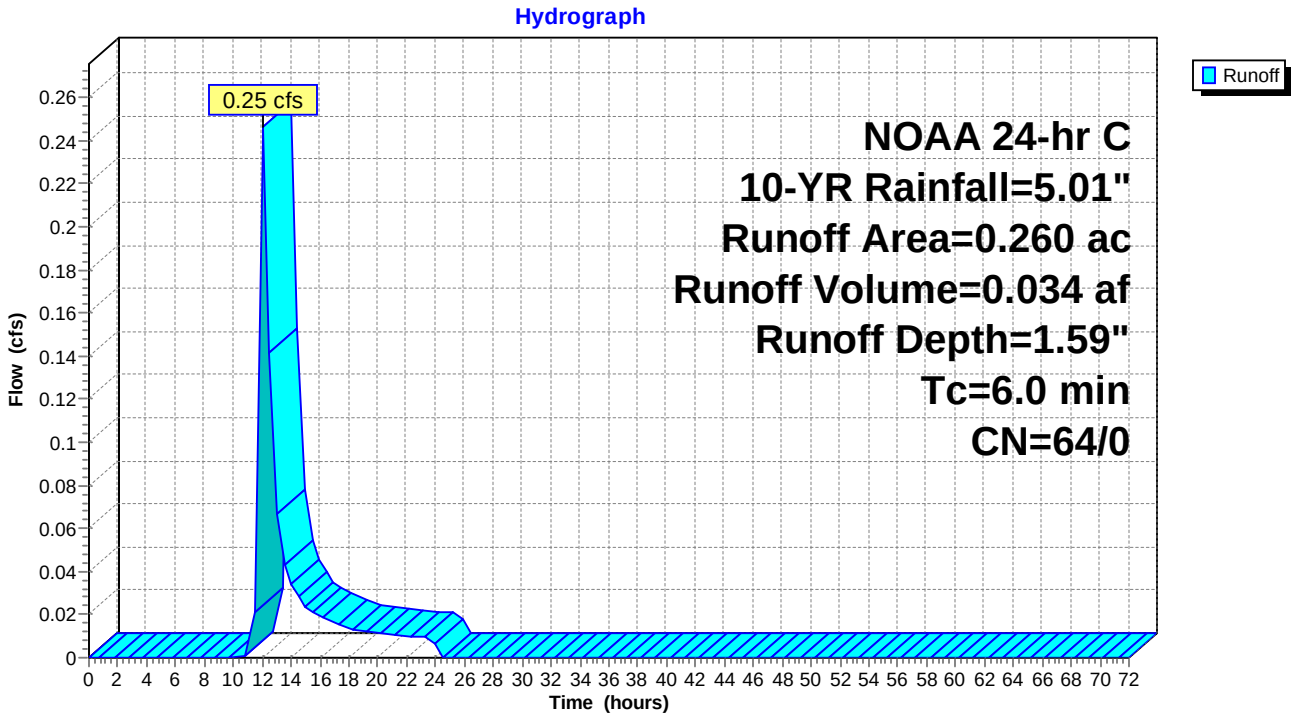
Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 10-YR Rainfall=5.01"

Area (ac)	CN	Description
0.200	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.260	64	Weighted Average
0.260	64	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 1.77" for 10-YR event
Inflow = 15.72 cfs @ 12.55 hrs, Volume= 2.333 af
Outflow = 1.86 cfs @ 14.89 hrs, Volume= 1.955 af, Atten= 88%, Lag= 140.5 min
Primary = 1.86 cfs @ 14.89 hrs, Volume= 1.955 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 263.81' @ 14.89 hrs Surf.Area= 35,335 sf Storage= 59,438 cf

Plug-Flow detention time= 709.9 min calculated for 1.941 af (83% of inflow)
Center-of-Mass det. time= 653.4 min (1,530.2 - 876.8)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

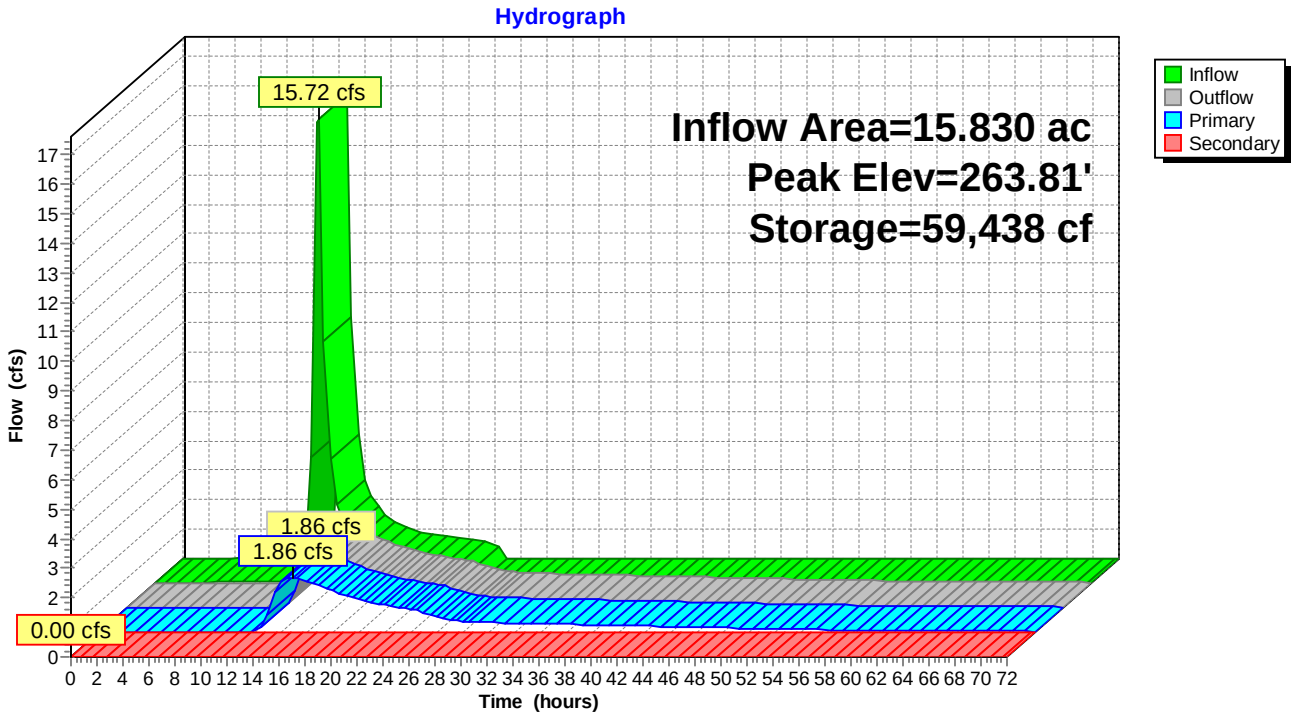
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.86 cfs @ 14.89 hrs HW=263.81' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 1.86 cfs of 14.14 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.47 cfs @ 5.33 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.39 cfs @ 2.79 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 1.55" for 10-YR event
Inflow = 0.34 cfs @ 12.11 hrs, Volume= 0.076 af
Outflow = 0.13 cfs @ 13.10 hrs, Volume= 0.076 af, Atten= 61%, Lag= 59.7 min
Primary = 0.13 cfs @ 13.10 hrs, Volume= 0.076 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.36' @ 13.10 hrs Surf.Area= 1,803 sf Storage= 568 cf

Plug-Flow detention time= 40.9 min calculated for 0.076 af (99% of inflow)
Center-of-Mass det. time= 40.9 min (951.8 - 910.9)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

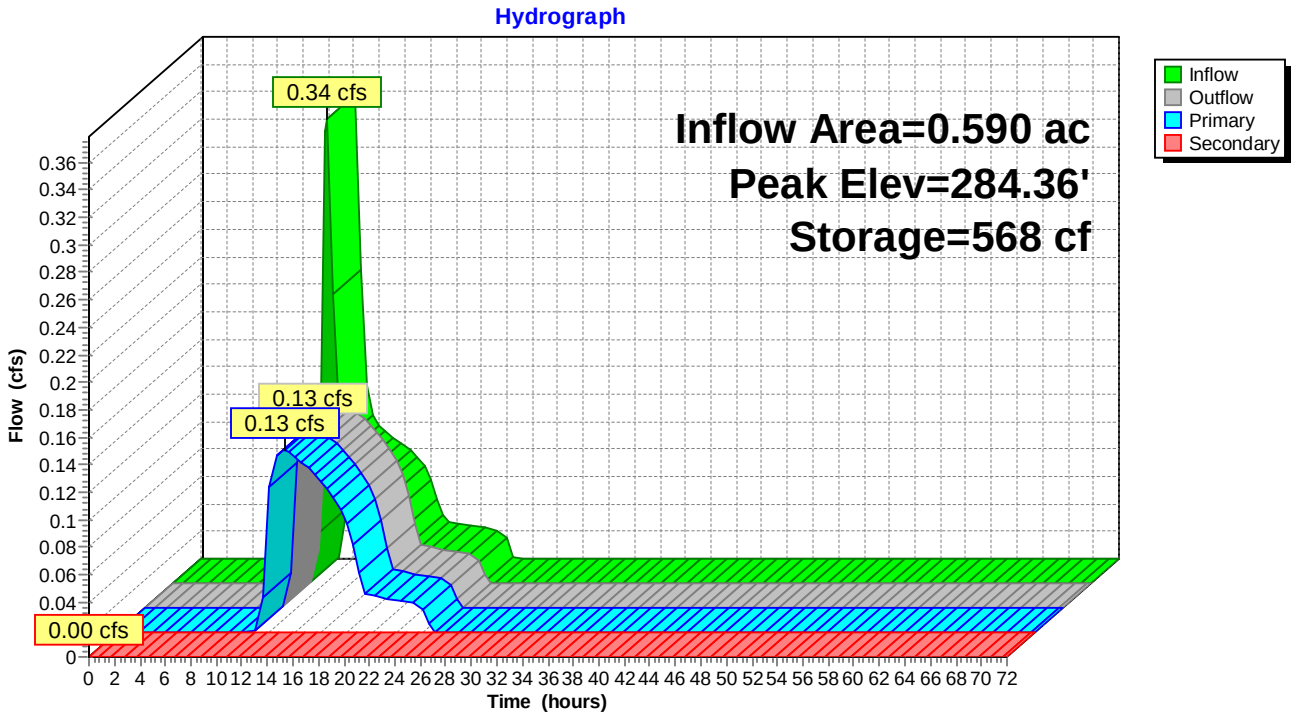
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.13 cfs @ 13.10 hrs HW=284.36' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.13 cfs of 1.23 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 3.89 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 1.59" for 10-YR event
Inflow = 0.25 cfs @ 12.09 hrs, Volume= 0.034 af
Outflow = 0.06 cfs @ 15.32 hrs, Volume= 0.034 af, Atten= 76%, Lag= 193.7 min
Primary = 0.06 cfs @ 15.32 hrs, Volume= 0.034 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.44' @ 13.41 hrs Surf.Area= 1,944 sf Storage= 585 cf

Plug-Flow detention time= 95.3 min calculated for 0.034 af (99% of inflow)
Center-of-Mass det. time= 95.0 min (961.3 - 866.3)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

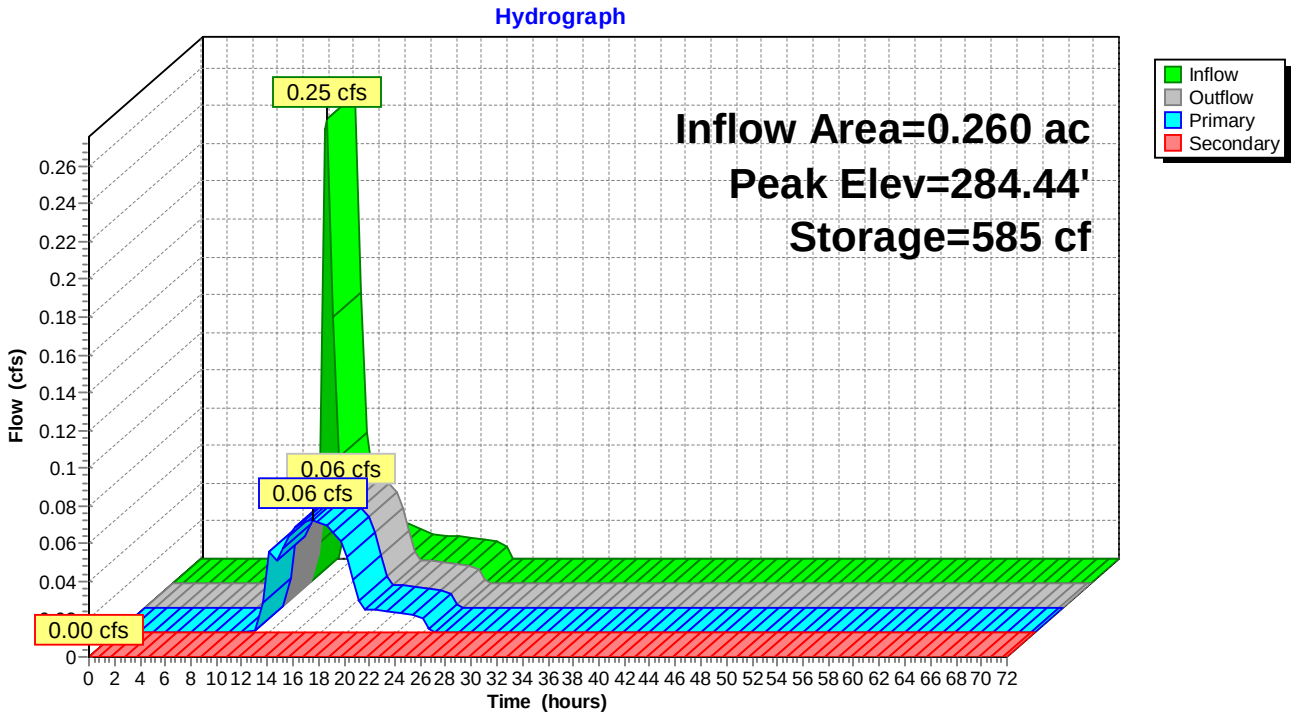
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.06 cfs @ 15.32 hrs HW=284.34' TW=284.21' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.06 cfs of 0.24 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 1.74 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

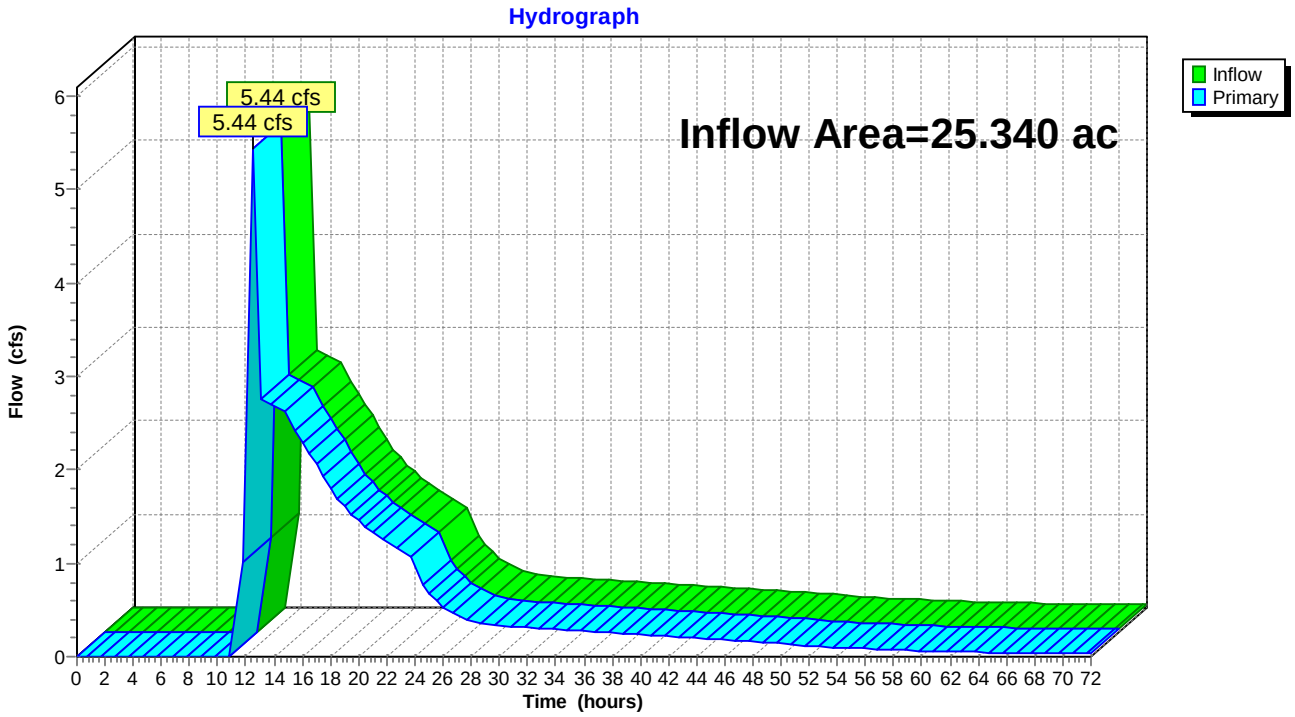
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 1.32" for 10-YR event
Inflow = 5.44 cfs @ 12.53 hrs, Volume= 2.784 af
Primary = 5.44 cfs @ 12.53 hrs, Volume= 2.784 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

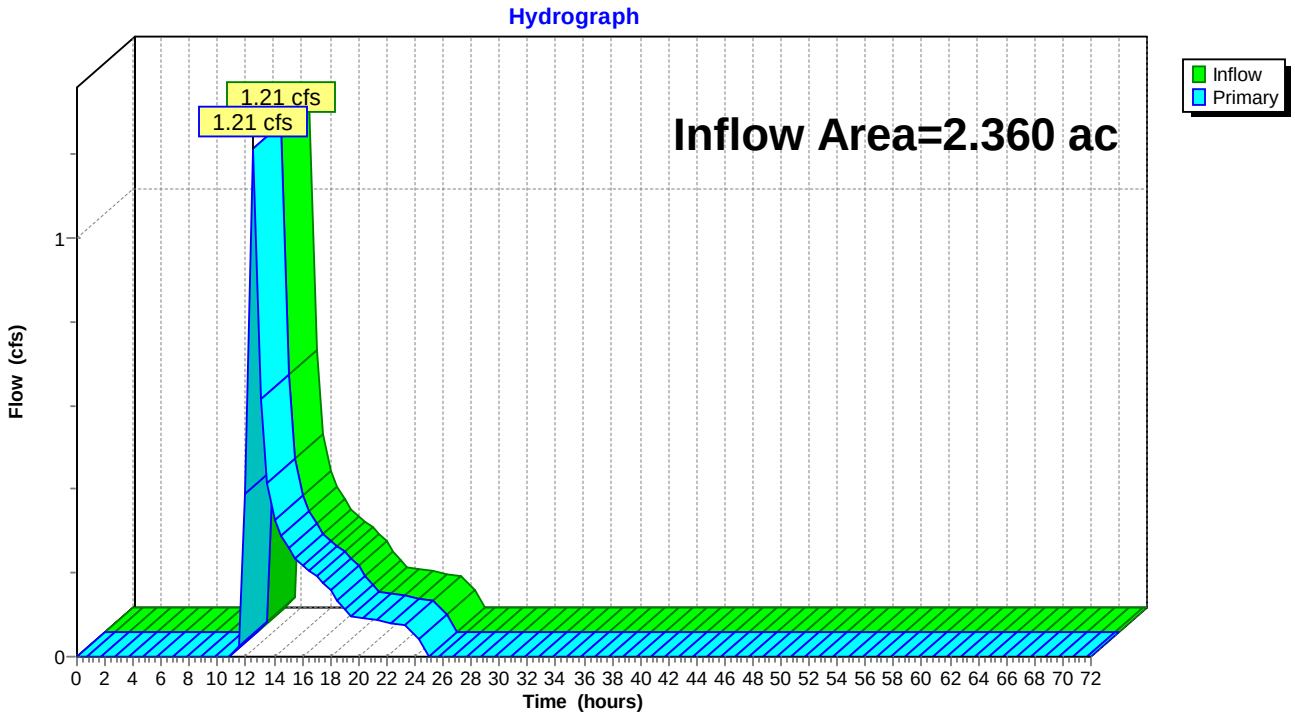


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 1.22" for 10-YR event
Inflow = 1.21 cfs @ 12.54 hrs, Volume= 0.240 af
Primary = 1.21 cfs @ 12.54 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

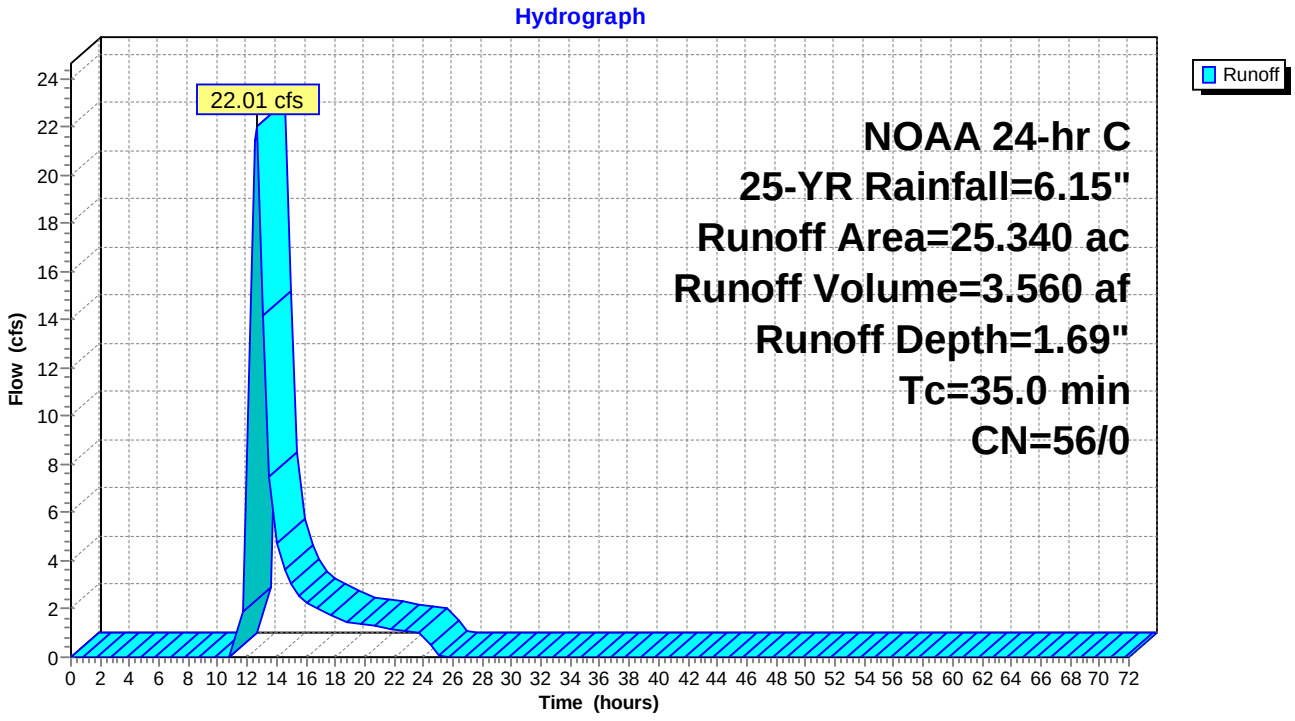
Runoff = 22.01 cfs @ 12.61 hrs, Volume= 3.560 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

Area (ac)	CN	Description
1.290	70	Woods, Good, HSG C
4.690	58	Meadow, non-grazed, HSG B
19.360	55	Woods, Good, HSG B
25.340	56	Weighted Average
25.340	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

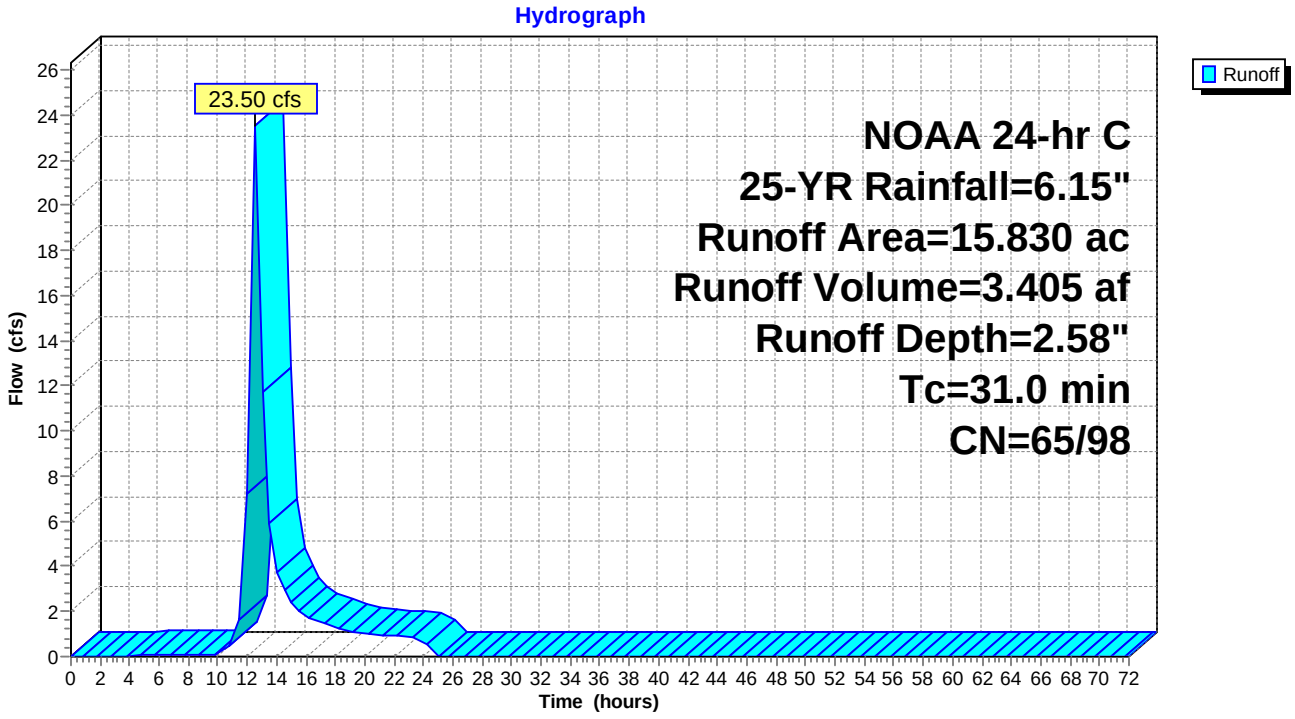
Runoff = 23.50 cfs @ 12.54 hrs, Volume= 3.405 af, Depth= 2.58"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

Area (ac)	CN	Description
0.390	89	Gravel roads, HSG C
0.550	98	Unconnected pavement, HSG B
4.690	85	Gravel roads, HSG B
7.240	58	Meadow, non-grazed, HSG B
2.960	48	Brush, Good, HSG B
15.830	66	Weighted Average
15.280	65	96.53% Pervious Area
0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

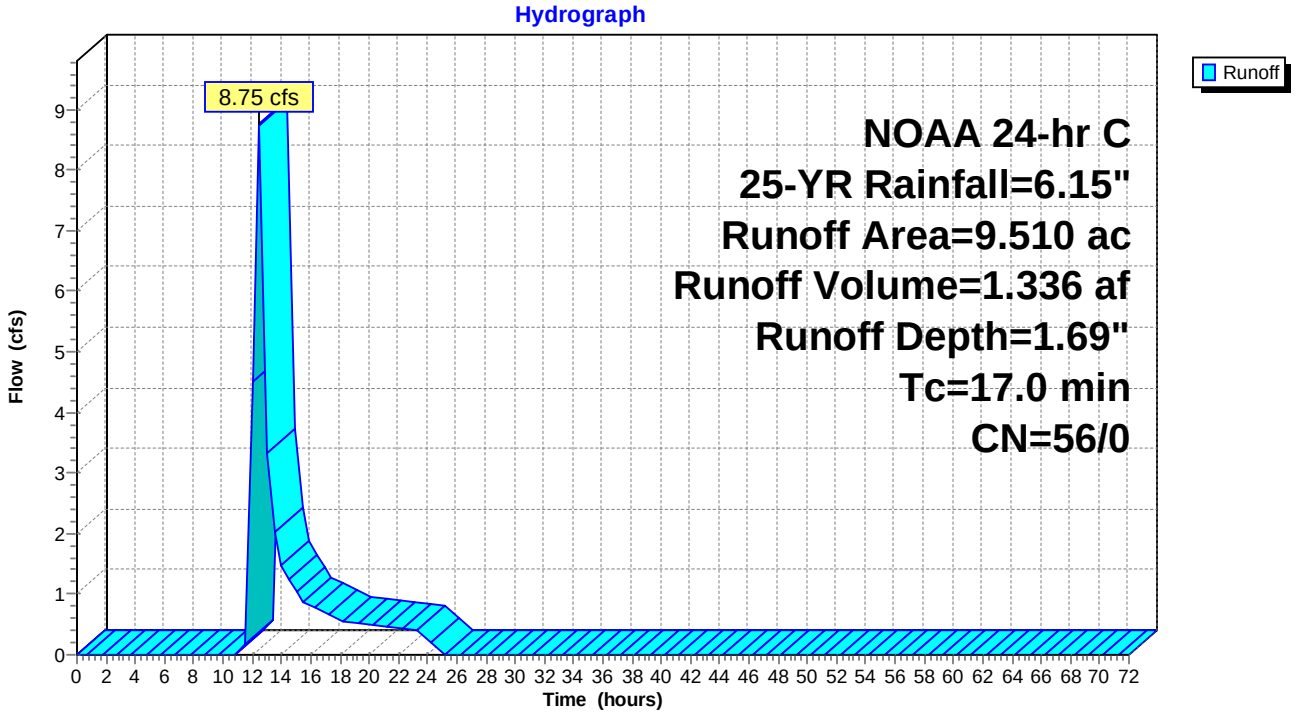
Runoff = 8.75 cfs @ 12.47 hrs, Volume= 1.336 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

Area (ac)	CN	Description
5.300	58	Meadow, non-grazed, HSG B
0.150	85	Gravel roads, HSG B
3.160	48	Brush, Good, HSG B
0.900	65	Brush, Good, HSG C
9.510	56	Weighted Average
9.510	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

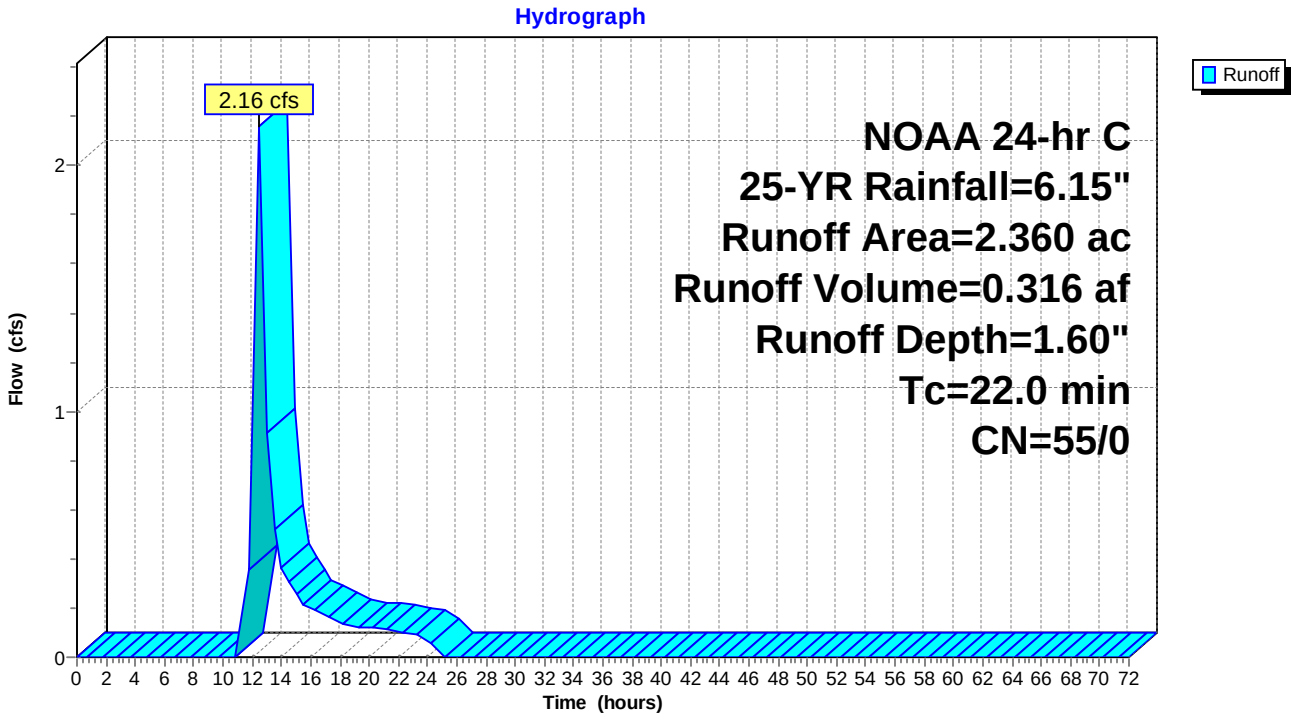
Runoff = 2.16 cfs @ 12.52 hrs, Volume= 0.316 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

Area (ac)	CN	Description
0.060	58	Meadow, non-grazed, HSG B
1.060	55	Woods, Good, HSG B
1.240	55	Woods, Good, HSG B
2.360	55	Weighted Average
2.360	55	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

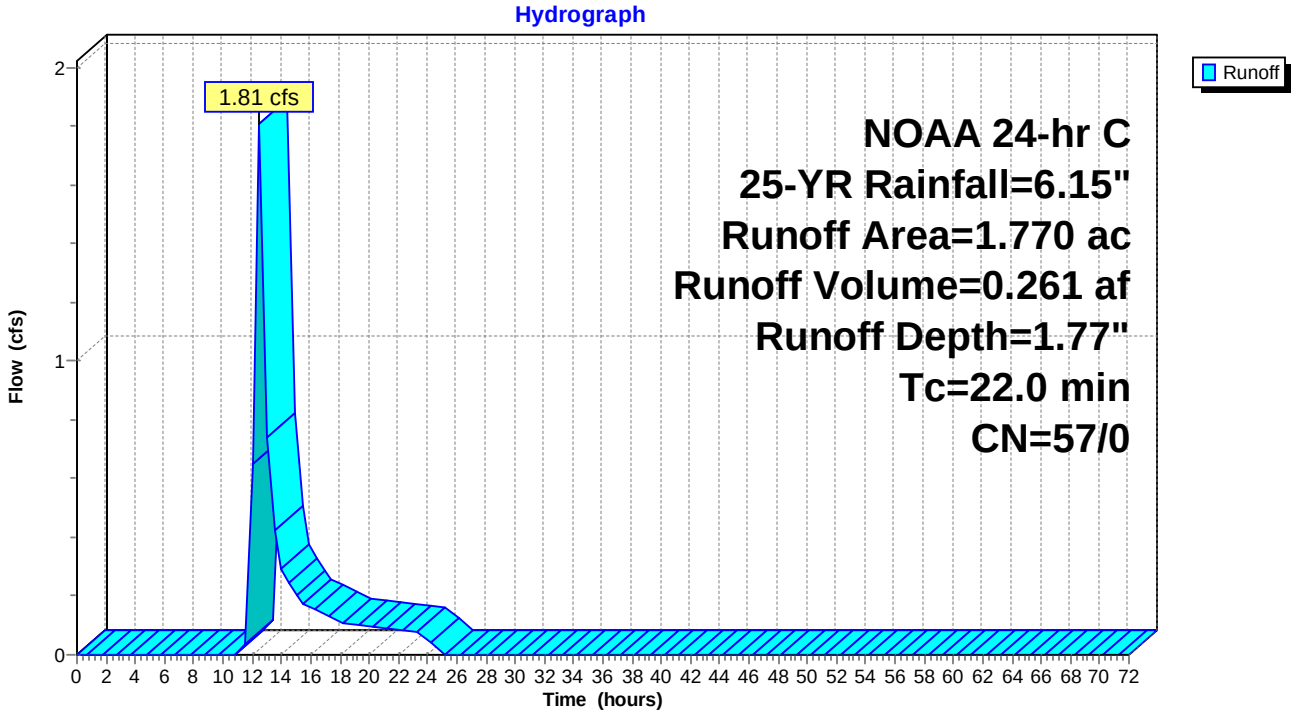
Runoff = 1.81 cfs @ 12.51 hrs, Volume= 0.261 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

Area (ac)	CN	Description
0.380	48	Brush, Good, HSG B
0.150	85	Gravel roads, HSG B
0.940	48	Brush, Good, HSG B
0.300	85	Gravel roads, HSG B
1.770	57	Weighted Average
1.770	57	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

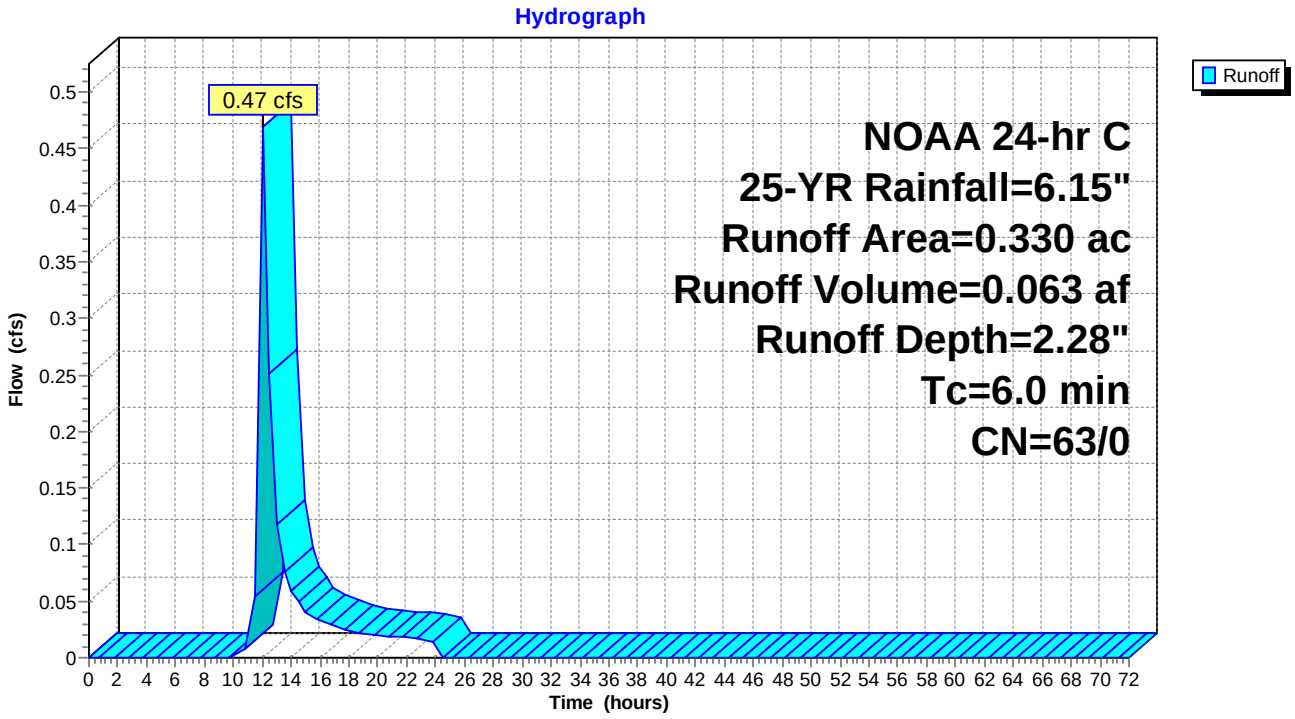
Runoff = 0.47 cfs @ 12.08 hrs, Volume= 0.063 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

Area (ac)	CN	Description
0.270	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.330	63	Weighted Average
0.330	63	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

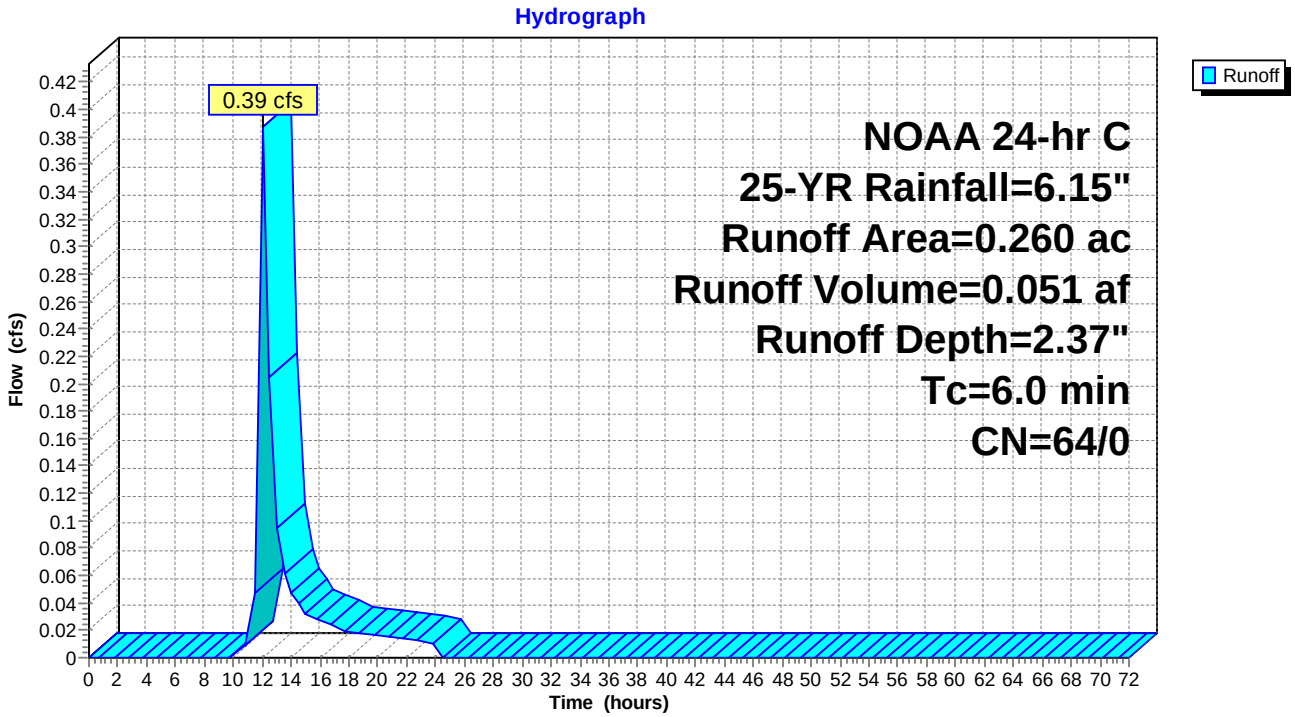
Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.051 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 25-YR Rainfall=6.15"

Area (ac)	CN	Description
0.200	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.260	64	Weighted Average
0.260	64	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 2.58" for 25-YR event
Inflow = 23.50 cfs @ 12.54 hrs, Volume= 3.405 af
Outflow = 4.31 cfs @ 13.94 hrs, Volume= 3.024 af, Atten= 82%, Lag= 84.1 min
Primary = 4.31 cfs @ 13.94 hrs, Volume= 3.024 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 264.35' @ 13.94 hrs Surf.Area= 37,471 sf Storage= 79,055 cf

Plug-Flow detention time= 542.6 min calculated for 3.024 af (89% of inflow)
Center-of-Mass det. time= 488.5 min (1,355.5 - 867.1)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

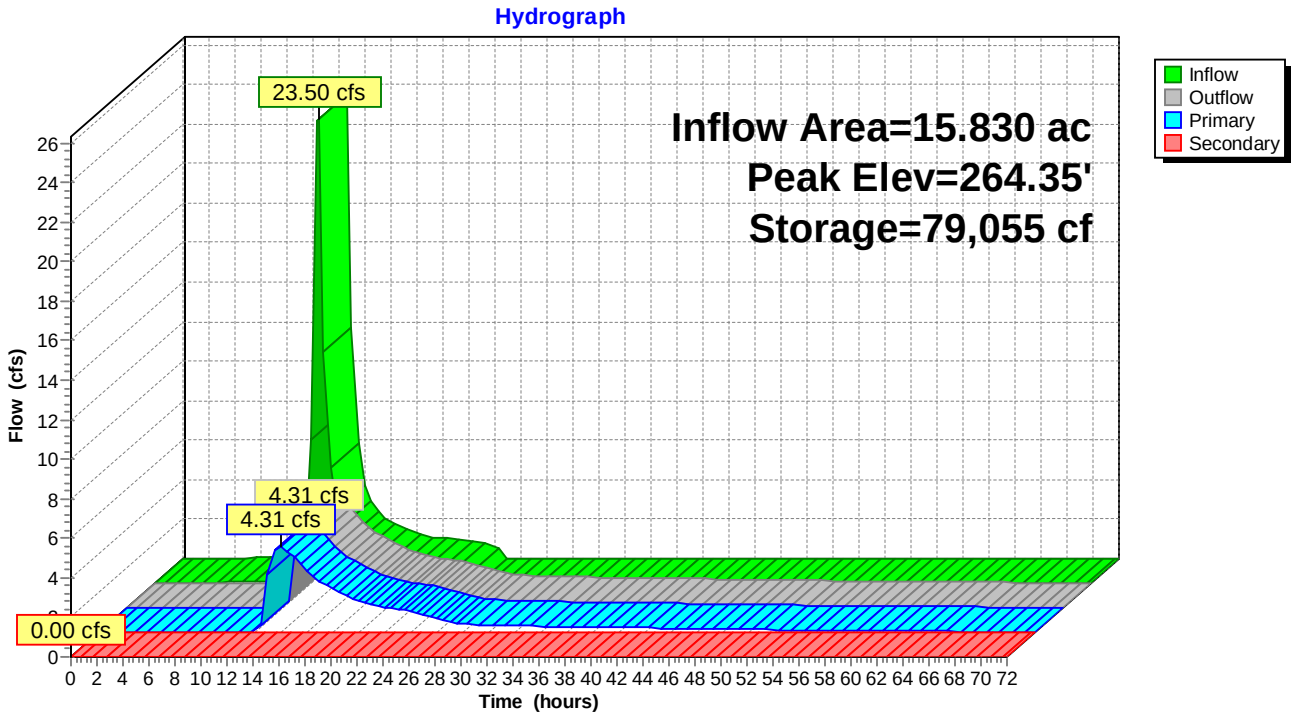
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.29 cfs @ 13.94 hrs HW=264.35' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 4.29 cfs of 15.46 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.56 cfs @ 6.39 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 3.73 cfs @ 4.35 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 2.32" for 25-YR event
Inflow = 0.51 cfs @ 12.08 hrs, Volume= 0.114 af
Outflow = 0.15 cfs @ 13.20 hrs, Volume= 0.114 af, Atten= 70%, Lag= 67.0 min
Primary = 0.15 cfs @ 13.20 hrs, Volume= 0.114 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.57' @ 13.20 hrs Surf.Area= 2,466 sf Storage= 1,007 cf

Plug-Flow detention time= 64.9 min calculated for 0.113 af (99% of inflow)
Center-of-Mass det. time= 64.8 min (995.8 - 931.0)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

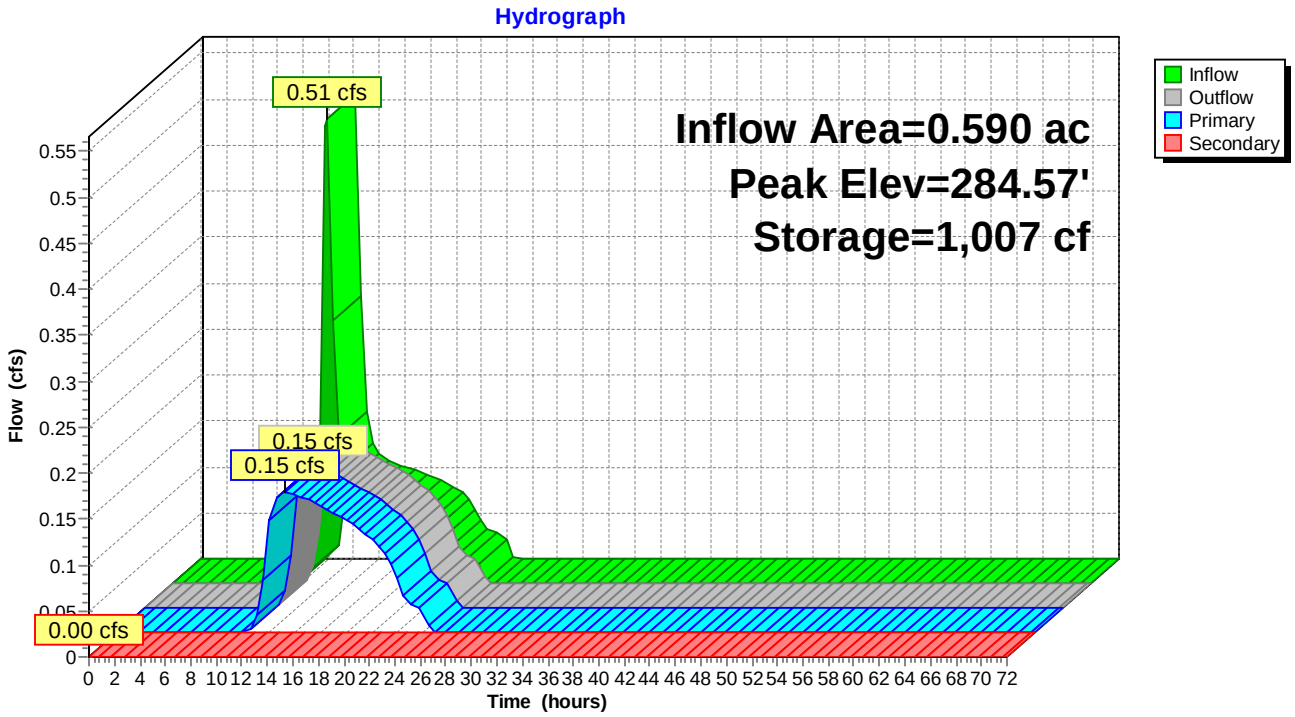
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.15 cfs @ 13.20 hrs HW=284.56' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 0.15 cfs of 1.28 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 4.45 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
↑**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 2.37" for 25-YR event
Inflow = 0.39 cfs @ 12.08 hrs, Volume= 0.051 af
Outflow = 0.07 cfs @ 16.81 hrs, Volume= 0.051 af, Atten= 83%, Lag= 284.3 min
Primary = 0.07 cfs @ 16.81 hrs, Volume= 0.051 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.65' @ 13.78 hrs Surf.Area= 2,668 sf Storage= 1,070 cf

Plug-Flow detention time= 169.1 min calculated for 0.051 af (99% of inflow)
Center-of-Mass det. time= 168.3 min (1,022.2 - 853.9)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

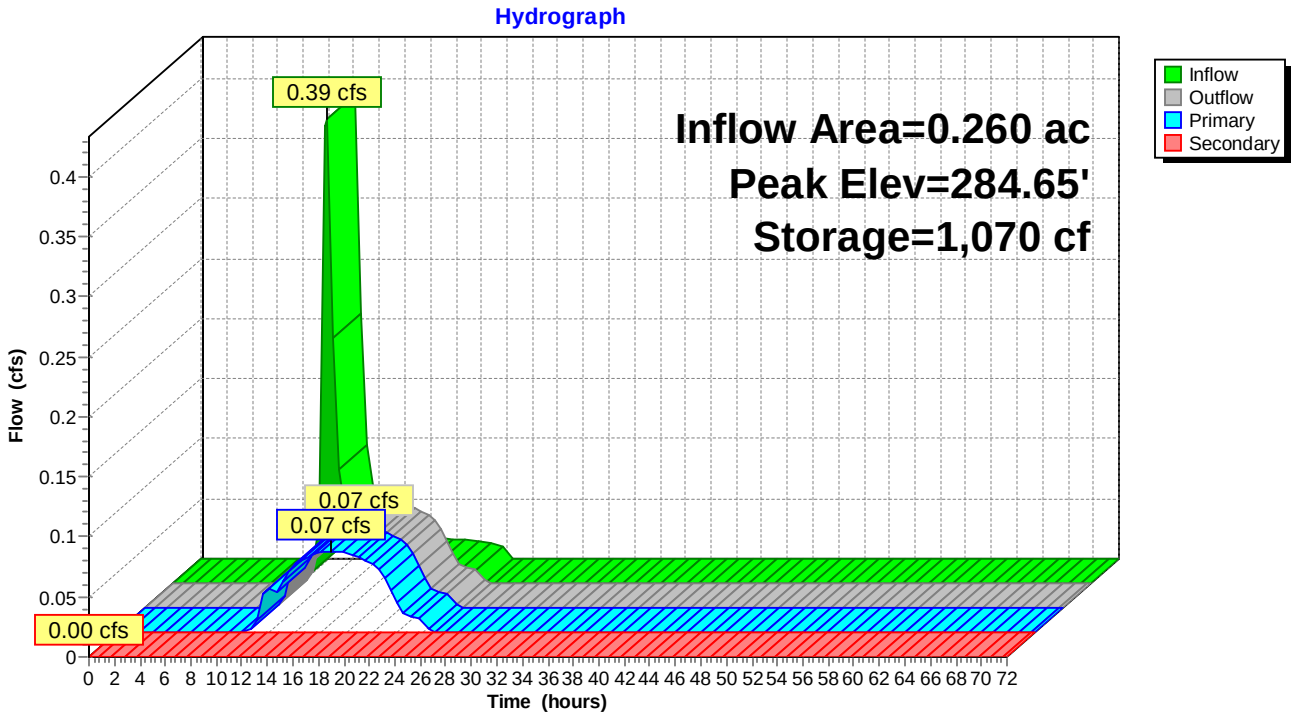
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.07 cfs @ 16.81 hrs HW=284.52' TW=284.35' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.07 cfs of 0.27 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.98 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

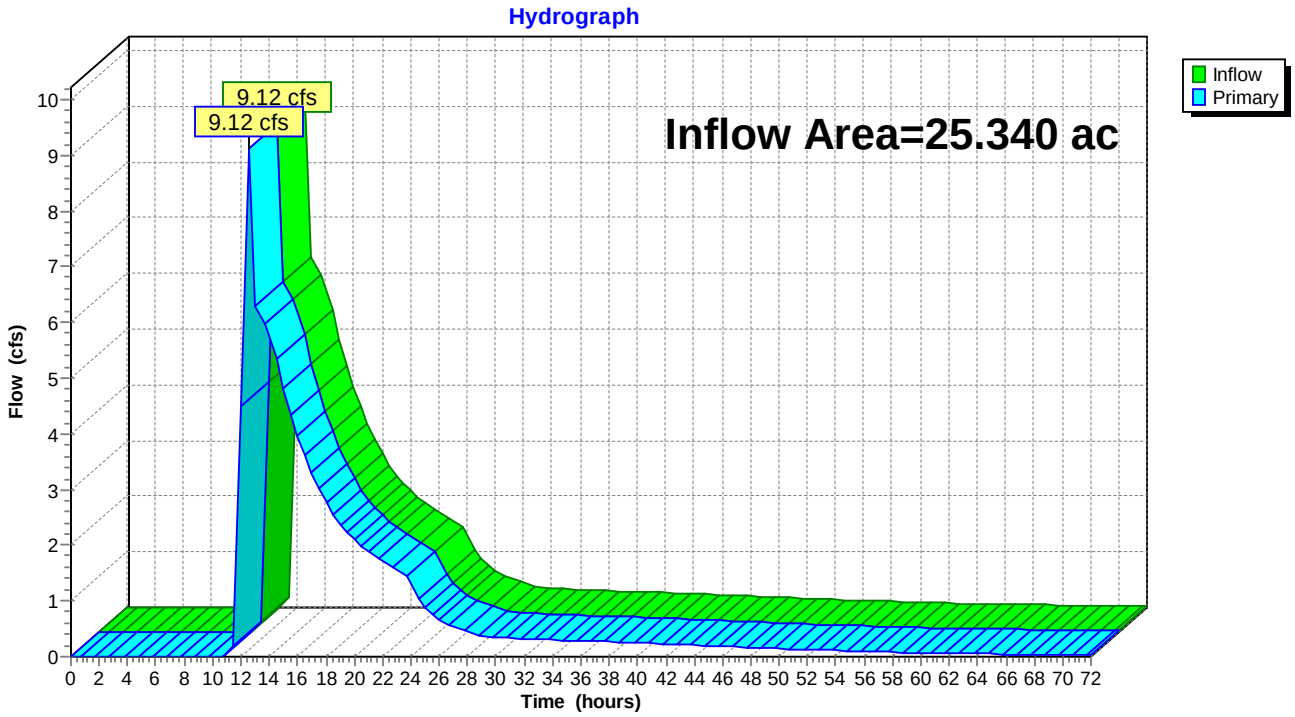
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 2.06" for 25-YR event
Inflow = 9.12 cfs @ 12.56 hrs, Volume= 4.360 af
Primary = 9.12 cfs @ 12.56 hrs, Volume= 4.360 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

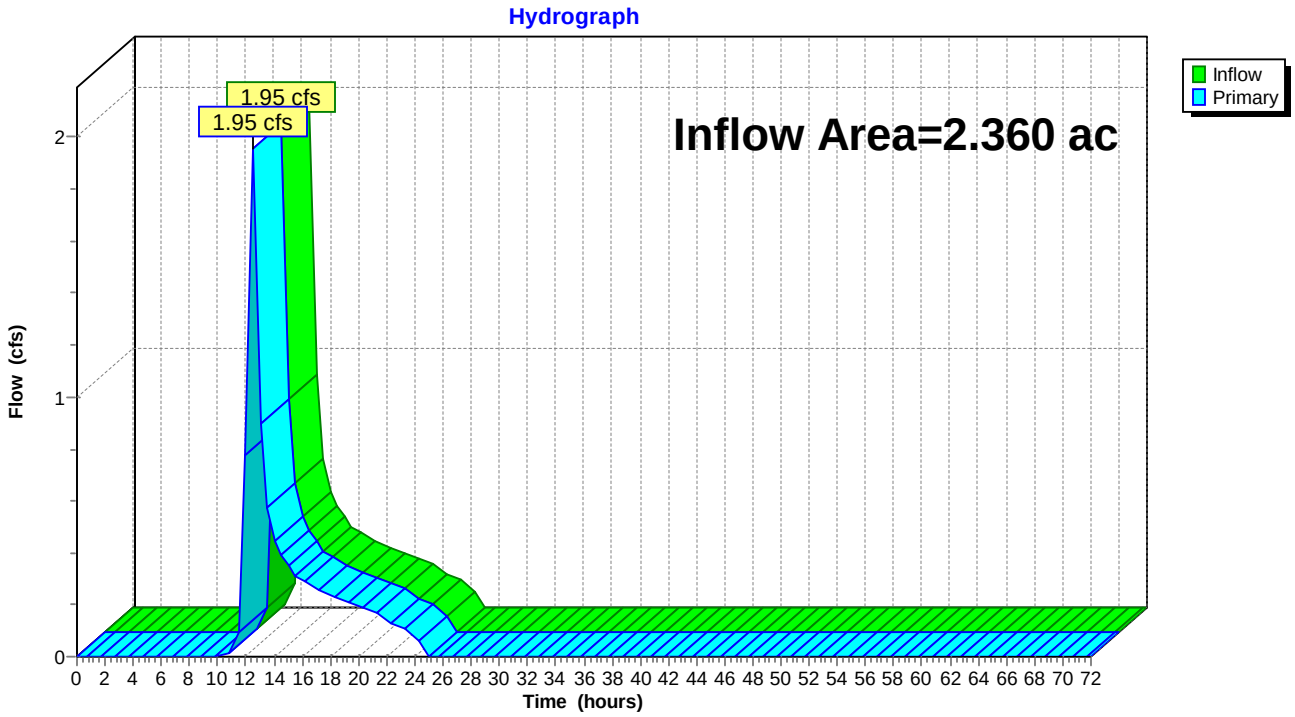


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 1.91" for 25-YR event
Inflow = 1.95 cfs @ 12.51 hrs, Volume= 0.375 af
Primary = 1.95 cfs @ 12.51 hrs, Volume= 0.375 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

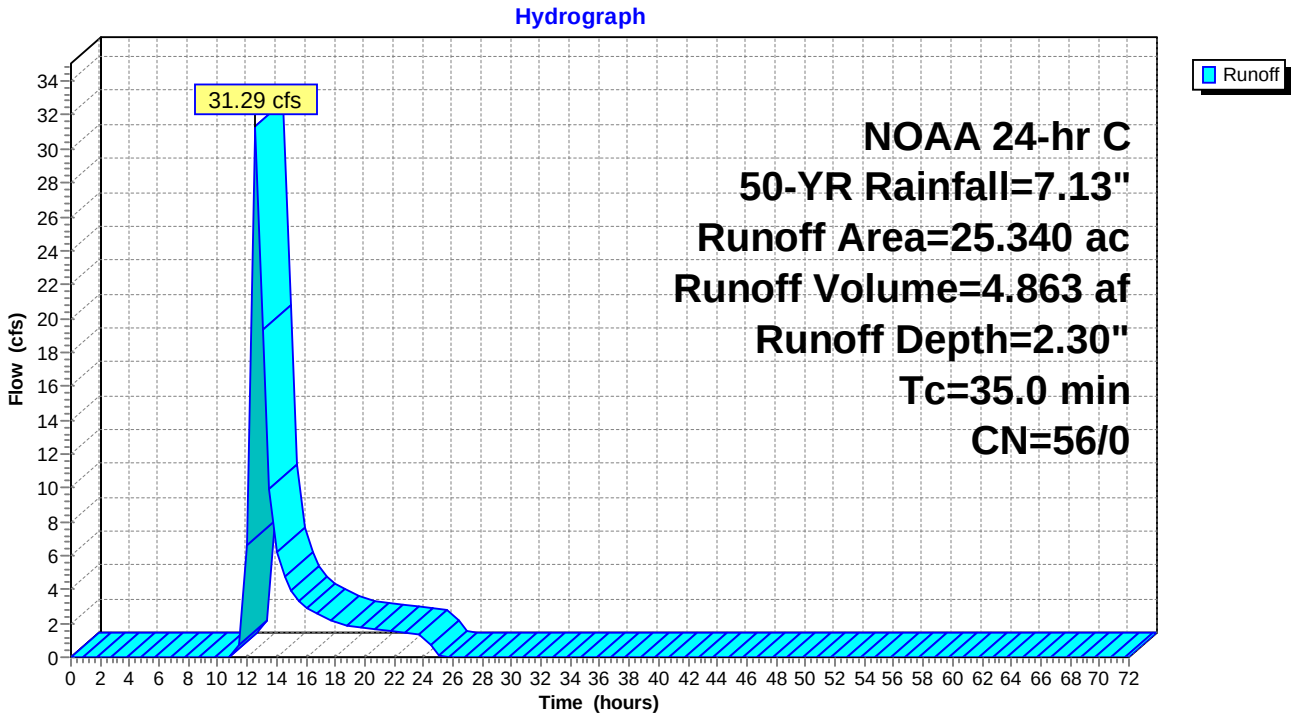
Runoff = 31.29 cfs @ 12.59 hrs, Volume= 4.863 af, Depth= 2.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

Area (ac)	CN	Description
1.290	70	Woods, Good, HSG C
4.690	58	Meadow, non-grazed, HSG B
19.360	55	Woods, Good, HSG B
25.340	56	Weighted Average
25.340	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

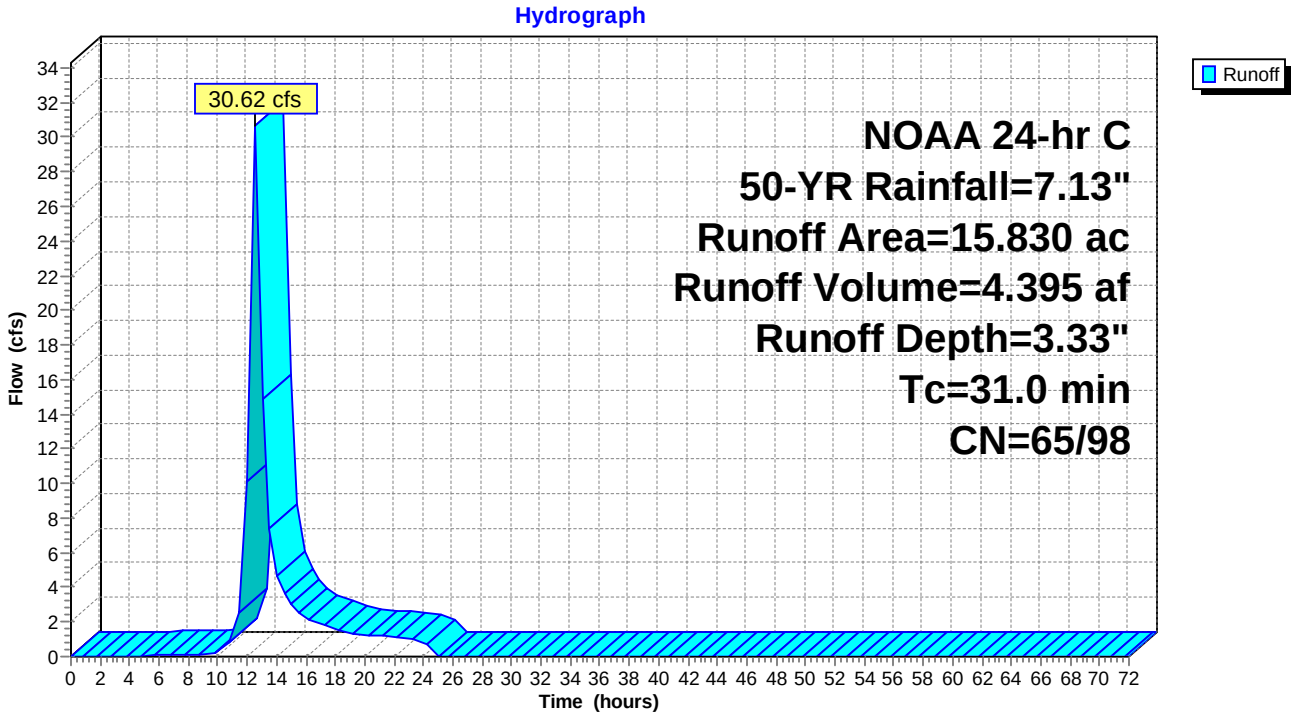
Runoff = 30.62 cfs @ 12.53 hrs, Volume= 4.395 af, Depth= 3.33"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

Area (ac)	CN	Description
0.390	89	Gravel roads, HSG C
0.550	98	Unconnected pavement, HSG B
4.690	85	Gravel roads, HSG B
7.240	58	Meadow, non-grazed, HSG B
2.960	48	Brush, Good, HSG B
15.830	66	Weighted Average
15.280	65	96.53% Pervious Area
0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

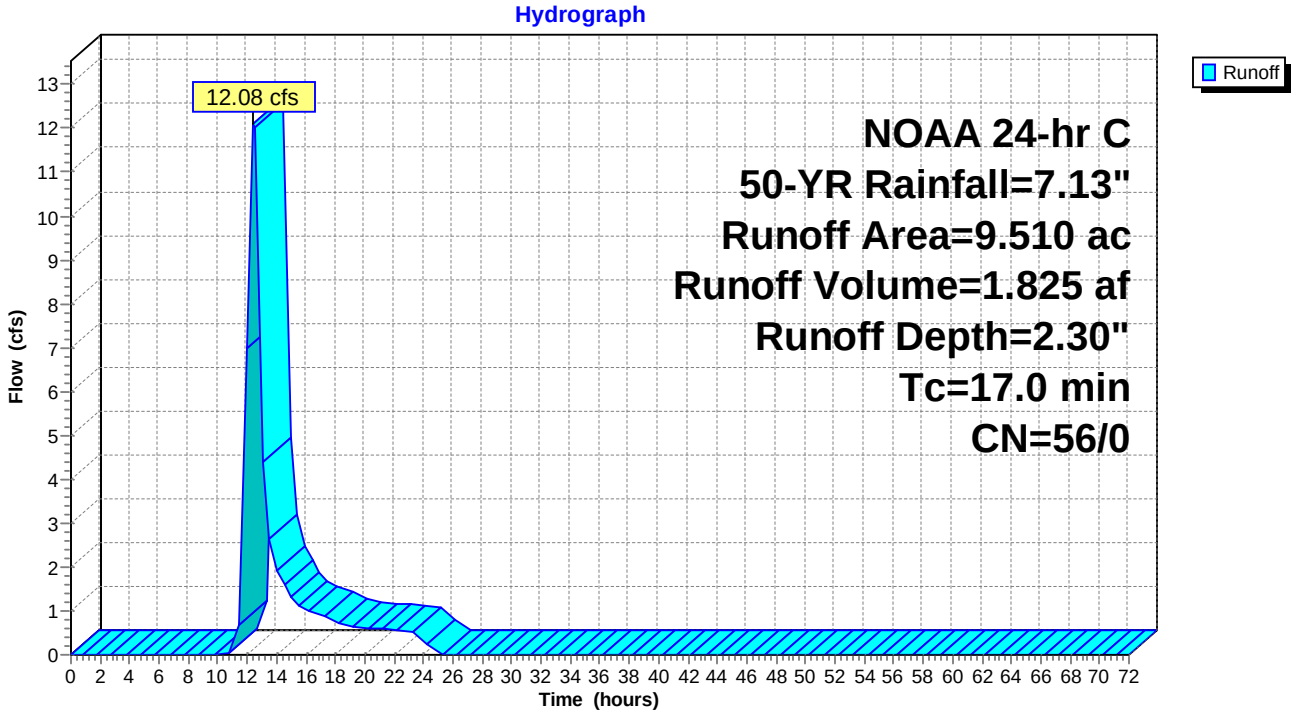
Runoff = 12.08 cfs @ 12.45 hrs, Volume= 1.825 af, Depth= 2.30"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

Area (ac)	CN	Description
5.300	58	Meadow, non-grazed, HSG B
0.150	85	Gravel roads, HSG B
3.160	48	Brush, Good, HSG B
0.900	65	Brush, Good, HSG C
9.510	56	Weighted Average
9.510	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

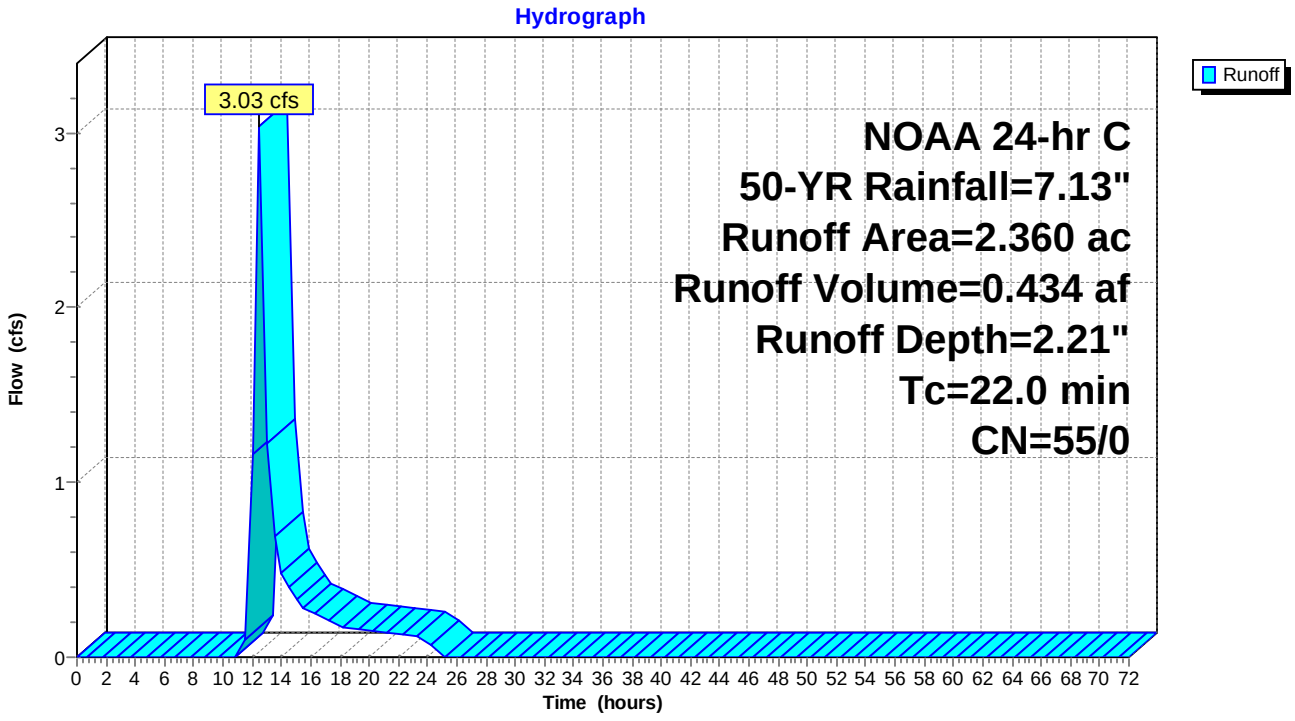
Runoff = 3.03 cfs @ 12.50 hrs, Volume= 0.434 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

Area (ac)	CN	Description
0.060	58	Meadow, non-grazed, HSG B
1.060	55	Woods, Good, HSG B
1.240	55	Woods, Good, HSG B
2.360	55	Weighted Average
2.360	55	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

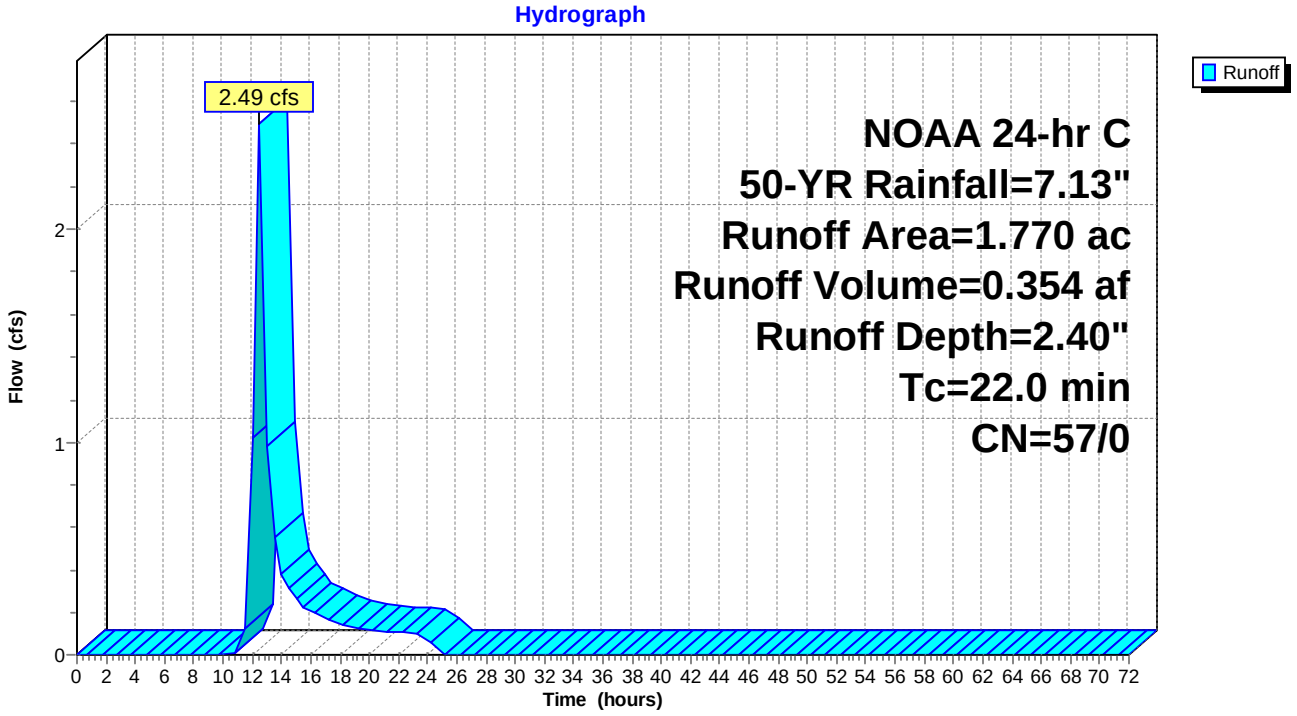
Runoff = 2.49 cfs @ 12.50 hrs, Volume= 0.354 af, Depth= 2.40"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

Area (ac)	CN	Description
0.380	48	Brush, Good, HSG B
0.150	85	Gravel roads, HSG B
0.940	48	Brush, Good, HSG B
0.300	85	Gravel roads, HSG B
1.770	57	Weighted Average
1.770	57	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

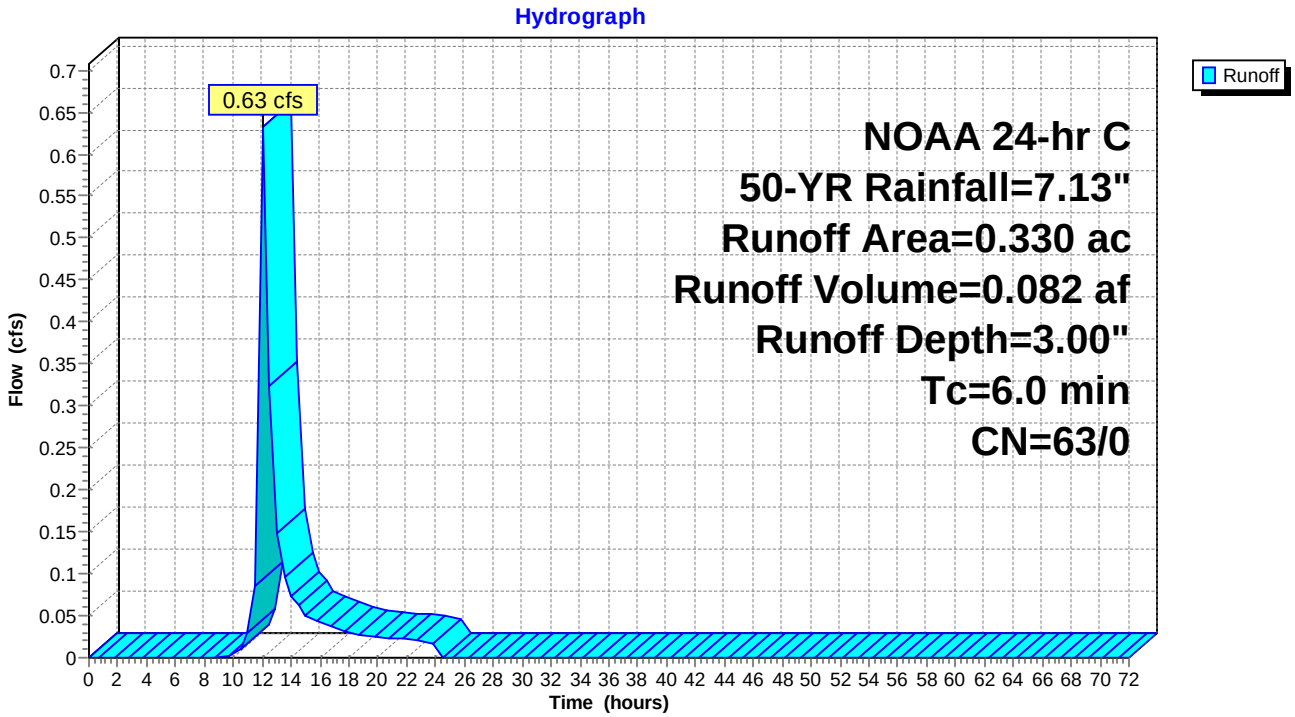
Runoff = 0.63 cfs @ 12.07 hrs, Volume= 0.082 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

Area (ac)	CN	Description
0.270	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.330	63	Weighted Average
0.330	63	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

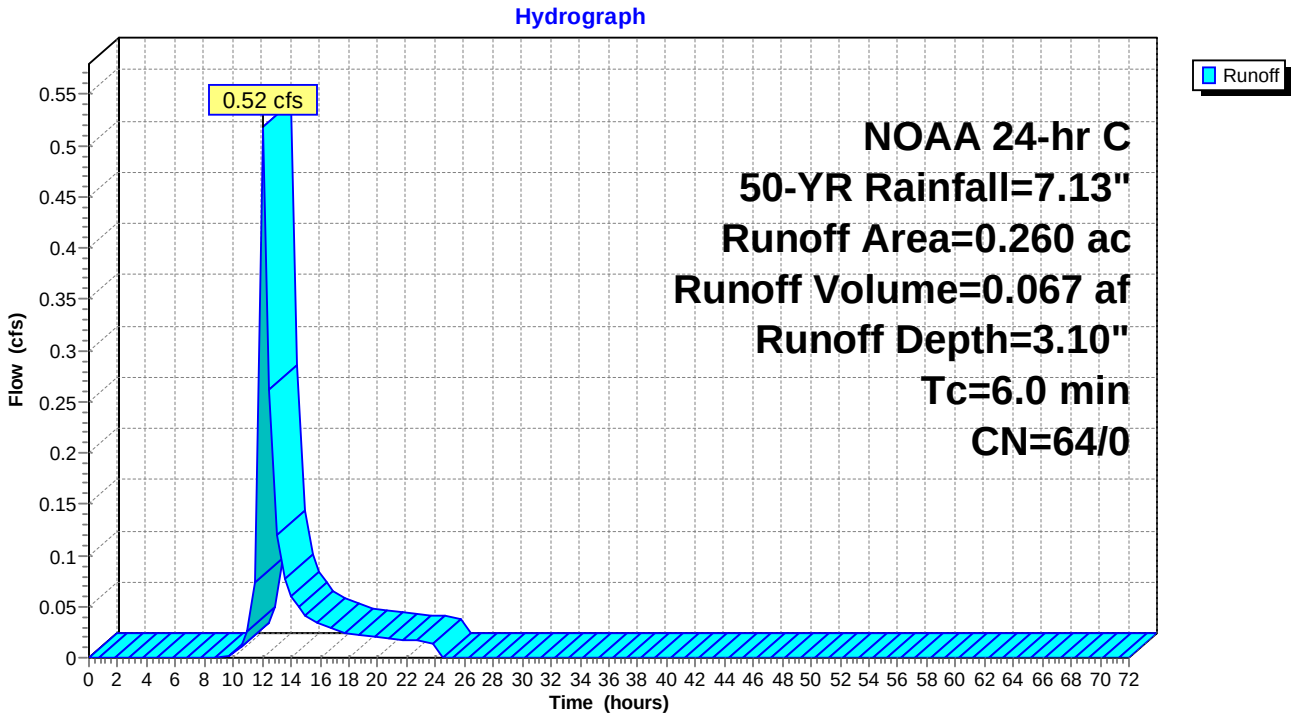
Runoff = 0.52 cfs @ 12.07 hrs, Volume= 0.067 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 50-YR Rainfall=7.13"

Area (ac)	CN	Description
0.200	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.260	64	Weighted Average
0.260	64	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 3.33" for 50-YR event
Inflow = 30.62 cfs @ 12.53 hrs, Volume= 4.395 af
Outflow = 6.92 cfs @ 13.68 hrs, Volume= 4.013 af, Atten= 77%, Lag= 69.1 min
Primary = 6.92 cfs @ 13.68 hrs, Volume= 4.013 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 264.86' @ 13.68 hrs Surf.Area= 39,728 sf Storage= 98,409 cf

Plug-Flow detention time= 451.5 min calculated for 4.013 af (91% of inflow)
Center-of-Mass det. time= 407.6 min (1,268.1 - 860.5)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

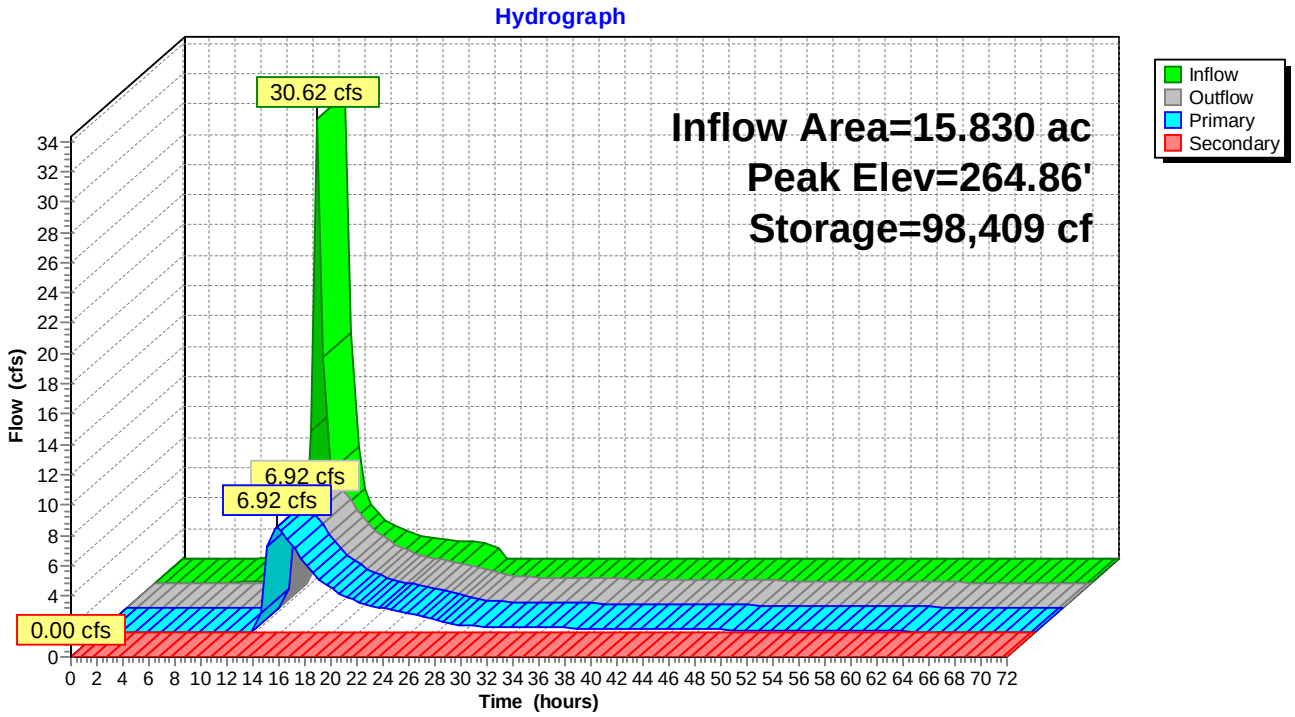
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=6.76 cfs @ 13.68 hrs HW=264.82' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 6.76 cfs of 16.53 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.63 cfs @ 7.20 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 6.13 cfs @ 5.68 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 3.04" for 50-YR event
Inflow = 0.66 cfs @ 12.07 hrs, Volume= 0.150 af
Outflow = 0.17 cfs @ 13.00 hrs, Volume= 0.150 af, Atten= 75%, Lag= 55.9 min
Primary = 0.17 cfs @ 13.00 hrs, Volume= 0.150 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.73' @ 13.25 hrs Surf.Area= 2,987 sf Storage= 1,448 cf

Plug-Flow detention time= 87.7 min calculated for 0.149 af (99% of inflow)
Center-of-Mass det. time= 87.8 min (1,042.4 - 954.7)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

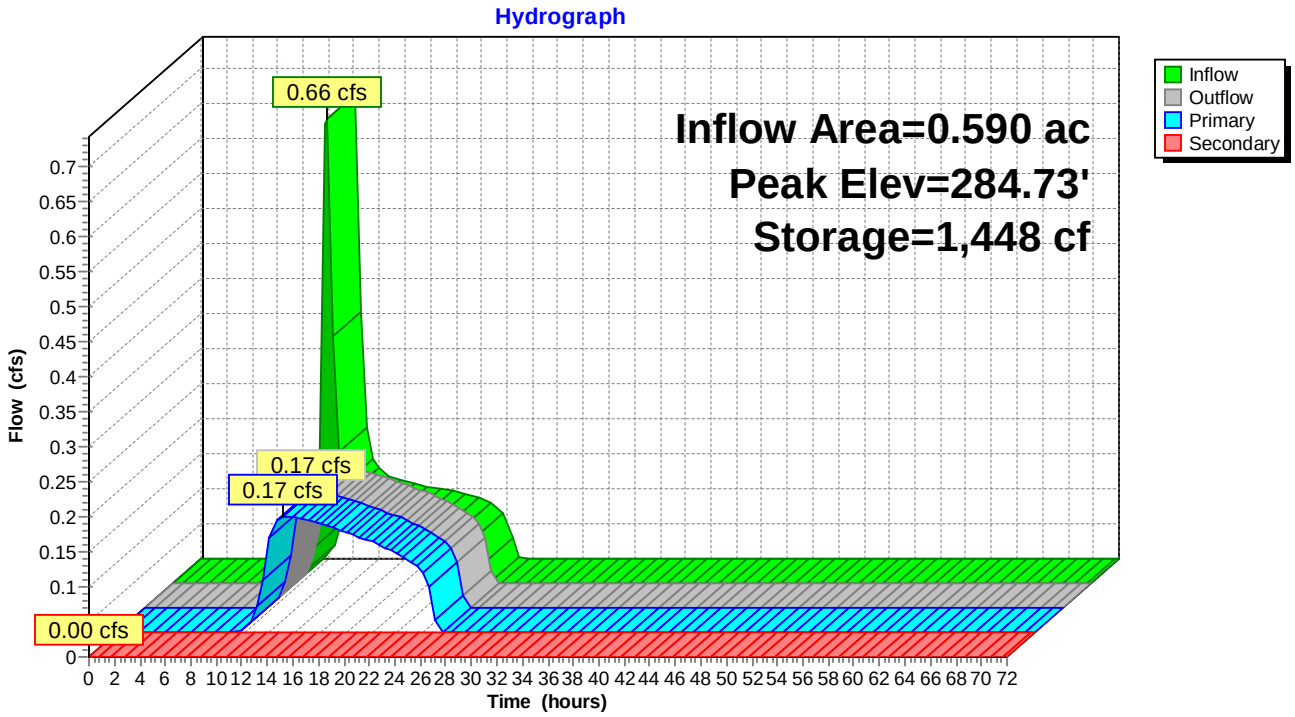
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.17 cfs @ 13.00 hrs HW=284.72' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.17 cfs of 1.33 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.17 cfs @ 4.85 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 3.10" for 50-YR event
Inflow = 0.52 cfs @ 12.07 hrs, Volume= 0.067 af
Outflow = 0.07 cfs @ 18.27 hrs, Volume= 0.067 af, Atten= 86%, Lag= 372.4 min
Primary = 0.07 cfs @ 18.27 hrs, Volume= 0.067 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.82' @ 14.17 hrs Surf.Area= 3,239 sf Storage= 1,560 cf

Plug-Flow detention time= 240.8 min calculated for 0.067 af (99% of inflow)
Center-of-Mass det. time= 239.6 min (1,085.4 - 845.8)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

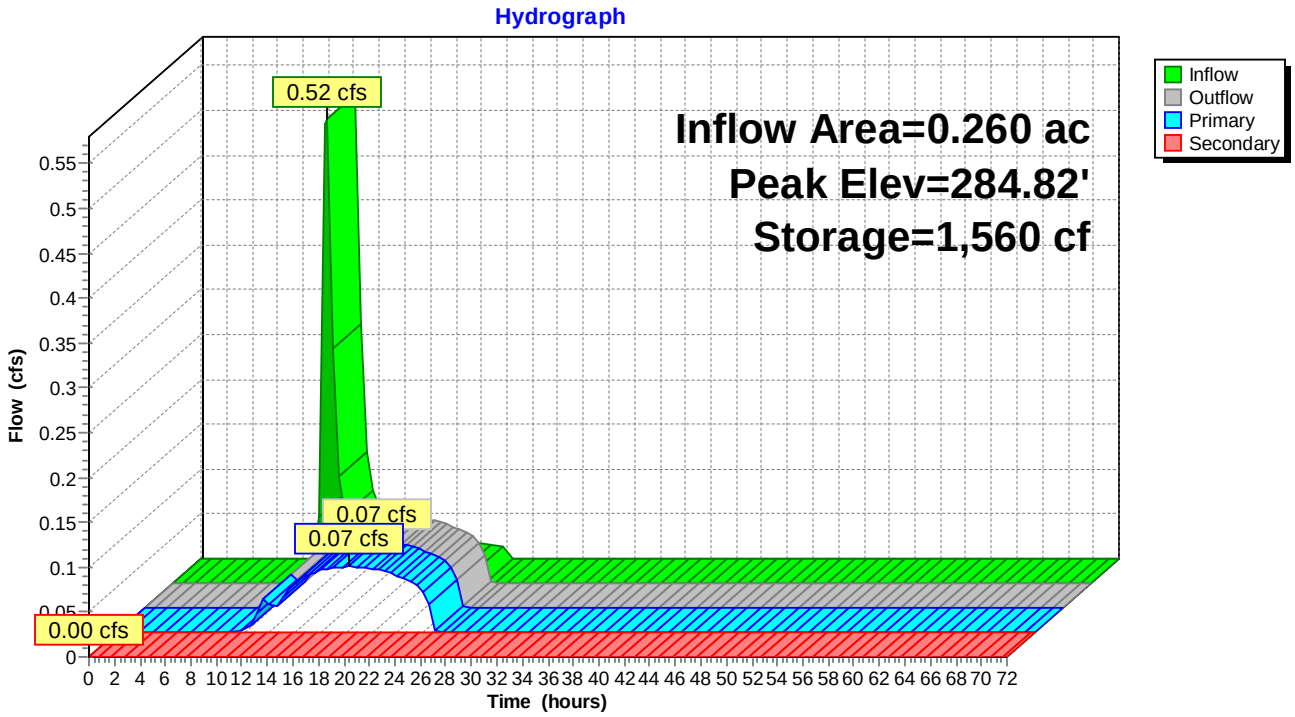
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.07 cfs @ 18.27 hrs HW=284.64' TW=284.44' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.07 cfs of 0.29 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 2.15 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

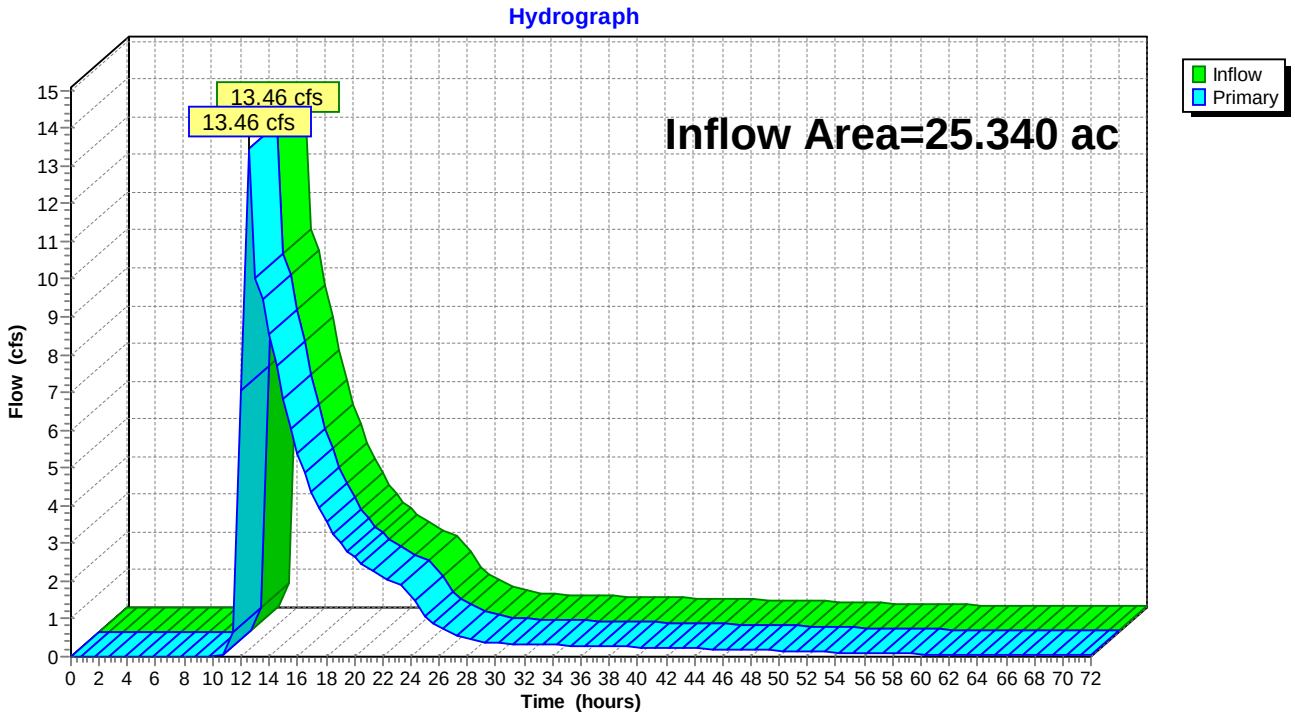
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 2.76" for 50-YR event
Inflow = 13.46 cfs @ 12.58 hrs, Volume= 5.838 af
Primary = 13.46 cfs @ 12.58 hrs, Volume= 5.838 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

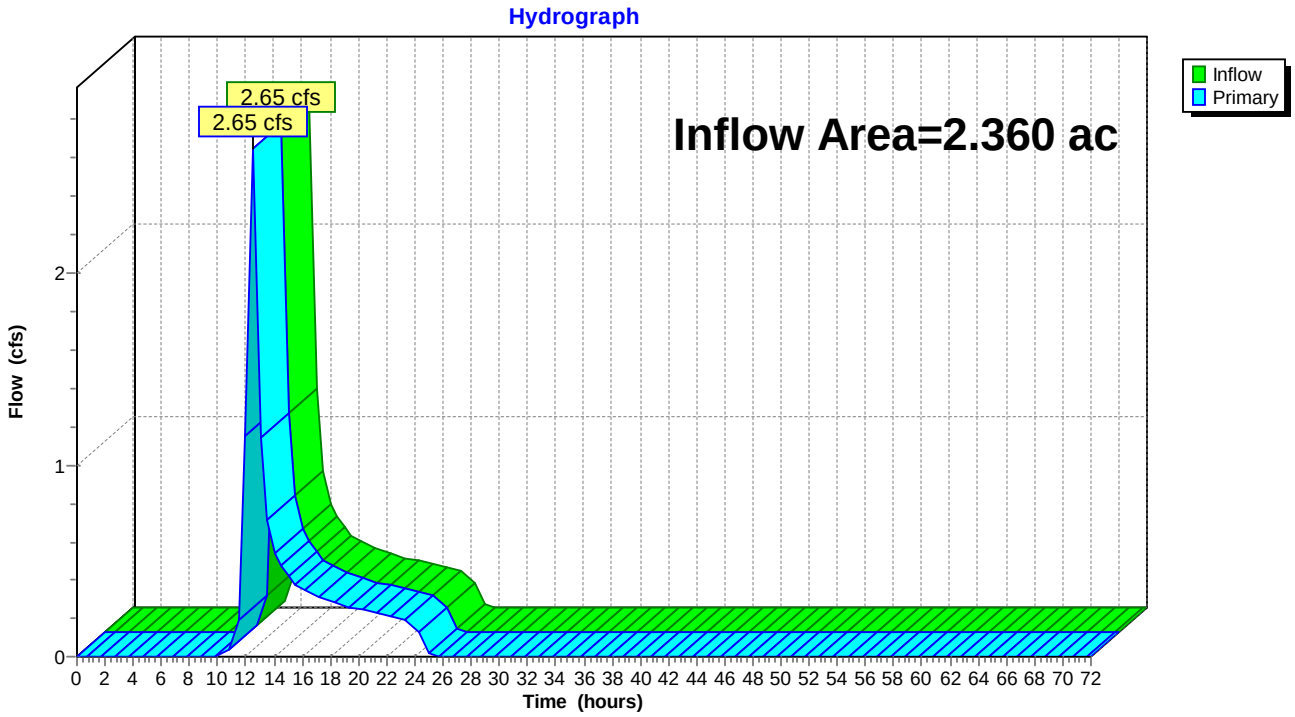


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 2.56" for 50-YR event
Inflow = 2.65 cfs @ 12.50 hrs, Volume= 0.504 af
Primary = 2.65 cfs @ 12.50 hrs, Volume= 0.504 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



Summary for Subcatchment 1: PRE - POI #1

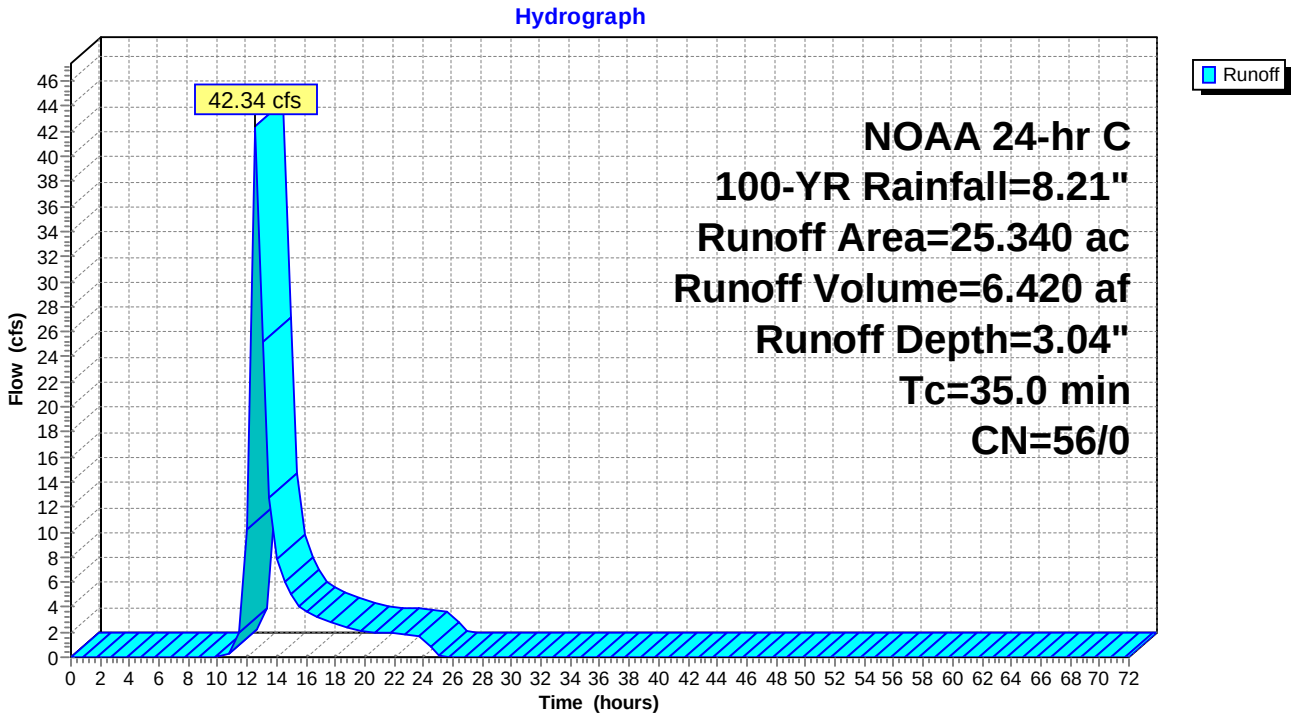
Runoff = 42.34 cfs @ 12.58 hrs, Volume= 6.420 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

Area (ac)	CN	Description
1.290	70	Woods, Good, HSG C
4.690	58	Meadow, non-grazed, HSG B
19.360	55	Woods, Good, HSG B
25.340	56	Weighted Average
25.340	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.0					**Direct Entry, PRE - POI #1**

Subcatchment 1: PRE - POI #1



Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

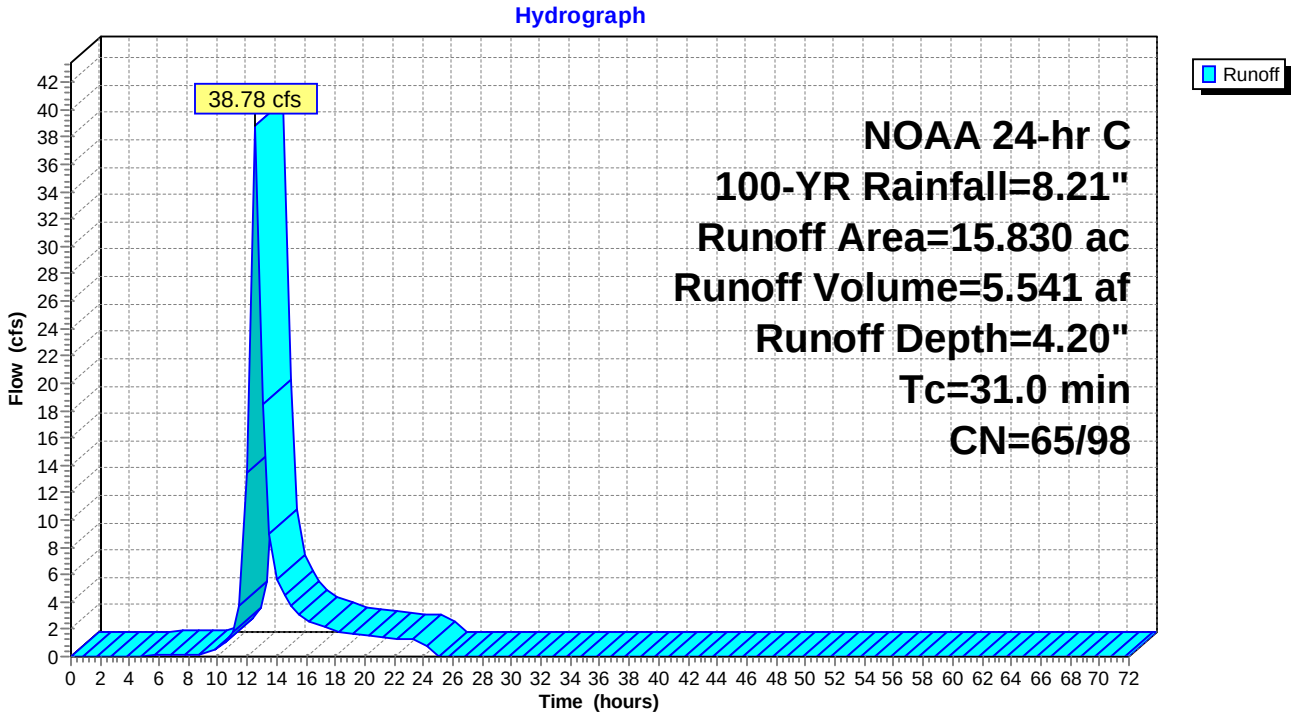
Runoff = 38.78 cfs @ 12.53 hrs, Volume= 5.541 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

Area (ac)	CN	Description
0.390	89	Gravel roads, HSG C
0.550	98	Unconnected pavement, HSG B
4.690	85	Gravel roads, HSG B
7.240	58	Meadow, non-grazed, HSG B
2.960	48	Brush, Good, HSG B
15.830	66	Weighted Average
15.280	65	96.53% Pervious Area
0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Subcatchment 2B: POST - POI #1 - Bypass

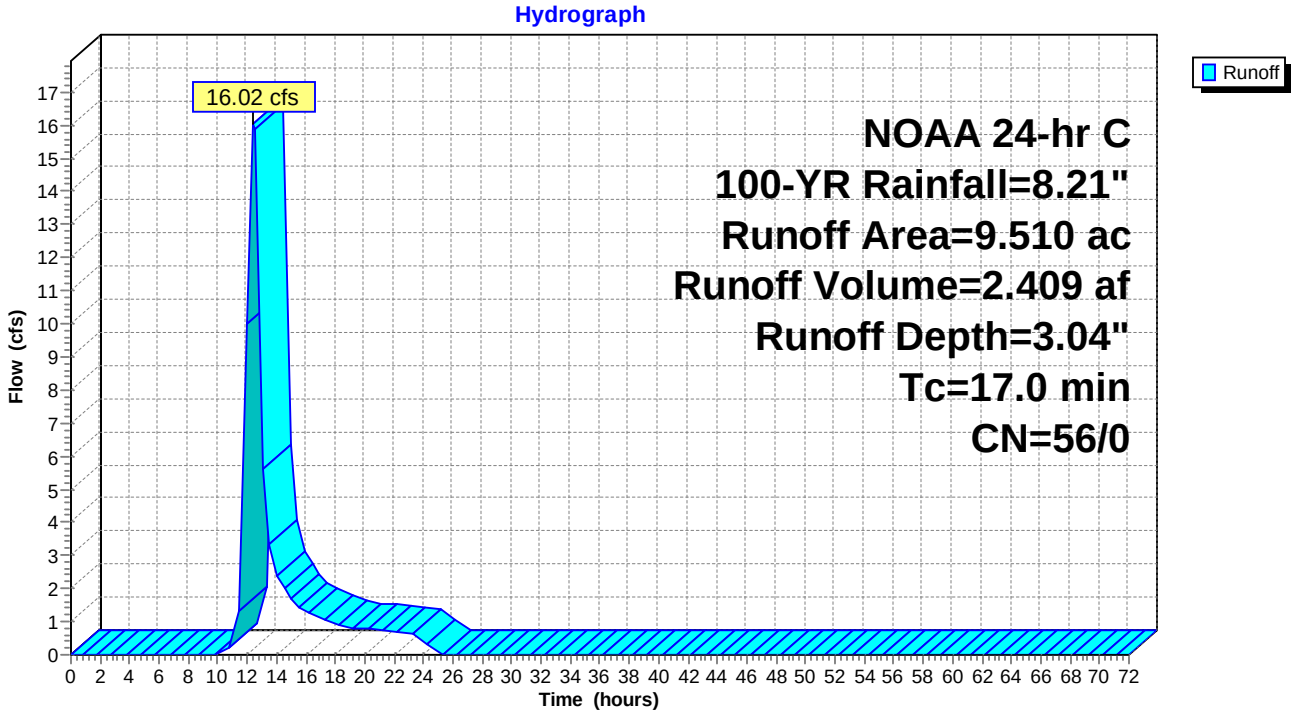
Runoff = 16.02 cfs @ 12.43 hrs, Volume= 2.409 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

Area (ac)	CN	Description
5.300	58	Meadow, non-grazed, HSG B
0.150	85	Gravel roads, HSG B
3.160	48	Brush, Good, HSG B
0.900	65	Brush, Good, HSG C
9.510	56	Weighted Average
9.510	56	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0					**Direct Entry, POST - POI #1 - Bypass**

Subcatchment 2B: POST - POI #1 - Bypass



Summary for Subcatchment 3: PRE - POI #2

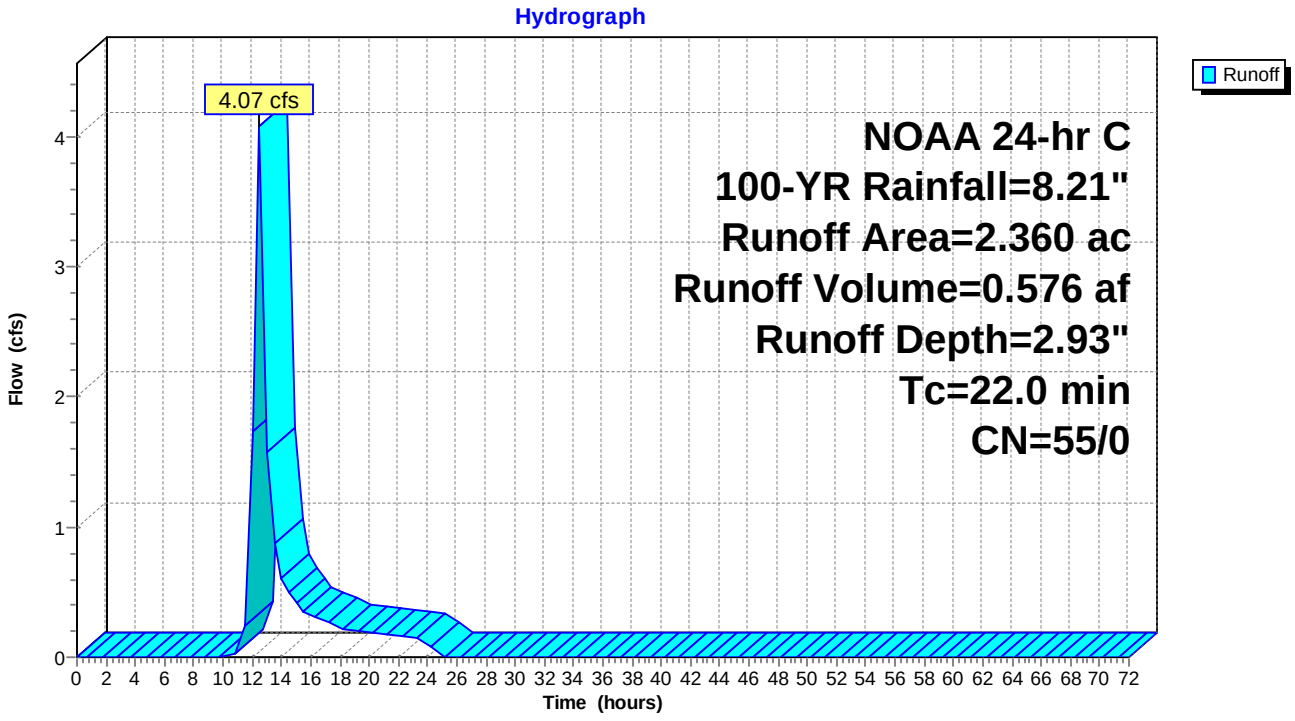
Runoff = 4.07 cfs @ 12.49 hrs, Volume= 0.576 af, Depth= 2.93"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

Area (ac)	CN	Description
0.060	58	Meadow, non-grazed, HSG B
1.060	55	Woods, Good, HSG B
1.240	55	Woods, Good, HSG B
2.360	55	Weighted Average
2.360	55	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, PRE - POI #1**

Subcatchment 3: PRE - POI #2



Summary for Subcatchment 4A: POST - POI #2 - Bypass

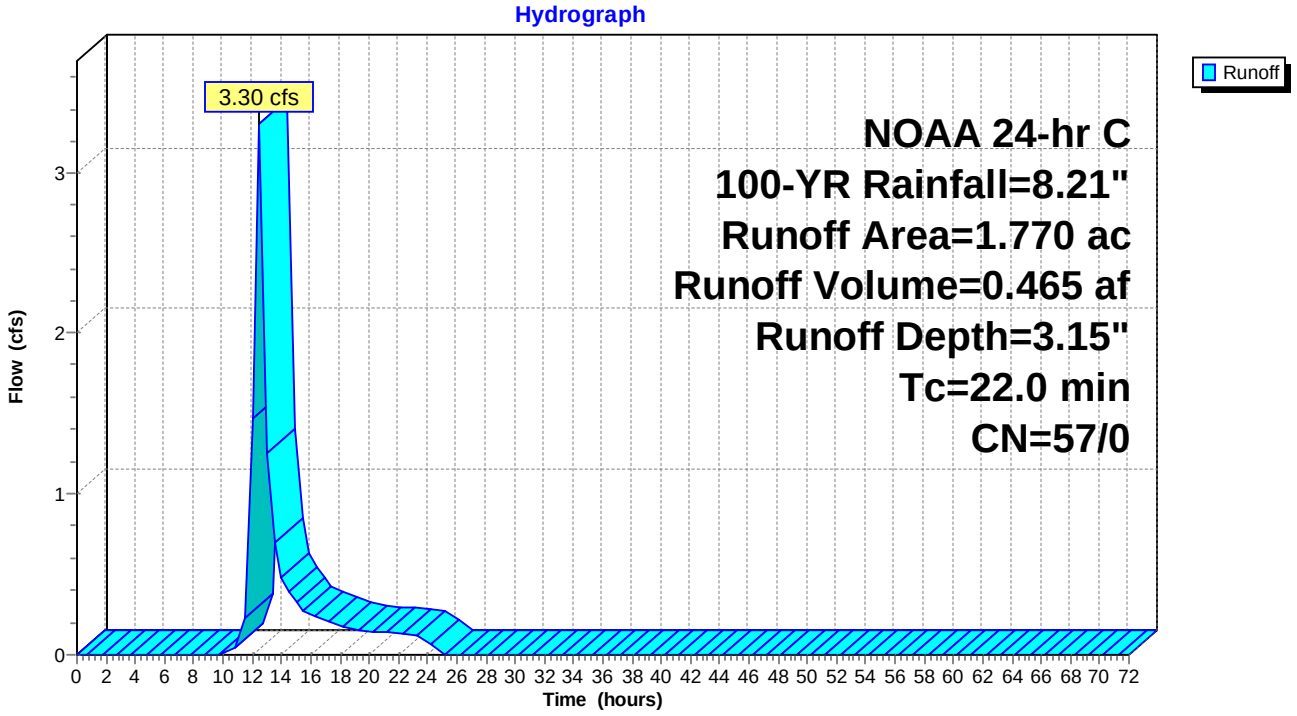
Runoff = 3.30 cfs @ 12.49 hrs, Volume= 0.465 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

Area (ac)	CN	Description
0.380	48	Brush, Good, HSG B
0.150	85	Gravel roads, HSG B
0.940	48	Brush, Good, HSG B
0.300	85	Gravel roads, HSG B
1.770	57	Weighted Average
1.770	57	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0					**Direct Entry, POST - POI #2 - Bypass**

Subcatchment 4A: POST - POI #2 - Bypass



Summary for Subcatchment 4B: POST - POI #2 - Detention Basin #1

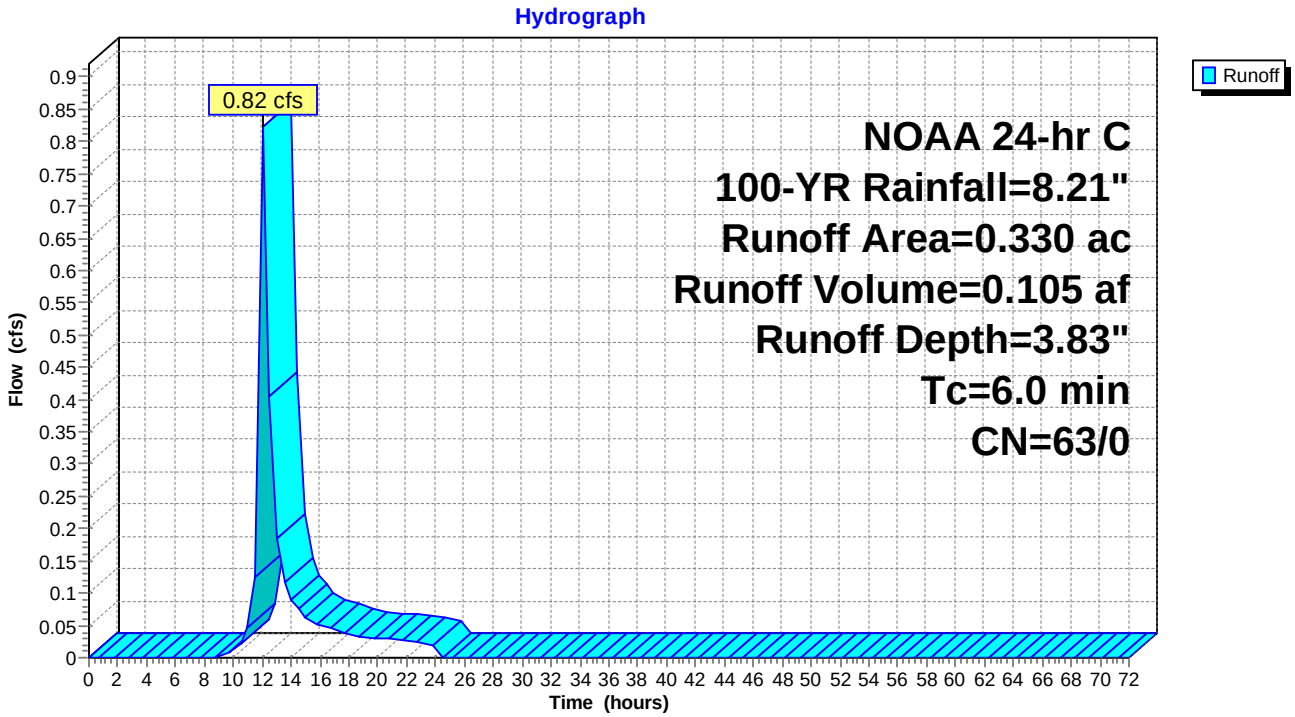
Runoff = 0.82 cfs @ 12.06 hrs, Volume= 0.105 af, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

Area (ac)	CN	Description
0.270	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.330	63	Weighted Average
0.330	63	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #1**

Subcatchment 4B: POST - POI #2 - Detention Basin #1



Summary for Subcatchment 4C: POST - POI #2 - Detention Basin #2

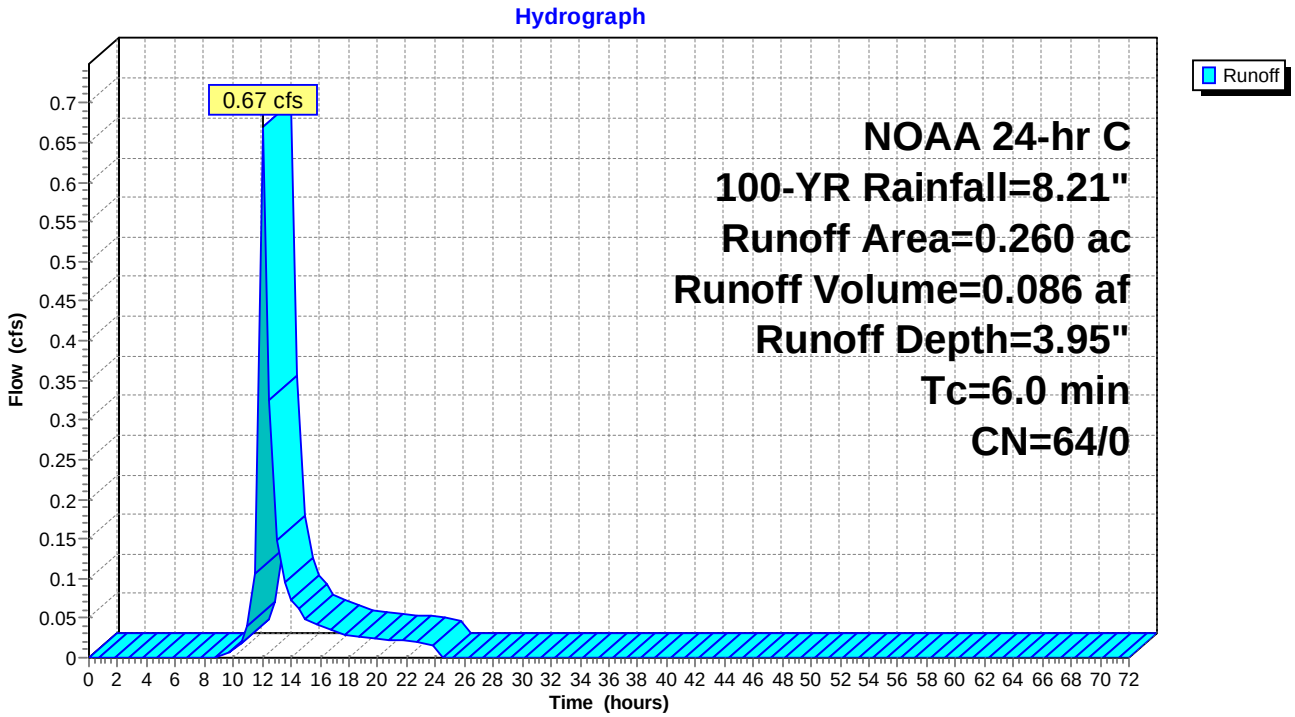
Runoff = 0.67 cfs @ 12.06 hrs, Volume= 0.086 af, Depth= 3.95"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

Area (ac)	CN	Description
0.200	58	Meadow, non-grazed, HSG B
0.060	85	Gravel roads, HSG B
0.260	64	Weighted Average
0.260	64	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, POST - POI #2 - Detention Basin #2**

Subcatchment 4C: POST - POI #2 - Detention Basin #2



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 4.20" for 100-YR event
Inflow = 38.78 cfs @ 12.53 hrs, Volume= 5.541 af
Outflow = 9.63 cfs @ 13.60 hrs, Volume= 5.158 af, Atten= 75%, Lag= 64.3 min
Primary = 9.63 cfs @ 13.60 hrs, Volume= 5.158 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 265.39' @ 13.60 hrs Surf.Area= 42,331 sf Storage= 120,336 cf

Plug-Flow detention time= 370.7 min calculated for 5.122 af (92% of inflow)
Center-of-Mass det. time= 351.5 min (1,205.9 - 854.4)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

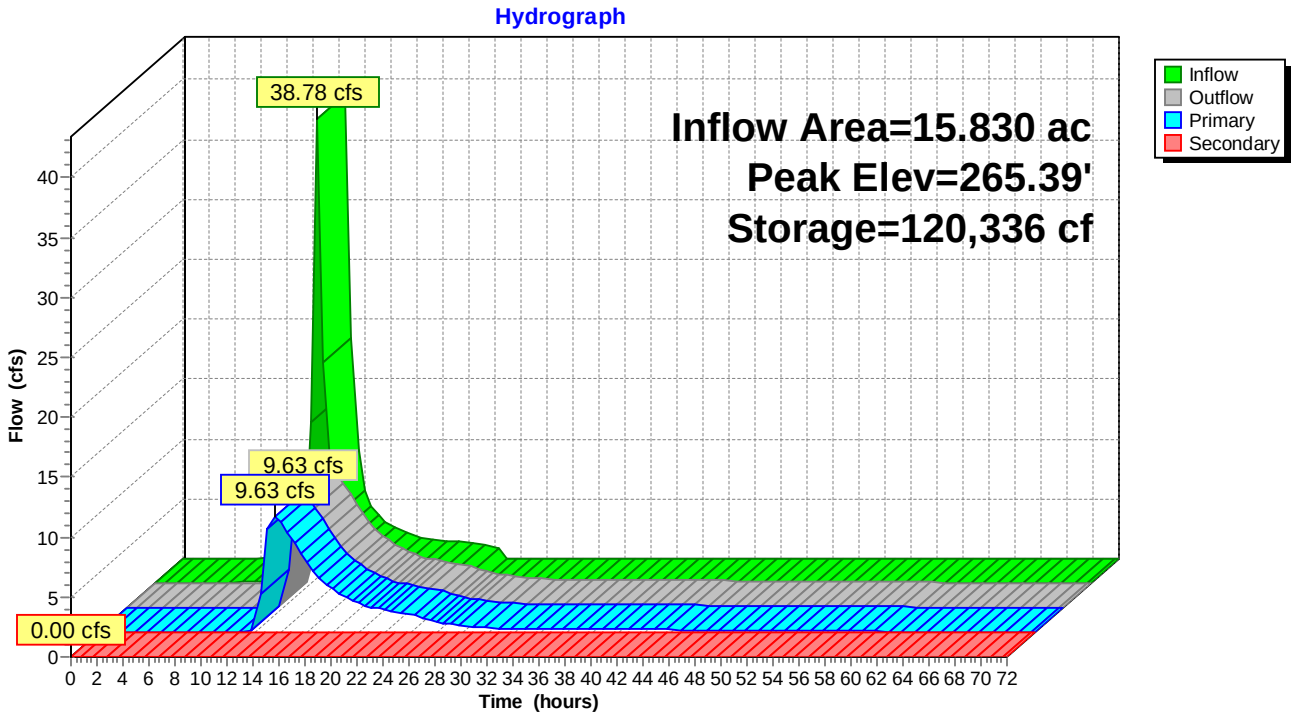
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=9.52 cfs @ 13.60 hrs HW=265.37' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 9.52 cfs of 17.68 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 0.70 cfs @ 8.03 fps)
—**3=Sharp-Crested Rectangular Weir** (Weir Controls 8.81 cfs @ 7.22 fps)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



Stage-Area-Storage for Pond 2C: Infiltration Basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
262.00	30,359	0
262.10	30,620	3,049
262.20	30,881	6,124
262.30	31,142	9,225
262.40	31,403	12,352
262.50	31,664	15,506
262.60	31,924	18,685
262.70	32,185	21,891
262.80	32,446	25,122
262.90	32,707	28,380
263.00	32,968	31,664
263.10	33,259	34,975
263.20	33,550	38,315
263.30	33,841	41,685
263.40	34,132	45,084
263.50	34,424	48,511
263.60	34,715	51,968
263.70	35,006	55,454
263.80	35,297	58,969
263.90	35,588	62,514
264.00	35,879	66,087
264.10	36,329	69,697
264.20	36,779	73,353
264.30	37,230	77,053
264.40	37,680	80,799
264.50	38,130	84,589
264.60	38,580	88,425
264.70	39,030	92,305
264.80	39,481	96,231
264.90	39,931	100,201
265.00	40,381	104,217
265.10	40,881	108,280
265.20	41,382	112,393
265.30	41,882	116,556
265.40	42,382	120,770
265.50	42,883	125,033
265.60	43,383	129,346
265.70	43,883	133,709
265.80	44,383	138,123
265.90	44,884	142,586
266.00	45,384	147,100
266.10	45,830	151,660
266.20	46,276	156,265
266.30	46,722	160,915
266.40	47,168	165,610
266.50	47,614	170,349
266.60	48,640	175,162
266.70	49,666	180,077
266.80	50,691	185,095
266.90	51,717	190,215
267.00	52,743	195,438
267.10	53,231	200,737
267.20	53,719	206,084
267.30	54,207	211,481
267.40	54,695	216,926
267.50	**55,183**	**222,420**

Summary for Pond 4D: Detention Basin #1

Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 3.89" for 100-YR event
Inflow = 0.85 cfs @ 12.06 hrs, Volume= 0.191 af
Outflow = 0.18 cfs @ 13.42 hrs, Volume= 0.191 af, Atten= 79%, Lag= 81.4 min
Primary = 0.18 cfs @ 13.42 hrs, Volume= 0.191 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.89' @ 13.42 hrs Surf.Area= 3,500 sf Storage= 1,964 cf

Plug-Flow detention time= 112.9 min calculated for 0.190 af (99% of inflow)
Center-of-Mass det. time= 112.6 min (1,096.0 - 983.4)

Volume	Invert	Avail.Storage	Storage Description
#1	283.60'	12,466 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

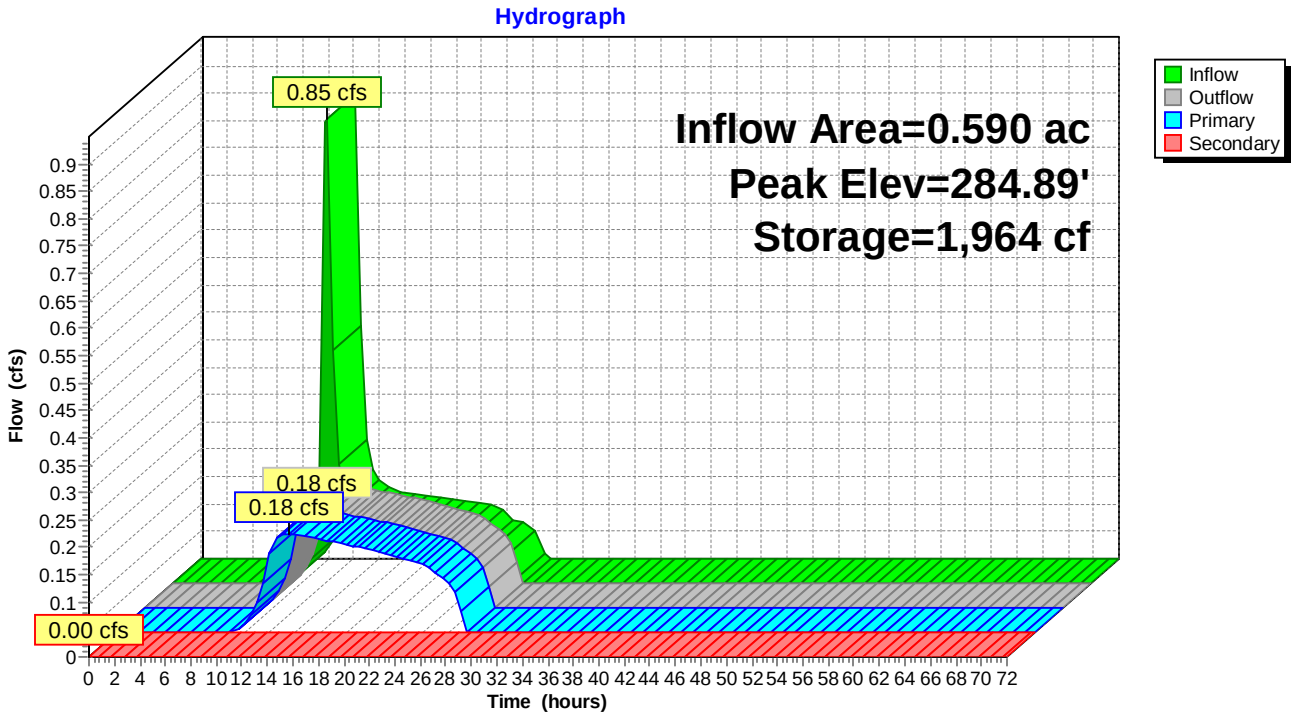
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.60	0	0	0
284.00	637	127	127
285.00	3,861	2,249	2,376
286.00	5,037	4,449	6,825
287.00	6,244	5,641	12,466

Device	Routing	Invert	Outlet Devices
#1	Primary	282.00'	**6.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.00' / 281.75' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.60'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.18 cfs @ 13.42 hrs HW=284.89' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.18 cfs of 1.37 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 5.24 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.60' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4D: Detention Basin #1



Stage-Area-Storage for Pond 4D: Detention Basin #1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.60	0	0
283.65	80	2
283.70	159	8
283.75	239	18
283.80	319	32
283.85	398	50
283.90	478	72
283.95	557	98
284.00	637	127
284.05	798	163
284.10	959	207
284.15	1,121	259
284.20	1,282	319
284.25	1,443	387
284.30	1,604	464
284.35	1,765	548
284.40	1,927	640
284.45	2,088	740
284.50	2,249	849
284.55	2,410	965
284.60	2,571	1,090
284.65	2,733	1,223
284.70	2,894	1,363
284.75	3,055	1,512
284.80	3,216	1,669
284.85	3,377	1,834
284.90	3,539	2,006
284.95	3,700	2,187
285.00	3,861	2,376
285.05	3,920	2,571
285.10	3,979	2,768
285.15	4,037	2,969
285.20	4,096	3,172
285.25	4,155	3,378
285.30	4,214	3,588
285.35	4,273	3,800
285.40	4,331	4,015
285.45	4,390	4,233
285.50	4,449	4,454
285.55	4,508	4,678
285.60	4,567	4,905
285.65	4,625	5,134
285.70	4,684	5,367
285.75	4,743	5,603
285.80	4,802	5,842
285.85	4,861	6,083
285.90	4,919	6,328
285.95	4,978	6,575
286.00	5,037	6,825
286.05	5,097	7,079
286.10	5,158	7,335
286.15	5,218	7,595
286.20	5,278	7,857
286.25	5,339	8,122
286.30	5,399	8,391
286.35	5,459	8,662
286.40	5,520	8,937
286.45	5,580	9,214
286.50	5,641	9,495
286.55	5,701	9,778
286.60	5,761	10,065
286.65	5,822	10,354
286.70	5,882	10,647
286.75	5,942	10,943
286.80	6,003	11,241
286.85	6,063	11,543
286.90	6,123	11,848
286.95	6,184	12,155
287.00	**6,244**	**12,466**

Summary for Pond 4E: Detention Basin #2

Inflow Area = 0.260 ac, 0.00% Impervious, Inflow Depth = 3.95" for 100-YR event
Inflow = 0.67 cfs @ 12.06 hrs, Volume= 0.086 af
Outflow = 0.08 cfs @ 19.63 hrs, Volume= 0.086 af, Atten= 88%, Lag= 454.1 min
Primary = 0.08 cfs @ 19.63 hrs, Volume= 0.086 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 284.99' @ 14.56 hrs Surf.Area= 3,823 sf Storage= 2,158 cf

Plug-Flow detention time= 320.6 min calculated for 0.085 af (99% of inflow)
Center-of-Mass det. time= 320.3 min (1,159.0 - 838.7)

Volume	Invert	Avail.Storage	Storage Description
#1	283.70'	12,241 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

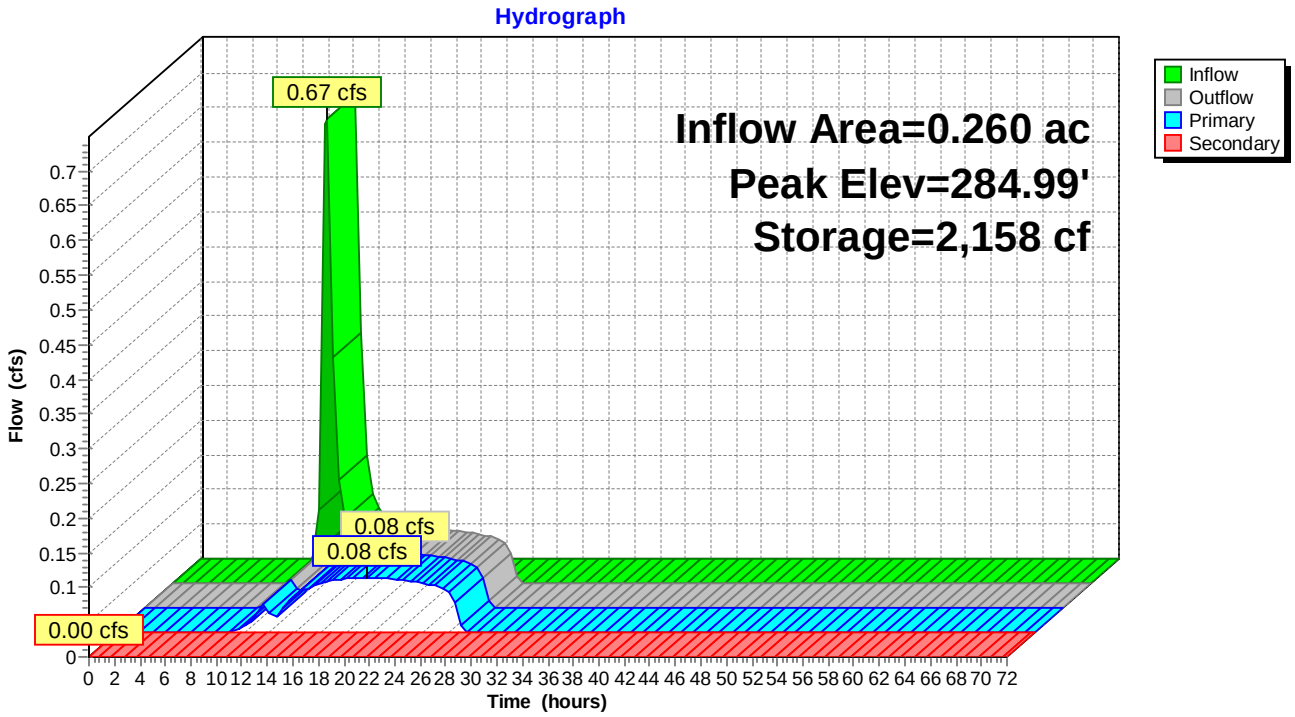
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
283.70	0	0	0
284.00	423	63	63
285.00	3,870	2,147	2,210
286.00	5,009	4,440	6,649
287.00	6,174	5,592	12,241

Device	Routing	Invert	Outlet Devices
#1	Primary	282.55'	**6.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 282.55' / 282.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Device 1	283.70'	**2.5" Vert. Orifice/Grate** C= 0.600
#3	Device 1	285.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	286.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.08 cfs @ 19.63 hrs HW=284.79' TW=284.56' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.08 cfs of 0.31 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 2.31 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=283.70' TW=0.00' (Dynamic Tailwater)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 4E: Detention Basin #2



Stage-Area-Storage for Pond 4E: Detention Basin #2

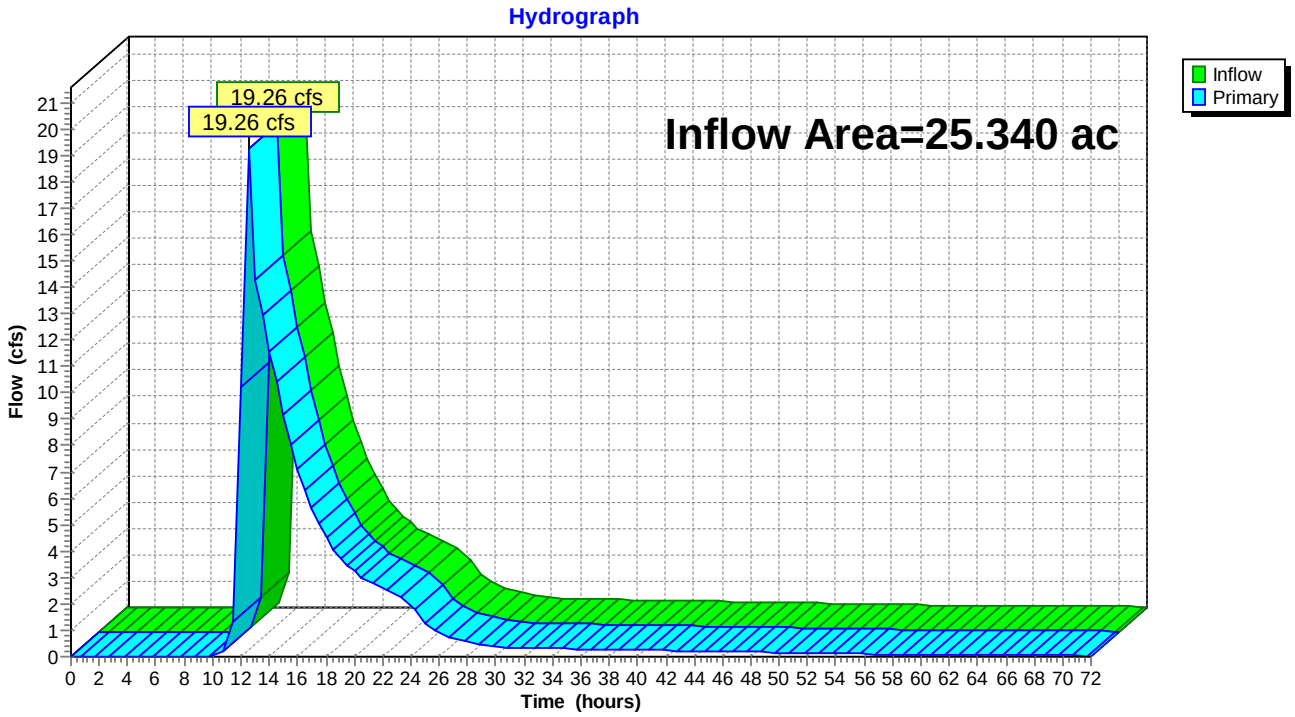
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
283.70	0	0
283.75	71	2
283.80	141	7
283.85	211	16
283.90	282	28
283.95	352	44
284.00	423	63
284.05	595	89
284.10	768	123
284.15	940	166
284.20	1,112	217
284.25	1,285	277
284.30	1,457	345
284.35	1,629	423
284.40	1,802	508
284.45	1,974	603
284.50	2,147	706
284.55	2,319	817
284.60	2,491	938
284.65	2,664	1,067
284.70	2,836	1,204
284.75	3,008	1,350
284.80	3,181	1,505
284.85	3,353	1,668
284.90	3,525	1,840
284.95	3,698	2,021
285.00	3,870	2,210
285.05	3,927	2,405
285.10	3,984	2,603
285.15	4,041	2,803
285.20	4,098	3,007
285.25	4,155	3,213
285.30	4,212	3,422
285.35	4,269	3,634
285.40	4,326	3,849
285.45	4,383	4,067
285.50	4,440	4,287
285.55	4,496	4,511
285.60	4,553	4,737
285.65	4,610	4,966
285.70	4,667	5,198
285.75	4,724	5,433
285.80	4,781	5,670
285.85	4,838	5,911
285.90	4,895	6,154
285.95	4,952	6,400
286.00	5,009	6,649
286.05	5,067	6,901
286.10	5,125	7,156
286.15	5,184	7,414
286.20	5,242	7,675
286.25	5,300	7,938
286.30	5,359	8,205
286.35	5,417	8,474
286.40	5,475	8,746
286.45	5,533	9,021
286.50	5,592	9,300
286.55	5,650	9,581
286.60	5,708	9,865
286.65	5,766	10,151
286.70	5,824	10,441
286.75	5,883	10,734
286.80	5,941	11,029
286.85	5,999	11,328
286.90	6,057	11,629
286.95	6,116	11,934
287.00	**6,174**	**12,241**

Summary for Link 2D: POST - POI #1

Inflow Area = 25.340 ac, 2.17% Impervious, Inflow Depth > 3.58" for 100-YR event
Inflow = 19.26 cfs @ 12.57 hrs, Volume= 7.567 af
Primary = 19.26 cfs @ 12.57 hrs, Volume= 7.567 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 2D: POST - POI #1

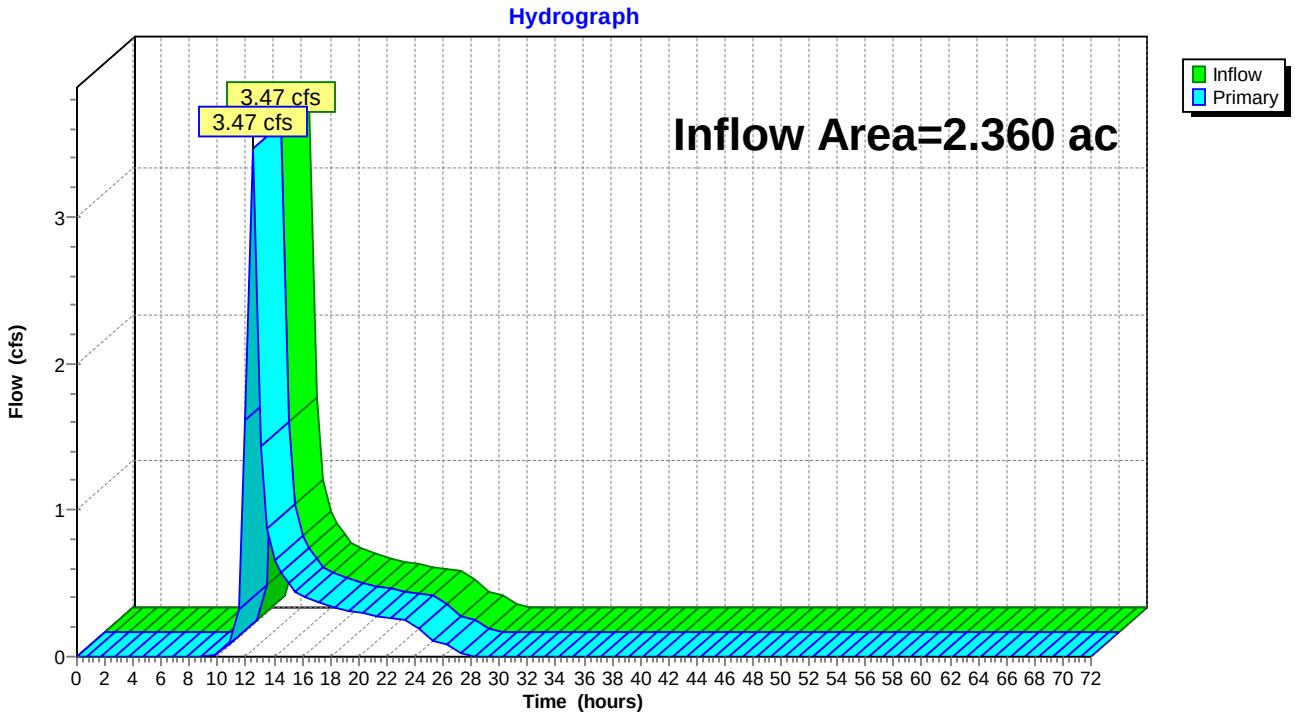


Summary for Link 4F: POST - POI #2

Inflow Area = 2.360 ac, 0.00% Impervious, Inflow Depth = 3.34" for 100-YR event
Inflow = 3.47 cfs @ 12.49 hrs, Volume= 0.656 af
Primary = 3.47 cfs @ 12.49 hrs, Volume= 0.656 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs

Link 4F: POST - POI #2



APPENDIX C
GROUNDWATER RECHARGE ANALYSIS

Infiltrated Stormwater Runoff Volume for 2-Year Storm Event

Completed by: PPH 4/17/2019

Keyport HSG D (per USDA/NRCS) Pre vs. Post

Pre-Construction Volume (ft^3)	Post-Construction Volume (ft^3)	Required Volume [1] (ft^3)	Infiltrated Volume [2] (ft^3)
129,554	150,980	21,426	59,198

Neshaminy HSG B Pre vs. Post

Pre-Construction Volume (ft^3)	Post-Construction Volume (ft^3)	Required Volume [1] (ft^3)	Infiltrated Volume [2] (ft^3)
41,171	75,844	34,674	38,986

1. Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two- year storm is infiltrated, per N.J.A.C. 7:8-5.4 (a).2.i.(2)
2. From hydrologic analysis (HydroCAD) for 2-Year storm event utilizing the lowest field measured infiltration rate (1 in/hr) and applying a factor of safety of 2, resulting in a rate of 0.5 in/hr

APPENDIX C.1
KEYPORT (HSG D)

Difference in Stormwater Runoff Volume for 2-Year Storm Event

Project: NESE CS 206
2-Year Rainfall: 3.34 **in**

Keyport HSG D (per USDA/NRCS) Pre vs. Post

Existing Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft³)
Brush	A	0	0.00	30	23.33	4.67	0.00	0
Woods	A	0	0.00	30	23.33	4.67	0.00	0
Meadow	A	0	0.00	30	23.33	4.67	0.00	0
Gravel	A	0	0.00	76	3.16	0.63	1.25	0
Impervious	A	0	0.00	98	0.20	0.04	3.11	0
Brush	B	0	0.00	48	10.83	2.17	0.11	0
Woods	B	0	0.00	55	8.18	1.64	0.29	0
Meadow	B	0	0.00	58	7.24	1.45	0.39	0
Gravel	B	0	0.00	85	1.76	0.35	1.88	0
Impervious	B	0	0.00	98	0.20	0.04	3.11	0
Brush	C	0	0.00	65	5.38	1.08	0.67	0
Woods	C	102,358	2.35	70	4.29	0.86	0.91	7,769
Meadow	C	2,442	0.06	71	4.08	0.82	0.96	196
Gravel	C	0	0.00	89	1.24	0.25	2.21	0
Impervious	C	0	0.00	98	0.20	0.04	3.11	0
Brush	D	0	0.00	73	3.70	0.74	1.07	0
Woods	D	897,303	20.60	77	2.99	0.60	1.31	98,165
Meadow	D	204,150	4.69	78	2.82	0.56	1.38	23,424
Gravel	D	0	0.00	91	0.99	0.20	2.39	0
Impervious	D	0	0.00	98	0.20	0.04	3.11	0
Total			27.69					129,554

Developed Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft³)
Brush	A	0	0.00	30	23.33	4.67	0.00	0
Woods	A	0	0.00	30	23.33	4.67	0.00	0
Meadow	A	0	0.00	30	23.33	4.67	0.00	0
Gravel	A	0	0.00	76	3.16	0.63	1.25	0
Impervious	A	0	0.00	98	0.20	0.04	3.11	0
Brush	B	0	0.00	48	10.83	2.17	0.11	0
Woods	B	0	0.00	55	8.18	1.64	0.29	0
Meadow	B	0	0.00	58	7.24	1.45	0.39	0
Gravel	B	0	0.00	85	1.76	0.35	1.88	0
Impervious	B	0	0.00	98	0.20	0.04	3.11	0
Brush	C	55,626	1.28	65	5.38	1.08	0.67	3,104
Woods	C	0	0.00	70	4.29	0.86	0.91	0
Meadow	C	20,370	0.47	71	4.08	0.82	0.96	1,635
Gravel	C	28,798	0.66	89	1.24	0.25	2.21	5,303
Impervious	C	0	0.00	98	0.20	0.04	3.11	0
Brush	D	307,556	7.06	73	3.70	0.74	1.07	27,512
Woods	D	0	0.00	77	2.99	0.60	1.31	0
Meadow	D	546,299	12.54	78	2.82	0.56	1.38	62,683
Gravel	D	223,700	5.14	91	0.99	0.20	2.39	44,553
Impervious	D	23,909	0.55	98	0.20	0.04	3.11	6,190
Total			27.69					150,980

2-Year Volume Increase (ft³): 21,426

1. Runoff (in) = Q = (P - 0.2S)2 / (P + 0.8S) where P = 2-Year Rainfall (in) and S = (1000 / CN) - 10
2. Runoff Volume (cf) = Q x Area x 1/12 where Q= Runoff (in) and Area = Land use area (sq. ft)
3. 2-Year Volume Increase = Developed - Existing

Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

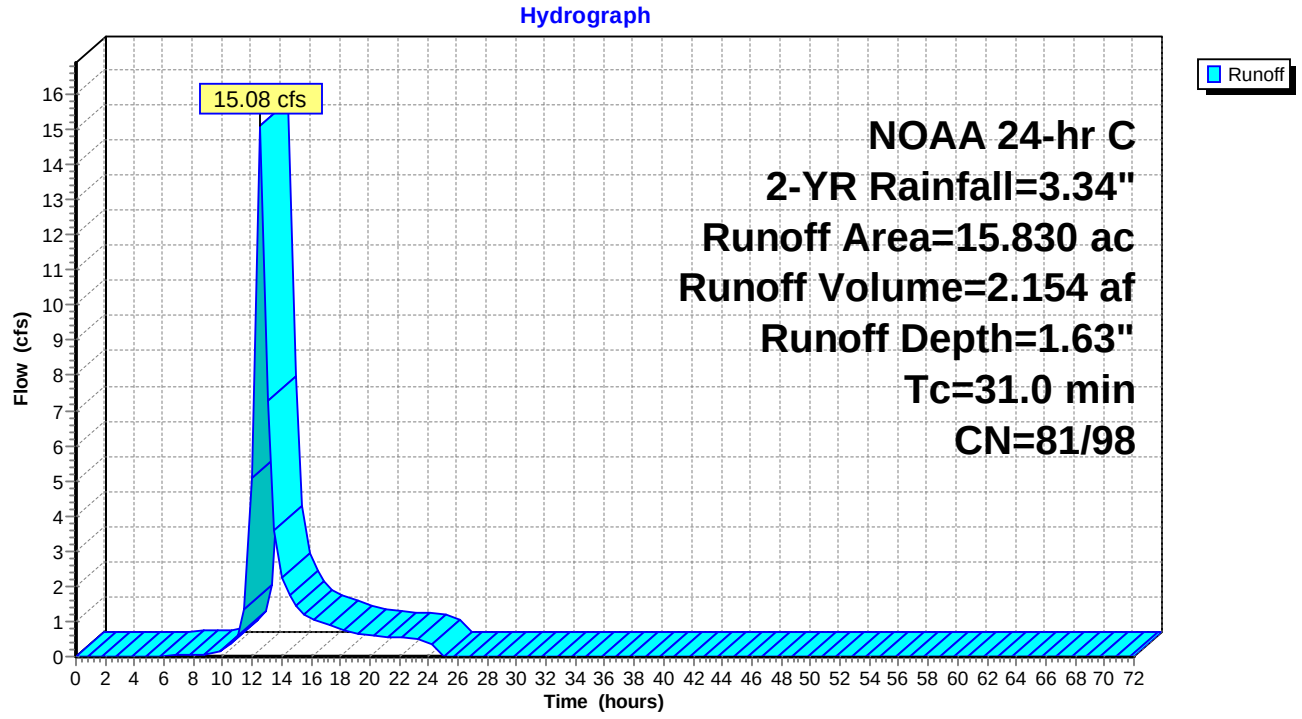
Runoff = 15.08 cfs @ 12.53 hrs, Volume= 2.154 af, Depth= 1.63"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 1.63" for 2-YR event
Inflow = 15.08 cfs @ 12.53 hrs, Volume= 2.154 af
Outflow = 1.76 cfs @ 14.58 hrs, Volume= 2.159 af, Atten= 88%, Lag= 122.8 min
Discarded = 0.58 cfs @ 14.58 hrs, Volume= 1.359 af → 59,198 cu. ft.
Primary = 1.18 cfs @ 14.58 hrs, Volume= 0.799 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 263.62' @ 14.58 hrs Surf.Area= 34,782 sf Storage= 52,771 cf

Plug-Flow detention time= 561.4 min calculated for 2.144 af (100% of inflow)
Center-of-Mass det. time= 567.4 min (1,426.0 - 858.5)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

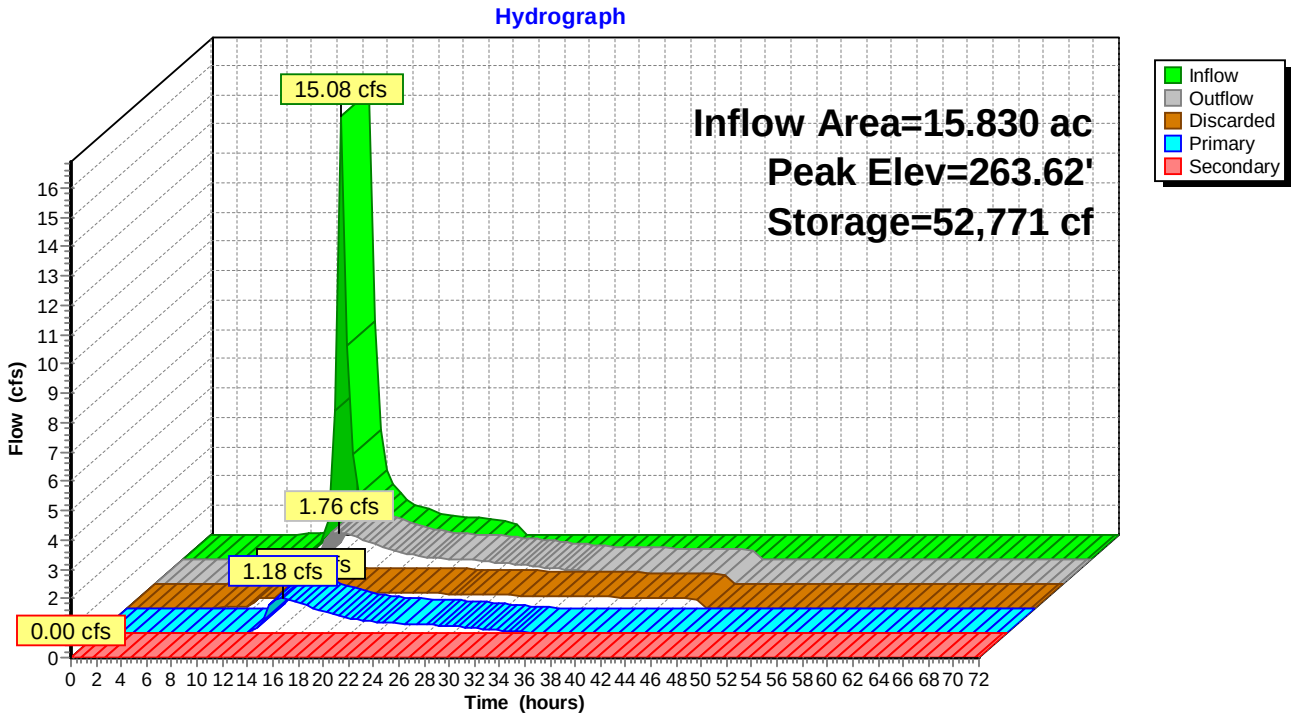
Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#6	Discarded	262.00'	**0.500 in/hr Infiltration over Surface area** Conductivity to Groundwater Elevation = 258.50'

Discarded OutFlow Max=0.57 cfs @ 14.58 hrs HW=263.62' (Free Discharge)
└**6=Infiltration** (Controls 0.57 cfs)

Primary OutFlow Max=1.18 cfs @ 14.58 hrs HW=263.62' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 1.18 cfs of 13.65 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.43 cfs @ 4.90 fps)
  └**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.75 cfs @ 2.18 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



APPENDIX C.2
NESHAMINY (HSG B)

Difference in Stormwater Runoff Volume for 2-Year Storm Event

Project: NESE CS 206
2-Year Rainfall: 3.34 **in**

Neshaminy HSG B Pre vs. Post

Existing Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft³)
Brush	A	0	0.00	30	23.33	4.67	0.00	0
Woods	A	0	0.00	30	23.33	4.67	0.00	0
Meadow	A	0	0.00	30	23.33	4.67	0.00	0
Gravel	A	0	0.00	76	3.16	0.63	1.25	0
Impervious	A	0	0.00	98	0.20	0.04	3.11	0
Brush	B	0	0.00	48	10.83	2.17	0.11	0
Woods	B	843,311	19.36	55	8.18	1.64	0.29	20,633
Meadow	B	204,150	4.69	58	7.24	1.45	0.39	6,666
Gravel	B	0	0.00	85	1.76	0.35	1.88	0
Impervious	B	0	0.00	98	0.20	0.04	3.11	0
Brush	C	0	0.00	65	5.38	1.08	0.67	0
Woods	C	102,358	2.35	70	4.29	0.86	0.91	7,769
Meadow	C	2,442	0.06	71	4.08	0.82	0.96	196
Gravel	C	0	0.00	89	1.24	0.25	2.21	0
Impervious	C	0	0.00	98	0.20	0.04	3.11	0
Brush	D	0	0.00	73	3.70	0.74	1.07	0
Woods	D	53,992	1.24	77	2.99	0.60	1.31	5,907
Meadow	D	0	0.00	78	2.82	0.56	1.38	0
Gravel	D	0	0.00	91	0.99	0.20	2.39	0
Impervious	D	0	0.00	98	0.20	0.04	3.11	0
Total			27.69					41,171

Developed Conditions

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft³)
Brush	A	0	0.00	30	23.33	4.67	0.00	0
Woods	A	0	0.00	30	23.33	4.67	0.00	0
Meadow	A	0	0.00	30	23.33	4.67	0.00	0
Gravel	A	0	0.00	76	3.16	0.63	1.25	0
Impervious	A	0	0.00	98	0.20	0.04	3.11	0
Brush	B	266,556	6.12	48	10.83	2.17	0.11	2,547
Woods	B	0	0.00	55	8.18	1.64	0.29	0
Meadow	B	546,299	12.54	58	7.24	1.45	0.39	17,838
Gravel	B	210,707	4.84	85	1.76	0.35	1.88	32,971
Impervious	B	23,909	0.55	98	0.20	0.04	3.11	6,190
Brush	C	55,626	1.28	65	5.38	1.08	0.67	3,104
Woods	C	0	0.00	70	4.29	0.86	0.91	0
Meadow	C	20,370	0.47	71	4.08	0.82	0.96	1,635
Gravel	C	28,798	0.66	89	1.24	0.25	2.21	5,303
Impervious	C	0	0.00	98	0.20	0.04	3.11	0
Brush	D	41,000	0.94	73	3.70	0.74	1.07	3,668
Woods	D	0	0.00	77	2.99	0.60	1.31	0
Meadow	D	0	0.00	78	2.82	0.56	1.38	0
Gravel	D	12,993	0.30	91	0.99	0.20	2.39	2,588
Impervious	D	0	0.00	98	0.20	0.04	3.11	0
Total			27.69					75,844

2-Year Volume Increase (ft³): 34,674

1. Runoff (in) = Q = (P - 0.2S)2 / (P + 0.8S) where P = 2-Year Rainfall (in) and S = (1000 / CN) - 10
2. Runoff Volume (cf) = Q x Area x 1/12 where Q= Runoff (in) and Area = Land use area (sq. ft)
3. 2-Year Volume Increase = Developed - Existing

Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

[49] Hint: Tc<2dt may require smaller dt

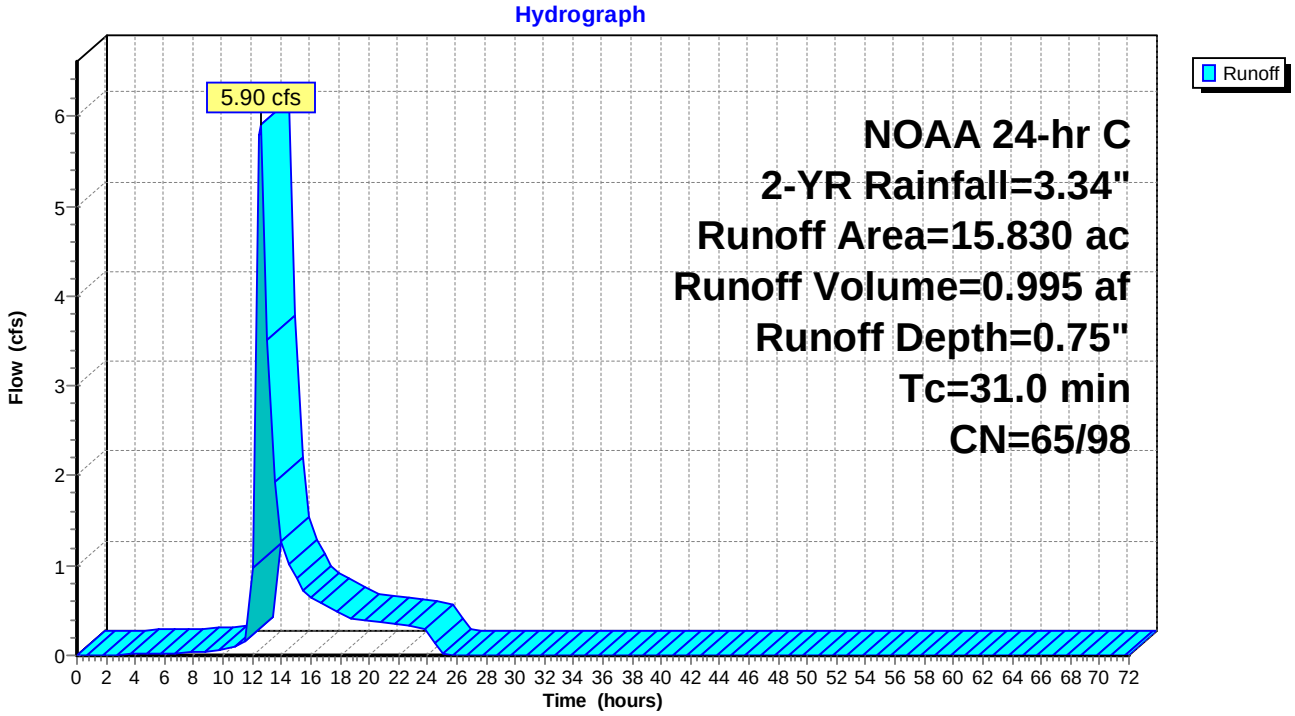
Runoff = 5.90 cfs @ 12.59 hrs, Volume= 0.995 af, Depth= 0.75"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 2-YR Rainfall=3.34"

Area (ac)	CN	Description
0.390	89	Gravel roads, HSG C
0.550	98	Unconnected pavement, HSG B
4.690	85	Gravel roads, HSG B
7.240	58	Meadow, non-grazed, HSG B
2.960	48	Brush, Good, HSG B
15.830	66	Weighted Average
15.280	65	96.53% Pervious Area
0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 0.75" for 2-YR event
Inflow = 5.90 cfs @ 12.59 hrs, Volume= 0.995 af
Outflow = 0.59 cfs @ 16.64 hrs, Volume= 0.999 af, Atten= 90%, Lag= 243.3 min
Discarded = 0.45 cfs @ 16.64 hrs, Volume= 0.895 af → 38,986 cu. ft.
Primary = 0.14 cfs @ 16.64 hrs, Volume= 0.105 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 262.71' @ 16.64 hrs Surf.Area= 32,200 sf Storage= 22,066 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 484.0 min (1,383.0 - 899.0)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

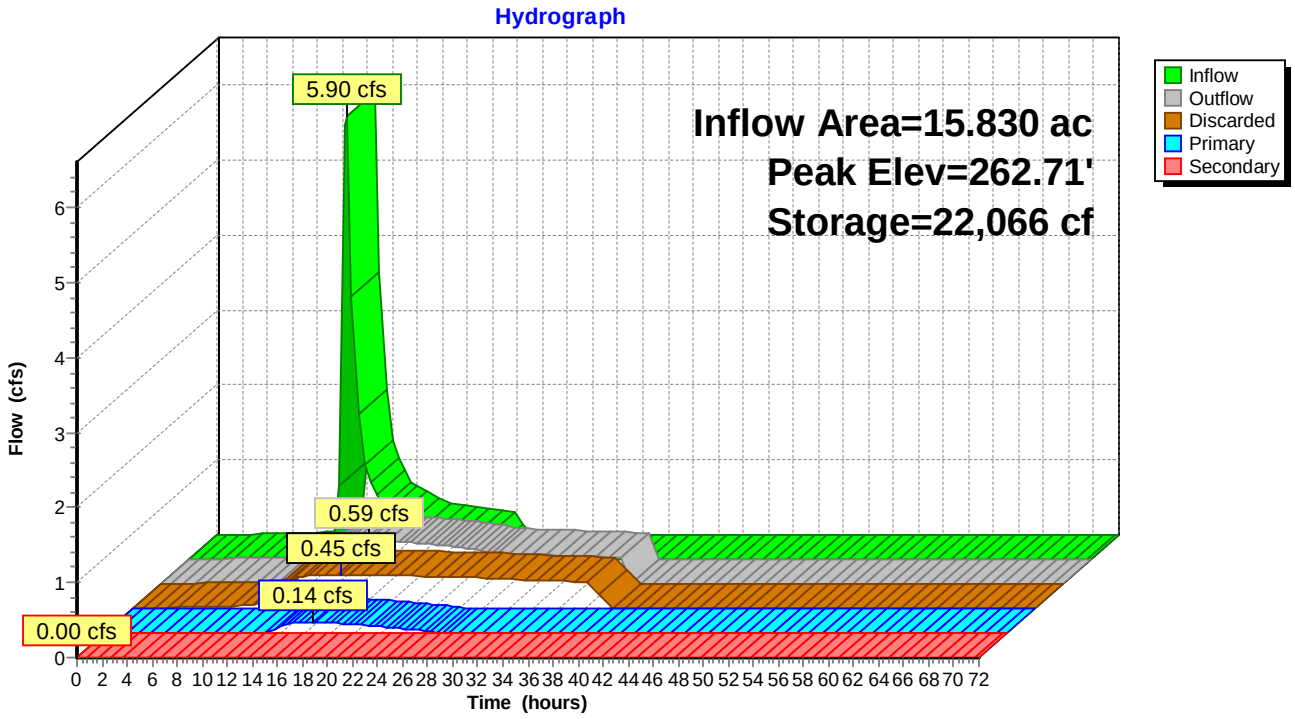
Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#6	Discarded	262.00'	**0.500 in/hr Infiltration over Surface area** Conductivity to Groundwater Elevation = 258.50'

Discarded OutFlow Max=0.45 cfs @ 16.64 hrs HW=262.71' (Free Discharge)
└**6=Infiltration** (Controls 0.45 cfs)

Primary OutFlow Max=0.14 cfs @ 16.64 hrs HW=262.71' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.14 cfs of 10.95 cfs potential flow)
  └**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 1.82 fps)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



APPENDIX D
WATER QUALITY DESIGN STORM

APPENDIX D.1
KEYPORT (HSG D)

Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

[49] Hint: Tc<2dt may require smaller dt

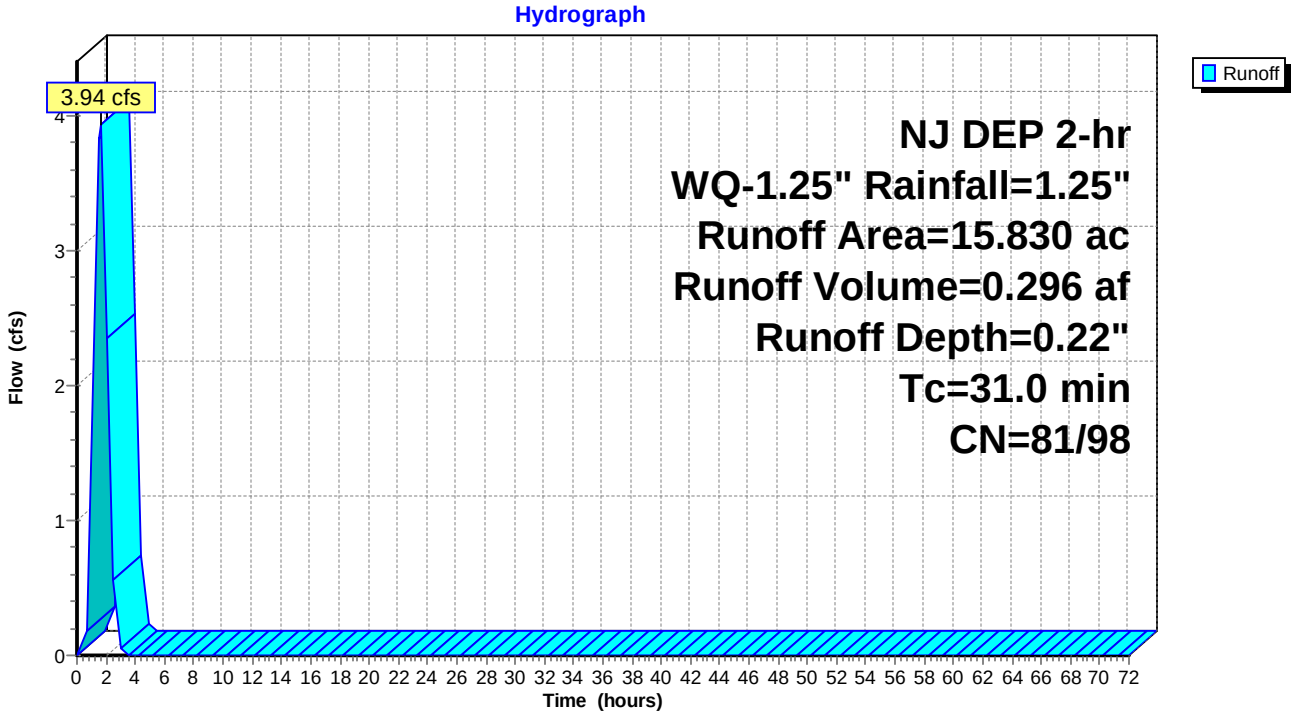
Runoff = 3.94 cfs @ 1.60 hrs, Volume= 0.296 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NJ DEP 2-hr WQ-1.25" Rainfall=1.25"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 0.22" for WQ-1.25" event
Inflow = 3.94 cfs @ 1.60 hrs, Volume= 0.296 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 262.42' @ 4.50 hrs Surf.Area= 31,447 sf Storage= 12,883 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

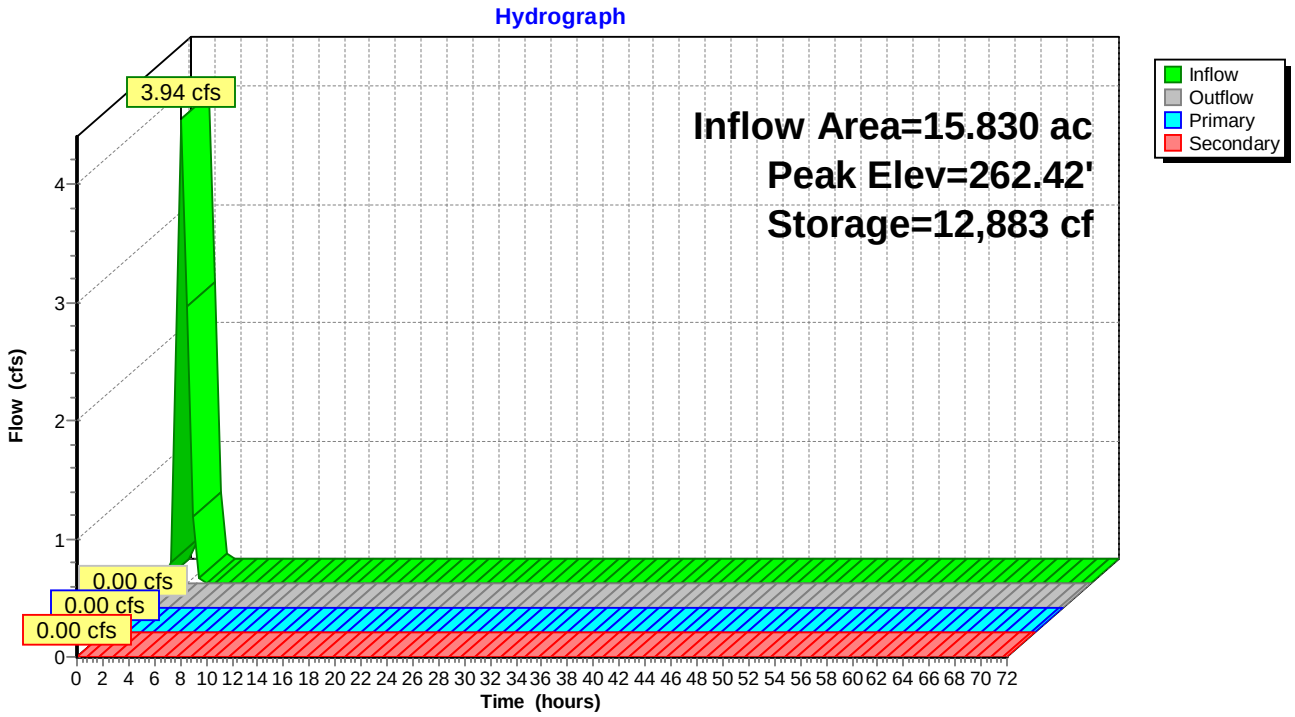
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.00 cfs of 8.29 cfs potential flow)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



APPENDIX D.2
NESHAMINY (HSG B)

Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

[49] Hint: Tc<2dt may require smaller dt

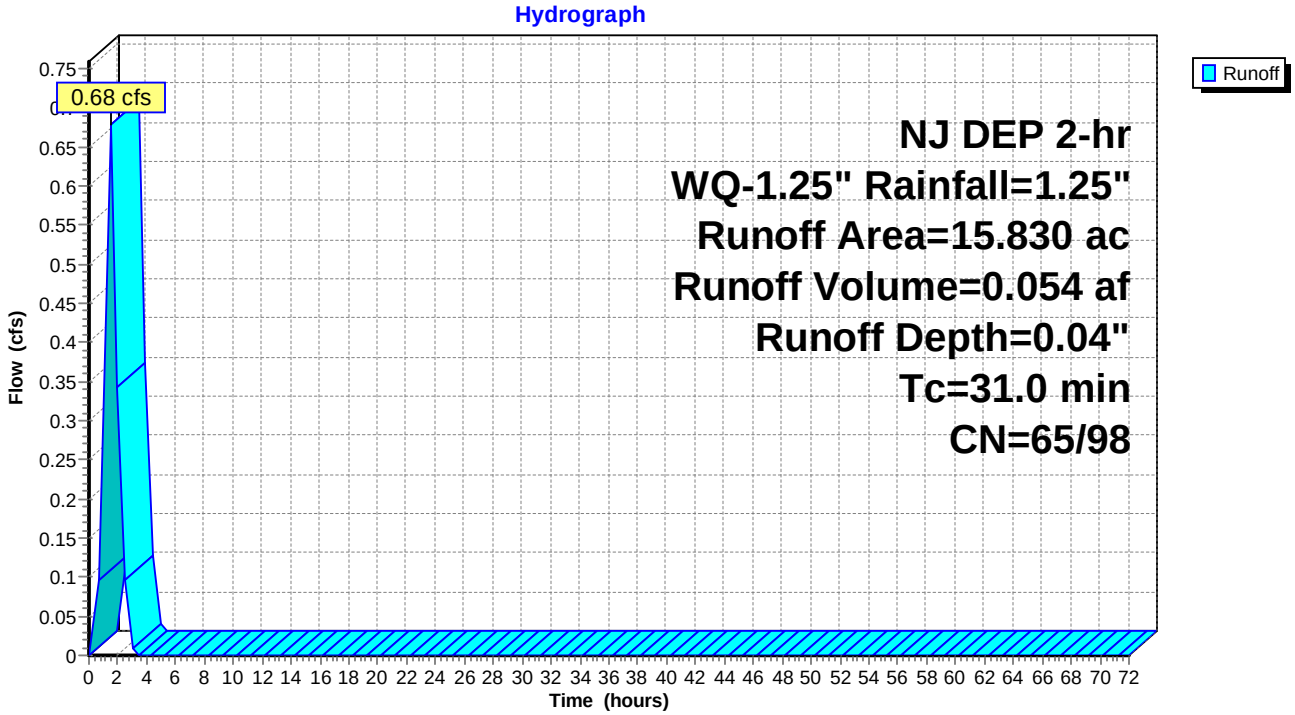
Runoff = 0.68 cfs @ 1.55 hrs, Volume= 0.054 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NJ DEP 2-hr WQ-1.25" Rainfall=1.25"

Area (ac)	CN	Description
0.390	89	Gravel roads, HSG C
0.550	98	Unconnected pavement, HSG B
4.690	85	Gravel roads, HSG B
7.240	58	Meadow, non-grazed, HSG B
2.960	48	Brush, Good, HSG B
15.830	66	Weighted Average
15.280	65	96.53% Pervious Area
0.550	98	3.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



Summary for Pond 2C: Infiltration Basin

Inflow Area = 15.830 ac, 3.47% Impervious, Inflow Depth = 0.04" for WQ-1.25" event
Inflow = 0.68 cfs @ 1.55 hrs, Volume= 0.054 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.50 hrs / 3
Peak Elev= 262.08' @ 4.50 hrs Surf.Area= 30,562 sf Storage= 2,364 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	222,420 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

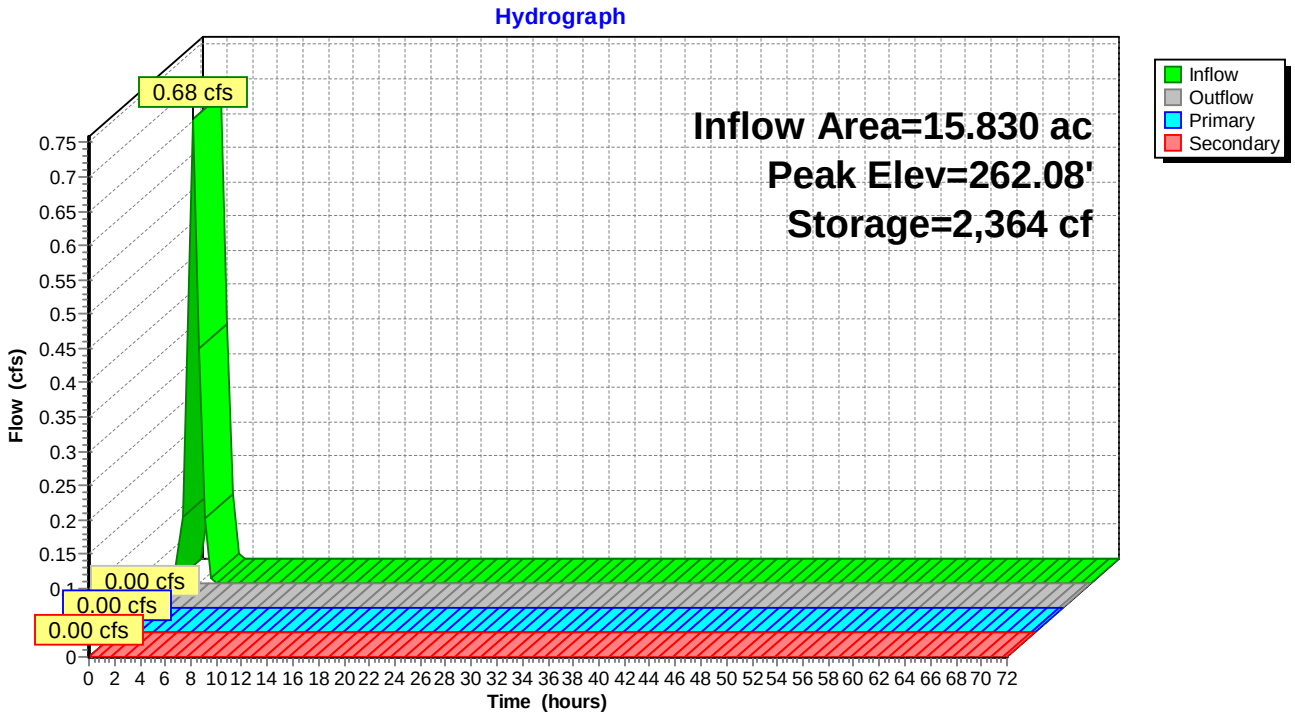
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
262.00	30,359	0	0
263.00	32,968	31,664	31,664
264.00	35,879	34,424	66,087
265.00	40,381	38,130	104,217
266.00	45,384	42,883	147,100
266.50	47,614	23,250	170,349
267.00	52,743	25,089	195,438
267.50	55,183	26,982	222,420

Device	Routing	Invert	Outlet Devices
#1	Primary	260.30'	**18.0" Round Culvert** L= 40.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 260.30' / 259.80' S= 0.0125 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	262.42'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	263.25'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	265.50'	**48.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	266.00'	**100.0' long x 16.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Passes 0.00 cfs of 8.29 cfs potential flow)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)
—**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
—**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
↑—**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2C: Infiltration Basin



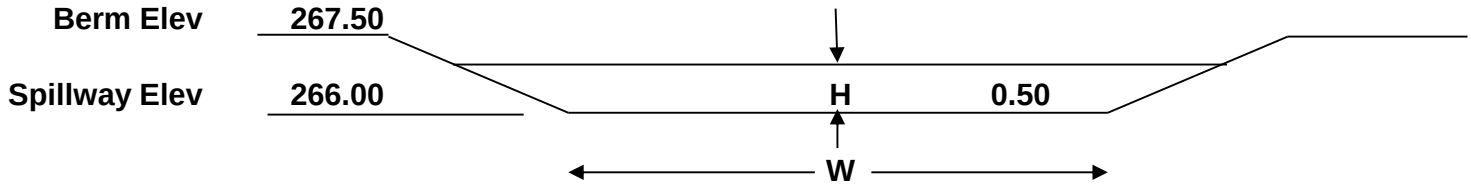
APPENDIX E
SPILLWAY CALCULATIONS

Completed by: PPH Date: 4/22/2019

Emergency Spillway Capacity

Infiltration Basin

Q_D =	81.62	cfs	(54.41 cfs 100-Yr Storm + 50%)
Q =	C L H $^{3/2}$		
C =	2.60		(Broad Crested Weir Coefficient)
L=	100	ft	(Spillway Width)
H=	0.50	ft	(Head i.e. Depth of Flow)
Q_{CAP}=	**91.92**	**cfs**	
Freeboard	**1.00**	ft	



Infiltration Basin Emergency Spillway Channel

PROJECT NAME: **Northeast Supply Expansion - Compressor Station 206**

LOCATION: **Franklin Township, Somerset County**

PREPARED BY: PPH DATE: 4/19/2019

CHANNEL OR CHANNEL SECTION		INFILTRATION BASIN
TEMPORARY OR PERMANENT	(T OR P)	PERMANENT
DESIGN STORM		100 YR + 50%
MULTIPLIER	(1.6, 2.25. or 2.75)[1]	N/A
Q_r (REQUIRED CAPACITY) (CFS)		81.62
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	81.62
PROTECTIVE LINING		R-4
n (MANNING'S COEFFICIENT)		0.035
V_a (ALLOWABLE VELOCITY)	(FPS)	9.0
V (CALCULATED AT FLOW DEPTH d)	(FPS)	6.2
CHANNEL BOTTOM WIDTH	(FT)	100.0
Z_1 - CHANNEL SIDE SLOPES	(H:V)	3
Z_2 - CHANNEL SIDE SLOPES	(H:V)	3
D (TOTAL DEPTH)	(FT)	1.0
CHANNEL TOP WIDTH @ D	(FT)	106.0
d (CALCULATED FLOW DEPTH)	(FT)	0.13
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	100.8
d_{50} STONE SIZE	(IN)	6
A (CROSS-SECTIONAL AREA)	(SQ. FT)	13.09
R - HYDRAULIC RADIUS		0.13
S (BED SLOPE)[3]	(FT/FT)	0.330
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.30
PROVIDED FREEBOARD	(FT)	0.87

Summary for Subcatchment 2A: POST - POI #1 - Infiltration Basin

Runoff = 54.41 cfs @ 12.51 hrs, Volume= 7.930 af, Depth= 6.01"

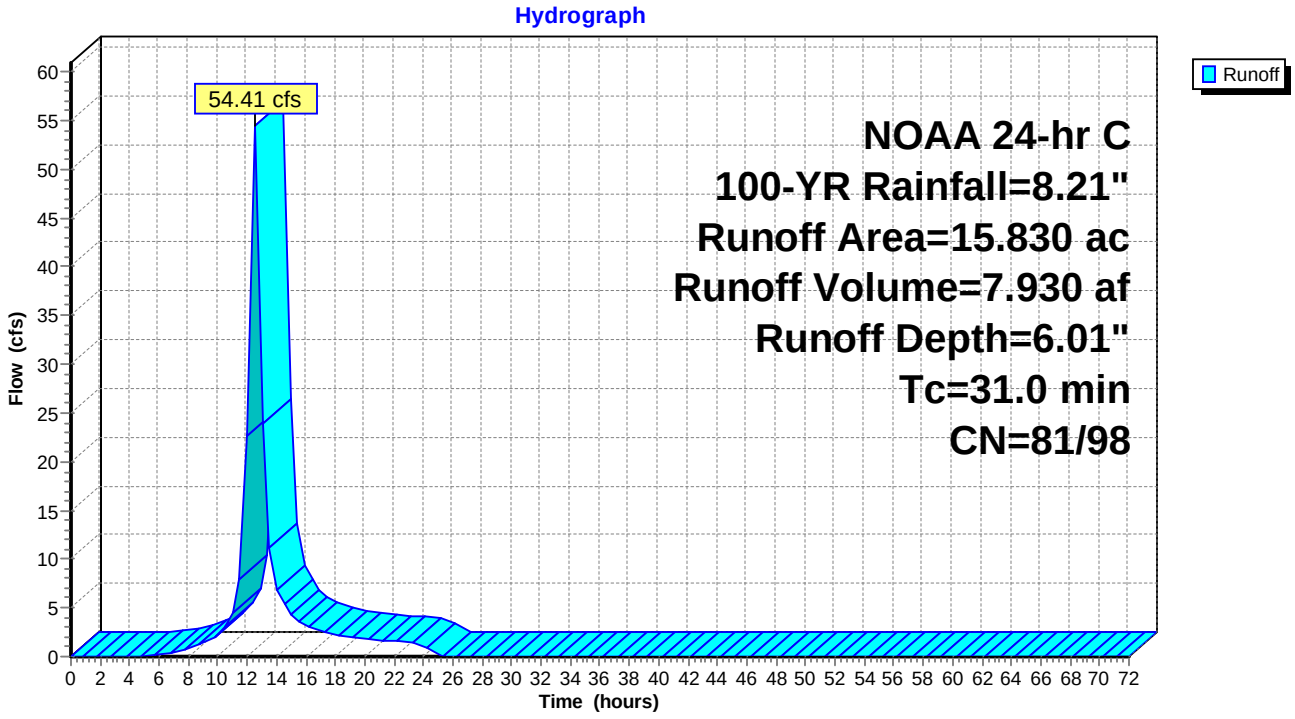
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.50 hrs
NOAA 24-hr C 100-YR Rainfall=8.21"

	Area (ac)	CN	Description
*	0.390	89	Gravel C
*	0.550	98	Impervious D
*	4.690	91	Gravel D
*	7.240	78	Meadow D
*	2.960	73	Brush D
	15.830	82	Weighted Average
	15.280	81	96.53% Pervious Area
	0.550	98	3.47% Impervious Area

54.41 (100-Year Inflow) + 27.21 (50%) = 81.62 cfs
Emergency Spillway Design Capacity

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.0					**Direct Entry, POST- POI #1 Basin**

Subcatchment 2A: POST - POI #1 - Infiltration Basin



APPENDIX F
DRAWINGS
(ATTACHED SEPARATELY)

From: Czapka, Stephen J.
Sent: Thursday, April 4, 2019 3:14 PM
To: Christina.Albizati@dep.nj.gov
Cc: Kellogg, Stephen <Stephen.Kellogg@Williams.com>; Ham, Brian <Brian.Ham@Williams.com>; Mochrie, Sara <SMochrie@ene.com>; Horner, Scott <Scott.Horner@williams.com>; Olson, Karen <Karen.Olson@williams.com>; Sue Quackenbush <squackenbush@amygreene.com>
Subject: CS206 Call-Back Survey

Christina:
As we discussed during the site visit today, attached is the report from the call-back owl surveys conducted in April 2018.
-Steve

Stephen J. Czapka, Certified Wildlife Biologist, Ecology and Environment, Inc.
200 Bendix Road, Suite 250, Virginia Beach, VA 23452 | t: 757-456-5356 ext. 5008 | m: 757-945-9899 | f: 888-350-6877 | www.ene.com

AMY S. GREENE
ENVIRONMENTAL
CONSULTANTS, INC.

April 26, 2018

Stephen J. Czapka, *Certified Wildlife Biologist*
Ecology & Environment, Inc.
200 Bendix Road
Virginia Beach, VA 23452

VIA ELECTRONIC MAIL (sczapka@ene.com)

Re: Results of Diurnal and Nocturnal Woodland Raptor Surveys
Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Proposed New Compressor Station (CS 206)
Block 5.01, Lot 117.02
Franklin Township, Somerset County, New Jersey
ASGECI Project #3980

Dear Mr. Czapka,

This letter serves to describe the results of the woodland raptor nest searches and targeted species call-back surveys performed on April 11, 2018 at the site of the proposed new compressor station (CS 206) associated with the Transcontinental Gas Pipe Line Company, LLC Northeast Supply Enhancement Project. The surveys targeted early nesting species at the site, including red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), and eastern screech-owl (*Megascops asio*).

ASGECI biologists Robert Piel and Liz Dancer conducted a diurnal survey, beginning 30 minutes before sunrise (approx. 6:00am), to document the presence of early nesting raptors, which included searching the area for stick nests and cavities suitable for diurnal or nocturnal raptor species. The survey was performed during calm, clear conditions, as required by protocol. Spotting scopes and binoculars were utilized. No stick nests of suitable size for nesting raptors were found. Two cavities (Cavity 01 and 02) potentially suitable for nesting eastern screech-owl were identified within a forested wetland at the westernmost limits of the proposed access road. Two additional cavities (Cavity 03 and 04) were identified within the eastern portion of the proposed facility footprint; one was potentially suitable for nesting eastern screech-owl and the second was potentially appropriate for great horned owl. No raptors were observed within or near these cavities during the course of the survey.

Because cavities potentially suitable for nesting owls were identified during the diurnal survey, a follow-up call-back survey targeting nocturnal raptors was performed at the site, beginning 30 minutes after sunset (approx. 8:00pm). The survey was performed during calm, clear conditions,

as required by protocol. Surveyors utilized a call playback technique at six (6) survey points, which were distributed throughout the site to increase the likelihood of detecting owls (see Attachment A). Audio files and a mini-vox amplifier were held at approximately 1.5 meter above ground to broadcast the calls. At each survey point, recordings of conspecific calls were broadcast to elicit responses from the target species. Great horned owl calls were broadcast after eastern screech-owl. For each species, a six-minute broadcast was performed, followed by a five-minute listening period. Each six-minute broadcast consisted of six (6) sets of approximately 15-20 seconds of vocalizations, followed by a 45-second silence interval. At each survey point, the direction for each set of broadcasts was reversed 180 degrees. Surveyors recorded the approximate locations of all owls seen and/or heard during surveys.

Eastern screech-owls responded to call-backs at all six survey points, though it is likely that the same birds were detected at multiple point locations. A distinctive call likely belonging to the same individual bird was heard at survey points 04 and 05. Two screech-owls were visually detected immediately west of survey point 01. At least two screech-owls were detected at each survey point. Several continued vocalizing during the great horned owl callbacks. Based on the distribution of the survey point locations across the site and the distances and directions at which the birds were detected, we estimate that between six and eight individual screech-owls were present on or near the site at the time of the survey. One great horned owl was detected at survey point 05, though this bird was located offsite, to the east.

All wildlife encountered during the surveys was recorded (refer to Attachment B). No rare, threatened, or endangered wildlife species were identified. The photo log (Attachment C) depicts portions of the surveyed area, as well as some wildlife/wildlife sign encountered. The attached figure shows the locations of the four potentially suitable cavities found onsite, as well as the six survey points.

If you have any questions regarding the information contained in this report, please contact Jennifer LaStella (ext. 38), Robert Piel (ext. 19), or myself (ext. 22) at (908)-788-9676.

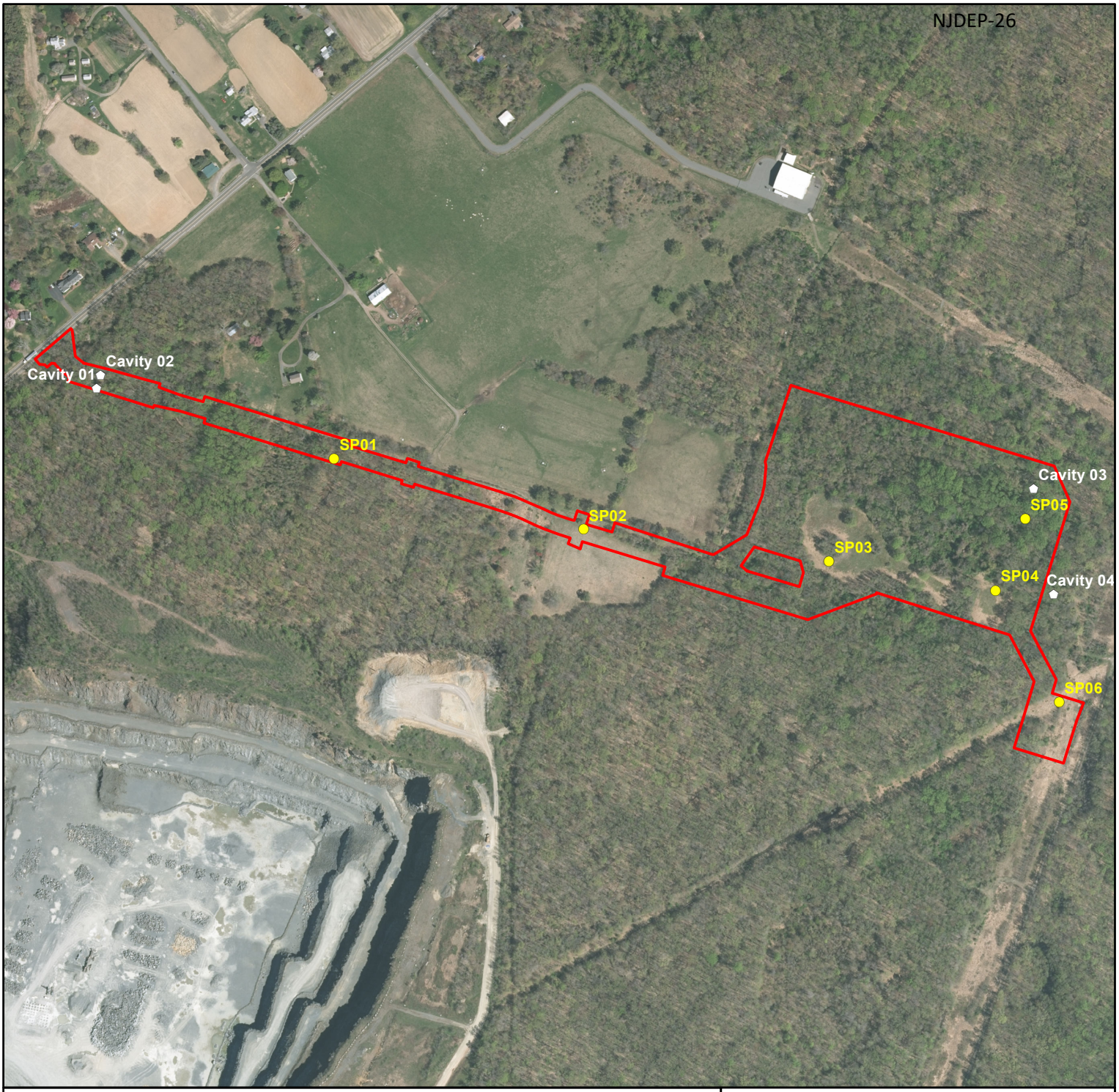
Sincerely,
AMY S. GREENE ENVIRONMENTAL CONSULTANTS, INC.

Liz Dancer, *Environmental Scientist*

LD/JFL
cc: ASGECI: B. Macholdt, S. Quackenbush, J. LaStella, R. Piel, L. Dancer, File #3980

ATTACHMENT A
Results of Diurnal and Nocturnal Woodland Raptor Surveys
Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Proposed New Compressor Station (CS 206)
Block 5.01, Lot 117.02
Franklin Township, Somerset County, New Jersey
ASGECI Project #3980

DIURNAL AND NOCTURNAL RAPTOR SURVEY LOCATION MAP



Legend

- Project Area
- Survey Point
- Potential Nest Location

N
W E
S

Diurnal & Nocturnal Raptor
Survey Location Map

Transcontinental Gas Pipeline Co. LLC
Northeast Supply Enhancement Project
Compressor Station 206
Franklin Township
Somerset County, New Jersey

ASGECI Project #3980

550
Feet

AMY S. GREENE ENVIRONMENTAL CONSULTANTS, Inc.

Sources:
New Jersey 2015 High Resolution Orthophotography, NAD83 NJ State Plane Feet, MrSID Tiles, State of New Jersey - Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), Trenton, NJ, February 2016.

ATTACHMENT B
Results of Diurnal and Nocturnal Woodland Raptor Surveys
Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Proposed New Compressor Station (CS 206)
Block 5.01, Lot 117.02
Franklin Township, Somerset County, New Jersey
ASGECI Project #3980

Diurnal Raptor Survey - List of Observed Wildlife
April 11, 2018
Start Time/Temp: 06:00AM/28°F
End Time/Temp: 11:00AM/48°F
Weather Conditions: Clear, calm.
Sunrise: 06:26AM

Diurnal Raptor Surveys – List of Observed Wildlife		
Common Name	**Scientific Name**	**Comments**
Wild turkey	*Meleagris gallopavo*	
Mourning dove	*Zenaida macroura*	
Red-bellied woodpecker	*Melanerpes carolinus*	
Downy woodpecker	*Picoides pubescens*	
Northern flicker	*Colaptes auratus*	
Pileated woodpecker	*Hylatomus pileatus*	
Fish crow	*Corvus ossifragus*	Flyover flock
Blue jay	*Cyanocitta cristata*	
Eastern phoebe	*Sayornis phoebe*	
Tufted titmouse	*Baeolophus bicolor*	
Carolina chickadee	*Poecile carolinensis*	
White-breasted nuthatch	*Sitta carolinensis*	
Golden-crowned kinglet	*Regulus satrapa*	
Carolina wren	*Thryothorus ludovicianus*	
American robin	*Turdus migratorius*	
Hermit thrush	*Catharus guttatus*	
Northern cardinal	*Cardinalis cardinalis*	
White-throated sparrow	*Zonotrichia albicollis*	
Song sparrow	*Melospiza melodia*	
Field sparrow	*Spizella pusilla*	
Dark-eyed junco	*Junco hyemalis*	
Eastern towhee	*Pipilo erythrophthalmus*	
American goldfinch	*Spinus tristis*	
Gray squirrel	*Sciurus carolinensis*	
White-tailed deer	*Odocoileus virginianus*	Live individuals observed in woods. Scavenged leg and bones also found onsite.
Gray fox	*Urocyon cinereoargenteus*	
Raccoon	*Procyon lotor*	Tracks
Eastern cottontail	*Syvilagus floridanus*	Scat

ATTACHMENT B (cont.)
Results of Diurnal and Nocturnal Woodland Raptor Surveys
Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Proposed New Compressor Station (CS 206)
Block 5.01, Lot 117.02
Franklin Township, Somerset County, New Jersey
ASGECI Project #3980

Nocturnal Raptor Survey – List of Observed Wildlife
April 11, 2018
Start Time/Temp: 08:10PM/46°F
End Time/Temp: 11:00PM/42°F
Weather Conditions: Partly cloudy; initially calm, with SW wind increasing to 1-5mph.
Sunset: 07:33PM

Nocturnal Raptor Surveys – List of Observed Wildlife		
Common Name	**Scientific Name**	**Comments**
Eastern screech-owl	*Megascops asio*	Detected at all six survey point locations
Great horned owl	*Bubo virginianus*	Detected from survey point 05

ATTACHMENT C
Results of Diurnal and Nocturnal Woodland Raptor Surveys
Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Proposed New Compressor Station (CS 206)
Block 5.01, Lot 117.02
Franklin Township, Somerset County, New Jersey
ASGECI Project #3980

PHOTOGRAPHS WITH DESCRIPTIONS

Photo A: View, facing west, showing red maple and sweetgum-dominated forest within southeastern portion of site.

Photo B: View, facing southeast, showing early successional field and forest edge to the south of the existing remnant building foundation.

Photo C: View, facing north, showing hunting stand at western end of early successional field and the approximate location of survey point 03.

Photo D: View, facing north, showing tulip poplar, eastern red cedar, and red maple-dominated forest at northern limits of the proposed facility footprint.

Photo E: View, facing northeast, showing disturbed successional edge habitat at northwestern edge of the proposed facility footprint.

Photo F: View, facing west along proposed access road footprint, showing early successional meadow and approximate location of survey point 02.

Photo G: View, facing west, showing a field sparrow (*Spizella pusilla*) in an early successional meadow.

Photo H: View, facing southwest, showing cavity 01 in a mature tulip poplar at the western limits of the proposed access road footprint.

Photo I: View, facing north, showing cavity 02 in a dead tree.

Photo J: View, facing southeast, showing a Palustrine forested wetland within the western limits of the proposed access road footprint, near the locations of cavities 01 and 02.

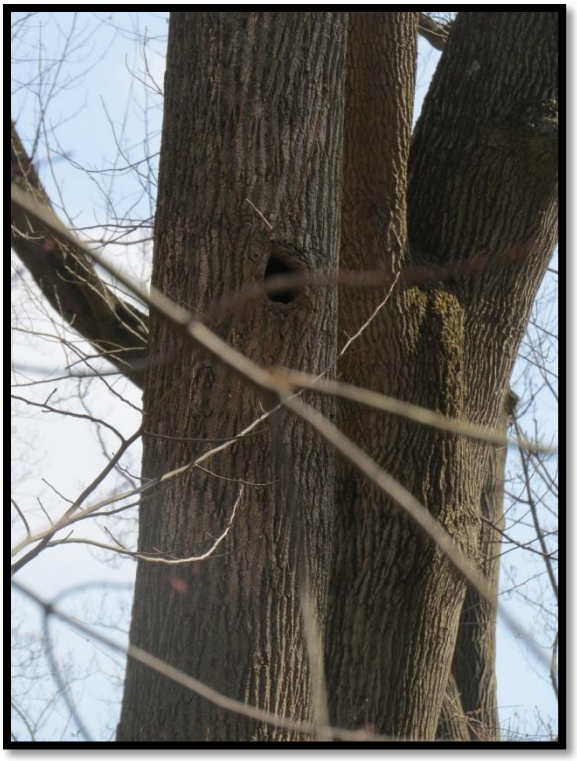


Photo K: View, facing north, showing cavity 03 in a mature tulip poplar tree at the northeast limits of the proposed facility footprint.

From: Resnick, Matthew
To: Mason, Jeffrey A.
Cc: Albizati, Christina
Subject: RE: Northeast Supply Enhancement - Wetland Walkovers
Date: Monday, April 8, 2019 8:02:36 AM

I wonder how Christina got ahold of those numbers then. I don't recall them being on any of the plan sheets.

From: Mason, Jeffrey A. <JMason@ene.com>
Sent: Monday, April 08, 2019 10:00 AM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Albizati, Christina <Christina.Albizati@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] RE: Northeast Supply Enhancement - Wetland Walkovers

Matt,

Thanks for the reply. That is correct, all other wetlands east of Gondeck will be considered exceptional RVC with 150ft transition area.

As for the number sequence "2957 through 2976" they must have come from the civil surveyor's numbering schema on a different plan set that they were reviewing at the time. We actually figured it out through counting the number of flags in the sequence and matching that to this wetland feature which we had already mapped as ordinary resource value with a 50ft transition area. It was the only wetland east of Gondek that was not mapped as exceptional RVC and buffered at 150ft, so it is the only location/wetland where this would have made any logical sense for them to call out as an exception to the rest of the wetland mapping east of Gondeck.

Thanks,

Jeff

Jeffrey A. Mason, PWS, CERP
Chief Environmental Scientist
368 Pleasant View Dr. Lancaster, NY. 14086
Phone: 716-684-8060 • Cell: 716-462-2543
jmason@ene.com • www.ene.com

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Monday, April 8, 2019 9:21 AM
To: Mason, Jeffrey A. <JMason@ene.com>; Albizati, Christina <Christina.Albizati@dep.nj.gov>
Cc: Mochrie, Sara <SMochrie@ene.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: RE: Northeast Supply Enhancement - Wetland Walkovers

Thanks Jeffery, I'm forwarding this to Christina and I showed it to her. I'll let her make the final call,

but on a short review, she agreed that calling out this finger of the larger wetland as intermediate RVC with a 50' TA was appropriate given the disturbed nature it has being within the currently cleared ROW.

Can you clarify something? The numbers she had originally cited 2957 through 2976, where did they come from? They don't seem to align with the existing numbering system? I just want to make it clear for the record. If I'm understanding the rest of the email correctly, then we are agreed that the rest of the wetlands east of Gondeck will be exceptional, and Christina will confirm that.

From: Resnick, Matthew
To: Mochrie, Sara
Cc: Jones, Christopher
Subject: Updating Transco FWW Compliance Statement
Date: Thursday, April 11, 2019 7:40:51 AM

Sara,

In light of the potential Barred Owl habitat finding at CS 206, we need to be proactive in regards to updating the Freshwater Wetlands Individual Permit compliance statement since there is not much time left in the review period. While no formal decision has been made, can your team please update the environmental report with the assumption that the wetlands surrounding CS 206 are suitable Barred Owl habitat with an exceptional RVC Transition Area. Specifically the alternatives analysis for CS 206 will need to be updated to address 7:7A-10.2(b)3 and 7:7A-10.4(a)1 and 2, with additional detail needed to address compelling public need, and an alternative analysis will need to be updated for the Stormwater Management basin addressing why the basin cannot be relocated. Also please have the site plans and TA impact numbers updated to reflect the change in buffer.

From: Mochrie, Sara
Sent: Wednesday, May 1, 2019 4:42 PM
To: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Albizati, Christina <Christina.Albizati@dep.nj.gov>; Torok, Larry <Larry.Torok@dep.nj.gov>; Ham, Brian <Brian.Ham@Williams.com>; Eakin,Megan <MEakin@ene.com>; Perry, Katharine <KPerry@ene.com>; Albers, Meghan <MAlbers@ene.com>; Czapka, Stephen J. <SCzapka@ene.com>; Richard Scott <rscott@rutterroy.com>; Merz, Dan <Dan.Merz@Williams.com>; Kellogg, Stephen <Stephen.Kellogg@Williams.com>; Dow, Diane <Diane.Dow@dep.nj.gov>; Sundar, Nischint <NSundar@ene.com>; Schooling, Jason <jschooling@psands.com>; Olson, Karen <Karen.Olson@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: NESE Barred Owl 5_1_19

Chris and Matt,

Attached please find the barred owl submittal which is premised on the record that was accepted and communicated to the NESE Project team.

Permit plans were delivered to your office today and will be delivered to the municipalities tomorrow.

Please give me a call if we need to discuss.

Thanks,
Sara

Sara Mochrie, *Principal-Regional Manager*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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From: Olson, Karen <Karen.Olson@williams.com>
Sent: Wednesday, May 1, 2019 1:24 PM
To: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Albizati, Christina <Christina.Albizati@dep.nj.gov>; Torok, Larry <Larry.Torok@dep.nj.gov>; Ham, Brian <Brian.Ham@Williams.com>; Eakin,Megan <MEakin@ene.com>; Perry, Katharine <KPerry@ene.com>; Albers, Meghan <MAlbers@ene.com>; Czapka, Stephen J. <SCzapka@ene.com>; Richard Scott <rscott@rutterroy.com>; Merz, Dan <Dan.Merz@Williams.com>; Kellogg, Stephen <Stephen.Kellogg@Williams.com>; Dow, Diane <Diane.Dow@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Subject: RE: Barred Owl sighting

Hi Chris,

The FWW application updates based on the acceptance of the barred owl report will be submitted today and provided to the municipal offices.

The Dam Safety Permit application was delivered to the municipal offices this morning.

Thanks,
Karen

Karen Olson | Environmental Specialist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Sent: Wednesday, May 1, 2019 11:22 AM
To: Mochrie, Sara <SMochrie@ene.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Albizati, Christina <Christina.Albizati@dep.nj.gov>; Torok, Larry <Larry.Torok@dep.nj.gov>; Olson, Karen <Karen.Olson@williams.com>; Ham, Brian <Brian.Ham@Williams.com>; Eakin,Megan <MEakin@ene.com>; Perry, Katharine <KPerry@ene.com>; Albers, Meghan <MAlbers@ene.com>; Czapka, Stephen J. <SCzapka@ene.com>; Richard Scott <rscott@rutterroy.com>; Merz, Dan <Dan.Merz@Williams.com>; Kellogg, Stephen <Stephen.Kellogg@Williams.com>; Dow, Diane <Diane.Dow@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Subject: [EXTERNAL] RE: Barred Owl sighting

Joe,

It is my understanding that Transco was waiting to update the freshwater wetlands alternatives analysis until the barred owl sighting was accepted by the NJDEP Division of Fish & Wildlife. Now that the sighting has been accepted, can you update the Freshwater Wetlands Individual Permit application to address N.J.A.C. 7:7A-10.4 *Additional requirements for a non-water dependent activity in exceptional resource*

value wetlands or trout production waters? Please submit this information ASAP and be sure to provide the municipalities with a copy of the updated information.

Also, I understand that Transco has submitted an application for a Dam Safety Permit for the CS 206 detention basin. A copy of that application should also be provided to the municipalities.

Please don't hesitate to contact me if you have any questions.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

From: Heilferty, John
Sent: Tuesday, April 30, 2019 6:40 PM
To: Mochrie, Sara <SMochrie@ene.com>
Cc: Albizati, Christina <Christina.Albizati@dep.nj.gov>; Torok, Larry <Larry.Torok@dep.nj.gov>; Olson, Karen <Karen.Olson@williams.com>; Ham, Brian <Brian.Ham@Williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Eakin,Megan <MEakin@ene.com>; Perry, Katharine <KPerry@ene.com>; Albers, Meghan <MAlbers@ene.com>; Czapka, Stephen J. <SCzapka@ene.com>; Richard Scott <rscott@rutterroy.com>; dan.merz@williams.com; Kellogg, Stephen (Stephen.Kellogg@Williams.com) <Stephen.Kellogg@Williams.com>
Subject: RE: Barred Owl sighting

Yes – Earlier this afternoon, I briefed Chris, DLUR Director Diane Dow and others internally of our findings, and started a reply to Steve Czapka as well … Copying, pasting and finishing that here as there appear to be additional persons copied than from Steve and my earlier correspondence.

The Endangered and Nongame Species Program (ENSP) has reviewed the sighting report form you referenced below and has accepted it for inclusion into New Jersey's Biotics database. The observation will be added to the state's database of endangered, threatened and special concern wildlife species sightings and will eventually be reflected in New Jersey's Landscape Project mapping.

You have requested a copy of the sighting report form. Typically, portions of records containing the precise location of endangered and/or threatened animal species are not considered to be records subject to disclosure under the Open Public Records Act or its implementing regulations, nor otherwise released by the ENSP per standard business practice. However, exceptions are made pursuant to N.J.A.C. 7:1D-3.2(a)3i(1) in cases where such data is requested by a property owner upon who's land any such sighting has been reported. Among the issues I sought resolution to this afternoon with DLUR staff was whether Williams/Transco was in fact the owner of the property upon which the regulated activities are proposed, or whether the property was owned by a third party with an easement agreement of some form.

It is my present understanding that Williams does in fact own property at the site. I am also taking the

position that the sighting report form satisfies the requirement that a barred owl was in fact located on property presently owned by Williams/Transco at the time its vocalizations were heard, and that for this reason the Department should be compelled to share the sighting report form with Williams/Transco either via a formal OPRA request or via standard business practice adhering to similar standards.

Accordingly, I will ask that a representative of Williams/Transco confirm in writing and address to my attention (feel free to transmit electronically) the specific tax parcels owned at the subject site. Further, please copy and paste the following statement into said correspondence, and indicate that by the Williams/Transco representative's signature of said correspondence, that Williams/Transco agrees to abide by the following requirement regarding data confidentiality:

"We fully understand that as a property owner who has requested records not typically subject to public disclosure that we would *only* be permitted to share the records or disclose the information requested herein with our authorized agent(s) (such as an attorney, environmental consultant or engineer) and only to the extent necessary to prepare and submit an application to the Department or any other governmental regulatory authority for a permit, approval, authorization, or other determination. We agree to keep the precise location of any endangered and/or threatened animal species confidential. Should the sighting report form requested be shared with Williams/Transco, we agree not to share or disseminate the information to any other persons for any other reasons without the prior consent of the Department."

Please feel free to make minor edits to that statement as you may find necessary, discussing anything significant with me prior to submission. Upon receipt of the requested correspondence, including clear acceptance of the data confidentiality requirement, I will produce electronically a copy of the requested sighting report form, redacted consistent with the criteria established at N.J.A.C. 7:1D-3.2(a)3i(3). Please let me know if you have any questions or concerns.

Best regards,

John H. Heilferty, Acting Chief
Endangered and Nongame Species Program
NJ Division of Fish and Wildlife
(609) 292-9400 (main line)
(609) 292-9101 (desk)
www.NJFishandWildlife.com/ensphome.htm

We Manage New Jersey's Fish & Wildlife

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Tuesday, April 30, 2019 5:34 PM
To: Heilferty, John <John.Heilferty@dep.nj.gov>
Cc: Albizati, Christina <Christina.Albizati@dep.nj.gov>; Torok, Larry <Larry.Torok@dep.nj.gov>; Olson, Karen <Karen.Olson@williams.com>; Ham, Brian <Brian.Ham@Williams.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Eakin,Megan <MEakin@ene.com>; Perry, Katharine <KPerry@ene.com>; Albers, Meghan <MAlbers@ene.com>; Czapka, Stephen J. <SCzapka@ene.com>; Richard Scott <rscott@rutterroy.com>; dan.merz@williams.com; Kellogg, Stephen (Stephen.Kellogg@Williams.com) <Stephen.Kellogg@Williams.com>
Subject: [EXTERNAL] RE: Barred Owl sighting

John,

Chris Jones provided an update this afternoon indicating the record for the barred owl has been accepted. Following that outcome for the review, can you provide a copy of the sighting report at your earliest convenience.

Thanks in advance,
Sara

Sara Mochrie, *Principal-Regional Manager*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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From: Heilferty, John <John.Heilferty@dep.nj.gov>
Sent: Wednesday, April 17, 2019 4:17 PM
To: Czapka, Stephen J. <SCzapka@ene.com>
Cc: Albizati, Christina <Christina.Albizati@dep.nj.gov>; Torok, Larry <Larry.Torok@dep.nj.gov>; Olson, Karen <Karen.Olson@williams.com>; Ham, Brian <Brian.Ham@Williams.com>; Mochrie, Sara <SMochrie@ene.com>
Subject: RE: Barred Owl sighting

Stephen: We've discussed our initial assessment regarding this sighting with DLUR's E&T Unit staff

and understand that ENSP's formal review is appreciated for the record. So we are expediting our Biotics review and will advise you and DLUR as to the final decision ASAP. At that time we will send a copy of the sighting report form in a manner consistent with OPRA standards.

John H. Heilferty, Acting Chief
Division of Fish and Wildlife
Endangered and Nongame Species Program
(609) 292-9400 (main line)
(609) 292-9101 (desk)
www.NJFishandWildlife.com/ensphome.htm

We Manage New Jersey's Fish & Wildlife

From: Czapka, Stephen J. <SCzapka@ene.com>
Sent: Monday, April 15, 2019 4:08 PM
To: Heilferty, John <John.Heilferty@dep.nj.gov>
Cc: Albizati, Christina <Christina.Albizati@dep.nj.gov>; Torok, Larry <Larry.Torok@dep.nj.gov>; Olson, Karen <Karen.Olson@williams.com>; Ham, Brian <Brian.Ham@Williams.com>; Mochrie, Sara <SMochrie@ene.com>
Subject: [EXTERNAL] Barred Owl sighting

John,
Transco has asked me to follow-up with you regarding the Barred Owl sighting report near the proposed Compressor Station 206 site in Franklin Township, Somerset County, NJ.

Has a final decision been made regarding the acceptance of that report? If so, can you let us know the results of that decision? If not, can you tell us when a decision is expected?

If the sighting is, or has been, accepted, could you please provide a copy of the sighting report that was submitted?

Thank you,
Steve

Stephen J. Czapka, Certified Wildlife Biologist, Ecology and Environment, Inc.
200 Bendix Road, Suite 250, Virginia Beach, VA 23452 | t: 757-456-5356 ext. 5008 | m: 757-945-9899 | f: 888-350-6877 | www.ene.com

This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.

Transcontinental Gas Pipe Line Company, LLC
Land, Permits & GIS Department
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

May 1, 2019

Christopher Jones
New Jersey Department of Environmental Protection
Department of Land Use Regulation
Bureau of Urban Growth and Redevelopment
501 East State Street
Mail Code 501-02A
Trenton, New Jersey 08625

Reference: Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Response to email dated March 28, 2019 Request for Freshwater Wetland Permit
DLUR File No. 0000-01-1001.3

Dear Mr. Jones:

On April 1, 2019, Transcontinental Gas Pipe Line Company, LLC (Transco) received notification from your office of a report of a state threatened species (barred owl [*Strix varia*]) associated with the property proposed for Compressor Station 206 as part of Transco's Northeast Supply Enhancement Project (NESE).

As part of the review of this report, a site visit with Transco and Division of Land Use Regulation, Threatened and Endangered Species Unit staff took place on April 4, 2019. During the site visit, which lasted approximately 2-hours, potential barred owl habitat at the Compressor Station 206 site was evaluated. No barred owls were noted during the site visit. However, certain palustrine forested (PFO) wetlands were determined to be potentially suitable habitat. The report was accepted as a confirmed siting by the Endangered Species and Nongame Program (ENSP) on April 30, 2019.

The confirmed presence of the barred owl and/or its habitat has resulted in the reclassification of the PFO wetlands on the Compressor Station 206 site from intermediate resource value wetlands to exceptional resource value wetlands per N.J.A.C. 7:7A-3.2(b). Therefore, Transco has compiled the attached package for review.

This submittal includes the following:

- An updated narrative addressing the requirements set forth in N.J.A.C. 7:7A-10.2(b);
- A narrative addressing the requirements set forth in N.J.A.C. 7:7A-10.4;

NJDEP
April 30, 2019

- Supplemental Information regarding the siting of the infiltration basin; and
- A Revised Fresh Water Wetland (FWW) plan set for Compressor Station 206.

Transco has reviewed the PFO wetlands that were delineated beyond the limit of disturbance (LOD) to allow for the additional buffering and the creation of the new 150-ft transition areas associated with the re-classified wetlands. The updated Compressor Station 206 permit plans provided on May 1, 2019, under separate cover, reflect the 150-ft buffer change.

Please consider this letter information in advance of the record decision to facilitate continued review of permit documents.

Respectfully,

Transcontinental Gas Pipe Line Company, LLC.

Joseph Dean
Manager, Environmental Permitting, Atlantic-Gulf Operating Area

cc: Matthew Resnick, NJDEP Land Use

Attachment 1: Updated Freshwater Wetland Application narrative and Supplemental Information regarding the Compressor Station 206 infiltration basin
Attachment 2: NJDEP Land Use Permit Plans for the Northeast Supply Enhancement Project Proposed Compressor Station 206 (in-person delivery)

Comment: In light of the potential Barred Owl habitat finding at CS 206, we need to be proactive in regards to updating the Freshwater Wetlands Individual Permit compliance statement since there is not much time left in the review period. While no formal decision has been made, can your team please update the environmental report with the assumption that the wetlands surrounding CS 206 are suitable Barred Owl habitat with an exceptional RVC Transition Area. Specifically the alternatives analysis for CS 206 will need to be updated to address 7:7A-10.2(b)3 and 7:7A-10.4(a)1 and 2, with additional detail needed to address compelling public need, and an alternative analysis will need to be updated for the Stormwater Management basin addressing why the basin cannot be relocated. Also please have the site plans and TA impact numbers updated to reflect the change in buffer.

Response:

Freshwater Wetlands Permit Application Update: Section 4.3 and 4.4, and Section 5

Transco has prepared this narrative per the acceptance of the report of the barred owl (*Strix varia*) by New Jersey Department of Environmental Protection (NJDEP) Division of Fish and Wildlife (DFW) Endangered Species and Nongame (ENSP) Program, resulting in reclassification of the palustrine forested (PFO) wetlands on the Compressor Station 206 site from intermediate resource value wetlands to exceptional resource value wetlands per N.J.A.C. 7:7A-3.2(b).

Section 4: STANDARD REQUIREMENTS FOR ALL INDIVIDUAL PERMITS (N.J.A.C. 7:7A-10.2)
The following is a description of how the proposed Project will comply with the standard requirements for all individual permits:

N.J.A.C. 7:7A-10.2(b) The Department shall issue an individual freshwater wetlands or open water fill permit only if the regulated activity:

1. Has no practicable alternative which would meet the requirements at (b)1i and ii below:
i. The alternative would have a less adverse impact on the aquatic ecosystem or would not involve a freshwater wetland or State open water; and

ii. The alternative would not have other significant adverse environmental consequences, that is, it shall not merely substitute other significant environmental consequences for those attendant on the original proposal.

As detailed in Transco's June 2018 application for a Freshwater Wetlands (FWW) permit, Transco used a multi-tiered approach to identify the most suitable site for Compressor Station 206. The analysis resulted in five (5) site alternatives: site numbers 1, 2, 3, 8, and 27. Site 3 was chosen as the preferred alternative. With the acceptance by NJDEP DFW ENSP of the barred owl report and forested wetlands within and surrounding the Compressor Station 206 site are deemed suitable foraging habitat, Transco is providing the following information related to the five (5) site alternatives.

To calculate the total area of suitable forested wetland habitat surrounding the Compressor Station 206 site, Transco utilized the Land Use/Land Cover wetland types identified for barred owl in Appendix V of the *New Jersey Landscape Project, Version 3.3*. This resulted in approximately 381 acres of forested wetlands as suitable barred owl foraging habitat within the contiguous area

surrounding the proposed Compressor Station 206 site. Compressor Station 206 alternative sites 2, 8, and 27 also occur within the contiguous habitat area, and as such constitute suitable barred owl foraging habitat. Per N.J.A.C. 7:7A-3.2, wetlands that contain suitable habitat for threatened or endangered species are classified as exceptional resource value wetlands, and as such warrant a transition area of 150 feet. Although Compressor Station 206 alternative site 1 is outside of the defined contiguous habitat area for the barred owl, the impacts to PFO wetlands are still greater relative to the proposed Compressor Station 206 site.

As shown in Table 4.1-1 of Appendix A, Alternatives Analysis, of Transco's June 2018 FWW application, sites 1, 2, and 27 impact more PFO wetlands relative to site 3, and therefore result in greater impacts to wetlands than the proposed Compressor Station 206 site.

Site 8 would result in fewer acres of permanent wetland impacts than site 3, though site 8 would need to be constructed within open water features, which are presumed to be jurisdictional under the Flood Hazard Area Control Act. Further, due to the location of site 8 relative to the mainline, increased impacts associated with the launch/receiver facility to forested wetlands and/or residential areas, as described in Transco's FWW application, would occur.

3. Will not destroy, jeopardize or adversely modify a present or documented habitat for threatened or endangered species; and shall not jeopardize the continued existence of a local population of a threatened or endangered species, as defined at N.J.A.C. 7:7A-1.3; *and*

4. Will not be likely to result in the destruction or adverse modification of a habitat which is determined by the Secretary of the United States Department of the Interior or the Secretary of the U.S. Department of Commerce, as appropriate, to be a critical habitat under the Endangered Species Act of 1973, 16 U.S.C. § 1531 et seq.

A sighting of the NJ State-threatened barred owl was reported to the NJDEP ENSP in March 2019. The reported sighting occurred in the forested area to the east of the proposed Compressor Station 206 site. This barred owl record did not exist in May 2016, when Transco's consultation with NJDEP was initiated. A review of NJ Landscape Project and correspondence with the NJ Natural Heritage Program (NHP) did not identify the presence of barred owl or suitable habitat for barred owl as documented on or near Compressor Station 206 (dated June 23, 2017: Appendix E of Transco's June 2018 FWW Application).

Following submission of the barred owl record to NJDEP ENSP, The NJDEP Division of Land Use Regulation (DLUR), Threatened and Endangered Species Unit, conducted a site inspection of the proposed Compressor Station 206 site on April 4, 2019. DLUR biologists determined that the forested wetlands within and surrounding the Compressor Station 206 site contain suitable foraging habitat for barred owl, and with acceptance of the barred owl record by ENSP, onsite PFO wetlands will be classified as exceptional resource value wetlands, subject to 150 ft transition areas.

In order to protect all migratory birds at the Compressor Station 206 site during the breeding season, including any potential barred owls, Transco will not clear trees or shrubs from March 1 through August 31. Transco has determined that the Project would remove 2.73 acres of forested wetlands (i.e., potentially suitable barred owl foraging habitat) for construction of proposed Compressor Station 206. Given the total of approximately 381 acres of identified forested wetlands within the contiguous area surrounding the proposed Compressor Station 206 site, the clearing of 2.73 acres of suitable foraging habitat is not expected to jeopardize the continued existence of the local population.

As previously stated, Compressor Station 206 alternative sites 2, 8, and 27 also occur within the contiguous habitat area. Each of these alternatives contains more forested wetlands than the proposed Compressor Station 206 site. Therefore, selection of one of these alternatives for construction of the compressor station would have a greater impact on potential barred owl habitat. The total area of potentially suitable forested wetland habitat was calculated using the contiguous area of the Land Use/Land Cover wetland types identified for barred owl in Appendix V of the *New Jersey Landscape Project, Version 3.3*.

The Project will not result in adverse modification of barred owl habitat because the Compressor Station 206 site is adjacent to and contains areas of previously and/or actively disturbed areas. The Higgins Farm Superfund Site, which is primarily pastureland, is adjacent to the Compressor Station 206 site to the north and west; the Trap Rock Quarry is located south of the Compressor Station 206 site; and, the eastern portion of the proposed access road, along with the central portion of the Compressor Station footprint have been previously cleared. Barred owls typically shun human activity by avoiding residential, agricultural, industrial, or commercial areas. In northern New Jersey, barred owls favored sites that were at least 500 meters (1,640 feet) from human habitation and had little or no forest clearings or trails (NJDEP n.d.[1]).

Additionally, the Compressor Station 206 site contains few trees of suitable size for nesting. In studies of barred owl, mean nest tree diameter-at-breast height (dbh) ranged from 18.7 to 24 inches (Mazur and James 2000[2]). The Compressor Station 206 site has been identified as not providing suitable nesting habitat for barred owl. As described above, more preferable habitat conditions (e.g., further distance from disturbance, more suitably-sized nest trees) occur in the surrounding contiguous area, outside of the Compressor Station 206 site. Additionally, barred owls have large home ranges. In eastern North America, documented home range sizes for barred owls range from 213 to 914 acres (NJDEP n.d.). Therefore, the removal of 2.73 acres of suitable wetland foraging habitat on the periphery of the larger, contiguous, forested area is unlikely to have an impact on the owls' ability to find food and successfully raise young.

7:7A-10.4 Additional requirements for a non-water dependent activity in exceptional resource value wetlands or trout production waters

a. If an applicant proposes a non water-dependent activity in wetlands of exceptional resource value or in trout production waters, the applicant, in addition to complying with all other requirements in this subchapter, shall also demonstrate either:

1. That there is a compelling public need for the proposed activity greater than the need to protect the freshwater wetland or trout production water, and that the need cannot be met by essentially similar projects in the region which are under construction or expansion, or which have received the necessary governmental permits and approvals; or

As previously described in Transco's June 2018 FWW Application, Transco proposes to construct, install, and operate the Project facilities to provide 400,000 dekatherms per day

[1] New Jersey Department of Environmental Protection (NJDEP). n.d. New Jersey Division of Fish & Wildlife, New Jersey's Endangered and Threatened Wildlife, Barred Owl, *Strix varia*. Accessed at: https://www.njfishandwildlife.com/ensp/pdf/end-thrtened/barredowl.pdf. Accessed on April 17, 2019.

[2] Mazur, K.M., and P.C. James. 2000. Barred Owl (*Strix varia*), version 2.0. In The Birds of North America (A.F. Poole and F.B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bna.508.

(Dth/d) of incremental firm transportation capacity to National Grid from Compressor Station 195 through the Rockaway Transfer Point to supply National Grid's existing service territory.

Transco's existing natural gas transportation system currently supplies natural gas to the New York City metropolitan region via National Grid's existing receipt points. Transco's New York Bay Expansion project, which went into service in 2017, provides National Grid with 50,000 Dth/d at the Narrows meter station and 65,000 Dth/d at the Rockaway Transfer Point and satisfied supply needs for the 2017/2018 heating season. However, National Grid has forecasted a net need for additional natural gas supply to meet residential and commercial demands due to population and market growth within its service territory. National Grid has identified that this additional supply is needed because current forecast models for residential and commercial customer requirements indicate an increasing peak day demand year over year. As such, incremental upstream capacity will be needed to meet these requirements.

The Federal Energy Regulatory Commission (FERC or Commission) issued its Final Environmental Impact Statement (EIS) on January 25, 2019, fulfilling its requirements of the National Environmental Policy Act of 1969 (NEPA) and the Commission's implementing regulations under Title 18 of the Code of Federal Regulations Part 380 (18 CFR 380). Transco expects Commission approval (i.e., a Certificate of Public Convenience and Necessity [Certificate]) in May 2019 which will include the Commission's finding that the Project is in the public need.

On April 2, 2019 National Grid commented on the FERC Docket (Accession Number 20190402-5186) confirming its continued support for the Project and requesting FERC issue a Certificate of Public Convenience and Necessity for the Project no later than April 5, 2019, stating that "*Any delays may jeopardize National Grid's ability to adequately address the residential and commercial demand across its existing service territory*." National Grid also stated that "*This Project is also supported by public policy – including New York City's mandate that building owners convert from heavy heating oil to natural gas. Indeed, the NESE Project will allow us [National Grid] to continue converting thousands of customers each year from heavy fuels to cleaner natural gas. The record in this proceeding amply demonstrates that the Project is in the public interest and warrants the Commission's approval*."

Furthermore, as described in Transco's June 2018 Alternatives Analysis, Transco used hydraulic modeling to determine the system constraints along the existing Transco gas pipeline system and the modifications to Transco's existing infrastructure necessary to transport the 400,000 Dth/d required by the Project. The modifications identified by the hydraulic modeling comprise the components of the Project including the Quarryville Loop, Madison Loop, Raritan Bay Loop, modifications to Compressor Station 200, and Compressor Station 206. Based on the alternatives analysis conducted for the NESE Project there is no other feasible alternative that meets the purpose and need, and no practicable alternative to any of the Project components.

For these reasons, Transco submits that the Project will satisfy a compelling public need as required by the Freshwater Wetlands Protection Act Rules. See Del. Riverkeeper Network v. Sec'y Pa. Dept. of Envtl. Prot., 833 F.3d 360, 380 (3d Cir 2016)(holding that NJDEP appropriately determined that the compelling public need for the project outweighed the impact on exceptional resource value wetlands).

2. That denial of the permit would impose an extraordinary hardship on the applicant brought about by circumstances peculiar to the subject property.

On June 23, 2017, Transco submitted an application to NJDEP DLUR requesting a FWW Individual Permit. In order to provide NJDEP with additional time to comply with the timeframes by which it must act on Transco's request for a Water Quality Certification pursuant to Section 401(a)(1) of the Clean Water Act, 33 U.S.C §1341(a)(1), Transco withdrew these applications from NJDEP review on June 15, 2018. Transco resubmitted its request for the aforementioned permit and corresponding permit application on June 20, 2018.

As set forth in Transco's FWW Application, the vast majority of impacts to wetlands associated with proposed Compressor Station 206 are a result of the construction and operation of the proposed access road and suction and discharge piping (identified within the area of "Utility Crossing D" in Transco's permit plans). These two components are absolutely necessary for the construction, operation and maintenance of Compressor Station 206 and, therefore, the Project as a whole. Without the access road, Transco cannot access the property on which Compressor Station 206 would be built. And, as detailed in Transco's FWW Application and subsequent submittals to NJDEP, there is no practicable alternative to the proposed access road that would have less impacts on regulated features.

Moreover, in order for Compressor Station 206 to function, it must tie into Transco's existing pipelines. As detailed in Transco's FWW Application, the tie-in assembly can only be installed into straight segments of pipe; therefore, siting the tie-in assembly upstream (northeast) of where currently proposed is not possible due to the presence of bends in Mainlines A and C. Siting the tie-in assembly downstream (southwest) would increase the length of suction and discharge piping and associated wetland impacts. There is no practicable alternative to the location of the tie-in and suction and discharge piping that would have less impacts on regulated features.

Accordingly, the location of Transco's existing pipelines on the Compressor 206 site and the landlocked nature of the property, coupled with the fact there are no practicable alternatives that would have lesser environmental impacts, necessarily require the limited impacts to these wetlands. Transco has established in its FWW Application and subsequent submittals to NJDEP that it has avoided and minimized impacts to regulated areas, including wetlands, to the greatest extent practicable.

The denial of Transco's FWW Application due to impacts to wetlands that are now considered to be exceptional resource value just prior to the anticipated issuance of the FERC Certificate would constitute an extraordinary hardship for Transco. It is unlikely that Transco could identify an acceptable alternate site for Compressor Station 206 since, based on the extensive alternatives analysis conducted, all sites identified to date are either not practicable or would have greater environmental impacts when compared to Transco's current proposal.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
Northeast Supply Enhancement Project
Responses to NJDEP Questions dated April 11, 2019

Compressor Station 206 Infiltration Basin Siting Analysis

Transco sited the proposed infiltration basin for Compressor Station 206 in accordance with N.J.A.C. 7:8-5.3 and taking into account the existing hydrology of the site in evaluating practicable alternatives. The topography and drainage patterns at the site are such that the majority of the stormwater runoff from the site flows east towards Carters Brook thereby limiting the potential locations where the basin could be sited to the eastern portion of the site. Groundwater sampling of the site indicated that the northeastern portion of the site has a high water table which will not facilitate infiltration. Additionally, Transco's wetland delineation identified the presence of wetlands in the northeastern portion of the site. As such, the potential location for the basin was limited to the general area where it is currently planned. The proposed basin location minimizes direct impacts to wetlands while accommodating the anticipated volume of stormwater runoff that may be generated by the Project without the need for significant grading and additional impacts that would be necessary if the basin were sited elsewhere within the site.

For additional information regarding the alternatives analysis for Compressor Station 206, please see the information provided above.

From:	Mochrie, Sara
To:	Resnick, Matthew; Jones, Christopher
Cc:	Olson, Karen; Eakin,Megan; Sundar, Nischint; Albers, Meghan; Perry, Katharine; "SuLin.Jaaskelainen@williams.com"; Richard Scott; dan.merz@williams.com; Horner, Scott (Scott.Horner@williams.com); "Dean, Joseph" (Joseph.Dean@Williams.com)
Subject:	RE: Errata for Transco
Date:	Monday, April 29, 2019 9:03:19 AM

Thanks for confirming Matt

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Monday, April 29, 2019 9:31 AM
To: Mochrie, Sara <SMochrie@ene.com>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Eakin,Megan <MEakin@ene.com>; Sundar, Nischint <NSundar@ene.com>; Albers, Meghan <MAlbers@ene.com>; Perry, Katharine <KPerry@ene.com>; 'SuLin.Jaaskelainen@williams.com' <SuLin.Jaaskelainen@williams.com>; Richard Scott <rscott@rutterroy.com>; dan.merz@williams.com; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>
Subject: RE: Errata for Transco

Thank you Sara, the plans were received last week. Ill go through them and the attachment first thing today.

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Friday, April 26, 2019 4:11 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Eakin,Megan <MEakin@ene.com>; Sundar, Nischint <NSundar@ene.com>; Albers, Meghan <MAlbers@ene.com>; Perry, Katharine <KPerry@ene.com>; 'SuLin.Jaaskelainen@williams.com' <SuLin.Jaaskelainen@williams.com>; Richard Scott <rscott@rutterroy.com>; dan.merz@williams.com; Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; 'Dean, Joseph' (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>
Subject: [EXTERNAL] RE: Errata for Transco

Matt and Chris,

Attached please find supplemental information which supports the plans NJDEP received today for Madison Loop and includes responses to other questions you have sent via email.
You will also be receiving CD to support OPRA requests.

Under separate cover, another letter will be provided on Monday 4/29, which supports the plans for CS 206 which at this time are only for consideration by NJDEP while the review of the barred owl record is still pending.

All appropriate municipality notifications have been made for the Madison Loop plans and the

supplemental information.

Please feel free to call me with any questions.

Thanks,
Sara

Sara Mochrie, *Principal*
368 Pleasant View Drive Lancaster, NY 14086
Phone: 716-684-8060 • Cell: 716-984-0349
smochrie@ene.com • www.ene.com

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From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Friday, April 26, 2019 1:42 PM
To: Mochrie, Sara <SMochrie@ene.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: Errata for Transco

Sara,

It looks like the revised plans for CS206 and the Madison loop showed up in our Mail room today. Haven't had a chance to go over it. I just wanted to remind you, that since this information is likely to be opra requested, can you please provide another cd with the new submission materials? It should include the revised plans any updated reports, etc.

Transcontinental Gas Pipe Line Company, LLC
Land, Permits & GIS Department
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

April 26, 2019

Matthew Resnick
New Jersey Department of Environmental Protection
Division of Land Use Regulation
501 East State Street
Mail Code 501-02A, P.O. Box 420
Trenton, NJ 08625-0420

Re: Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Supplemental Information for Flood Hazard Area Individual Permit, Flood Hazard Area Verification. Freshwater Wetlands Individual Permit, Waterfront Development Permit (Upland & In-Water), Coastal Wetland Permit LUR File No. 0000-01-1001.3: FHA180001, FHA180002, FWWW180001, WFD180001, WFD180002, CSW180001

Dear Mr. Resnick:

On June 20, 2018, Transcontinental Gas Pipe Line, LLC (Transco) submitted an application to the New Jersey Department of Environmental Protection (NJDEP) Division of Land Use Regulation (DLUR) requesting a Flood Hazard Area Individual Permit & Verification, a Freshwater Wetlands Individual Permit, and a Waterfront Development Individual Permit & Wetlands Act of 1970 Permit for the Northeast Supply Enhancement Project (Project). Transco is submitting the following supplemental information related to the proposed Project and the NJDEP permit applications.

Attachment 1: In response to comments from the DLUR regarding potential threatened and endangered species habitat, Transco has updated the following sheets of the NJDEP Land Use Permit Plans for the Northeast Supply Enhancement Project Proposed 26" Madison Loop.

a. Sheets 14 and 15 and 16 of the Freshwater Wetlands Permit Plan include 150-foot wetland transition areas to all wetlands from milepost MP11.4 to 11.6, MP11.6 to 11.9, and MP11.9 to 12.1 except for wetland flag points labeled W-T01-017-020 through W-T01-017-039 (Sheet 15) per guidance from Christina Albizati at NJDEP dated 4/8/2019 (File # 0000-01-1001.3). These wetlands provide suitable habitat for bald eagles and osprey and are therefore considered exceptional resource value wetlands. Note, impacts to wetlands and threatened and endangered species habitat documented on these sheets will be avoided through the use of a horizontal directional drill from MP11.48 to 11.83.

b. Sheets 7, 8, and 9 of the Waterfront Development Permit Plan set include 150-foot wetland transition areas to all wetlands from MP11.4 to 11.6, MP11.6 to 11.9 and, MP11.9 to 12.1 with the exception of wetland points labeled W-T01-017-020 through W-T01-017-039 (Sheet 8) per guidance from Christina Albizati dated 4/8/2019 (File # 0000-01-1001.3). These wetlands provide suitable habitat for bald eagles and osprey and are therefore considered exceptional resource value wetlands. Note, impacts to wetlands and threatened and endangered species habitat documented on these sheets will be avoided through the use of a horizontal directional drill from MP11.48 to 11.83.

c. Sheets 10, 11, 12, and 13 of the Freshwater Wetlands Permit Plan set and Sheets 3, 4, and 5 of the Waterfront Development Permit Plan set have been updated to reduce the previously designated 150-foot wetland transition areas down to 50 feet (i.e., for intermediate resource value wetlands) as these wetlands are not considered exceptional resource value wetlands and do not contain suitable threatened and endangered species habitat per NJDEP guidance from Christina Albizati dated 4/8/2019 (File # 0000-01-1001.3).

Note, the permit plans have been submitted under separate cover.

Attachment 2: Transco is submitting its Onshore and Offshore Horizontal Directional Drill Contingency Plans.

Attachment 3: Supplemental Information regarding the Looping Intensive Alternative included in the June 2018 Alternatives Analysis submitted as part of Transco's application request for a Freshwater Wetlands Individual Permit.

If you have any questions regarding this filing, please contact Karen Olson at (713) 215-4232 or via email at Karen.Olson@williams.com. Alternatively, you can contact Ms. Sara Mochrie, Project Manager at Ecology and Environment, Inc. at (716) 684-8060 or via email at smochrie@ene.com.

Respectfully submitted,

Transcontinental Gas Pipe Line Company, LLC.

Joseph Dean
Manager, Environmental Health and Safety

Attachment 1: Updated NJDEP Land Use Permit Plans for the Northeast Supply Enhancement Project Proposed 26" Madison Loop (submitted under separate cover)
Attachment 2: Onshore and Offshore Horizontal Directional Drill Contingency Plans
Attachment 3: Supplemental Information to the Looping Intensive Alternative

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

NJDEP SUPPLEMENTAL INFORMATION FILING

NORTHEAST SUPPLY ENHANCEMENT PROJECT

APRIL 2019

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

MADISON LOOP PLAN SET REVISIONS

ATTACHMENT 1

PROVIDED UNDER SEPARATE COVER

NORTHEAST SUPPLY ENHANCEMENT PROJECT

APRIL 2019

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ONSHORE AND OFFSHORE HORIZONTAL DIRECTIONAL DRILL CONTINGENCY PLAN

ATTACHMENT 2

NORTHEAST SUPPLY ENHANCEMENT PROJECT

APRIL 2019

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

ONSHORE HORIZONTAL DIRECTIONAL DRILL CONTINGENCY PLAN

ATTACHMENT 2

NORTHEAST SUPPLY ENHANCEMENT PROJECT

APRIL 2019

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APPENDIX A ENVIRONMENTAL INCIDENT REPORT

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LIST OF ACRONYMS AND ABBREVIATIONS

EI	Environmental Inspector
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
NJDEP	New Jersey Department of Environmental Protection
PADEP	Pennsylvania Department of Environmental Protection
PFBC	Pennsylvania Fish and Boat Commission
Plan	Horizontal Directional Drill Contingency Plan
Transco	Transcontinental Gas Pipe Line Company, LLC.
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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1 INTRODUCTION

Transcontinental Gas Pipe Line Company, LLC. (Transco) is proposing to use horizontal directional drill (HDD) construction methods as an alternative crossing method at four onshore locations throughout the Northeast Supply Enhancement Project (Project). Transco is currently conducting geotechnical studies at each proposed HDD crossing to evaluate the risks inherent in using the HDD crossing method and determine that each proposed HDD crossing is feasible. Transco has developed this Horizontal Directional Drill Contingency Plan (Plan) to establish procedures for handling these inherent risks, i.e., abandoned HDD drill holes, crossing contingency methods if the drill is abandoned, and to address potential impacts associated with inadvertent releases of drilling fluid returns during the HDD process. This Plan identifies operational procedures and responsibilities for abandoning HDD drill holes and the prevention, containment, and clean-up of drilling fluids that have ponded on the ground surface or within a water body in response to an inadvertent release of drilling fluid during HDD operations. The specific objectives of this Plan include:

- Defining the HDD process and how to identify when the HDD has failed and should be abandoned;
- Identifying the procedures that will be followed when an HDD drill hole has to be abandoned;
- Minimizing the potential for an inadvertent release of drilling fluids;
- Identifying the timely detection of an inadvertent release of drilling fluids;
- Providing for environmental protection of waterbodies and associated habitats, in the event an inadvertent release occurs;
- Establishing response procedures to address containment and clean-up of an inadvertent release of fluids; and
- Providing for notifying the appropriate parties and regulatory agencies in the event of an inadvertent release of fluids.

Transco will ensure that all contractors comply with the methods outlined herein during construction, restoration, and operation of the Project. Contractors will be trained on the requirements of this Plan during mandatory pre-construction environmental training. Compliance with these requirements will be documented in the field by Environmental Inspectors (EIs) in weekly construction inspection reports, which will be submitted to the Federal Energy Regulatory

Commission (FERC) for review and comment. This Plan is subject to revision based on new data or on agency recommendations.

2 HDD PROCESSES AND POTENTIAL CAUSES OF FAILURE

There are three basic steps to install a pipeline crossing using HDD:

1. Pilot hole drilling;
2. Hole reaming; and
3. Pipe pullback.

This section briefly describes the HDD process and some potential causes of failure associated with each installation step.

2.1 PILOT HOLE DRILLING

The first step in the HDD sequence is to drill the initial hole beneath the proposed crossing along a predetermined alignment. The pilot hole is drilled using either a downhole displacement mud motor connected to a tri-cone rotary bit or a jetting assembly. Drilling fluid pumped through the annulus of the drill pipe helps to expedite the mud motor or jetting assembly in cutting the soil, sediment, or rock strata. The drilling fluid also helps lubricate the drill stem, suspends and carries the drilled cuttings to the surface, and forms a wall cake to keep the hole open. The HDD drilling fluid is composed primarily of fresh water and bentonite, a naturally occurring, nonhazardous clay that serves as a viscosifier. If needed to manipulate the rheological properties for optimized drilling operations, the drilling fluid may also be augmented with starch, cellulose, non-toxic polymers, and/or crystalline silica. Control of the drill bit is achieved by using a non-rotating drill string with an asymmetrical leading edge. This leading edge creates a steering bias that is held in a precise position during drilling.

A successful pilot hole provides pertinent data that helps to determine the potential success of the crossing. Data obtained from the pilot hole includes the rate of penetration to be expected and confirmation of the geologic strata. The HDD contractor can then confirm a plan for enlarging the hole to the required diameter. The diameter required to install the pipeline will vary depending on the confirmed geologic strata and the HDD contractor's judgment.

Failure During the Pilot Hole Process

The failure mode that can occur during the drilling of the pilot hole is the hole collapsing on the drill pipe string. This is typically caused by either not being able to maintain a good bentonite wall cake to keep the hole stable or an unfavorable drilling stratum containing glacial till, highly fractured rock, non-cohesive alluvial material, or cobbles. If the hole collapses on the drill pipe and creates high friction on the drill pipe surface, the torque required to rotate the drill

pipe will likely increase. The increased friction may either bind the drill pipe in such a way that it cannot be moved or, if the torque applied to the drill pipe by the drill rig exceeds the strength of the drill pipe, the force may cause the drill pipe to either shear or twist into two or more pipes. The longer the drill length, the more probability there is of this type of failure if non-cohesive alluvial materials are present. Typically, HDD installation will be considered a failure if there are two unsuccessful attempts at completing the pilot hole. If this happens, Transco will follow its standard process of selecting and permitting, as necessary, another appropriate installation method.

2.2 HOLE REAMING

The second step consists of one or more hole-reaming passes. There are two types of tools that enlarge the pilot hole:

- Flycutters, used for most soil formations.
- Rock hole-opening tools, used for very dense soil or rock formations.

Typically, the hole-opening tool is attached to the drill pipe string that drills the pilot hole and is then rotated and pulled back towards the drill rig from the exit point. The number of reaming passes varies depending on the soil conditions and carrier pipe size. Depending on the stability of the hole, the HDD contractor may use a barrel reamer, typically several inches smaller than the outside diameter of the final hole-opening tool, and pull it through the hole immediately prior to pullback. This is typically referred to as a swab pass. The purpose of the swab pass is to ensure the establishment of a good drilling fluid wall cake, a clean hole, and a hole full of drilling fluid with the proper density. Drilling through rock formations typically requires multiple passes, with each pass increasing the diameter of the hole until the desired diameter is achieved. Drill pipe is typically added behind the tool at the exit to keep the drill pipe in the hole for the entire length of the crossing.

A significant length of time may be needed to enlarge the hole to the required diameter. As the length of time to complete this process increases, the probability of failure also increases. This is especially true when drilling in a soil stratum that is loose or unstable (gravel or cobbles). At times, the loose material can be drilled very quickly, but maintaining an open hole through unstable soil strata over an extended period of time can be very difficult.

Failure During Hole Reaming

The main reason for failure during hole reaming is material collapsing into the hole, which in turn has been caused by a lack of an adequate bentonite wall cake. With each reaming pass, the large volume of drilling fluid being dispersed through the tool tends to expand into voids in the

annulus of the drilled hole. Because of the inability to support the soils, the hole becomes unstable and can lead to diminished drilling fluid returns. If the drilling fluid is no longer able to carry the drilled cuttings out of the hole, an excessive amount of cuttings would remain in the hole. The cuttings would slowly build up in the bottom of the hole, increasing the friction on the drill pipe and creating additional stress on the drill pipe. The increased friction can cause the drill pipe to slow or stop rotation to a point where the drill rig cannot supply enough torque to continue reaming without causing drill pipe failure. The two main types of failure in rock formations are the reaming tool breaking apart due to excessive wear on the tool, and weathered rock or cobbles collapsing into the hole.

If the penetration rates are extremely slow, excessive stress can occur on the arms holding the roller cutting cones. If the wear is too excessive, the roller cones can separate from the tool, leaving the tool unable to cut or rotate. If the tool can still be removed from the hole, and the missing pieces retrieved from the hole, the hole-opening pass may resume with different downhole tools.

HDD installation would be considered a failure after two unsuccessful attempts at retrieving tools or equipment downhole and if it has been determined that the hole reaming operation cannot be completed. If failure occurs, the HDD contractor shall then demobilize and remove the equipment from the site after approval from Transco. If this happens, Transco will follow its standard process of selecting and permitting, as necessary, another appropriate installation method.

2.3 PULLBACK

The last step to complete a successful installation is the pullback of the prefabricated pipeline into the enlarged hole. A reinforced pullhead is attached to the leading end of the pipe and to a swivel that is connected to the drill pipe. The swivel is placed between the drill pipe string and the carrier pipe to minimize rotation and torsion from being transferred to the pipeline.

The pipeline may be buoyant in the drilling fluid during the pullback process and may require the pipe to be filled with a calculated amount of water to keep the pipeline as close to neutral buoyancy as possible. The following problems could occur if the pipe is not allowed to remain neutrally buoyant in the hole during the pullback process:

- Skin friction of the pipeline will increase, which will then increase the load that the drill rig has to pull. The pipeline could be damaged if an excessive amount of pull tension has to be applied to the pipe to continue the pullback process.

- The leading edge of the pullhead could dislodge a cobble or rock fragment, binding the pipeline and making it impossible to move in either direction.
- The external coating could be damaged by sharp and/or protruding material and highly abrasive material (coarse sands).

The pull section is also supported with a combination of roller stands, pipe-handling equipment, and/or a floatation ditch to further minimize excessive tension on the pipe and prevent the carrier pipe from being damaged during the pullback process. HDD pipe will be coated with an abrasion-resistant overlay to prevent pipeline damage.

Failure During the Pullback Process

Failure of the pullback process occurs when the pipe becomes lodged in the hole and is unable to be moved in either direction. If this occurs, Transco and the contractor will assess the situation and determine the appropriate course of action. Transco will, based on site-specific conditions, conduct agency consultation if needed.

2.4 MECHANICAL FAILURES

This type of failure occurs if there is a major mechanical breakdown. If the drill pipe remains idle for an extended time, the material in the drilled hole annulus can seize the drill pipe string in place and prevent further movement such that the drill pipe may not continue to rotate or move in either direction. If this occurs during pilot hole drilling, the contractor will be required to change the alignment of the crossing to miss the abandoned hole and start the drilling process from the beginning.

HDD installation also may be considered a failure if after either repairing or replacing the broken drill rig or vital piece of ancillary equipment, the drill pipe, hole-opening tool, or pipeline cannot be rotated or pulled. If failure occurs, the HDD contractor shall then demobilize and remove the equipment from the site after approval from Transco. If this happens, Transco will follow its standard process of selecting and permitting, as necessary, another appropriate installation method.

3 SEALING ABANDONED HDD BOREHOLES

If for any reason an HDD hole must be abandoned, the HDD contractor will fill the abandoned hole with grout to completely seal it off. The top 5 feet of the abandoned hole will be filled with compacted soil to allow vegetation to reestablish. If deemed necessary by Transco, the HDD contractor may be required to complete grouting up to and including the entire abandoned hole to reduce the risk of ground subsidence, inadvertent drilling fluid returns from adjacent HDD alignments, or to comply with applicable regulatory requirements or other Project conditions.

The grout mixture used to abandon a borehole will consist of either a cement grout or cement/bentonite grout mixture that can be pumped downhole through the drill pipe used to drill/ream the hole. The grout mix (e.g., water/cement/bentonite ratios) will be designed generally for each HDD location based on the geologic formation(s) along the abandoned portion of the hole. Additional modifiers, such as those used in structural concrete, may be used to modify the flowability and/or set time of the grout. To grout the abandoned hole, the HDD contractor will extract all cutting tools (i.e., reamer and cutting heads) from the hole, advance the drill pipe into the hole to the required grout depth, and begin pumping the grout mixture while the drill pipe is extracted from the hole. The rate at which the drill pipe is extracted during grouting operations will be regulated to match the rate of grout placement.

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4 REDUCING THE RISK OF INADVERTENT DRILLING FLUID RETURNS

Drilling fluids have several functions that support an HDD installation. The primary functions include:

- Cooling and lubrication of drilling tools, drill pipe, and the carrier pipe.
- Rotation of the drill bit (using a positive displacement mud motor in bedrock installations).
- Suspension of cuttings within the drilling fluid/slurry mixture.
- Removal of soil/bedrock cuttings from the bore during each phase of the installation process.
- Providing a hydrostatic fluid pressure in the bore that offsets natural groundwater formation pressures.
- Stabilizing the bore and preventing raveling of surrounding soil/bedrock materials. Stabilization of the bore is provided from the combination of developing a low-permeability bentonite filter cake along the bore walls and applying a positive fluid pressure to the surrounding bore walls. This supporting pressure is derived from the presence of the column of drilling fluid within the bore.

Prior to beginning construction, a specific scope of work will be developed for each trenchless crossing, and the contractor will be required to address all of the requirements in the specifications, plans, and scope of work. Transco's HDD contractor will be required to maintain a certified and approved drilling fluids engineer/technician on-site during all phases of the HDD installation to assist the HDD contractor with managing and optimizing drilling fluid functions.

The HDD profiles will be designed to extend into bedrock (Quarryville Loop only), where possible, and provide sufficient depth of cover to reduce the potential for inadvertent drilling fluid returns. During HDD installation, the HDD contractor will make every effort to maintain drilling fluid circulation and reduce the potential for inadvertent drilling fluid returns. The efforts may include but will not be limited to:

- Proper drilling fluids management.
- Daily inspection and repair of equipment components (e.g., drilling equipment, hydraulic hoses, and pumps).
- Using special downhole monitoring equipment to monitor fluid pressure.
- Using best management practices to remove cuttings from the hole and maintaining an open flow path from the downhole tooling to the drill rig.

- Using casing as needed to reduce the potential for inadvertent drilling fluid returns near the entry or exit points.
- Maintaining adequate drilling fluid flow rates and penetration rates.
- Using drilling fluid relief wells, if necessary.

If drilling fluid returns to the drill rig are lost during HDD operations, the HDD contractor will cease drilling operations and visually inspect the ground and water surfaces along the HDD alignment for inadvertent returns. The HDD contractor will make reasonable attempts to restore drilling fluid circulation, which may include:

- Extracting the downhole drill pipe string and tooling until drilling fluid returns are restored.
- Manipulating drilling fluid properties; consulting with the on-site drilling fluid engineer/technician.
- Installing small-diameter casing over the downhole drill pipe string through overburden soils.

If the integrity of the drilled hole or the HDD profile geometry is compromised through attempts to restore drilling fluid returns, the HDD contractor will notify Transco or the authorized representative. If it is determined that further attempts to restore drilling fluid returns may compromise the HDD installation or are unlikely to be successful, the HDD contractor will proceed with modified drilling procedures to reduce the risk of inadvertent drilling fluid returns. These procedures may include slowing the rate of penetration, drilling or reaming the hole from the other direction, using large-diameter casing, or installing drilling fluid relief wells, if necessary.

5 CONTINGENCY PLAN FOR DRILLING FLUID RELEASE AND MITIGATION

5.1 DRILLING FLUID CONTAINMENT, COLLECTION SUPPLIES, AND EQUIPMENT

The HDD contractor will monitor the HDD alignment for signs of inadvertent drilling fluid returns and will keep adequate spill containment and collection equipment and supplies on-site at all times to contain and collect any release of drilling fluids to the ground surface, wetlands, or waterbodies. All areas contaminated by drilling fluid migration and release will be cleaned up and restored to the original condition, according to applicable regulatory agency requirements, or as accepted by Transco and FERC. Equipment stored on-site for immediate response may include, but is not limited to:

- Silt fencing, sand bags, or straw bales for containment structures (certified weed-free);
- Stakes to secure bales;
- Straw logs (wattles or fiber rolls);
- Hand tools such as sledge hammers, push brooms, shovels, rakes, etc.;
- Several 5-gallon buckets and plastic sheeting;
- Several 55-gallon drums;
- Portable spill-containment booms, absorbent pads, turbidity curtains or other portable spill-containment kits;
- Leak-free hoses and portable pumps and
- Underwater boom and curtain.

5.2 MITIGATION OF INADVERTENT DRILLING FLUID RETURNS

If inadvertent drilling fluid returns are observed, the HDD contractor will immediately disengage the high pressure drilling fluid pumps, suspend drilling operations, and notify the EI(s) and Transco or their authorized representative. Transco or their authorized representative will notify all concerned parties and regulatory agencies. A complete list of appropriate regulatory agencies and their contact information will be prepared and distributed prior to construction. If inadvertent returns are observed in an upland area, the HDD contractor will:

- Take immediate measures to contain the inadvertent drilling fluid returns to the extent practicable.
- Collect the inadvertent drilling fluid returns using pumps and/or vacuum trucks, if the fluid is of sufficient volume.
- Document the size and impacts of the drilling fluids with photographs.

- Follow the direction of the on-site EI for cleanup and mitigation requirements.
- Remove the drilling fluids and restore the site to pre-existing conditions. Clean-up work will be performed by hand to the maximum extent possible. All collected materials will be disposed of at an approved location or processed through a drilling fluid separation plant.
- Document the cleanup procedures, changes made to the drilling fluid properties or drilling process to prevent future releases and photograph the conditions of the cleaned up area.
- Adjust drilling fluid properties to inhibit further flow through the leak origin, clear potential blockages in the HDD bore by extracting several or all drill pipe joints and tooling, and/or allow the area to sit or rest for a suitable period to allow the cracked pathway to close naturally.
- Evaluate any further steps that may increase the potential for regaining returns to entry/exit points. This may include advancing the tools in the opposite direction in an attempt to regain drilling fluid returns.
- Once the inadvertent drilling fluid returns are contained and collected, the HDD contractor may resume drilling operations using modified drilling techniques. These modified techniques will be used to reduce further inadvertent drilling fluid returns while maintaining full-time monitoring of the drilling fluid returns area to ensure that containment and collection measures are sufficient to handle any additional inadvertent returns that may result from resuming operations.
- If public health and safety are threatened by an inadvertent release, or if existing structures or transportation infrastructure are impacted, drilling operations will be immediately shut down until the threat is eliminated. Notifications will be made to all applicable parties, the measures listed above will all be instituted, and a thorough review of operations will be conducted. Damage attributed to an inadvertent release, would be assessed and repaired, if needed.

If the inadvertent returns are observed in an environmentally or culturally sensitive area, the HDD contractor will, in addition to the measures listed above, contain the inadvertent returns with straw bales or sand bags, without additional disturbance, if possible.

In addition to the measures noted above, Transco will contain any inadvertent releases that may occur within a waterbody using the following procedure:

- The inadvertent release area will be monitored for up to four hours to determine if the drilling mud congeals. Bentonite will usually harden, effectively sealing the inadvertent release location.
- The appropriate regulatory agencies and the property owner representative will be consulted regarding the next action(s) to take from among the following choices:
    - If drilling mud congeals, take no other action that could potentially suspend sediments in the water column.
    - If drilling mud does not congeal, erect isolation/containment environment (underwater boom and curtain).
    - If the release becomes excessively large, a spill response team will be called in to contain and clean up excess drilling mud in the water. Phone numbers of spill response teams in the area will be on-site.

After the inadvertent drilling fluid return has been assessed, the HDD contractor and Transco will make every effort to determine why the seepage occurred. Once the cause of the drilling fluid release has been determined, measures will be developed to control the factors causing the seepage and to minimize the chance of recurrence. Developing the corrective measure will be a joint effort of Transco and the HDD contractor and will be site- and problem-specific.

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6 ENVIRONMENTAL INSPECTION TRAINING, AND PRE-CONSTRUCTION NOTIFICATIONS

An EI experienced in HDD and associated environmental protection measures will work with the contractor to verify that the proper equipment and materials are available on-site at all times and that the necessary procedures are followed on a daily basis. Prior to the start of construction, the EI will conduct a training session with all key HDD contractors, drilling, and inspection personnel. All such personnel will be thoroughly trained in the applicable inadvertent release of drilling fluid contingency plan procedures. On-site safety and environmental protection meetings will provide ongoing communications and awareness measures regarding prevention, mitigation, and response associated with potential inadvertent drilling fluid releases.

Visual observations along the land and water portions of the HDD alignment will be completed on a regular basis throughout the drilling program. The frequency of these observations will be greatest during the pilot bore and initial reaming passes, where the probability of an inadvertent release of drilling fluid event occurring is the highest.

Transco will notify all affected landowners by mail at least two weeks in advance of the commencement of construction. Affected landowners includes directly impacted landowners, abutters, and identified NSAs. The notification will include contact information for land representatives that may be contacted for issues related to noise, vibrations, or inadvertent returns.

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7 CONTACT INFORMATION

Transco will provide a technical consultant on-site during the HDD process to keep adequate documentation such as daily progress reports, as-built information, etc., describing the events leading up to the failure. Transco will then submit this documentation to the necessary agencies for their review and approval that the drill has failed at the present alignment. The HDD contractor will not demobilize until Transco approval has been received.

The following Project representatives will be notified in the event of an inadvertent release of drilling fluids:

Transco

Joseph Dean
Manager, Environmental Permitting
2800 Post Oak Blvd
Houston, TX 77056
Phone: 713-215-3427

The following regulatory agency representatives will be notified in the event of an inadvertent release of drilling fluids:

FERC

Christine Allen
Project Manager
Federal Energy Regulatory Commission
888 First Street NE
Washington DC, 20426
Phone: 202-502-8056

Additional Agencies for Notification

- U.S. Army Corps of Engineers (USACE) - [Contact information to be provided prior to construction]
- U.S. Fish and Wildlife Service (USFWS) - [Contact information to be provided prior to construction]
- Pennsylvania Department of Environmental Protection (PADEP) - [Contact information to be provided prior to construction]
- New Jersey Department of Environmental Protection (NJDEP) - [Contact information to be provided prior to construction]

If the release is within a stream or wetland, the following agencies must be contacted within two hours:

- PA Fish and Boat Commission (PFBC);
- NJ Department of Environmental Protection (NJDEP); and
- United States Fish and Wildlife Service, in the event of potential impacts on federally listed species.
- (Contact information to be provided prior to construction.)

An incident report (see Appendix A) should be prepared for hazardous waste releases and submitted as soon as possible but not later than 15 days after the spill. The report should include, at a minimum:

- an updated listing of all the information provided in the verbal notification;
- actions taken to respond to and contain the release;
- any known or anticipated acute or chronic health risks associated with the release;
- a summary of all actions taken by the owner or operator to prevent a recurrence; and
- other information as may be required.

APPENDIX A

ENVIRONMENTAL INCIDENT REPORT

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Environmental Incident Report	
Location (Facility/Specific Location):	
Date Incident Occurred:	
Time Incident Occurred:	
Type of Incident (Check all that apply):	
☐ Contaminated Groundwater/Soil ☐ Fish Kill ☐ Hazardous Substance Spill/Release ☐ Migratory Bird ☐ Other _____	☐ Oil Spill ☐ PCB Spill ☐ Storage Tank (leak or other problem) ☐ Wildlife Concern
If Spill:	
Type of Substance:	
Origin of Substance:	
Amount (if known):	
Spill On (floor, ground, water):	
Oil Spill to Water or Storm Drain (If any selection is entered, written notice to EPA is due within 60 days)	☐ Spill greater than 1,000 gallons ☐ Two spills > 42 gal. within a 12-month period Date of Previous Spill _____
Description of Incident (include cause, if known, specific location, amount, duration, and impact on environment)	

Immediate Action/Cleanup Procedures			
Action Taken or Planned to Prevent Recurrence			
Notifications Made			
	Name	Date	Time
Emergency Response Coordinator			
Other facility Personnel			
Environmental Services			
State Agency			
National Response Center			
Other (i.e., Local Agency)			

Regulatory Personnel on the Scene (Name and Agency)	
Site Contact for Additional Information (Name and Title)	**Telephone Number** (With Area Code)
Incident Reported By (Name and Title)	**Telephone Number** (With Area Code)
Form Completed By (Signature)	**Date** (MM/DD/YYYY)

Transcontinental Gas Pipe Line Company, LLC

OFFSHORE HORIZONTAL DIRECTIONAL DRILL CONTINGENCY PLAN

ATTACHMENT 2

NORTHEAST SUPPLY ENHANCEMENT PROJECT

APRIL 2019

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APPENDIX A ENVIRONMENTAL INCIDENT REPORT

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LIST OF ACRONYMS AND ABBREVIATIONS

EI	Environmental Inspector
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
NJDEP	New Jersey Department of Environmental Protection
PADEP	Pennsylvania Department of Environmental Protection
PFBC	Pennsylvania Fish and Boat Commission
Plan	Horizontal Directional Drill Contingency Plan
Transco	Transcontinental Gas Pipe Line Company, LLC.
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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1 INTRODUCTION

Transcontinental Gas Pipe Line Company, LLC. (Transco) is proposing to use horizontal directional drill (HDD) construction methods as an alternative crossing method at two offshore locations throughout the Northeast Supply Enhancement Project (Project). Transco conducted geotechnical studies at each proposed HDD crossing to evaluate the risks inherent in using HDD crossing methods and determined that each proposed HDD crossing is feasible. Transco has developed this Horizontal Directional Drill Contingency Plan (Plan) to establish procedures for handling these inherent risks, e.g., abandoned HDD drill holes, crossing contingency methods if the drill is abandoned, and to address potential impacts associated with inadvertent releases of drilling fluid returns during the HDD process. This Plan identifies operational procedures and responsibilities for abandoning HDD drill holes, and the prevention, containment, and clean-up of drilling fluids that have ponded on the ground surface or within a water body in response to an inadvertent release of drilling fluid event during HDD operations. The specific objectives of this Plan include:

- Defining the HDD process and how to identify when the HDD has failed and should be abandoned;
- Identifying the procedures that will be followed when an HDD drill hole has to be abandoned;
- Minimizing the potential for an inadvertent release of drilling fluids;
- Identifying the timely detection of an inadvertent release of drilling fluids;
- Providing for environmental protection of waterbodies and associated habitats, in the event an inadvertent release occurs;
- Establishing response procedures to address containment and clean-up of an inadvertent release of fluids; and
- Providing for notifying the appropriate parties and regulatory agencies, in the event an inadvertent release of fluids.

Transco will ensure that all contractors comply with the methods outlined herein during construction, restoration, and operation of the Project. Contractors will be trained on the requirements of this Plan during mandatory pre-construction environmental training. Compliance with these requirements will be documented in the field by Environmental Inspectors (EIs) in weekly construction inspection reports, which will be submitted to the Federal Energy Regulatory

Commission (FERC) for review and comment. This Plan is subject to revision based on new data or on agency recommendations.

2 HDD PROCESSES AND POTENTIAL CAUSES OF FAILURE

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1. Pilot hole drilling;
2. Hole reaming; and
3. Pipe pullback.

This section briefly describes the HDD process and some potential causes of failure associated with each installation step.

2.1 PILOT HOLE DRILLING

The first step in the HDD sequence is to drill the initial hole beneath the proposed crossing along a predetermined alignment. The pilot hole is drilled using either a downhole displacement mud motor connected to a tri-cone rotary bit or a jetting assembly. Drilling fluid pumped through the annulus of the drill pipe helps to expedite the mud motor or jetting assembly in cutting the soil, sediment, or rock strata. The drilling fluid also helps lubricate the drill stem, suspends and carries the drilled cuttings to the surface, and forms a wall cake to keep the hole open. The HDD drilling fluid is composed primarily of fresh water and bentonite, a naturally occurring, nonhazardous clay that serves as a viscosifier. If needed to manipulate the rheological properties for optimized drilling operations, the drilling fluid may also be augmented with starch, cellulose, non-toxic polymers, and/or crystalline silica. Control of the drill bit is achieved by using a non-rotating drill string with an asymmetrical leading edge. This leading edge creates a steering bias that is held in a precise position during drilling.

A successful pilot hole provides pertinent data that helps to determine the potential success of the crossing. Data obtained from the pilot hole includes the rate of penetration to be expected and confirmation of the geologic strata. The HDD contractor can then confirm a plan for enlarging the hole to the required diameter. The diameter required to install the pipeline will vary depending on the confirmed geologic strata and the HDD contractor's judgment.

Failure during the Pilot Hole Process

The failure mode that may occur during the pilot hole drilling is the hole collapsing on the drill pipe string. This is typically caused by either not being able to maintain hole stability or unfavorable drilling strata that contain non-cohesive alluvial material, e.g., gravel and/or cobbles. If the hole collapses on the drill pipe and creates high friction on the drill pipe surface, the torque required to rotate the drill pipe will likely increase. The increased friction may either bind the drill

pipe in such a way that it cannot be moved or, if the torque applied to the drill pipe by the drill rig exceeds the strength of the drill pipe, the force may cause the drill pipe to either shear or twist into two or more pieces. The longer the drill length, the more probability there is of this type of failure if non-cohesive alluvial materials are present. Typically, HDD installation will be considered a failure if there are two unsuccessful attempts at completing the pilot hole. If this happens, Transco will review an alternate crossing profile or location for the HDD.

2.2 HOLE REAMING

The second step consists of one or more hole-reaming passes. There are two types of tools that enlarge the pilot hole:

- Flycutters, used for most soil and sediment formations.
- Rock hole-opening tools, used for very dense soil, sediment, or rock formations.

Typically, the hole-opening tool is attached to the drill pipe string that drills the pilot hole and is then rotated and pulled back towards the drill rig from the exit point. The number of reaming passes varies depending on the soil/sediment conditions and carrier pipe size. Depending on the stability of the hole, the HDD contractor may use a barrel reamer, typically several inches smaller than the outside diameter of the final hole-opening tool, and pull it through the hole immediately prior to pullback. This is typically referred to as a swab pass. The purpose of the swab pass is to ensure the establishment of a good drilling fluid wall cake, a clean hole, and a hole full of drilling fluid with the proper density. Drilling through rock formations typically requires multiple passes, with each pass increasing the diameter of the hole until the desired diameter is achieved. Drill pipe is typically added behind the tool at the exit to keep the drill pipe in the hole for the entire length of the crossing.

A significant length of time may be needed to enlarge the hole to the required diameter. As the length of time to complete this process increases, the probability of failure also increases. This is especially true when drilling in a soil/sediment stratum that is loose or unstable (gravel or cobbles). At times, the loose material can be drilled very quickly, but maintaining an open hole through the unstable soil/sediment strata over an extended period of time can be very difficult.

Failure during the Hole Reaming Process

The main reason for failure during hole reaming is material collapsing into the hole, which in turn has been caused by a lack of an adequate bentonite wall cake. With each reaming pass, the large volume of drilling fluid being dispersed through the tool tends to expand into voids in the annulus of the drilled hole. Because of the inability to support the soils/sediments, the hole

becomes unstable and can lead to diminished drilling fluid returns. If the drilling fluid is no longer able to carry the drilled cuttings out of the hole, an excessive amount of cuttings would remain in the hole. The cuttings would slowly build up in the bottom of the hole, increasing the friction on the drill pipe and creating additional stress on the drill pipe. The increased friction can cause the drill pipe to slow or stop rotation to a point where the drill rig cannot supply enough torque to continue reaming without causing drill pipe failure. The two main types of failure in rock formations are the reaming tool breaking apart due to excessive wear on the tool and weathered rock or cobbles collapsing into the hole.

If the penetration rates are extremely slow, excessive stress can occur on the arms holding the roller cutting cones. If the wear is too excessive, the roller cones can separate from the tool, leaving the tool unable to cut or rotate. If the tool can still be removed from the hole, and the missing pieces retrieved from the hole, the hole opening pass may resume with different downhole tools.

HDD installation would be considered a failure after two unsuccessful attempt at retrieving tools or equipment downhole and if it has been determined that the hole reaming operation cannot be completed. If failure occurs, the HDD contractor shall then demobilize and remove the equipment from the site after approval from Transco. If this happens, Transco will review an alternate crossing profile of location for the HDD.

2.3 PULLBACK PROCESS

The last step to complete a successful installation is the pullback of the prefabricated pipeline into the enlarged hole. A reinforced pullhead is attached to the leading end of the pipe and to a swivel that is connected to the drill pipe. The swivel is placed between the drill pipe string and the carrier pipe to minimize rotation and torsion from being transferred to the pipeline.

The pipeline may be buoyant in the drilling fluid during the pullback process and may require the pipe to be filled with a calculated amount of water to keep the pipeline as close to neutral buoyancy as possible. The following problems could occur if the pipe is not allowed to remain neutrally buoyant in the hole during the pullback process:

- Skin friction of the pipeline will increase, which will then increase the load that the drill rig has to pull. The pipeline could be damaged if an excessive amount of pull tension has to be applied to the pipe to continue the pullback process.
- The leading edge of the pullhead could dislodge a cobble or rock fragment, binding the pipeline and making it impossible to move in either direction.

- The external coating could be damaged by sharp and/or protruding material and highly abrasive material (coarse sands).

The pull section is also supported with a combination of roller stands, pipe-handling equipment, and/or a floatation ditch to further minimize excessive tension on the pipe and prevent the carrier pipe from being damaged during the pullback process. The HDD pipe will be coated with an abrasion-resistant overlay to prevent pipeline damage.

Failure During the Pullback Process

Failure of the pullback process occurs when the pipe becomes lodged in the hole and is unable to be moved in either direction. If this occurs, Transco and the contractor will assess the situation and determine the appropriate course of action. Transco will, based on site-specific conditions, conduct agency consultation if needed.

2.4 MECHANICAL FAILURES

This type of failure occurs if there is a major mechanical breakdown. If the drill pipe remains idle for an extended time, the material in the drilled hole annulus can seize the drill pipe string in place and prevent further movement such that the drill pipe may not continue to rotate or move in either direction. If this occurs during pilot hole drilling, the contractor will be required to change the alignment of the crossing to miss the abandoned hole and start the drilling process from the beginning.

HDD installation method may be considered a failure if after either repairing or replacing the broken drilling rig or vital piece of ancillary equipment, the drill pipe, hole-opening tool, or pipeline cannot be rotated or pulled. If failure occurs, the HDD contractor shall then demobilize and remove the equipment from the site after approval from Transco. If this happens, Transco will review an alternate crossing profile of location for the HDD.

3 SEALING ABANDONED HDD BOREHOLES

If for any reason an HDD hole must be abandoned, the HDD contractor will fill the abandoned hole with grout to completely seal it off. The HDD contractor will grout the top 5 vertical feet of the abandoned hole at the onshore entry side of the crossing by inserting a grout tremie pipe into the drilled hole annulus. The grout will be a cement-type grout. As the grout is pressured into the drilled hole annulus, the tremie pipe will be extracted from the hole so the grout mixture is allowed to sufficiently displace any drilling fluid that may have remained within the hole. The top 12 inches of the hole will be backfilled with the native material, and the HDD contractor will not demobilize until Transco approval has been received.

For offshore entry/exit holes, the minimum extent of grouting will be to completely seal and fill the upper 30 feet of the hole entirely with grout. The top 5 feet of the hole will be backfilled with native material. In the event native material is not available, Transco will use a clean, compatible material to backfill the hole. If deemed necessary by Transco, the HDD contractor may be required to complete grouting up to and including the entire abandoned hole to reduce the risk of inadvertent drilling fluid returns from adjacent HDD alignments, or to comply with applicable regulatory requirements or other Project conditions.

The cement grout mixture used to abandon a borehole will be pumped downhole through the drill pipe used to drill/ream the hole. The grout mix will be designed generally for each HDD location based on the geologic formation(s) along the abandoned portion of the hole. Additional modifiers, such as those used in structural concrete, may be used to modify the viscosity and/or set time of the grout. To grout the abandoned hole, the HDD contractor will extract all cutting tools (i.e., reamer and cutting heads) from the hole, advance the drill pipe into the hole to the required grout depth, and begin pumping the grout mixture while the drill pipe is extracted from the hole. The rate at which the drill pipe is extracted during grouting operations will be regulated to match the rate of grout placement.

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4 REDUCING THE RISK OF INADVERTENT DRILLING FLUID RETURNS

Drilling fluids have several functions that support an HDD installation. The primary functions include:

- Cooling and lubrication of drilling tools, drill pipe, and the carrier pipe.
- Rotation of the drill bit (using a positive displacement mud motor in bedrock installations).
- Suspension of cuttings within the drilling fluid/slurry mixture.
- Removal of soil/sediment/bedrock cuttings from the bore during each phase of the installation process.
- Providing a hydrostatic fluid pressure in the bore that offsets natural groundwater formation pressures.
- Stabilizing the bore and preventing raveling of surrounding soil/sediment/bedrock materials. Stabilization of the bore is provided from the combination of developing a low-permeability bentonite filter cake along the bore walls and applying a positive fluid pressure to the surrounding bore walls. This supporting pressure is derived from the presence of the column of drilling fluid within the bore.

Prior to beginning construction, a specific scope of work will be developed for each trenchless crossing, and the contractor will be required to address all of the requirements in the specifications, plans, and scope of work. Transco's HDD contractor will be required to maintain a certified and approved drilling fluids engineer/technician on-site during all phases of the HDD installation process to assist the HDD contractor with managing and optimizing drilling fluid functions.

The HDD profiles will be designed to provide sufficient depth of cover to reduce the potential for inadvertent drilling fluid returns. During HDD installation, the HDD contractor will make every effort to maintain drilling fluid circulation and reduce the potential for inadvertent drilling fluid returns. The efforts may include but will not be limited to:

- Proper drilling fluids management.
- Daily inspection and repair of equipment components (e.g., drilling equipment, hydraulic hoses, and pumps).
- Using special downhole monitoring equipment to monitor fluid pressure.
- Using best management practices to remove cuttings from the hole and maintaining an open flow path from the downhole tooling to the drill rig.

- Using casing as needed to reduce the potential for inadvertent drilling fluid returns near the entry or exit points.
- Maintaining adequate drilling fluid flow rates and penetration rates.

If drilling fluid returns to the drill rig are lost during HDD operations, the HDD contractor will cease drilling operations and visually inspect the water surfaces along the HDD alignment for inadvertent returns. The HDD contractor will make reasonable attempts to restore drilling fluid circulation, which may include:

- Extracting the downhole drill pipe string and tooling until drilling fluid returns are restored.
- Manipulating drilling fluid properties, consulting with the on-site drilling fluid engineer/technician.
- Installing small-diameter casing over the downhole drill pipe string through overburden soils.

If the integrity of the drilled hole or the HDD profile geometry is compromised through attempts to restore drilling fluid returns, the HDD contractor will notify Transco or the authorized representative. If it is determined that further attempts to restore drilling fluid returns may compromise the HDD installation or are unlikely to be successful, the HDD contractor will proceed with modified drilling procedures to reduce the risk of inadvertent drilling fluid returns. These procedures may include slowing the rate of penetration, drilling or reaming the hole from the other direction, or using large-diameter casing, if necessary.

5 CONTINGENCY PLAN FOR DRILLING FLUID RELEASE AND MITIGATION

5.1 DRILLING FLUID CONTAINMENT, COLLECTION SUPPLIES, AND EQUIPMENT

The HDD contractor will monitor the HDD alignment for signs of inadvertent drilling fluid returns and will keep adequate spill containment and collection equipment and supplies on-site at all times to contain and collect any release of drilling fluids to the ocean. All areas contaminated by drilling fluid migration and release will be cleaned up and restored to the original condition, according to applicable regulatory agency requirements, or as accepted by Transco and FERC. Equipment stored on-site for immediate response may include, but is not limited to:

- Several 5-gallon buckets and plastic sheeting;
- Several 55-gallon drums;
- Portable spill containment booms, absorbent pads, turbidity curtains or other portable spill containment kits;
- Leak-free hoses and portable pumps; and
- Underwater boom and curtain.

5.2 MITIGATION OF INADVERTENT DRILLING FLUID RETURNS

If inadvertent drilling fluid returns are observed, the HDD contractor will immediately disengage the high pressure drilling fluid pumps, suspend drilling operations, and notify the EI(s) and Transco or their authorized representative. Transco or their authorized representative will notify all concerned parties and regulatory agencies. A complete list of appropriate regulatory agencies and their contact information will be prepared and distributed prior to construction.

5.2.1 Onshore Returns

If inadvertent drilling fluid returns are detected onshore, the drilling crew will take immediate corrective action. For the duration of drilling operations, the drilling personnel will be aware of what containment materials would be needed when responding to an onshore release of drilling fluid and will have these items available on-site. Since inadvertent drilling fluid returns can be easily controlled onshore, these materials will be stored in the entry site work area along with spill kits. Containment items may include lumber for temporary shoring, sand bags, portable pumps, hand tools, silt fencing, and hay bales. The HDD contractor will also keep heavy equipment that can be used to control and clean up the drilling fluids (e.g., excavators and backhoes) in accessible locations. Transfer pumps, hoses, and possibly vacuum trucks may be used if necessary for transferring any inadvertent drilling fluid released onshore. After removal of

the released drilling fluid, the release area will be returned as close to the original condition as feasible. It may be necessary to store the drilling fluid on-site before disposal.

In the event of an inadvertent return onshore the HDD contractor will:

- Take immediate measures to contain the inadvertent drilling fluid returns to the extent practicable.
- Collect the inadvertent drilling fluid returns using pumps and/or vacuum trucks, if of sufficient volume.
- Document the size and impacts of the drilling fluids with photographs.
- Follow the direction of the on-site EI for cleanup and mitigation requirements.
- Remove the drilling fluids and restore the site to pre-existing conditions. Clean-up work will be performed by hand to the maximum extent possible. All collected materials will be disposed of at an approved location or processed through the drilling fluid-separation plant.
- Document the cleanup procedures, changes made to the drilling fluid properties or drilling process to prevent future releases, and photograph the conditions of the cleaned up area.
- Adjust drilling fluid properties to inhibit further flow through the leak origin, clear potential blockages in the HDD bore by extracting several or all drill pipe joints and tooling, and/or allow the area to sit or rest for a suitable period to allow the cracked pathway to naturally close.
- Evaluate any further steps that may increase the potential for regaining returns to entry/exit points. This may include advancing the tools in the opposite direction in an attempt to regain drilling fluid returns.
- Once the inadvertent drilling fluid returns are contained and collected, the HDD contractor may resume drilling operations using modified drilling techniques. These modified techniques will be used to reduce further inadvertent drilling fluid returns while maintaining full-time monitoring of the inadvertent drilling fluid returns area to ensure that containment and collection measures are sufficient to handle any additional inadvertent returns that may result from resuming operations.

If the inadvertent returns are observed in an environmentally or culturally sensitive area, the HDD contractor will, in addition to the measures listed above, contain the inadvertent returns with straw bales or sand bags, if practical without additional disturbance, if possible.

In addition to the measures noted above, Transco will:

- Notify the appropriate regulatory agencies and the property owner representative regarding their next course of action(s) to protect the sensitive resource.
- If the release becomes excessively large, a spill response team will be called in to contain and clean up excess drilling mud. Phone numbers of spill response teams in the area will be on-site.

After the inadvertent drilling fluid return has been assessed, the HDD contractor and Transco will make every effort to determine why the seepage occurred. Once the cause of the drilling fluid release has been determined, measures will be developed to control the factors causing the seepage and to minimize the chance of recurrence. Developing the corrective measure will be a joint effort of Transco and the HDD contractor and will be site- and problem-specific.

5.2.2 Offshore Returns

A significant inadvertent return occurring offshore may be detected by a visible plume. Minor seepage, however, may be difficult to detect because of currents and the high specific gravity of the drilling fluid. If an inadvertent drilling fluid release is detected offshore, outside of the exit pit, it will be monitored and documented. Drilling activities may be temporarily suspended to evaluate possible implementation of mitigation measures to regain hole integrity. Drilling activities will not be suspended unless the volume of inadvertent drilling fluid returns creates an immediate threat to public health and safety. If an extended shutdown were required to try to reduce the turbidity or amount of drilling fluid being released, it could lead to a hole collapse and, ultimately, a failure in the HDD. This could require drilling a new hole and would therefore extend the duration of the Project.

Removal of drilling fluid surfacing offshore is not feasible because of the strong currents in the area. The exit pit is designed to contain the exiting fluid and cuttings. Drilling fluid returns and cuttings entering the exit pit will be left to naturally dissipate or settle into the excavated pit. Any inadvertent leakage would be expected to disperse naturally with the currents.

In the event an inadvertent return is observed offshore the following actions will be taken:

- The magnitude of the offshore return will be qualitatively determined.
- If warranted by the volume of the drilling fluid return, drilling fluid pumps will be stopped.

- The Transco representative will be notified and will contact the appropriate agencies.
- Drilling fluid properties will be adjusted to inhibit further flow through the leak origin; potential blockages in the HDD bore will be cleared by extracting several or all drill pipe joints and tooling; and/or the area will be left to sit or rest for a suitable period to allow the cracked pathway to naturally close.
- Any further steps that may increase the potential for regaining returns to entry/exit points will be evaluated. This may include tripping the tools in the opposite direction in an attempt to regain drilling fluid returns.

After the inadvertent drilling fluid return has been assessed, the HDD contractor and Transco will make every effort to determine why the seepage occurred. Once the cause of the drilling fluid release has been determined, measures will be developed to control the factors causing the seepage and to minimize the chance of recurrence. Developing the corrective measure will be a joint effort of Transco and the HDD contractor and will be site- and problem-specific.

6 ENVIRONMENTAL INSPECTION AND TRAINING

An EI experienced in HDD and associated environmental protection measures will work with the contractor to verify that the proper equipment and materials are available on-site at all times and that the necessary procedures are followed on a daily basis. Prior to the start of construction, the EI will conduct a training session with all key HDD contractors, drilling, and inspection personnel. All such personnel will be thoroughly trained in the applicable inadvertent release of drilling fluid contingency plan procedures. On-site safety and environmental protection meetings will provide ongoing communications and awareness measures regarding prevention, mitigation, and response associated with potential inadvertent drilling fluid releases.

Visual observations along the land and water portions of the HDD alignment will be completed on a regular basis throughout the drilling program. The frequency of these observations will be greatest during the pilot bore and initial reaming passes where the probability of an inadvertent release of drilling fluid event occurring is the highest.

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7 CONTACT INFORMATION

Transco will provide a technical consultant on-site during the HDD process to keep adequate documentation such as daily progress reports, as-built information, etc., describing the events leading up to the failure. Transco will then submit this documentation to the necessary agencies for their review and approval that the drill has failed at the present alignment. The HDD contractor will not demobilize until Transco approval has been received.

The following Project representatives will be notified in the event of an inadvertent release of drilling fluids:

Transco

Joseph Dean
Manager, Environmental Permitting
2800 Post Oak Blvd
Houston, TX 77056
Phone: 713-215-3427

The following regulatory agency representatives will be notified in the event of an inadvertent release of drilling fluids:

FERC

Christine Allen
Project Manager
Federal Energy Regulatory Commission
888 First Street NE
Washington DC, 20426
Phone: 202-502-8056

Additional Agencies for Notification

- U.S. Army Corps of Engineers (USACE) – *(Contact information to be provided prior to construction)*
- U.S. Fish and Wildlife Service (USFWS) - *(Contact information to be provided prior to construction)*
- U.S. Coast Guard (offshore only) - *(Contact information to be provided prior to construction)*
- New Jersey Department of Environmental Protection (NJDEP) - *(Contact information to be provided prior to construction)*
- New York State Department of Environmental Conservation (NYSDEC) – *(Contact information to be provided prior to construction)*

An incident report (see Appendix A) should be prepared for hazardous waste releases and submitted as soon as possible but not later than 15 days after the spill. The report should include, at a minimum:

- an updated listing of all the information provided in the verbal notification;
- actions taken to respond to and contain the release;
- any known or anticipated acute or chronic health risks associated with the release;
- a summary of all actions taken by the owner or operator to prevent a recurrence; and
- other information as may be required.

APPENDIX A

ENVIRONMENTAL INCIDENT REPORT

Environmental Incident Report	
Location (Facility/Specific Location):	
Date Incident Occurred:	
Time Incident Occurred:	
Type of Incident (Check all that apply):	
☐ Contaminated Groundwater/Soil ☐ Fish Kill ☐ Hazardous Substance Spill/Release ☐ Migratory Bird ☐ Other _____	☐ Oil Spill ☐ PCB Spill ☐ Storage Tank (leak or other problem) ☐ Wildlife Concern
If Spill:	
Type of Substance:	
Origin of Substance:	
Amount (if known):	
Spill On (floor, ground, water):	
Oil Spill to Water or Storm Drain (If any selection is entered, written notice to EPA is due within 60 days)	☐ Spill greater than 1,000 gallons ☐ Two spills > 42 gal. within a 12-month period Date of Previous Spill _____
Description of Incident (include cause, if known, specific location, amount, duration, and impact on environment)	

Immediate Action/Cleanup Procedures			
Action Taken or Planned to Prevent Recurrence			
Notifications Made			
	Name	Date	Time
Emergency Response Coordinator			
Other facility Personnel			
Environmental Services			
State Agency			
National Response Center			
Other (i.e., Local Agency)			

Regulatory Personnel on the Scene (Name and Agency)	
Site Contact for Additional Information (Name and Title)	**Telephone Number** (With Area Code)
Incident Reported By (Name and Title)	**Telephone Number** (With Area Code)
Form Completed By (Signature)	**Date** (MM/DD/YYYY)

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LOOPING INTENSIVE ALTERNATIVE

ATTACHMENT 3

NORTHEAST SUPPLY ENHANCEMENT PROJECT

APRIL 2019

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
Northeast Supply Enhancement Project
Responses to NJDEP's questions dated 4/10/2019

1. **Where exactly would the new looping be located in relation to regulated areas (wetlands and watercourses)? Do you have an aerial view of the preferred pipeline route if the Looping Intensive Alternative was used instead of CS 206 that includes regulated areas, residential areas, and federal/state owned open space areas?**

Response:

See revised Figure 1, attached herein.

2. **In terms of environmental impact to wetlands, I note that table 2.1-1 in the Alternative Analysis report suggests that there are 29.26 acres of impacts to wetlands for construction impacts, and 10.63 acres of operational impacts to wetlands. This is how the impacts were reported to FERC. How would they be provided to NJDEP (ie [*sic*] Temporary impacts vrs [*sic*] Permanent). My understanding is the Loop, like with the Madison Loop, would largely be co-located with an existing gas pipe line. The Madison Loop has fairly minimal permanent impacts (0.328 from my memory) in terms of forested areas that will permanently converted into low growth scrub-shrub vegetation. Can you provide the impact numbers to forested, scrub shrub, and previously disturbed areas, temporary and permanent if the Looping alternative were pursued?**

Response:

Construction and Operation Impacts

The wetland impacts shown in Table 2.1-1 of Transco's Alternatives Analysis submitted as part of Transco's Freshwater Wetlands (FWW) Application in June 2018 were reported in accordance with New Jersey Department of Environmental Protection (NJDEP) guidance, such that there was no overlap between construction and operation impacts (i.e., construction and operation impacts were not combined in the reported construction number). However, Transco's June 2018 Alternatives Analysis presented impacts to forested areas and forested wetlands in accordance with Federal Energy Regulatory Commission (FERC) guidance. NJDEP considers impacts to forested areas and forested wetlands to be permanent if not restored within 6 months, though per FERC guidance (FERC *Wetland and Waterbody Construction and Mitigation Procedures),* with the exception of clearing minimal corridors to enable pipeline inspections, routine vegetation mowing or clearing should not be conducted in wetlands located along pipeline rights-of-way (ROW). As such, the majority of wetland impacts along pipeline ROWs are considered temporary by FERC regardless of wetland classification. Table 1 below, reflects all impacts as temporary or permanent in accordance with NJDEP guidance (i.e., impacts to forested wetlands are assumed to be permanent).

Impact Comparison

Table 1 below includes temporary and permanent impacts to palustrine forested wetlands (PFO), palustrine scrub-shrub wetlands (PSS), and palustrine emergent wetlands (PEM). The Looping-Intensive Alternative would result in 9.01 acres of temporary PEM wetland impacts, 0.0 acres of permanent PEM wetland impacts, 0.0 acres of temporary and permanent PSS wetland impacts, 0.0 acres of temporary PFO wetland impacts, and 8.78 acres of permanent PFO wetland impacts. Comparatively, Compressor Station 206 would result in 0.15 acres of temporary PEM wetland impacts, 0.78 acres of permanent PEM wetland impacts, 0.0 acres of temporary PSS wetland impacts, 0.31 acres of permanent PSS wetland impacts, 0.0 acres of temporary PFO wetland impacts, and 2.64 acres of permanent PFO wetland impacts. Impacts on previously disturbed areas are described in response to 3 below.

The Looping-Intensive alternative would result in significantly greater construction and operational impacts to wetlands when compared to Compressor Station 206. See Table 1 below. Accordingly, the Looping-Intensive Alternative would not be a practicable alternative that would have lesser impacts on freshwater wetlands or State Open Waters when compared to Transco's proposed construction of Compressor Station 206. See N.J.A.C. 7:7A-10.2(b)1.

3. How much new ROW would need to be acquired and ultimately cleared of vegetation under the Loop Intensive Alternative?

Response:

Transco assumed that 50 feet of permanent ROW and 100 feet of temporary ROW would be required based on Transco's standard requirements for temporary (construction) and permanent (operational) ROW requirements. Typically, a pipeline loop is sited to accommodate a 25-foot offset between the centerline of the loop and existing pipeline. As such, Transco has assumed that the Looping-Intensive Alternative would overlap Transco's adjacent existing maintained ROW by 25-feet. The existing maintained ROW (i.e., previously disturbed) that Transco would overlap and use as temporary workspace if the Looping-Intensive Alternative were pursued is 83.86 acres. Transco would need to acquire an additional 25-feet of permanent ROW for the permanent (operational) ROW for a total of 41.04 acres. Additionally, Transco would need another 25-feet of new temporary ROW to accommodate construction needs for a total of 41.76 acres. A total of 32.68 acres of vegetated lands[1] (inclusive of forested lands, PFO wetlands, scrub-shrub, agricultural lands, utility land, and PEM wetlands) would be cleared within the new permanent (operational) ROW; however, a portion of these lands (agricultural lands, utility lands, PEM wetlands) would be restored within 6 months and therefore would not be permanently impacted.

[1] Based on the NJDEP 2012 Land Use/Land Cover dataset.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
Northeast Supply Enhancement Project
Responses to NJDEP's questions dated 4/10/2019

Table 1
Comparison of the Wetland Impacts of Compressor Station 206 and the Looping-Intensive Alternative [a]

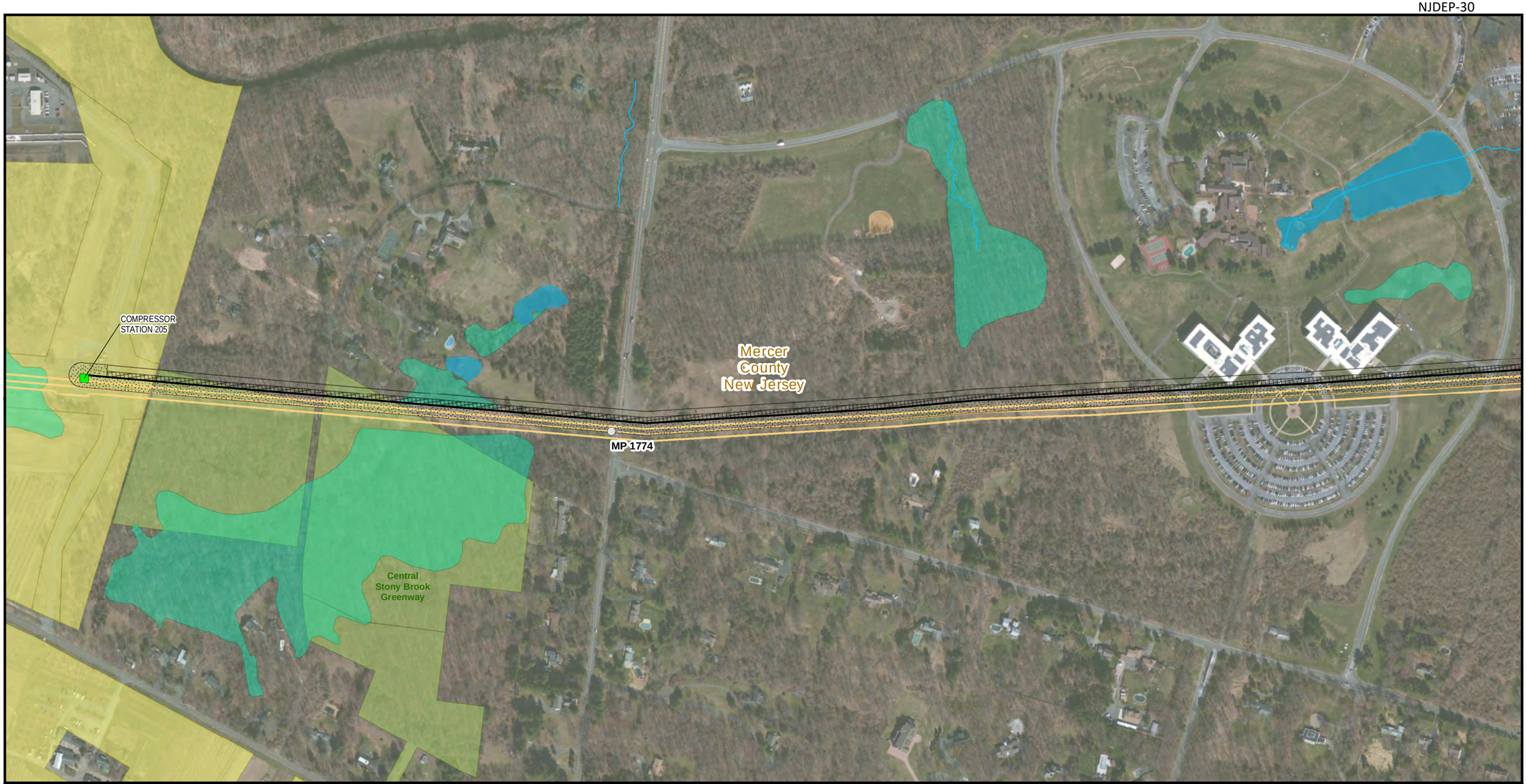
Factor	Unit	Compressor Station 206 [b]	Looping-Intensive Alternative [c]
Temporary impacts on wetlands	**Acres**	**0.15**	**9.01**
PEM	Acres	0.15	9.01
PSS	Acres	0.00	0.00
PFO	Acres	0.00	0.00
Permanent impacts on wetlands	**Acres**	**3.73**	**8.78**
PEM	Acres	0.78	0.00
PSS	Acres	0.31	0.00
PFO	Acres	2.64	8.78

Notes:

[a] This table only includes impacts that would occur within new temporary and permanent ROW.

[b] Wetland impacts presented for Compressor Station 206 represent wetland jurisdictional delineation data.

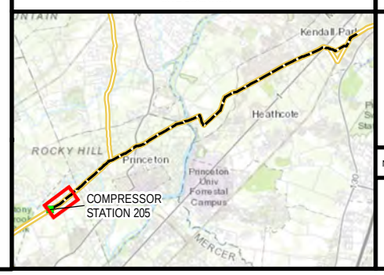
[c] Wetland impacts presented for the Looping-Intensive Alternative represent NJDEP 2012 Land Use/Land Cover data.



- Existing Compressor Station
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)
- NJDEP Green Acres Program Land
- Conservation Easement

0 200 400 600 800
Feet

SITE LOCATION



DRAWING NO.

REFERENCE TITLE

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	3/20/2017	CE	ISSUED FOR FERC FILING	1000891	MK	
B	5/24/2017	CE	ISSUED FOR FERC SUPPLEMENTAL FILING	1000891	MK	
C	4/25/2019	MK	ISSUED FOR NJDEP PERMIT APPLICATION	1000891	RS	

DRAWN BY: MK	DATE: 4/25/2019	ISSUE FOR BID: N/A	SCALE:
CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
WO: 1000891		11:30 AM 4/25/2019	Sheet 1 of 14

Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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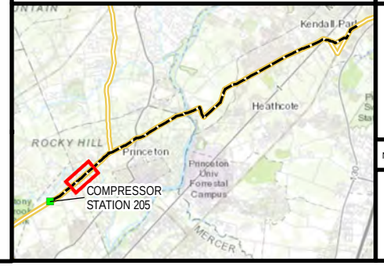
- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- HDD Section
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)

0 200 400 600 800
Feet

SITE LOCATION



DRAWING NO.

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C	4/25/2019	MK	ISSUED FOR NJDEP PERMIT APPLICATION	1000891	RS	

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

Williams

DRAWN BY: MK	DATE: 4/25/2019	ISSUE FOR BID: N/A	SCALE:
CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
WO: 1000891		11:31 AM 4/25/2019	Sheet 2 of 14

Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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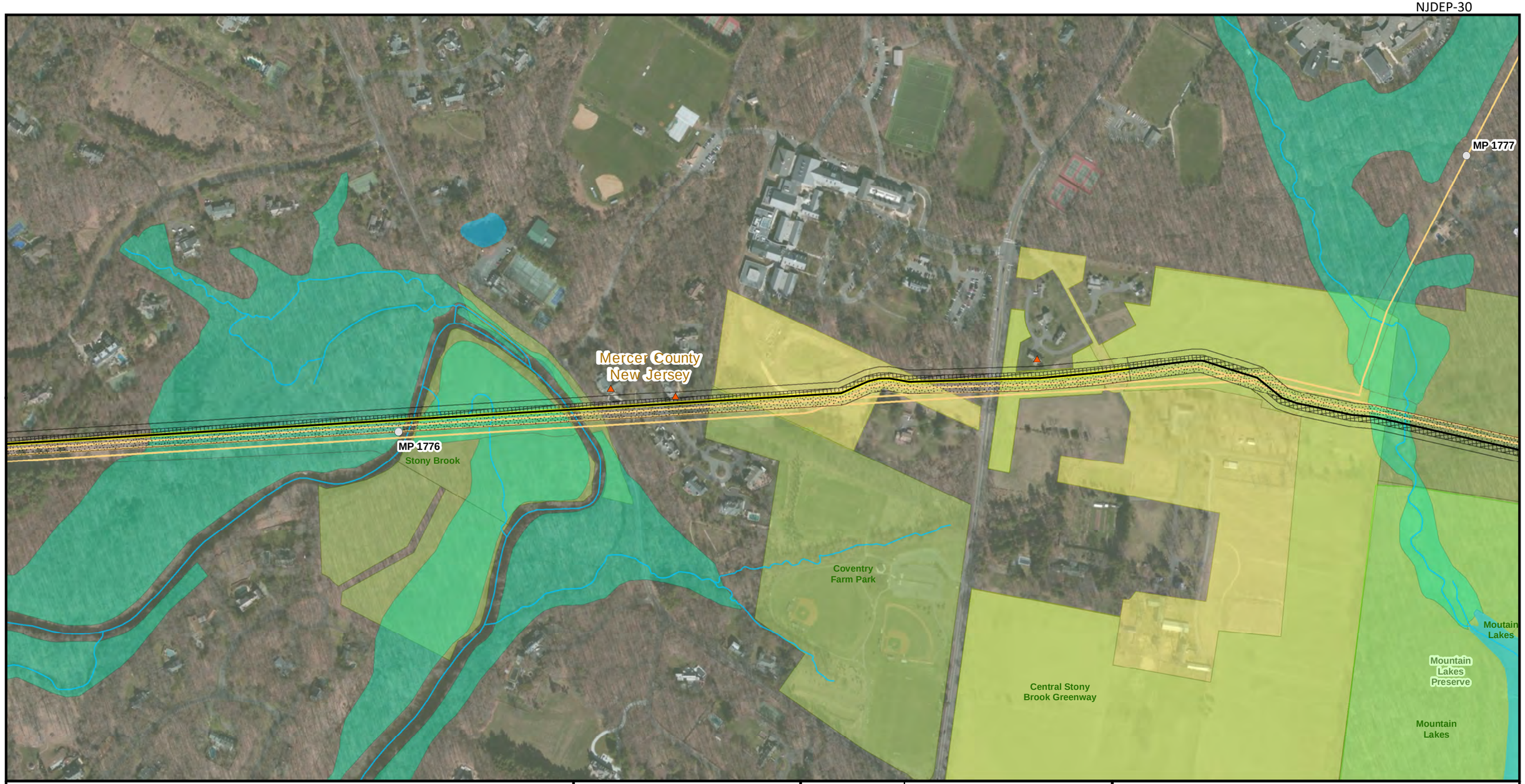
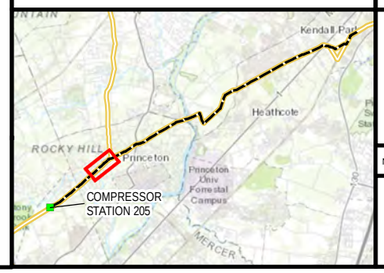


- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- HDD Section
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)
- Park
- NJDEP Green Acres Program Land
- Conservation Easement

0 200 400 600 800
Feet

SITE LOCATION



DRAWING NO.	REFERENCE TITLE

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	3/20/2017	CE	ISSUED FOR FERC FILING	1000891	MK	
B	5/24/2017	CE	ISSUED FOR FERC SUPPLEMENTAL FILING	1000891	MK	
C	4/25/2019	MK	ISSUED FOR NJDEP PERMIT APPLICATION	1000891	RS	

DRAWN BY: MK	DATE: 4/25/2019	ISSUE FOR BID: N/A	SCALE:
CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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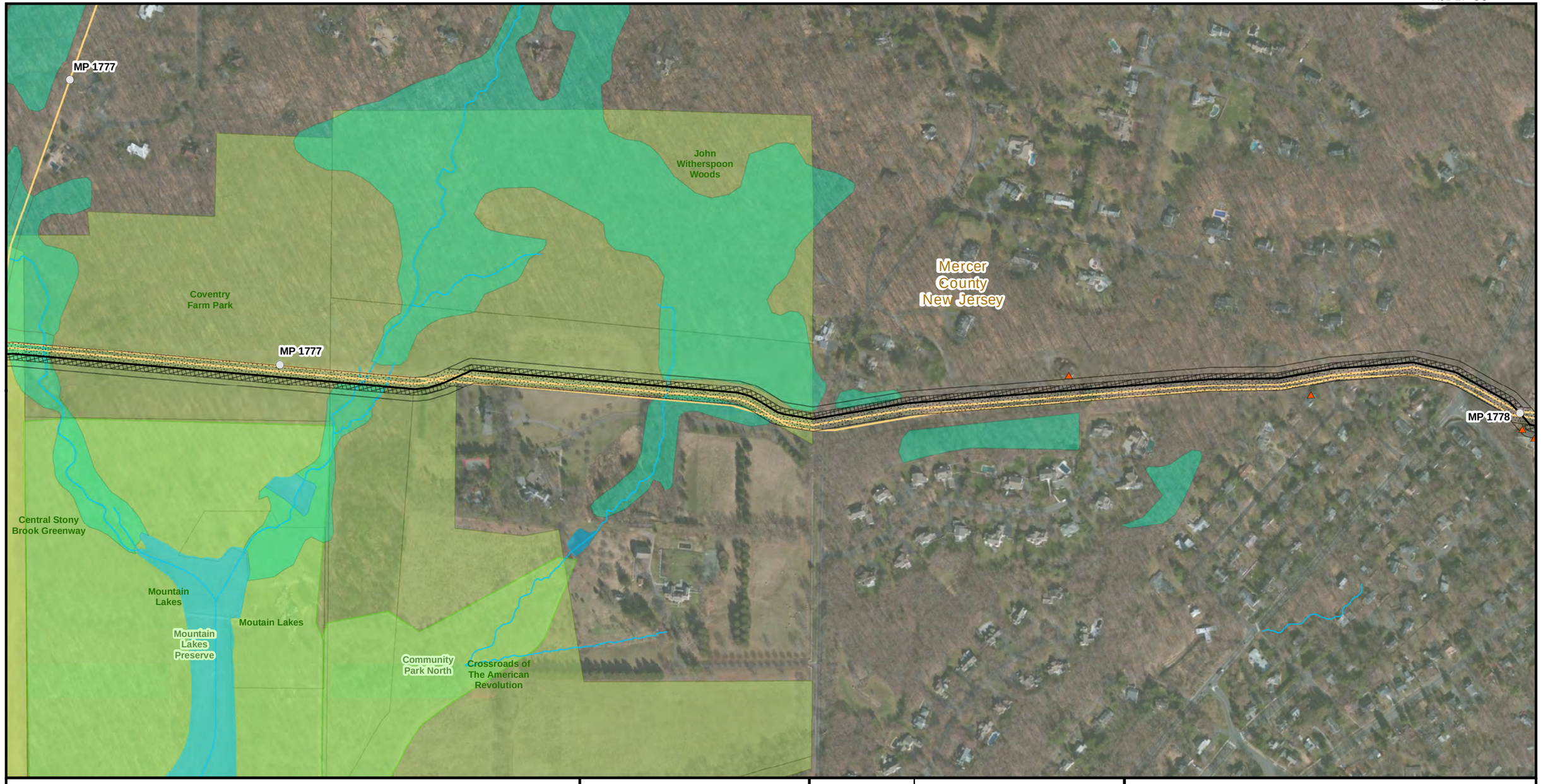
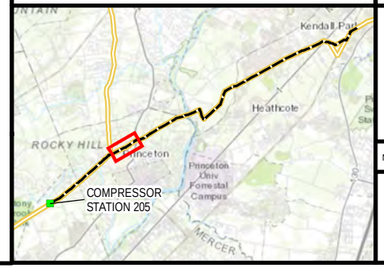


- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)
- Park
- NJDEP Green Acres Program Land
- Conservation Easement

0 200 400 600 800
Feet

SITE LOCATION



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TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

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C	4/25/2019	MK	ISSUED FOR NJDEP PERMIT APPLICATION	1000891	RS	

DRAWN BY: MK	DATE: 4/25/2019	ISSUE FOR BID: N/A	SCALE:
CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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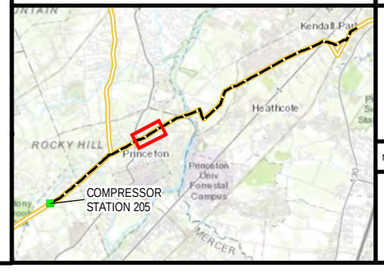
- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NJDEP Wetland (2012)
- Park
- NJDEP Green Acres Program Land

0 200 400 600 800
Feet

SITE LOCATION



DRAWING NO.	REFERENCE TITLE

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
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B	5/24/2017	CE	ISSUED FOR FERC SUPPLEMENTAL FILING	1000891	MK	
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DRAWN BY: MK	DATE: 4/25/2019	ISSUE FOR BID: N/A	SCALE:
CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER: FIGURE 1	Sheet 5 of 14
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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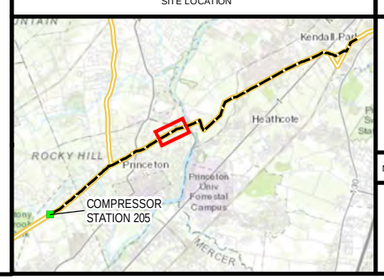
- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- County Boundary
- NHD Stream
- NJDEP Wetland (2012)
- State Open Space
- Park
- NJDEP Green Acres Program Land

N

0 200 400 600 800
Feet

SITE LOCATION



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REFERENCE TITLE

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

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A	3/20/2017	CE	ISSUED FOR FERC FILING	1000891	MK	
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C	4/25/2019	MK	ISSUED FOR NJDEP PERMIT APPLICATION	1000891	RS	

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APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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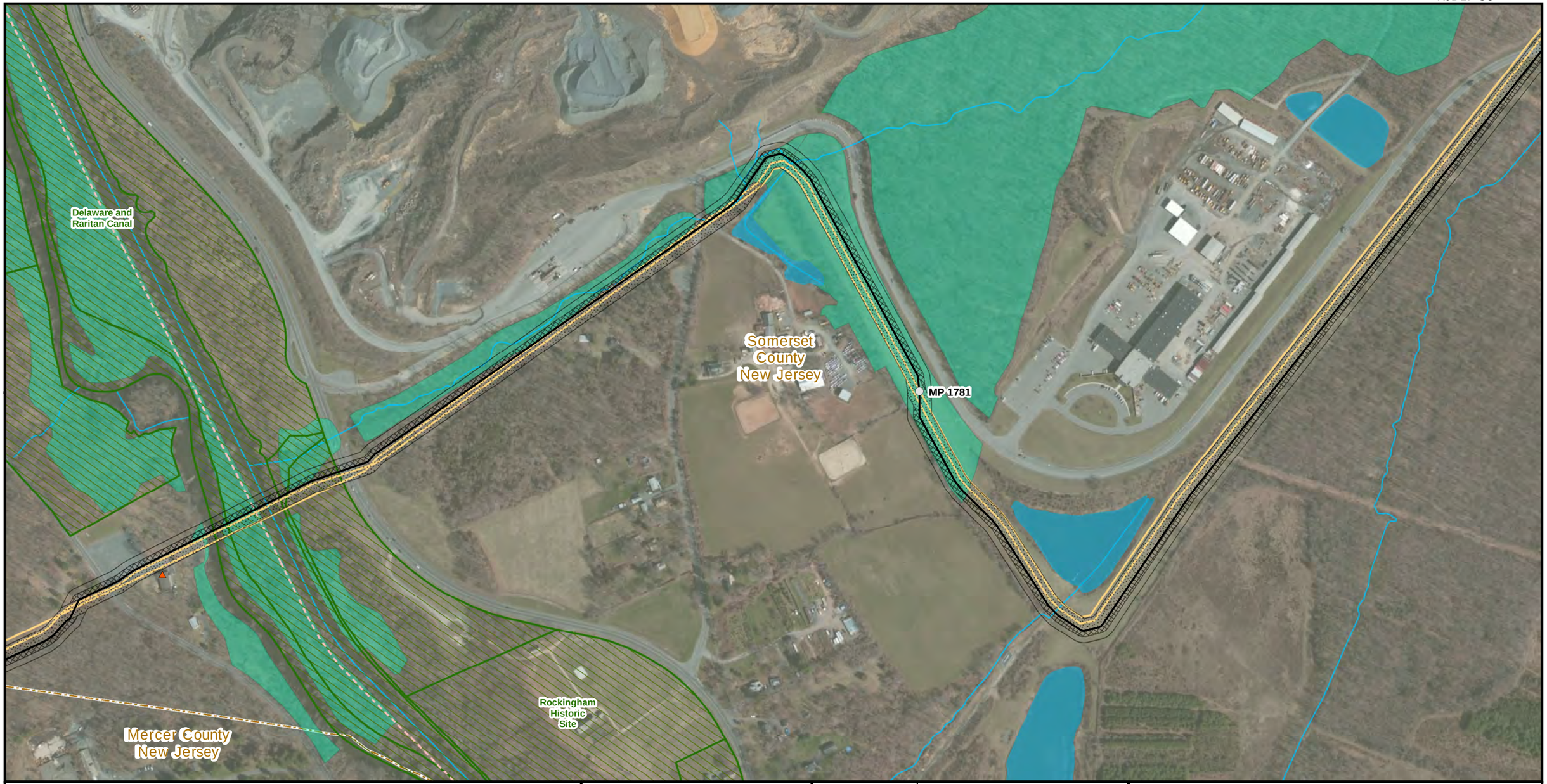

- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- County Boundary
- NJ State Park Trail
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)
- State Open Space

N

0 200 400 600 800
Feet

SITE LOCATION

DRAWING NO.	REFERENCE TITLE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	3/20/2017	CE	ISSUED FOR FERC FILING	1000891	MK	
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TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

Williams

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CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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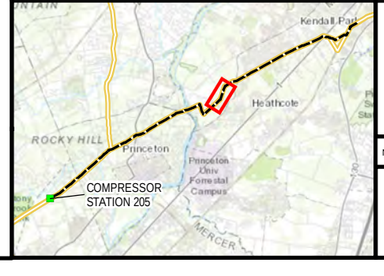
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)

0 200 400 600 800
Feet

SITE LOCATION



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REFERENCE TITLE

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

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CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER: FIGURE 1	Sheet 8 of 14
WO: 1000891		11:37 AM 4/25/2019	

Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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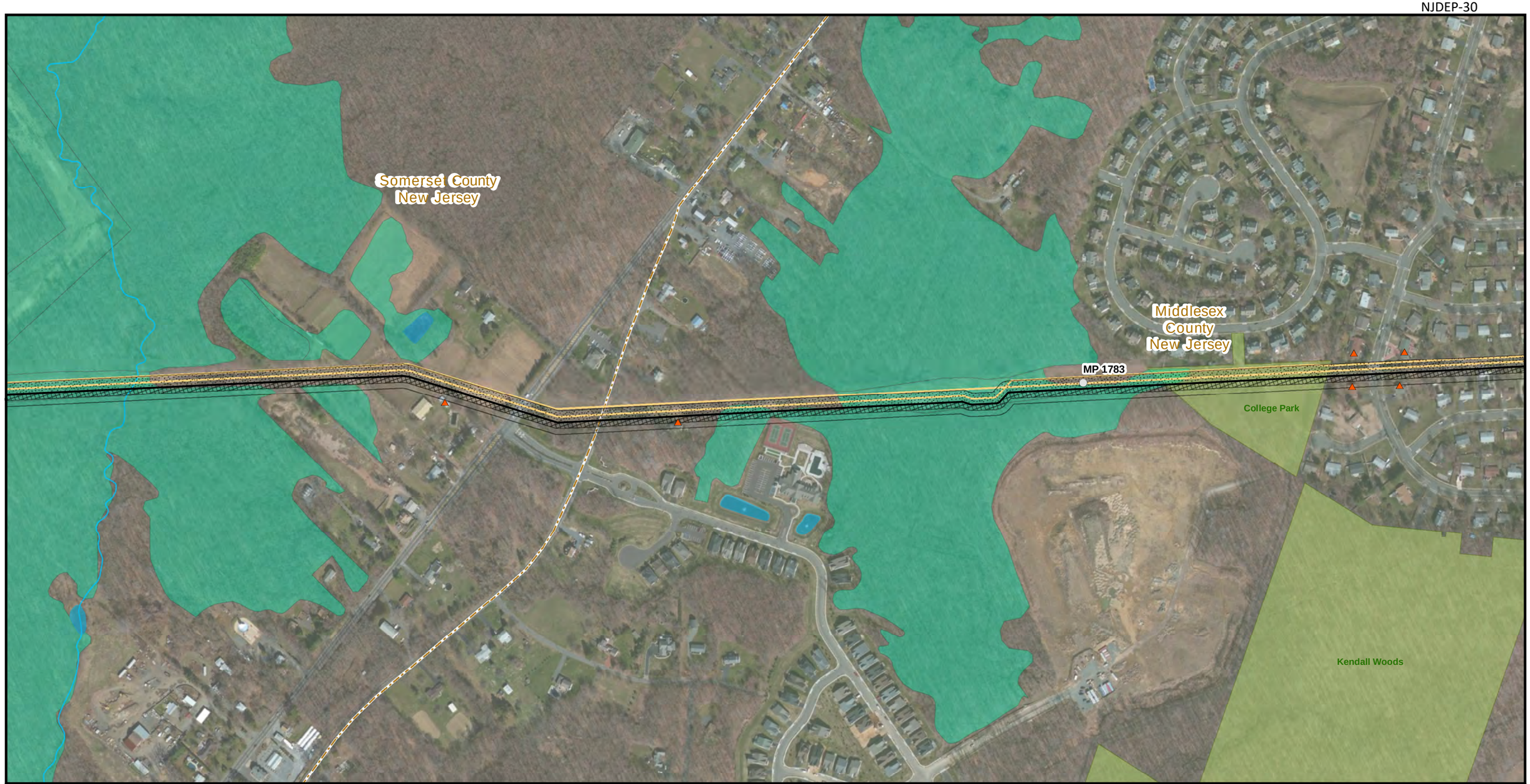
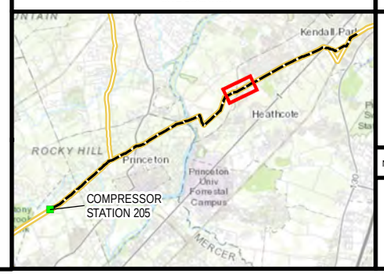


- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- County Boundary
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)
- NJDEP Green Acres Program Land

0 200 400 600 800
Feet

SITE LOCATION



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TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

Williams

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CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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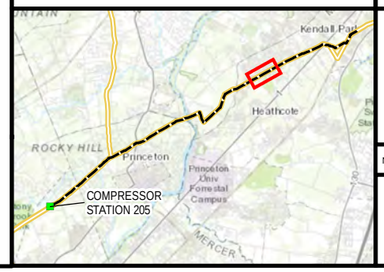
- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NJDEP Wetland (2012)
- Park
- NJDEP Green Acres Program Land

0 200 400 600 800
Feet

SITE LOCATION



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A	3/20/2017	CE	ISSUED FOR FERC FILING	1000891	MK	
B	5/24/2017	CE	ISSUED FOR FERC SUPPLEMENTAL FILING	1000891	MK	
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TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

Williams

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CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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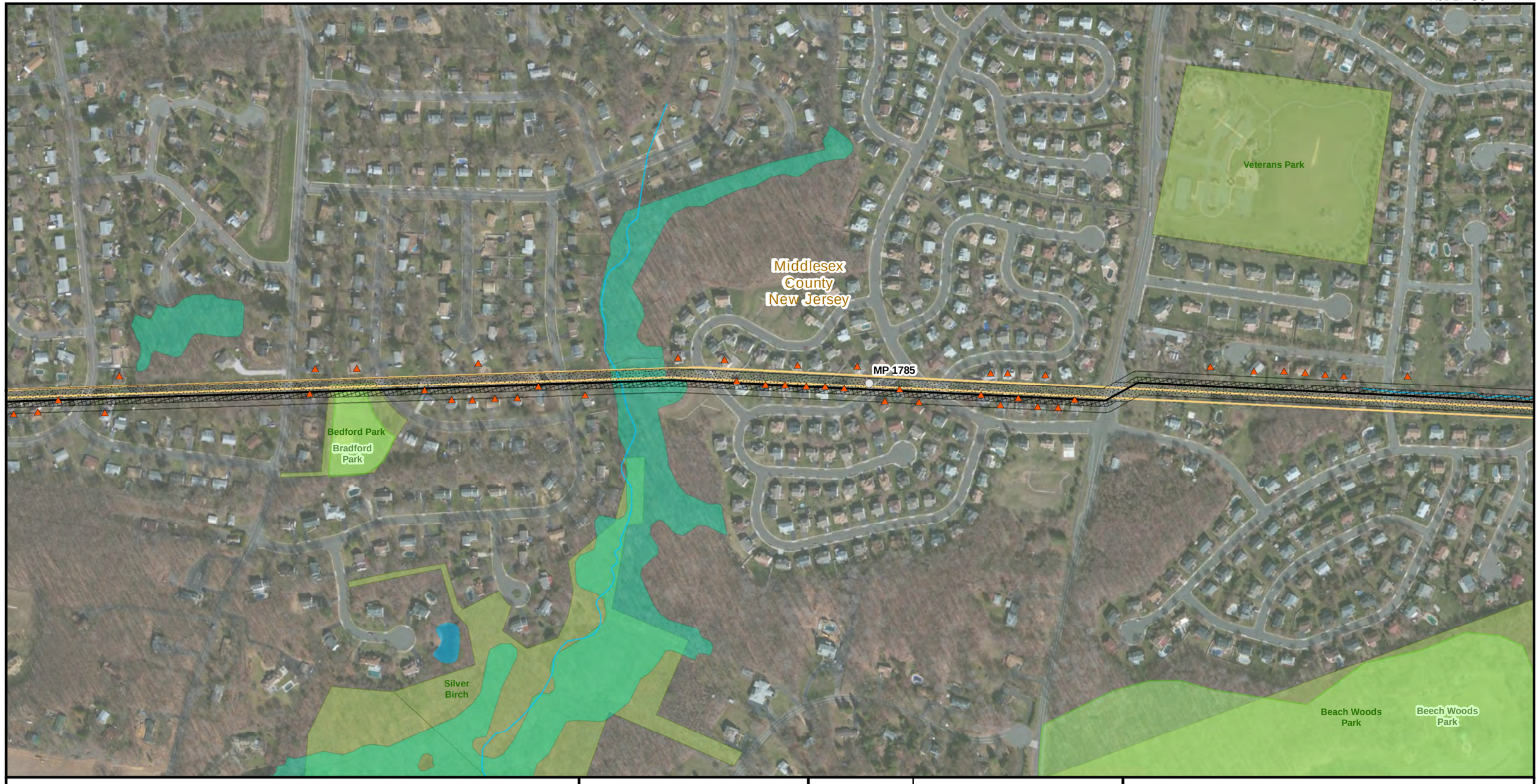
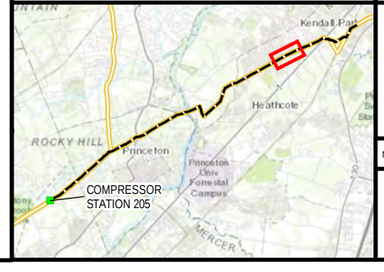


- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Waterbody
- NJDEP Wetland (2012)
- Park
- NJDEP Green Acres Program Land
- NHD Stream

0 200 400 600 800
Feet

SITE LOCATION



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REFERENCE TITLE

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

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DRAWN BY: MK	DATE: 4/25/2019	ISSUE FOR BID: N/A	SCALE:
CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER: FIGURE 1	Sheet 11 of 14
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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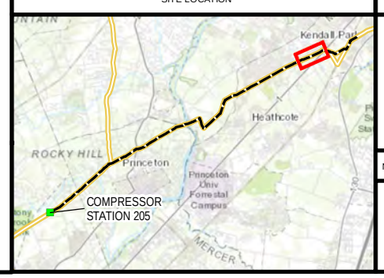
- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)
- Park
- NJDEP Green Acres Program Land

N

0 200 400 600 800
Feet

SITE LOCATION



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TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

Williams

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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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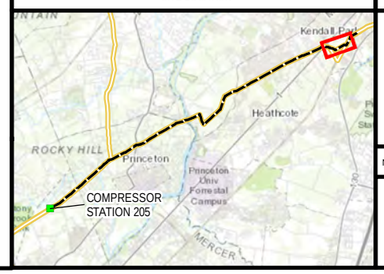
- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)
- NJDEP Green Acres Program Land

N

0 200 400 600 800
Feet

SITE LOCATION



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TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
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NEW JERSEY

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APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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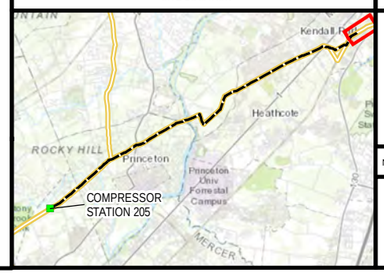
- Residence within 50-ft of Alterntive Workspace
- Milepost for Existing Pipeline
- Pipeline Looping-Intensive Alternative
- Existing Transco Mainline Pipeline
- 25' Permanent ROW
- 25' Temporary ROW
- Temporary EROW
- NHD Stream
- NHD Waterbody
- NJDEP Wetland (2012)
- NJDEP Green Acres Program Land

0 200 400 600 800
Feet

SITE LOCATION



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TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PIPELINE LOOPING-INTENSIVE ALTERNATIVE
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NEW JERSEY

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CHECKED BY: RS	DATE: 4/25/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER:	FIGURE 1
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Data Sources: Williams 2018; E&E 2018; ESRI 2012, 2018; NJDEP 2015, 2018; USGS 2018

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From:	Jones, Christopher
To:	Mochrie, Sara; Resnick, Matthew; Dean, Joseph (Joseph.Dean@Williams.com); Olson, Karen (Karen.Olson@williams.com)
Cc:	Dow, Diane; Perry, Katharine; Eakin,Megan; Albers, Meghan; Mason, Jeffrey A.; Sundar, Nischint; Czapka, Stephen J.
Subject:	RE: CS 206 revised plan set resub 4/26/19
Date:	Monday, April 29, 2019 1:35:45 PM

Sara,

The wetland boundary line is not dependent on any E&T species, but the width of the transition area is. The wetland boundary is based solely on the presence of the mandatory 3-parameters. If the wetland line expanded, it had to have occurred based upon a positive finding for these parameters. If the wetland boundary line changed, we need to verify the accuracy of the line and we need to do it ASAP. Thanks

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Monday, April 29, 2019 2:59 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Olson, Karen (Karen.Olson@williams.com) <Karen.Olson@williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>; Perry, Katharine <KPerry@ene.com>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>; Mason, Jeffrey A. <JMason@ene.com>; Sundar, Nischint <NSundar@ene.com>; Czapka, Stephen J. <SCzapka@ene.com>
Subject: [EXTERNAL] RE: CS 206 revised plan set resub 4/26/19

Matt,

Please note the wetland area is based on the potential expansion of the buffer if the barred owl record is accepted.

We have already delineated and flagged this area and it is 0.09 acres. Per my email on Friday 4/26, if the barred owl record is accepted these plans would apply and we will also have a narrative submission supporting that change. Following that we can address steps for field verification.

Do you have any updates on the barred owl record review status?

Thanks!
Sara

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Monday, April 29, 2019 11:08 AM
To: Mochrie, Sara <SMochrie@ene.com>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Olson, Karen (Karen.Olson@williams.com) <Karen.Olson@williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dow, Diane <Diane.Dow@dep.nj.gov>
Subject: CS 206 revised plan set resub 4/26/19

Sara,

I've reviewed the resubmitted CS206 plans. I note that wetlands W-T09-002C-2 (PFO) and W-T09-002C-3 (PFO) were added to the plans and are within the access road disturbance area. Please have these wetlands field delineated and flagged ASAP so that they can be field verified.

From:	Resnick, Matthew
To:	Mochrie, Sara; Dean, Joseph (Joseph.Dean@Williams.com); Olson, Karen (Karen.Olson@williams.com)
Cc:	Jones, Christopher; Dow, Diane; Perry, Katharine; Eakin,Megan; Albers, Meghan; Mason, Jeffrey A.; Sundar, Nischint; Czapka, Stephen J.
Subject:	RE: CS 206 revised plan set resub 4/26/19
Date:	Monday, April 29, 2019 1:25:40 PM

Sara,

The wetland boundary is not dependent on the presence of an E&T species, only the transition area is. If the field team found more wetlands within the project envelope based upon positive findings for the mandatory 3 parameters, we will need to verify those wetlands ASAP. The plans are showing the aforementioned areas as wetlands within roadway clearing area.

From: Olson, Karen
Sent: Friday, May 10, 2019 4:23 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Ham, Brian <Brian.Ham@Williams.com>; Horner, Scott <Scott.Horner@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: RE: NESE questions

Hi Matt, in response to your questions below:

- Electric Motor-Drive Compression at Compressor Station 206
  - The power line could not be collocated for the entire route. The attached figure is the route overview in relation to NJDEP mapped wetlands**.**
- Combined HDD Alternative
  - If the Lockwood Marina and Morgan Shore HDDs were combined, then the valve setting would be located near the Lockwood Marina HDD entry point (MP 11.5). As shown on sheet 14 of the FWW plan set, this area is located in a wetland. Locating a permanent facility in this area would result in at least 0.27 acre of permanent wetland impact.
  - You are correct, combining the two HDDs would effectively increase the length of time for in-water activities in the Bay, resulting in conflict with the agreed upon TOY restrictions, creating additional risk of failure of the longer length HDD, and increasing dredged material volumes requiring disposal.

Thanks,
Karen

Karen Olson | Environmental Specialist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Thursday, May 9, 2019 9:06 AM
To: Olson, Karen <Karen.Olson@williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] RE: NESE questions

I'm sure Chris will have additional questions, but I have some myself; My questions are in blue below.

Electric Motor-Drive Compression at Compressor Station 206
Transco estimated that the impacts associated with this alternative would be 8.37 **2.43** acres **of temporary impacts on PEM** wetlands**,** impact (construction), **0.78 acres of permanent impacts on PEM wetlands, 0.31 acres of permanent impacts on PSS wetlands, 15.63 acres of permanent impacts on PFO wetlands (this appears to be over estimated considering Transco would collocate the electrical line within existing ROWs. Can you provide additional information as to why forested wetland impacts are so high?),** 15.5 **45.43** acres of **permanent impacts to** forested uplands, and 2.11 acres **of temporary impacts on** public open space, **and 2.08 acres of permanent impacts on public open space.**

Also;

Combined HDD Alternative

If I'm understanding this alternative correctly, combining the two HDD locations (Morgan shore and Lockwood) would force the mainline valve further to the west near where the pipeline would be closer to the surface. You state that this would increase the permanent wetland impacts. By how much? Do you have any drawings of what this would look like for comparison sake?

Second, combining the two HDDs would effectively increase the length of time inwater activities in the Bay would require, conflicting with the agreed to TOY restrictions, and creating additional risk of failure of the longer length HDD, as well as increased dredged volumes to be disposed of?

From: Olson, Karen <Karen.Olson@williams.com>
Sent: Wednesday, May 08, 2019 8:10 PM
To: Jones, Christopher <Christopher.Jones@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Horner, Scott <Scott.Horner@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Subject: [EXTERNAL] RE: NESE questions

Hi Chris and Matt –

See attached for responses to your questions imbedded in the alternatives analysis language below. New text is in red bold, old text is struck through. Since this included revisions to the text it will be

sent to the municipal clerks.

Let me know if you have any additional questions.

Thanks,

Karen

Karen Olson | Environmental Specialist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Sent: Friday, May 3, 2019 1:10 PM
To: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>; Horner, Scott <Scott.Horner@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Subject: [EXTERNAL] NESE questions

All,

Going through the alternatives analysis I highlighted areas in yellow that were not clearly understood and require further explanation. Can you clarify these items? Thanks. And don't hesitate to contact me if you have any questions.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
(609) 984-6216

Electric Motor-Drive Compression at Compressor Station 206

According to Transco, electric motor-driven compression at Compressor Station 206 would require additional aboveground power grid infrastructure, including high voltage power lines and a substation, to provide at least 22,000 kilowatts of power.

Using aerial photography, Transco developed a transmission route based on the location of the nearest electrical substation. Transco's developed route sought to avoid residences and to co-located the transmission line adjacent to existing roadways or other ROW's. Transco determined that the transmission line would be 3.89 miles long and would begin at the existing substation on Ridge Road in South Brunswick Township, approximately 2.5 miles south of the Compressor Station 206 location. The route follows Ridge Road for a half a mile and then at the junction of Ridge Road and Route 1 takes a north-northeast route to avoid residences before continuing another 1.5 miles on Route 27 to Transco's Mainline. The transmission route then follows Transco's Mainline until reaching the proposed Compressor Station 206 site. Transco estimated that the impacts associated with this alternative would be 8.37 acres of wetlands (construction), 15.5 acres of forested uplands, (11.62 acres of wetlands operational impacts, what is the difference between operational impacts and construction impacts?) and 2.11 acres of public open space (2.08 acre figure given as well for open space. Why is the different than the 2.12 acres?) Does Electric Motor-Drive Compression replace CS 206 or

augment it?

Combined HDD Alternative

Transco concluded that combining these Loops was not a practicable alternative because a mainline valve is proposed as close as possible to the shoreline as a safety measure for the existing Class 3 and HCS locations. What are these? A mainline valve must be installed where the pipeline is near to the surface and not in a deep HDD location. The location for the mainline valve was identified near the junction of the Madison Loop and the Raritan Loop. The combined Morgan Shore Approach HDD and the Lockwood Marina HDD would require the valve to be located more inland than proposed. Why is that not good?

Transco is currently proposing to integrate cathodic protection (CP) for the Raritan Bay Loop by installing a power cable and anode sled. Relocating the start point of the Morgan Shore Approach to the west would prevent the CP cable from being integrated into the pipeline system at the beginning of the Raritan Bay Loop near the shoreline (Why?) and would require additional CP length installed to connect the pipeline approximately 0.5 miles to the west. (why is this bad?) While the conceptual length of approximately 1 mile of the combined HDD may be technically feasible in the expected soil conditions, there were other factors considered by Transco in their decision to conduct two separate HDD's. In particular, Transco identified increased risks associated with the added duration of offshore assets (meaning?), increased workspaces and logistical issues needed for the increased length of pullback string offshore (what are the logistical issues?), added offshore pit volume excavation and associated increased drilling fluid volume offshore, and increased horizontal curvature into the HDD alignment to maneuver the pipeline between the entry and exit pits.

Compression-Intensive Alternative

Two compression-intensive alternatives were considered to the Madison and Raritan Bay Loops. The first alternative involved the addition of compression at Compressor Station 207. Transco concluded that this was not a practicable alternative because even with the added compression, the increased pressure drop caused by the additional Project volumes would not allow for the existing and incremental Project volumes to be delivered without the addition of facilities downstream of Compressor Station 207. What are the additional facilities? Loops? CS's?

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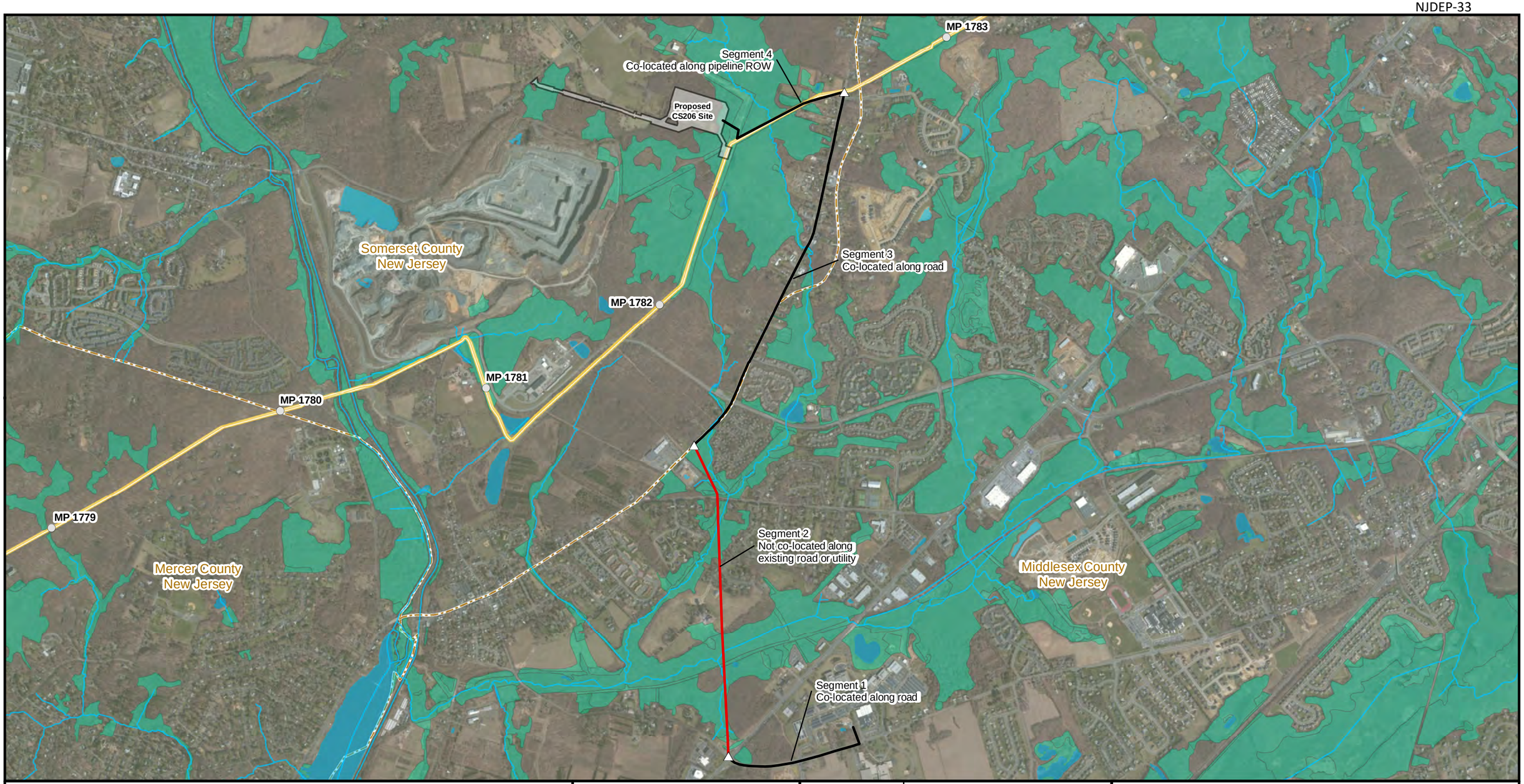
This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.



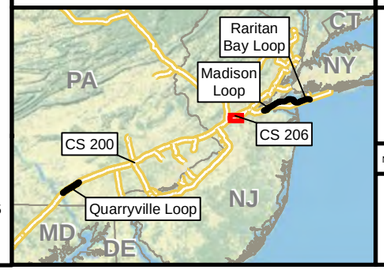
- Electric Transmission Route Not Co-located
- Electric Transmission Route Co-located
- Co-location Corridor Change
- Proposed CS 206 Site
- NJDEP Wetland (2012)
- Milepost for Existing Pipeline
- Existing Transco Pipeline
- County Boundary
- NHD Stream
- NHD Waterbody

N

0 0.25 0.5

Miles

SITE LOCATION



DRAWING NO.	REFERENCE TITLE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	5/10/2019	MK	ISSUED FOR PERMITTING	1000891	BS	

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
ELECTRIC-DRIVEN COMPRESSION ALTERNATIVE
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

Williams

DRAWN BY: MK	DATE: 5/10/2019	ISSUE FOR BID: N/A	SCALE:
CHECKED BY: BS	DATE: 5/10/2019	ISSUE FOR CONSTRUCTION: N/A	Project features ver20a
APPROVED BY:	DATE:	DRAWING NUMBER: FIGURE 1	SHEET 1 OF 1
WO: 1000891		4:39 PM 5/10/2019	

Data Sources: Williams 2017; E&E 2017; ESRI 2012, 2017.

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From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Friday, May 3, 2019 11:02 AM
To: Mochrie, Sara <SMochrie@ene.com>; Dean, Joseph (Joseph.Dean@Williams.com) <Joseph.Dean@Williams.com>; Olson, Karen (Karen.Olson@williams.com) <Karen.Olson@williams.com>
Cc: Dow, Diane <Diane.Dow@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: Errata from discussion this morning.

Good Morning Transco Team, as discussed, here are the documents;

1. Transco.PDF. This is Christina's comments to Jeffery Mason regarding the location of what would be considered suitable habitat for Barred Owl, and as a result Exceptional Resource. Exceptional Resources are in Green. Intermediate/ordinary are in purple.
2. Summary letter from EELC to DEP.
3. Summary Letter from Princeton Hydro raising technical and legal objections to the project as it currently stands.

Lastly, please look at other alternatives for utility connection D at CS 206.

NOTES ON USE OF PLANS:

1. UNLESS THESE PERMIT DRAWINGS ARE SPECIFICALLY DESIGNATED AS "CONSTRUCTION ISSUE," THESE DRAWINGS SHALL NOT BE USED FOR PERMITTING ASSOCIATED WITH CONSTRUCTION OR THE IMPROVEMENTS DEPICTED HEREIN. CONTRACTORS SHALL NOTIFY THE DESIGN ENGINEER TO OBTAIN PERMITTING DOCUMENTS. THESE PLANS ARE FOR NJDEP PERMITTING ONLY, NO CONSTRUCTION IS TO BE BASED UPON THESE PLANS.
2. ALL DIMENSIONS MUST BE VERIFIED IN THE FIELD DURING CONSTRUCTION BY THE CONTRACTOR. NOTIFY PAULUS, SOKOLOWSKI AND SARTOR, LLC OF ANY CONFLICTS, ERRORS, AMBIGUITIES OR DISCREPANCIES IN THE CONTRACT DRAWINGS OR SPECIFICATIONS BEFORE PROCEEDING WITH CONSTRUCTION.
3. ALL DIMENSIONS SHALL BE AS NOTED IN WORDS OR NUMBERS ON THE CONTRACT DRAWINGS. DO NOT SCALE THE DRAWINGS TO DETERMINE DIMENSIONS.
4. THESE CONTRACT DRAWINGS CONTAIN DATA INTENDED SPECIFICALLY FOR THE NOTED PROJECT AND CLIENT. THEY ARE NOT INTENDED FOR USE ON EXTENSIONS OF THIS PROJECT OR FOR REUSE ON ANY OTHER PROJECT.
5. THE COPYING AND/OR MODIFICATION OF THIS DOCUMENT OR ANY OTHER PORTION THEREOF WITHOUT THE WRITTEN PERMISSION OF PAULUS, SOKOLOWSKI, AND SARTOR, LLC IS EXPRESSLY PROHIBITED.
6. INFORMATION FOR DESIGN LAYOUT IS CONTAINED SOLELY IN THE WRITTEN DIMENSIONS, BEARINGS, AND ANGLES CONTAINED ON THE DRAWINGS.
7. THIS DIMENSIONAL INFORMATION IS NOT WARRANTED NOR SHOULD IT BE CONSIDERED AS COMPLETE FOR EVERY ASPECT OF THE LAYOUT. STANDARD PRACTICE REQUIRES THAT THE LAYOUT PERSON CHECK THE DIMENSIONAL DATA CONSISTENCY AND TO PERFORM SURVEY CALCULATIONS WHICH ARE CUSTOMARY FOR CONSTRUCTION LAYOUT. IN THE EVENT THAT A QUESTION OR INCONSISTENCY IS DISCOVERED, THE INSTALLER SHALL IMMEDIATELY NOTIFY THE DESIGN ENGINEER, PAULUS, SOKOLOWSKI, AND SARTOR, LLC.
8. THE GRAPHICAL INFORMATION CONTAINED IN ELECTRONIC FILES IS INTENDED AS DRAWING DATA ONLY. IT IS NOT INTENDED TO SERVE AS SURVEY LAYOUT DATA.
9. ALL PROPOSED FITTING ANGLES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PRIOR TO CUTTING.

GENERAL NOTES:

1. AS INDICATED IN THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES," SUFFICIENT CONSTRUCTION WARNING SIGNS ARE TO BE PROVIDED AND MAINTAINED BY CONTRACTORS PERFORMING CONSTRUCTION WORK. SAID SIGNS ARE TO BE MAINTAINED UNTIL CONSTRUCTION IS COMPLETED AND APPROVED BY THE APPROPRIATE MUNICIPAL INSPECTION PERSONNEL.
2. THE CONTRACTOR SHALL PROVIDE SUCH TEMPORARY DRAINAGE, SOIL EROSION, AND DUST CONTROL MEASURES AS MAY BE INDICATED ON THE PLANS AND/OR AS DIRECTED BY THE MUNICIPAL ENGINEER OR OTHER AGENCIES OR DEPARTMENTS TO SATISFY ENVIRONMENTAL CONCERNS.
3. LOCATION OF EXISTING INLETS, CATCH BASINS AND MANHOLES MUST BE FIELD VERIFIED BEFORE WORK MAY COMMENCE. ANY CONFLICTING INFORMATION FROM THAT SHOWN SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGN ENGINEER, PAULUS, SOKOLOWSKI, AND SARTOR, LLC.
4. ALL ROADWAYS ARE TO BE PASSABLE FOR FIRE, POLICE, & EMERGENCY VEHICLES DURING CONSTRUCTION. NOTICE SHALL BE GIVEN TO AGENCIES 72 HOURS IN ADVANCE IF WORK MAY IMPACT EMERGENCY RESPONSE.
5. UNLESS SPECIFICALLY SHOWN HEREIN, THE DESIGN ENGINEER HAS NOT CONDUCTED AN INVESTIGATION OR PROVIDED DATA ON THE NATURE OF, OR STRUCTURAL SUITABILITY OF ANY SUBSURFACE MATERIALS. THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IN WRITING OF ANY UNUSUAL SOIL OR ROCK CONDITIONS ENCOUNTERED.
6. ALL SOIL EROSION AND SEDIMENT CONTROL STRUCTURES AND MEASURES SHALL BE IN PLACE PRIOR TO ANY SITE DISTURBANCE.
7. CONTRACTOR TO RESTORE GROUND SURFACE OF GAS PIPELINE TRENCH, CONSTRUCTION STAGING AREAS, AND ALL OTHER DISTURBED AREAS TO THEIR ORIGINAL CONDITION OR BETTER, OR AS SPECIFIED IN THESE PLANS.
8. NO CONSTRUCTION SHALL BE PERFORMED ON WEEKENDS OR DURING NIGHTS IN RESIDENTIAL AREAS WITHOUT PRIOR APPROVAL OF WILLIAMS.
9. ALL TREES REMOVED DURING CLEARING SHALL BE TRIMMED AND PLACED AT EDGE OF EASEMENT FOR LANDOWNER UNLESS OTHERWISE NOTED ON PLANS.

OWNER / APPLICANT

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
2800 POST OAK BLVD.
HOUSTON, TEXAS 77056

FLOOD HAZARD AREA AND FRESHWATER WETLANDS NOTES:

1. THE PURPOSE OF THESE PLANS IS TO SECURE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION FRESHWATER WETLANDS, FLOOD HAZARD AREA FLOODPLAIN VERIFICATION AND FLOOD HAZARD AREA INDIVIDUAL PERMITS FOR THE PROPOSED CONSTRUCTION OF A COMPRESSION STATION 206 AND ASSOCIATED IMPROVEMENTS IN FRANKLIN TOWNSHIP, SOMERSET COUNTY AS PART OF THE NORTHEAST SUPPLY ENHANCEMENT PROJECT.
   A. FRESHWATER WETLAND INDIVIDUAL PERMIT – N.J.A.C. 7:7A-7.2
   B. FLOOD HAZARD AREA INDIVIDUAL PERMIT REGULATED ACTIVITIES
      - N.J.A.C. 7:13-11.1 REGULATED ACTIVITY IN CHANNEL
      - N.J.A.C. 7:13-11.2 REGULATED ACTIVITY IN RIPARIAN ZONE
      - N.J.A.C. 7:13-11.6 REGULATED ACTIVITY IN OR AFFECTING A PRESENT OR DOCUMENTED HABITAT FOR THREATENED OR ENDANGERED SPECIES
      - N.J.A.C. 7:13-12.1 REGULATED ACTIVITY ALL REQUIREMENTS
      - N.J.A.C. 7:13-12.2 REGULATED ACTIVITY FOR STORMWATER MANAGEMENT
      - N.J.A.C. 7:13-12.3 REGULATED ACTIVITY FOR EXCAVATION, FILL AND GRADING ACTIVITIES
      - N.J.A.C. 7:13-12.6 REGULATED ACTIVITY FOR ROADWAY
      - N.J.A.C. 7:13-12.7 REGULATED ACTIVITY FOR CULVERT
      - N.J.A.C. 7:13-12.8 REGULATED ACTIVITY FOR UTILITY LINE
2. THE APPLICANT/OWNER SHALL SECURE ALL PROPOSED PERMANENT AND TEMPORARY EASEMENTS AND RIGHTS OF ACCESS SHOWN ON THE PLANS PRIOR TO CONSTRUCTION. THE OWNER/CONTRACTOR SHALL ALSO SECURE NECESSARY EASEMENTS OR RIGHTS OF ACCESS BEYOND THE LIMITS SHOWN, AS DEEMED NECESSARY.
3. THE CONTRACTOR IS ADVISED THAT STAGING, STORING AND STOCKPILING OF MATERIALS AND EQUIPMENT SHALL BE ACCOMPLISHED OUTSIDE NJDEP REGULATED FRESHWATER WETLANDS, WETLANDS BUFFERS OR FLOOD HAZARD AREA RIPARIAN ZONES TO THE MAXIMUM EXTENT PRACTICABLE AND IN ACCORDANCE WITH NJDEP LINEAR CONSTRUCTION GUIDELINES.
4. THE CONTRACTOR SHALL EXCAVATE, STORE AND REPLACE TOPSOIL WITHIN TRENCH LIMITS. PROPOSED FINISHED GRADE SHALL MATCH EXISTING GRADE. ALL EXCESS MATERIAL SHALL BE DISPOSED OF LAWFULLY.
5. ANY PROPOSED TRENCH IN A STREAM CHANNEL, OPEN WATER OR RIPARIAN ZONE IS TO BE A MAXIMUM OF 20 FEET WIDE, UNLESS CONSTRUCTION STANDARDS DICTATE ADDITIONAL WIDTH.
6. A MINIMUM COVER OF FOUR (4) FEET SHALL BE PROVIDED FROM THE CHANNEL INVERT. THE ELEVATION OF THE TRANSMISSION GAS MAIN SHALL REMAIN HORIZONTAL UNTIL TEN (10) FEET BEYOND THE TOP OF BANK, OR TWICE THE HEIGHT OF THE STREAM BANK, WHICHEVER IS GREATER. THE INCLINED OF THE MAIN SHALL BE NO GREATER THAT 1:2 ENTERING AND EXITING THE CHANNEL BANK AREA.
7. ALL OR A PORTION OF THE SITE LIES WITHIN A FLOOD HAZARD AREA. CERTAIN ACTIVITIES IN FLOOD HAZARD AREAS ARE REGULATED BY THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND SOME ACTIVITIES MAY BE PROHIBITED ON THIS SITE OR MAY FIRST REQUIRE A PERMIT. CONTACT THE DIVISION OF LAND USE REGULATIONS AT (609) 292-0060 FOR MORE INFORMATION PRIOR TO ANY CONSTRUCTION ON SITE.
8. NEW JERSEY WATERS OF THE UNITED STATES DELINEATION DATA WERE COLLECTED BY ECOLSCIENCES AND ECOLOGY AND ENVIRONMENT, INC. IN 2016/2017. A MAPPING GRADE TRIMBLE GPS WAS USED TO COLLECT FRESHWATER WETLANDS IN THE FIELD. IN NEW JERSEY MAPPING GRADE LOCATIONS AND DATA WERE RECORDED BY CIVIL SURVEY OF WILLIAMS STRATEGIC SOURCING COMPANY, LLC TO MEET PLS CERTIFICATION REQUIREMENT REQUIRED FOR NJDEP LETTER OF INTERPRETATION.
9. WITHIN THE SURVEY CORRIDOR ECOLOGY AND ENVIRONMENT, INC. AND AMY GREENE ENVIRONMENTAL ESTABLISHED THE RIPARIAN ZONES UTILIZING WATERS OF THE UNITED STATES FIELD DATA. OUTSIDE SURVEY CORRIDOR FEATURES ECOLOGY AND ENVIRONMENT, INC. USED REMOTE SENSING FOR FEATURES WHO'S TRADITIONAL AREAS ENCROACH INTO THE SURVEY CORRIDOR FROM OUTSIDE.
10. PROPOSED PROJECT IS SUBJECT TO SOMERSET-UNION SOIL CONSERVATION DISTRICT PLAN CERTIFICATION APPROVAL.
11. PRIOR TO ANY SITE DISTURBANCE, ALL WETLANDS AND OR WETLANDS TRANSITION AREA LIMITS SHALL BE CLEARLY IDENTIFIED IN THE FIELD WITH ORANGE "MIRAFI" PROTECTIVE FENCING OR APPROVED ALTERNATE. LOCATE SILT FENCE FIVE FEET UPSTREAM OF PROTECTIVE FENCING AND DOWNSTREAM OF CLEARING LIMITS AS SHOWN. THE CONTRACTOR SHALL VERIFY THAT ALL PERMITS AS MAY BE REQUIRED BY LOCAL, COUNTY, STATE, OR FEDERAL REGULATIONS ARE IN HAND, ON THE JOB AND VALID PRIOR TO COMMENCING WORK. PS&S SHALL STAKE THESE BOUNDARIES PRIOR TO CONSTRUCTION.
12. NON-PAVED AREAS IN FRESHWATER WETLANDS AND/OR RIPARIAN ZONES TO RECEIVE 18 INCHES OF TOPSOIL/INSITU MATERIAL.
13. CONTRACTOR SHALL DISPOSE OF ANY HAZARDOUS SUBSTANCES (IF ENCOUNTERED) OFF-SITE. NO PLACEMENT, STORAGE OR PROCESSING OF HAZARDOUS SUBSTANCES IN REGULATED AREAS PERMITTED.
14. THE NEW JERSEY FLOOD HAZARD AREA DESIGN FLOOD ASSOCIATED WITH CARTER'S BROOK WERE DETERMINED USING NJDEP METHOD 5 (FLOOD HAZARD AREA DETERMINED BY APPROXIMATION) ACCORDING TO N.J.A.C. 7:13-3.5.
15. STAGING, STORING AND STOCKPILING OF MATERIALS AND EQUIPMENT SHALL, TO THE MAXIMUM EXTENT PRACTICABLE, BE ACCOMPLISHED OUTSIDE THE RIPARIAN ZONE. WHERE IT IS NECESSARY TO CONDUCT THESE ACTIVITIES IN THE RIPARIAN ZONE, THESE ACTIVITIES, AS WELL AS ACCESS TO THE UTILITY LINE DURING CONSTRUCTION, SHALL, TO THE MAXIMUM EXTENT PRACTICABLE, BE UNDERTAKEN IN ACTIVELY DISTURBED AREAS.

REFERENCE NOTES

1. EXISTING CONDITIONS SHOWN HEREON ARE BASED UPON SURVEY INFORMATION PREPARED BY D.W. SMITH ASSOCIATES, INC. AND WILLIAMS TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC.
2. THE VERTICAL DATUM REFERS TO NAVD 88 TOPOGRAPHICAL DATA. (CONVERSION TO NVGD 1929; + 1.04 FT.)
3. THE HORIZONTAL DATUM REFERS TO NAD83 NEW JERSEY STATE PLANE COORDINATE SYSTEM.
4. LOT LINES AND RIGHT-OF-WAY LINES SHOWN HEREON WERE TAKEN FROM INFORMATION AS REFERENCED ABOVE.
5. TOPOGRAPHIC CONTOURS BASED UPON FIELD SURVEY PERFORMED BY D.W. SMITH ASSOCIATES, LLC OCTOBER 2016–JUNE 2017, PROVIDED BY TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC.
6. PROPOSED SITE IMPROVEMENTS AND PROPOSED LIMITS OF DISTURBANCE TAKEN FROM PLANS ENTITLED "TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC POST CONSTRUCTION STORMWATER MANAGEMENT PLAN", LAST REVISED FEBRUARY 1, 2019, PROPOSED BY AECOM.
7. PRIOR TO ANY SITE DISTURBANCE, ALL WETLANDS AND OR WETLANDS TRANSITION AREA LIMITS SHALL BE CLEARLY IDENTIFIED IN THE FIELD WITH ORANGE "MIRAFI" PROTECTIVE FENCING OR APPROVED ALTERNATE. LOCATE SILT FENCE FIVE FEET UPSTREAM OF PROTECTIVE FENCING AND DOWNSTREAM OF CLEARING LIMITS AS SHOWN. THE CONTRACTOR SHALL VERIFY THAT ALL PERMITS AS MAY BE REQUIRED BY LOCAL, COUNTY, STATE, OR FEDERAL REGULATIONS ARE IN HAND, ON THE JOB AND VALID PRIOR TO COMMENCING WORK. PS&S SHALL STAKE THESE BOUNDARIES PRIOR TO CONSTRUCTION.
8. NEW JERSEY STATE PLANE COORDINATES IN NAD83 AT APPROXIMATELY 1000-FT INTERVALS ALONG PROJECT:
   #1 NORTH 572,290', EAST 461,603'
   #2 NORTH 571,931', EAST 462,514'
   #3 NORTH 571,628', EAST 463,461'
   #4 NORTH 571,304', EAST 464,405'
   #5 NORTH 571,911', EAST 465,195'

GRAPHIC SCALE
0 100 200 400
(IN FEET)
1 inch = 200 ft.

FLOOD HAZARD AREA METES AND BOUNDS				
Line #	Length	Direction	START	END
L1	16.390	S1° 12' 48.59"E	N=572590.5184 E=465198.0982	N=572574.1324 E=465198.4453
L2	33.609	S8° 58' 56.56"E	N=572574.1324 E=465198.4453	N=572540.9358 E=465203.6927
L3	88.932	S2° 03' 55.39"W	N=572540.9358 E=465203.6927	N=572452.0613 E=465200.4875
L4	25.330	S7° 07' 37.92"W	N=572452.0613 E=465200.4875	N=572426.9268 E=465197.3448
L5	31.203	S15° 04' 51.26"E	N=572426.9268 E=465197.3448	N=572396.7982 E=465205.4633
L6	22.074	S45° 27' 06.17"E	N=572396.7982 E=465205.4633	N=572381.3129 E=465221.1948
L7	40.335	S29° 15' 06.43"E	N=572381.3129 E=465221.1948	N=572346.1213 E=465240.9044
L8	28.747	S26° 08' 47.26"E	N=572346.1213 E=465240.9044	N=572320.3159 E=465253.5723
L9	56.168	S6° 44' 53.41"W	N=572320.3159 E=465253.5723	N=572264.5371 E=465246.9723
L10	35.727	S25° 39' 40.23"E	N=572264.5371 E=465246.9723	N=572232.3335 E=465262.4440
L11	35.388	S0° 25' 28.96"W	N=572232.3335 E=465262.4440	N=572196.9466 E=465262.1816
L12	42.555	S32° 13' 29.32"E	N=572196.9466 E=465262.1816	N=572160.9463 E=465284.8740
L13	15.355	S54° 19' 39.39"E	N=572160.9463 E=465284.8740	N=572151.9920 E=465297.3480
L14	18.974	S53° 14' 24.10"E	N=572151.9920 E=465297.3480	N=572140.6365 E=465312.5493
L15	87.262	S22° 28' 08.89"E	N=572140.6365 E=465312.5493	N=572059.9987 E=465345.8997
L16	20.786	S37° 39' 49.96"E	N=572059.9987 E=465345.8997	N=572043.5445 E=465358.6004
L17	82.215	S50° 12' 46.54"E	N=572043.5445 E=465358.6004	N=571990.9323 E=465421.7765
L18	25.279	S22° 47' 49.51"E	N=571990.9323 E=465421.7765	N=571967.6282 E=465431.5712
L19	25.259	S43° 14' 15.91"E	N=571967.6282 E=465431.5712	N=571949.2266 E=465448.8743
L20	23.886	S79° 07' 11.24"E	N=571949.2266 E=465448.8743	N=571944.7179 E=465472.3312

FLOOD HAZARD AREA METES AND BOUNDS				
Line #	Length	Direction	START	END
L21	25.796	S63° 22' 32.86"E	N=571944.7179 E=465472.3312	N=571933.1576 E=465495.3922
L22	35.893	S28° 15' 16.81"E	N=571933.1576 E=465495.3922	N=571901.5413 E=465512.3836
L23	35.710	S5° 12' 36.14"E	N=571901.5413 E=465512.3836	N=571865.9793 E=465515.6263
L24	32.903	S27° 01' 14.58"E	N=571865.9793 E=465515.6263	N=571836.6682 E=465530.5744
L25	33.298	S50° 27' 10.16"E	N=571836.6682 E=465530.5744	N=571815.4666 E=465556.2508
L26	22.493	S31° 48' 26.92"E	N=571815.4666 E=465556.2508	N=571796.3511 E=465568.1064
L27	43.134	S12° 25' 48.69"E	N=571796.3511 E=465568.1064	N=571754.2284 E=465577.3909
L28	14.152	S4° 55' 02.83"E	N=571754.2284 E=465577.3909	N=571740.1285 E=465578.6041
L29	12.587	S54° 03' 12.48"E	N=571740.1285 E=465578.6041	N=571732.7396 E=465588.7940
L30	20.359	S67° 59' 34.20"E	N=571732.7396 E=465588.7940	N=571725.1104 E=465607.6700
L31	14.865	S41° 53' 51.82"E	N=571725.1104 E=465607.6700	N=571714.0456 E=465617.5972
L32	35.715	S8° 38' 51.01"E	N=571714.0456 E=465617.5972	N=571678.7369 E=465622.9671
L33	38.061	S21° 59' 02.48"E	N=571678.7369 E=465622.9671	N=571643.4430 E=465637.2152
L34	30.232	S35° 06' 50.77"E	N=571643.4430 E=465637.2152	N=571618.7127 E=465654.6051
L35	1.443	S36° 14' 12.41"E	N=571618.7127 E=465654.6051	N=571617.5491 E=465655.4579
L36	8.205	S39° 30' 56.61"W	N=571617.5491 E=465655.4579	N=571611.2197 E=465650.2374
L37	44.559	S27° 49' 37.01"W	N=571611.2197 E=465650.2374	N=571571.8138 E=465629.4373
L38	53.036	S12° 40' 50.04"W	N=571571.8138 E=465629.4373	N=571520.0714 E=465617.7951
L39	14.238	S11° 25' 08.44"E	N=571520.0714 E=465617.7951	N=571506.1148 E=465620.6141
L40	19.244	S13° 14' 07.28"E	N=571506.1148 E=465620.6141	N=571487.3819 E=465625.0200

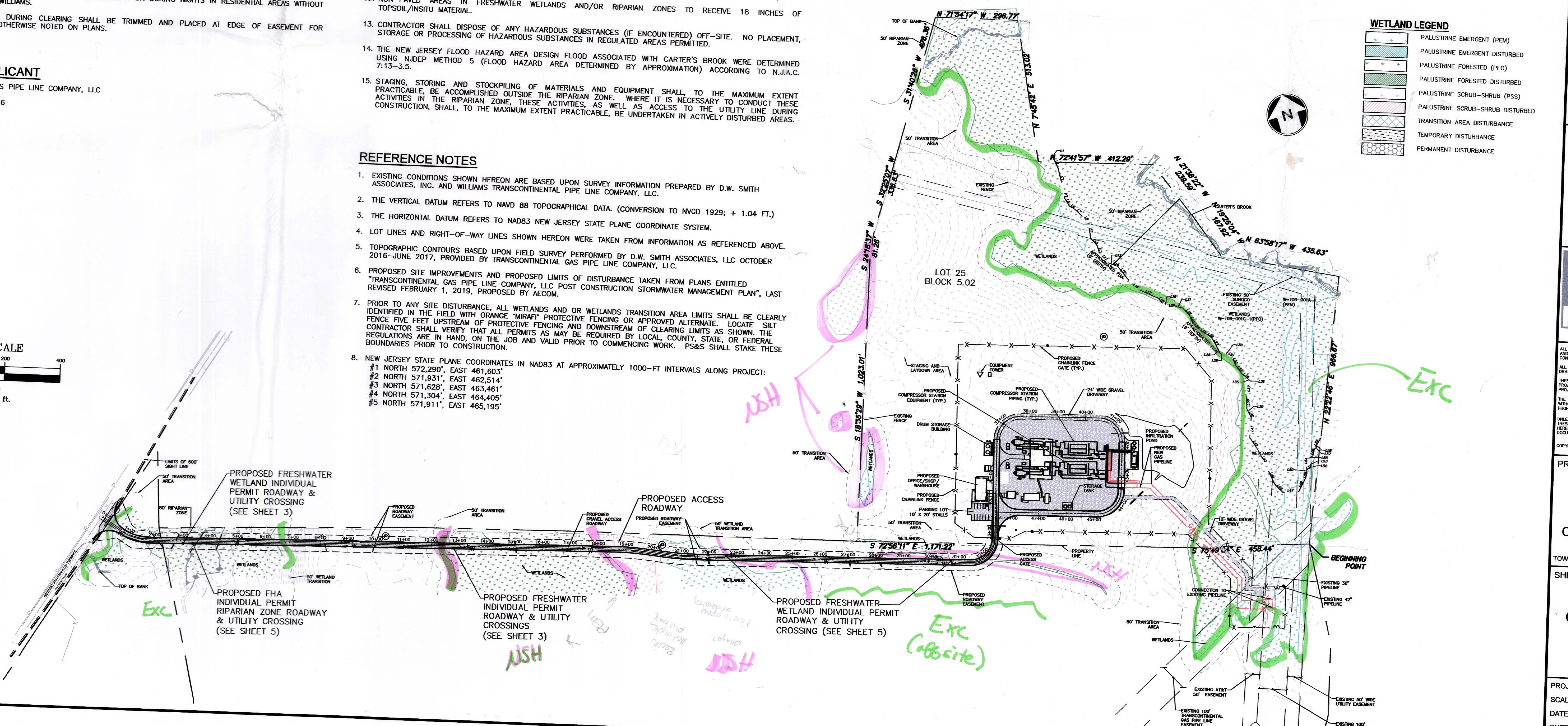
FLOOD HAZARD AREA METES AND BOUNDS				
Line #	Length	Direction	START	END
L41	73.495	S20° 13' 55.32"W	N=571487.3819 E=465625.0200	N=571418.4211 E=465599.6036
L42	53.561	S17° 51' 25.33"E	N=571418.4211 E=465599.6036	N=571367.4408 E=465616.0276
L43	74.181	S10° 41' 26.54"E	N=571367.4408 E=465616.0276	N=571294.5470 E=465629.7888
L44	63.251	S10° 28' 55.63"E	N=571294.5470 E=465629.7888	N=571232.3517 E=465641.2959
L45	44.573	S29° 34' 14.34"E	N=571232.3517 E=465641.2959	N=571193.5846 E=465663.2925
L47	56.087	S79° 34' 19.14"E	N=571193.5846 E=465663.2925	N=571183.4328 E=465718.4531
L48	55.444	N42° 45' 03.26"E	N=571183.4328 E=465718.4531	N=571224.1459 E=465756.0891
L49	16.388	N29° 44' 10.93"E	N=571224.1459 E=465756.0891	N=571238.3757 E=465764.2176
L50	13.312	N13° 16' 42.62"E	N=571238.3757 E=465764.2176	N=571251.3320 E=465767.2752
L51	17.292	N88° 04' 24.87"E	N=571251.3320 E=465767.2752	N=571251.9133 E=465784.5576
L52	6.610	N29° 15' 50.40"E	N=571251.9133 E=465784.5576	N=571257.6793 E=465787.7886
L53	19.566	N38° 38' 03.11"W	N=571257.6793 E=465787.7886	N=571272.9631 E=465775.5727
L54	15.071	N22° 22' 03.75"E	N=571272.9631 E=465775.5727	N=571286.9000 E=465781.3079
L55	22.779	N76° 30' 51.47"E	N=571286.9000 E=465781.3079	N=571292.2122 E=465803.4590
L56	24.477	N28° 27' 40.07"E	N=571292.2122 E=465803.4590	N=571313.7310 E=465815.1239
L57	17.038	N65° 52' 59.53"E	N=571313.7310 E=465815.1239	N=571320.6928 E=465830.6749
L58	8.911	N83° 40' 51.67"W	N=571320.6928 E=465830.6749	N=571321.6736 E=465821.8179
L59	35.806	N47° 11' 33.58"E	N=571321.6736 E=465821.8179	N=571346.0053 E=465848.0869

RIPARIAN ZONE LEGEND

- ROADWAY ACCESS AREA
- ACCESS TO THE PROJECT DISTURBANCE
- NEW UTILITY LINE DISTURBANCE

WETLAND LEGEND

- PALUSTRINE EMERGENT (PEM)
- PALUSTRINE EMERGENT DISTURBED
- PALUSTRINE FORESTED (PFO)
- PALUSTRINE FORESTED DISTURBED
- PALUSTRINE SCRUB-SHRUB (PSS)
- PALUSTRINE SCRUB-SHRUB DISTURBED
- TRANSITION AREA DISTURBANCE
- TEMPORARY DISTURBANCE
- PERMANENT DISTURBANCE



REV./ISSUE	DATE
1	08/24/18
2	02/04/19

U-T09-002-
W-T19-001-006
WW-T19-001-T0BR-003
#5
1609

I AM A DULY REGISTERED PR... THE LAWS OF THE STATE OF... THAT EXISTING CONDITIONS S... PREPARED UNDER MY DIRECT...
THOMAS J.
DW SMITH A...
1450 STATE ROU...
PROFESSIONA...
N.J. LIC. NO. 37207
SIGNATURE

I AM A DULY REGISTERED PRO... OF THE STATE OF NEW JERSEY... PROPOSED ENVIRONMENTAL DIS... AND CORRESPOND WITH THE D...
WILLIAM S...
PS&...
1433 HIGHWAY 34, SU...
PROFESSION...
N.J. LIC. NO. 41319
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PROJECT
NORTHEAS...
ENHANCEMEN...
PROPO...
COMPRESSOR ...
BLOCK 5.02, ...
TOWNSHIP OF FRANKLIN, SOMER...

SHEET TITLE
OVERALL S...
AND...
GENERAL ...

PROJECT NO.: 05731.0003
SCALE: 1 = 200'
DATE: 06-08-2018
SHEET NO.
2

Princeton Hydro's Review of Transco's NESE NJDEP Permit Applications (May 2, 2019)

I. Executive Summary

Princeton Hydro has been retained by the Eastern Environmental Law Center ("EELC") to review Transcontinental Gas Pipeline Company ("Transco") proposed Northeast Supply Enhancement (NESE) Project relative to ecological impacts and regulatory compliance. We have already reviewed Transco's previously submitted applications for a Freshwater Wetlands Individual Permit, Coastal Wetlands Permit, In-Water Waterfront Development Individual Permit, and Upland Waterfront Development Individual Permit, which were withdrawn by the applicant in June 2018.[1] We have also reviewed both FERC's Draft Final Environmental Impact Statement ("DEIS") for the NESE Project (issued on March 23, 2018) and FERC's Final Environmental Impact Statement ("FEIS") for the NESE Project (issued on January 25, 2019). This report focuses on the following Transco permit applications for the NESE Project that were submitted to the New Jersey Department of Environmental Protection ("NJDEP") in June 2018: Freshwater Wetlands Individual Permit, Coastal Wetlands Permit, In-Water Waterfront Development Individual Permit, and Upland Waterfront Development Individual Permit.

In preparing this report, Princeton Hydro reviewed and evaluated information on the NESE Project provided by Transco to NJDEP, which included the permit applications themselves, various environmental reports, several project plans, and various materials subsequently submitted by Transco to NJDEP in response to deficiency letters or requests for more information from NJDEP. We note, however, that Transco submitted certain permit-related material close to NJDEP's May 2, 2019 deadline for submitting public comments and have not yet had time to fully analyze them. We plan to provide additional analysis of this recent permit-related material once we have had the opportunity to properly review these last minute submissions.

Our review of Transco's June 2018 applications reveals a number of important issues that should preclude any serious consideration regarding an approval by NJDEP of this Project. We note that, where relevant, our review below refers to Transco's withdrawn NJDEP permit applications as well as FERC's DEIS and FEIS to better inform our analysis of the environmental impacts of this Project (in its current configuration) and its ability to

[1] See Princeton Hydro's Review of Transco's NESE NJDEP Permit Applications (June 2018).

comply with the appropriate New Jersey laws and regulations. A few of the key issues we identified in the documents are summarized below.

1. Transco's Freshwater Wetlands Individual Permit application fails to make any realistic attempt to satisfy the requirements at 40 CFR 230, as required by N.J.A.C. 7:7A-10.2(b)8. Incorporation of these requirements into the impact analysis is essential to a realistic determination of impacts, including secondary impacts. As such the Freshwater Wetlands Individual Permit application remains incomplete and thus fails to adequately illustrate compliance with the Freshwater Wetlands Protection Act and New Jersey's requirement to fully satisfy the requirements of Section 404 of the Clean Water Act. The requirement for a greater level of analysis regarding impacts to regulated areas is also set forth at N.J.A.C. 7:7A-16.7(a)4ii of the FWPA. Currently, the FWP IP does not provide a sufficient level of detail to satisfy the requirements of the FWPA.

2. Stormwater Management: Based on our analysis of Transco's stormwater basin design, it is apparent from the multiple design errors that the proposed basin continues to not meet the minimum requirements or design standards for an infiltration facility as required by the NJDEP. In addition, Transco finally understands that the berm of the proposed facility will be classified as a Class IV Dam, in accordance with New Jersey Dam Safety Regulations (N.J.A.C. 7:20). These and other design errors reveal significant technical design flaws that preclude the proposed basin from complying with New Jersey's Stormwater Management rules. Importantly, N.J.A.C. 7:7A-7.2(b)15 requires a project such as the one proposed to comply in its entirety with the Stormwater Management Rules at N.J.A.C. 7:8 in order to satisfy the requirements for an Individual Permit.

3. The presence of acid producing clays is still not mentioned in the applications to the NJDEP even though there are several references to the underlying Magothy geologic formation. Acid producing clays are known to be common in areas underlain by the Magothy Geologic Formation. Once these acid-producing clays are exposed to the air, they are difficult to stabilize due to the inability of plants to establish in soils with a pH near 3. Although acid producing soils are identified in the FERC FEIS and a plan was provided to guide the management of acid producing soils when encountered, no such plan has been provided to the NJDEP. Although the development of an acid producing soils management plan has value, it is even more important to identify all locations where the project will be exposing or drilling through acid producing soils deposits. It is important to not only describe the locations of where these soils will be exposed but for how long the clays will be exposed and how extensive the grading will be in the areas. Importantly, Transco continues to be cryptic with regard to the extent of grading and other disturbances and simply defaults to the implementation of its restoration plan. The extent and severity of the proposed disturbances to regulated area must be provided in order to fully satisfy New Jersey's regulations and realistically determine the severity of the project's direct and secondary impacts.

4. Transco's proposed NESE project violates N.J.A.C. 7:9B Surface Water Quality Standards and also does not fully address impacts of their project to NJ water resources under N.J.A.C. 7:7 Coastal Zone Management Rules. Of particular concern is the level of sediment and toxins that will be suspended in the water column, which will not only negatively impact designated uses of the water body, but specifically harm populations of marine organisms. The benthic community will be directly affected, as there will be a 100% mortality of sedentary organisms. Disturbance to sediments will affect any visual predators and migratory species, especially since flexibility with Time of Year Restrictions on construction activities was requested. Further magnifying the impacts is the fact that the proposed project timeline has been condensed from 15 months down to only 9 months, forcing Transco to have to increase the pace of work and therefore increase the environmental impact and risk of negligence.

Based on Princeton Hydro's examination and evaluation of Transco's June 2018 NJDEP permit applications and the related materials listed above – which includes Transco's stormwater management plan -- it is our professional opinion that this Project fails to fully comply with New Jersey's Freshwater Wetlands Protection Act[2], Flood Hazard Area Control Act[3], Wetlands Act of 1970[4], Waterfront Development Law[5], these statutes' related regulations, New Jersey's Stormwater Management Act Rules, and New Jersey's Surface Water Quality Standards. Therefore, as with Transco's withdrawn NJDEP permit applications --, it is our position that the NJDEP must deny the June 2018 permit applications related to Transco's NESE Project.

II. Onshore Water Resources (Freshwater Wetlands Individual Permit, In-Water Waterfront Development Individual Permit, Upland Waterfront Development Individual Permit)

1. Overview of Deficiencies

Transco's Freshwater Wetlands ("FWW") Individual Permit ("IP") application, prepared by Amy S. Greene Environmental Consultants, Inc. and dated June 19, 2018, does not satisfy the minimum relevant requirements as set out in New Jersey's Freshwater Wetlands Protection Act Rules at N.J.A.C. 7:7A, Subchapter 7. Overall, this permit application (1) only provides a general account of the natural resources associated with the project site; (2) fails to satisfy the requirements of an alternatives analysis designed to meet the minimum requirements of New Jersey's Freshwater Wetlands Protection Act ("FWWPA), which seeks to first avoid and then minimize wetland impacts before engaging in mitigation; and (3) does not sufficiently describe the Project's impacts to regulated

[2] N.J.S.A. 13:9B-1 et seq.
[3] N.J.S.A. 58:16A-50 et seq.
[4] N.J.S.A. 13:9A-1 et seq.
[5] N.J.S.A. 12:5-3 et seq.

resources, including wetlands, wetland transition area and surface waters. In addition, the primary stormwater management facility proposed for Compressor Station 206 is poorly and improperly designed and continues to fail to meet the NJDEP's minimum stormwater management standards and thus the requirements of a FWW IP.

As the NJDEP is well aware, New Jersey regulations related to the preparation of a FWW IP application necessitates a greater level of environmental analysis than is currently provided in Transco's current FWW IP application. The FWW IP application contains a number of oversights, omissions, and errors that need to be addressed before this Project can satisfy the minimum permit requirements set forth by the NJDEP. Regulatory compliance is a prerequisite for Transco to be able to implement the proposed project, yet the FWW IP application submitted to the NJDEP is currently technically deficient and will require substantially more effort in order to illustrate full compliance with the minimum requirements of New Jersey's permit program.

Transco states on page 6 of their FWW IP application the following: "The Project has been designed to minimize impacts to the greatest extent practicable while still achieving the Project goals and objectives. Reduction of wetland and transition area impacts makes the current proposed plan the most environmentally responsible alternative (refer to the Alternative Analysis above). Impacts to wetlands and transition area have been minimized by reducing disturbance areas to the greatest extent practicable **while still allowing for activities necessitated for successful implementation of the proposed Project"** (emphasis added). It is important to understand that rhetoric such as that of the preceding quote, especially in the context of the highlighted section, does not mean that the NESE Project is consistent with the FWPA -- it just indicates that Transco has minimized impacts to its own satisfaction. Transco's convenient failure to provide a sufficient level of detail regarding its proposed regulated activities allows them to understate the project's real impacts to regulated features.

The following sections will describe the deficiencies in Transco's FWW IP application and the various reasons why it is not consistent with the FWPA.

New Jersey's assumption of section 404 of the Clean Water Act ("CWA") does not negate the need for the applicant and the NJDEP to follow the requirements of the CWA 404(b)(1) guidelines in the development of this individual permit application. The Freshwater Wetlands Protection Act specifically indicates the need to comply with 40 CFR 230.10(c) at N.J.A.C. 7:7A-10.2(b)8. This section states that the proposed regulated activity "Will not cause or contribute to a significant degradation, as defined at 40 CFR 230.10(c), of ground or surface waters." Failure to fully understand the implications of the reference to 40 CFR 230.10 will preclude the applicant from being able to fully comply with both the FWPA and the CWA. Rather than take the time to understand the meaning of this requirement, Transco's FWW IP application simply states on page 4-12 the following: **"The Project will incorporate a Soil Erosion and Sediment Control Plan and Best Management Practices will be employed to minimize impacts on surface water quality**

during construction (emphasis added)." Based on this inappropriate and misleading single sentence response to this important requirement, it is apparent in Transco's FWW IP application that no effort was made to actually understand the implications of the reference to 40 CFR 230.10(c) in the preparation of their IP application. In part, 40 CFR 230.10(c) states the following: "(c) Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. **Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests (emphasis added)** required by subparts B and G, after consideration of subparts C through F, with special emphasis on the persistence and permanence of the effects outlined in those subparts." Transco's failure to respond to this regulation allowed them to avoid any serious attempt to either identify or understand the impacts that this project will have on New Jersey's sensitive natural resource. Instead Transco submitted a document that relies of rhetoric or generalized responses related to the identification of impacts. A project of this scale and level of disturbance should not be allowed to base its impact analysis on broad generalizations.

It is also important to note that this section of the guidelines leads to the inclusion of other key sections of 404(b)(1), such as the need to identify secondary impacts that an applicant must be able to address in order to illustrate compliance. Compliance with this Federal requirement has not been addressed and must be provided in order to satisfy the requirements of the Clean Water Act.

In this regard, it is essential to understand the Memorandum of Agreement ("MOA") between the U.S. Environmental Protection Agency and the NJDEP (See Attachment 1). This MOA explicitly states (in Section IV. Program Maintenance, A. Duty to Maintain Program Compatibility) that the "State Program will be conducted in conformance with applicable regulations and definitions found in 40 C.F.R. Parts 230 and 233."[6] As such, it is the responsibility of the NJDEP to make sure the applicant fully satisfies the requirements of the relevant portions of 40 CFR 230 instead of allowing Transco to circumvent this important section of the Freshwater Wetlands Protection Act as well as the CWA. In the absence of any realistic attempt by Transco to satisfy the requirements set forth in 40 CFR 230, this FWW IP application remains incomplete and thus fails to adequately illustrate compliance with the Freshwater Wetlands Protection Act. The NJDEP has assumed jurisdiction of Section 404 of the CWA and thus cannot be less restrictive than the US Army Corps of Engineers when conducting an analysis of alternatives. Here, Transco's analysis of impacts remains based mostly on rhetoric and thus does not fully comply with either the FWPA or the CWA. To fully comply with section 404 of the CWA, an alternatives analysis must be prepared in accordance with the 404(b)(1) guidelines (CFR 40 Part 230, Section *404(b)(1)*).

[6] A copy of the MOA is provided in Attachment 1

The following sections provide other more specific examples of where the FWW IP application failed to meet the minimum requirements of the Freshwater Wetlands Protection Act.

Permanent versus Temporary Impacts

As can be seen in the tables on the plan sheets entitled Wetland Permit Plan and prepared by P,S&S (dated 6/8/2018) that accompany the FWW application submitted to the NJDEP by Transco, three categories of impacts are provided, permanent impact, temporary impact and temporary impact with restoration. The FWW IP Application does not include a similar description of these impacts and instead limits the impact analysis to two impact categories, permanent and temporary, as set forth in Table 2.2 on page 2-9. In the absence of a detailed description regarding how Transco determines the category of impacts associated with a regulated activity it is not possible to determine whether impacts such as those to transition areas are permanent or temporary. Typically Transco defines any disturbance outside to the new Right of way as being temporary with restoration (Wetland Permit Plan note) no matter what the disturbance. It is the failure to adequately describe the regulated activity in any detail that leads to the failure to satisfy the requirements of the FWPA. It is important that the descriptions of regulated activities be sufficiently detailed and based on facts in order to satisfy the FWPA. The NJDEP defines temporary disturbances to transition areas at section 7:7A-2.3 (b)2 as follows; "**Minor and temporary disturbances of the transition area resulting from, and necessary for, normal construction activities on land adjacent to the transition area, provided the activities do not result in adverse environmental effects on the transition area or on the adjacent freshwater wetlands, and do not continue for more than six months. For the purposes of this paragraph, minor and temporary disturbances include, but are not limited to, the placement of scaffolds or ladders, the removal of human-made debris by non-mechanized means which does not destroy woody vegetation,** the placement of temporary construction supports, and the placement of utility lines over or under a previously authorized, currently serviceable paved roadway surface. Fencing will not be regulated if it is installed on the boundary between the transition area and upland area." (emphasis added). The FWW IP does not provide any detail regarding how those areas of wetland transition area will be impacted during construction and simply identifies areas outside of the right of way as being temporary impacts. However, with regard to construction activities the FEIS states (page 2-21) that "**Grading would be necessary to provide a reasonably level work surface" and that "More extensive grading would be required in uneven terrain and where the right-of-way crosses steep slopes and side slopes**." The plans indicate 1.260 acres of impact outside the proposed right of way from Milepost 10.05 to 10.19. This area possesses transition areas with steep slopes within the Additional Temporary Workspace but provides no specific description regarding what the proposed disturbance will be. If these slopes are to be the subject of grading they should not be considered to be temporary impacts as the severity of the activity would be significant.

There are also wetlands areas indicated as Emergent /Intertidal/Estuarine wetlands that are located within the ROW near milepost 11.8. The regulated area within the Limit of Disturbance is a forested wetland (thus not an estuarine wetland as indicated on the permit plan) and located within an HDD workspace. As there is a 9-10' grade difference between the wetland and the existing ROW clarification by Transco is necessary to understand what is being proposed at this location. Princeton Hydro's concerns reside in the fact that Transco's application lacks sufficient clarity to understand exactly what is planned for wetland and transition area impact. Interestingly, Transco's response to comments regarding a request that Transco consider using HDD rather than trenching between Mileposts 10.05 and 10.19 in the June 2018 FWW IP application provides a greater level of detail regarding impacts than does the rest of the application. Transco's response to the comment indicated above states that due to steep slopes in this area a "significant amount of earth material would have to be removed to safely support HDD stringing and pullback operations."[7] So, are steep slope being regraded in other areas within the proposed ROW where HDD is being proposed? Although Transco identifies the need to move a significant amount of earth to defend their position to not use HDD, the application does not provide any detail regarding the impacts to steep slopes and steep slopes in transition areas where HDD is proposed. The absence of a sufficient level of detail to understand the project's impacts to regulated resources is inconsistent with the requirements of New Jersey's Freshwater Wetlands Protection Act. A comprehensive description of all of the activities proposed in a regulated area must be provided in order to realistically ascertain the severity of the impacts to each regulated resource affected by this pipeline project.

Although no discussion of the impacts associated with steep slopes was provided in the FWW IP application, steep slopes were briefly discussed in Section 7:7-9.32 of Transco's Waterfront Development & Wetlands Act of 1970 Individual Permit Application (dated June, 2018), where it was indicated that steep slopes "within the HDD workspace may be temporarily re-graded to accommodate equipment storage."[8] However, as there are no proposed contours on the plans, it is impossible to determine the extent of the grading contemplated by Transco. This is important as it relates to the potential for determining secondary impacts as well as concerns relative to post construction stabilization. Moreover, it is important to point out that there is no such thing as "temporary regrading" and Transco must show the horizontal and vertical extent of the proposed grading, especially in regulated areas such as wetland transition area and riparian zones, in order to realistically determine impacts and to satisfy the minimum requirements of the FWPA.

It is Princeton Hydro's interpretation of the regulations that any regrading to wetlands or wetland transition areas outside of the footprint of the pipe be categorized as being a

[7] Transco Freshwater Wetlands Permit Application page 4-9

[8] Transco Waterfront Development & Wetlands Act of 1970 Individual Permit Application

permanent impact as regrading of the transition area is far more invasive and the impacts more long lived than the minor activities described in the Freshwater Wetlands Protection Act. It is apparent in the applications submitted to the NJDEP that significant grading is contemplated to construct this pipeline project, including in regulated areas. However, the FWW IP fails to accurately describe this activity and the impacts associated with grading in wetlands as well as in wetland transition areas. It is important to understand that the NJDEP requires a greater level of analysis than that provided by Transco in order to evaluate the impacts that regulated activities have on New Jersey's wetlands and wetland transition areas. Section N.J.A.C. 7:7A-16.7(a)4ii of the FWPA indicates that an applicant shall include a description of "All proposed regulated activities; the size, location, and details of any proposed structures, roads, or utilities; details of any clearing, grading, filling, excavation, and dredging; the location and area of wetlands, transition areas, and/or State open waters that will be disturbed and the limits of disturbance". As previously stated no detail regarding earth moving was provided in the application to address this requirement and thus Transco's application remains incomplete.

The following are specific examples where more detail is necessary to understand whether impacts to regulated areas are temporary or permanent as well as to realistically assess the severity of the impacts.

Examples of Proposed Regulated Activities in Wetlands and Wetland Transition Areas that require a detailed impact analysis:

Milepost 8.75 – Steep slopes within proposed HDD temporary workspace of wetland WT15-001A-1. Will this wetland transition area be regraded to accommodate HDD operations? If so, this impact area should be considered to be a permanent impact rather than "Temporary impact with Restoration". Transco identified 0.228 acres of impact in the "Temporary impact with Restoration" category. Due to Transco's failure to describe or show its impacts to regulated areas it is impossible to tell if grading will occur in wetlands outside of the new ROW.

Milepost 8.9 – Steep slopes within new ROW. What is being proposed in these steeply sloping forested transition areas? Will they be regraded and restored or modified to accommodate future maintenance? Insufficient detail provided. If this represents re-grading then the application should describe the extent of this regulated activity.

Milepost 9.25 – Steeply sloping forested transition area in HDD workspace. Will the wetlands and wetlands transition area be regraded? If so, the impacts should be considered to be permanent.

Milepost 10.05-10.3 - Steeply sloping forested wetland transition area bordering an exceptional resource value wetlands on slopes in excess of 35%. The regrading of these areas should be viewed as a significant impact and not fall into the category of

temporary impact with restoration and more appropriately be considered as a permanent impact. There are 1.26 acres of forested wetland transition area that fall into this category. If the regulated activity includes regrading, it needs to be described in greater detail in the FWW IP.

Milepost 10.69 - Steeply sloping forested transition area bordering exceptional resource value wetlands. The table indicates 0.082 acres of temporary impact with restoration in the estuarine wetland column. This area is identified as bald eagle foraging habitat. Transco indicates that "it is anticipated that these impacts will be minor and/temporary in nature and will not result in any significant, long term, adverse impact to bald eagle or its habitat". This is an example of unsubstantiated rhetoric that fails to be supported by any realistic analysis or published research.

Milepost 10.87 - Extremely steep forested transition area of exceptional resource value. No detail is provided as to what is contemplated to occur in the wetland transition area. As previously stated, if this area is to be graded it should not be considered to be a temporary impact. In addition, as the indicated 0.082 acres of temporary impact with restoration is the same as that of Milepost 10.69-10.74, the area of impact should be confirmed as the impact area appears to be substantially larger.

Milepost 11.84-11.9 - Sloping forested transition area of exceptional resource value. The table indicates 0.228 acres of temporary impact with restoration. If this represents grading then it should indicate so and describe the extent of the regulated activity. If grading is contemplated in this area this should be evaluated as a permanent impact.
In addition, as previously stated, there are wetlands indicated as Emergent /Intertidal/Estuarine wetlands that are located within the ROW near milepost 11.8. The area within the Limit of Disturbance is a forested wetland (thus not an emergent/intertidal/estuarine wetland) and located within an HDD workspace. As there is a 9-10' grade difference between the wetland and the existing ROW clarification, it is necessary to understand what Transco proposes. Transco's inability to accurately describe the regulated activities contemplated in this area is yet another example of Transco's failure to satisfy the requirements of the Freshwater Wetlands Protection Act.

Acid Producing Clays

The underlying geology of the part of New Jersey in which Transco's Madison Loop is proposed to be built is a concern as the area is underlain by a geologic formation that possesses pyritic clays. These sulfide-bearing marine and estuarine sediments are potential acid-soil producers. The development of acid-sulfate soils occurs when sulfide minerals, such as pyrite, oxidize upon exposure to air. These materials are exposed through erosion or, anthropogenically, through earth-moving activities such as those related to pipeline construction. Once these acid-producing clays are exposed to the air, they are difficult to stabilize due to the inability of plants to establish in soils with a pH near 3. The presence of these clays was not indicted in any of Transco's reports to the

NJDEP or in the FERC DEIS. In response to public comment FERC included Transco's "Acid Producing Soils Control Plan" in the FEIS. Although Transco prepared a plan to manage high acid-producing soils Transco has yet to confirm the presence of these soils within the project area. In a response to comment (*Comment SOIL-3*), FERC indicated in the recent FEIS that "Transco reported that it has not encountered evidence of acid-producing soils (e.g., poor vegetative cover) along its permanent right-of-way adjacent to the proposed Project loops".[9] Princeton Hydro is not sure what Transco is looking at, but -- between a simple review of the aerial photograph below from 2016 (which shows an area somewhere between Milepost 9.0-9.2) and the photographs provided in Transco's wetland delineation report -- there is ample evidence that acid producing clays are present along the pipeline route.[10] It is important to understand that, based on a review of aerial photographs of the area along Transco's existing right of way, between Milepost 9.0-9.2, portions of this area have been barren since between 1963 and 1969. The origin of this barren area appears to coincide with the construction of the original pipeline. Review of aerial photographs from 1963 onward indicate that these areas have remained barren since at least 1969[11].

Importantly, the absence of plants in these areas is frequently related to aluminum toxicity driven by the low pH levels. Review of the wetland delineation report submitted to the NJDEP appears to illustrate the presence of these dark gray acid-producing clays at the ground surface in several photographs, such as those on pages 411, 418, 502 and 518.[8] The two adjacent photographs included in this section of our report were taken from the Williams Transco Wetland report (dated June 2017) and both show un-vegetated areas of a dark gray material, which Princeton Hydro believes to be exposed acid-producing clay due to the dark gray color and total absence of vegetation. The

[9] FERC FEIS page 4-22
[10] Attachment 2
[11] Attachment 2

exposure of these acid-producing clays to air as a result of project activities will complicate restoration efforts and slope stability, which in turn may impact downgradient wetlands and surface waters. The presence of these clays in areas of steep slopes contemplated to be the subject of grading to facilitate pipeline activities is one of the reasons why full compliance with N.J.A.C. 7:7A-16.7(a)4ii of the FWPA is necessary.

The presence of acid producing soils and the impact that they have on the land, such as those barren areas within Transco's pipeline corridor, warrants the identification of all areas where these clays will be exposed due to project activities or subject to HDD impacts in order to address both Sections N.J.A.C. 7:7A-10.2(b)8 and 7:7A-16.9 (b)4iv**.** FERC indicated in the FEIS that, according to Transco's Acid Producing Soils Control Plan, Transco would limit the "excavation area and soil exposure time when high acid-producing soils are encountered." But this approach still fails to satisfy the aforementioned requirement of the FWPA, as Transco has yet to confirm the presence of acid producing soils along the pipeline route and the impacts that exposure of these soils may have on regulated areas. The plan provided by Transco in the FEIS is just rhetoric as Transco continues to be unaware that these soils exist in their right-of-way and that their application continues to satisfy the requirements of the FWPA.

Princeton Hydro also remains concerned about the integrity of the pipe and other infrastructure elements of the pipeline that may pass through acid-producing clays. Princeton Hydro is also concerned that if an inadvertent return occurs during an HDD

boring through acid-producing clay deposits the impact to wetland or wetland transition areas will exacerbate the impact due to the presence of pyrtic clays in the drilling mud. An inadvertent return in an area of acid producing clays would be difficult to clean up and could significantly affect the impacted area. The presence of these clays in the project area warrants the need for Transco to identify where these clays will be encountered as a result of grading in or near regulated areas, such as within steeply sloping transition areas. It is essential to identify where these acid producing clays will be encountered in order to identify potential short and long term project impacts to these regulated resources.

Hydrology

The modification of hydrology, especially as it relates to groundwater discharge, due to the construction of this project is important. The wetlands in the vicinity of Mileposts 10.6-10.9 show a considerable amount of groundwater discharge, which is illustrated by the presence of freshwater wetlands at the upper limits of the wetland system. Will the placement of the proposed pipeline modify the discharge of groundwater to this wetland complex? It is our position that the discharge is related to the dense clays present in this area. It is for this reason that we are concerned about the impact to hydrology that may result from the excavation of the transition areas in this area as well as in other areas along the pipeline route. Any modification to the areas above the wetland has the potential to modify groundwater flow paths and thus modify the groundwater discharge currently driving the hydrology of the uppermost parts of the wetlands.

Other wetland impacts are those associated with the dewatering of groundwater during pipeline construction. Dewatering activities are discussed in two reports prepared by Transco but it is important to note that dewatering activities are regulated activities that warrant discussion in the FWW IP as well as in the Waterfront Development (WDP) IP. However, dewatering was not discussed in either application. Dewatering activities have the potential to allow acid producing soils to come in contact with air during trenching. Dewatering may also foster compaction of the wetlands within the workspace.

For example, all of the over 1-acre HDD entrance site at milepost 11.48 is located in coastal wetlands designated as being of exceptional resource value. To reduce impacts to this exceptional resource value wetland, the FEIS indicates that "Transco would implement its *Project-Specific Erosion Control, Revegetation, and Maintenance Plan* (Transco Plan) and *Project-Specific Wetland and Waterbody Construction and Mitigation Procedures* (Transco Procedures) (see appendices E and F of the FEIS, respectively). These are based on the mitigation measures described in the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (FERC Procedures), but include several

proposed site-specific modifications to the FERC Procedures."[12] One of the procedures to reduce impacts is through the use of timber mats to support equipment in inundated or saturated wetlands. However, as is typical throughout the FEIS, no site-specific information regarding the character of the wetland or the efficacy of using mats in a tidal wetland as it relates to wetland impacts is provided. It is also important to acknowledge that workspace at HDD entry points is equipment intensive and, according to the FEIS, "typically includes the drilling rig, control cab, office, storage trailers, power generators, drill string pipe storage, water trucks, water storage, other heavy equipment, and a drill entry pit. The workspace would also include facilities and equipment to manage drilling fluid and drill cuttings."[13] If all this equipment is to be used on timber mats, then an understanding of compaction to the wetlands substrate should be an essential component of the impact analysis as it would significantly impact the recovery of wetland vegetation. Moreover, dewatering reports (dated March 2018) submitted to the New Jersey Bureau of Water Allocation & Well Permitting included information related to dewatering which indicated that the estuarine wetland at milepost 11.48 is likely to be subject to dewatering. Dewatering the coastal wetland at milepost 11.48 will exacerbate compaction. Impacts to wetlands associated with dewatering along the Madison Loop were not discussed in the FWW IP application. This is yet another example of an impact to regulated resources that was not even considered in the preparation of the FWW or the WDP IP. In accordance with NJAC 7:7A-2.2(a)2 the "drainage or disturbance of the water level or water table so as to alter the existing elevation of groundwater or surface water, regardless of the duration of such alteration" is a regulated activity. As such, any dewatering activity contemplated by Transco -- no matter its duration -- must be included in the IP application. As this activity has the potential to impact regulated areas such as wetlands, this requires a thorough analysis in the FWW application in order to satisfy the conditions of N.J.A.C. 7:7A-10.2(b)8 and N.J.A.C. 7:7A-16.9 (b)4iv. This analysis must also include a discussion of dewatering that may be required for both compressor stations in the FWW permit application's analysis of impacts related to this project. It is the understanding of Princeton Hydro that Transco did not submit an application to the NJDEP for a water lowering permit for Compressor Station 206 but specifically indicates on their plan notes that they intend to conduct dewatering activities. As the drawdown of groundwater within a wetland is a regulated activity, Transco should not be allowed to avoid any discussion of this impact in its FWW IP application.

The examples provided in the sections above are limited to those types of areas that warrant a substantially greater level of scrutiny and analysis in order to truly minimize impacts to sensitive resources. However, Transco should provide a thorough, factually-based analysis as set forth in the 404(b)(1) Guidelines and N.J.A.C. 7:7A-16.9 (b)4iv for every impacted wetland, State open water, and wetland transition area. The analysis should also include a discussion as to why the impacts to each regulated area cannot

[12] FERC FEIS Section 2.3, page 2-30

[13] FERC FEIS, page 2-28

be avoided or minimized. Moreover, in order to objectively make a determination of impacts, a thorough characterization of each wetland, state open water, and transition area that is anticipated to be impacted by project activities must be performed. In the absence of this type of analysis, it is simply not possible to realistically assess impacts or to determine whether the impacts to an area can be adequately mitigated.

B. Alternatives Analysis for Compressor Station 206

Transco's preliminary review identified a preferred site as well as four other parcels that could potentially host proposed Compressor Station 206. Regrettably, the alternatives analysis resulted in five finalists that would all have significant wetland impacts. Interestingly, Transco's alternatives analysis states that "Transco undertook an exhaustive study to identify and evaluate potential compressor station locations." It is obvious when reviewing Transco's FWW IP Application that the alternatives analysis was not only far from exhaustive, but is also at odds with the FWPA and CWA regulations. The FWPA – in Sections N.J.A.C. 7:7A-7.1 through 7.5 -- provides various requirements that must be addressed by an applicant, including the preparation of an alternatives analysis. The analysis of alternatives set forth in the FWPA has its genesis in Section 404 of the CWA and, as such, must follow the 404(b)(1) guidelines. Through the MOA (discussed above), New Jersey has an obligation to fulfill the requirements of Section 404 of the Clean Water Act, including the 404(b)(1) guidelines.

The requirements to satisfy the FWPA are far more rigorous than those presented by Transco to FERC in its National Environmental Policy Act ("NEPA") analysis for that federal agency's DEIS. The analysis of alternatives required by FERC for the DEIS routinely lacks sufficient detail to adequately respond to the requirements of either the FWPA or the 404(b)(1) guidelines. Under a 404(b)(1) analysis, it is critical for the applicant to identify and choose the Least Environmentally Damaging Practicable Alternative ("LEDPA") for the project. As such, it is incumbent upon an applicant to demonstrate to the reviewing agency that its proposed project and site present the LEDPA. The U.S. Army Corps of Engineers is prohibited from issuing a permit for anything less than the LEDPA, and so too is the NJDEP. Here, Transco's FWW IP application did not truly seek to identify the least environmentally damaging practicable alternative for the NESE Project and instead -- after reviewing 41 sites -- selected a short list of five sites that all included significant wetland resources and will result in significant wetland impacts. Transco's January 2018 document submitted to NJDEP (entitled "Supplemental Information to Freshwater Wetlands Individual Permit") provides the total permanent wetland impacts for the five sites in Table 4B-2, which is summarized here:

Transco Site Nos.	Permanent Wetland Impact	Forested Wetland Impacts	Permanent Transition Area Impacts
1	10.28 acres	10.22 acres	11.38 acres
2	4.98 acres	4.98 acres	6.36 acres
3	3.73 acres	2.64 acres	2.45 acres
8	1.27 acres	0.34 acres	11.53 acres
27	5.75 acres	5.14 acres	7.90 acres

Although the prerequisites for a FWW IP have unique requirements as set forth under section 404 of the CWA, Transco initially relied heavily on the alternatives analysis done for FERC in Transco's Resource Report No. 10 (dated June 2017). The alternatives analysis provided in the FWW IP is essentially a paraphrased version of Transco's Resource Report No. 10 and, as such, is not fully responsive to the requirements of the FWPA.

Transco's selected site for Compressor Station 206 is derived from the alternative analysis provided in Resource Report No. 10-- an alternatives analysis that is not consistent with the requirements of either the FWPA or the CWA. Contrary to the objectives of both the CWA and the FWPA, Transco selected a site with significant wetland impacts --including the permanent loss of 2.64 acres of forested wetland. Transco states in their FWW IP application, in response to N.J.A.C. 7:7A-7.2(b)2, that the basis for its selection is that "Impacts to wetlands and transition areas have been minimized by reducing disturbance areas to the greatest extent practicable while still allowing for activities necessitated for successful implementation of the proposed Project."[14] As previously discussed, this statement is inconsistent with the requirements of the FWPA and the CWA, which mandate that an applicant must first avoid impacts and then seek to minimize them. The alternatives analysis used by Transco did nothing to satisfy the requirement to avoid wetland impacts. This alternatives analysis actually states that the five parcels selected were the sites "with the least potential impact on wetlands based on a review of NJDEP mapping."[15][15] Transco's approach to identifying a site lacks sufficient sophistication to

[14] Transco, Application for NJDEP Freshwater Wetlands Individual Permit, p. 6 ["Section 4: Standard Requirements for All Individual Permits (N.J.A.C. 7:7A-7.2)"] (June 2018).

[15] Transco, Application for NJDEP Freshwater Wetlands Individual Permit, p 4.3 (New Jersey Alternatives, June 2018)

satisfy the objective of avoiding impacts to wetland resources. At this juncture it is important to point out that the FERC process regarding impacts to resources such as wetlands differs from that of the CWA and FWPA in that impacts can be reduced to less than significant levels through the implementation of mitigation measures. The approach used in Transco's alternatives analysis should be deemed unacceptable by the NJDEP as it fails to satisfy the most basic premise of the FWPA -- applicants are directed to seek an alternative that does not involve a freshwater wetland. Transco's alternatives analysis is sufficiently flawed to circumvent the objective of identifying a location that would provide a non-wetland alternative and, thus, it fails to satisfy the robust requirements of the FWPA.

As indicated above, Transco's FWW IP application did not respond to the minimum requirements for a FWW IP. Although Transco describes the project as being a non-water dependent activity, this compliance statement is inconsistent with the requirements of the FWPA Rules. In order to satisfy the minimum standards for a FWPA IP, an applicant must satisfy the conditions set forth at N.J.A.C. 7:7A-10.3(b), which states:

There shall be a rebuttable presumption that there is a practicable alternative to a non-water dependent activity in a freshwater wetland or in a special aquatic site, which alternative does not involve a freshwater wetland or special aquatic site, and that such an alternative would have less of an impact on the aquatic ecosystem.

The FWPA Rules, at N.J.A.C. 7:7A-1.4, define "practicable alternative" as:

[O]ther choices available and capable of being carried out after taking into consideration cost, existing technology, and logistics in light of overall project purposes, and may require an area not owned by the applicant which could reasonably have been or be obtained, utilized, expanded, or managed in order to fulfill the basic purpose of the proposed activity.

Outside of unsubstantiated statements and rhetoric, Transco fails to demonstrate that the proposed activity could not be accomplished at another location that would completely avoid impacts to freshwater wetlands. Importantly, as is the case with many alternative analyses, alternatives are often designed to fail and, in this case, the failure is based on a variety of issues (including wetlands, size of property, and shape of property). For example, with regard to Compressor Station 206, Transco's screening process only looked at individual parcels rather than multiple parcels that -- if combined -- may have provided the opportunity for non-wetland alternatives. In addition, Transco failed to consider properties that may be currently occupied or previously developed in its attempt to identify sites that would avoid impacts to freshwater wetlands.

Transco's alternatives analysis indicates that its preliminary review process resulted in the identification of five parcels (Sites 1, 2, 3 (Transco's proposed site), 8, and 27) that could potentially host Compressor Station 206 and that each of these sites were evaluated

further. As previously indicated, alternatives are often designed to fail and in this case the failure is based on Transco's screening criteria. As an example, parcel 5 (a site adjacent to Parcels 8 and 27), was initially dismissed because it possessed too much wetland as per NJDEP mapping. Based on Transco's remote sensing approach to wetland delineation, however, it is likely that – based on a review of the most recent remote sensing maps provided by Transco in the January 2018 supplement to their NJDEP FWW IP application -- less wetland may be present on Parcel 5 (and possibly other parcels) than indicated by NJDEP mapping. In addition, Parcel 27 was dismissed as having a greater amount of wetland impact than Parcel 3. The wetlands delineated for Parcel 27 were initially based only on remote sensing data. It is, however, interesting to point out that the wetlands spanning the property boundary between Parcels 8 and 27 were not identified as a wetland in the NJDEP's Letter of Interpretation (LOI) received for Parcel 8 and were subsequently removed from the Parcel 8 wetland mapping. Although the wetland identified via remote sensing on Parcel 8 was removed, the balance of the wetland that extended onto parcel 27 remained unchanged, and thus formed the basis for the high level of wetland impact used to eliminate this site from consideration.

Based on the mistaken identification of wetlands on Parcel 8 by Transco, an updated evaluation of the wetlands on Parcel 27 should have been performed. Although the remote sensing-based interpretation of wetland was to have included topography along with other resources (such as soil survey information), the results are inconsistent with the Light Detection and Ranging (LIDAR) generated topography done on Parcels 8 and 27 (Block 5.02, lot 69) by Princeton Hydro.[16] The area that Transco indicated to be wetland actually resides on a drainage divide (a landscape position that does not normally support a wetland determination) that extends into Parcel 5. The area is also mapped as possessing soils of the moderately well drained Keyport soil series. As such, the accuracy of Transco's remote sensing identification of wetlands is at best questionable and thus casts doubt on the efficacy of their alternatives analysis.

In addition, Parcel 8 was determined to have less wetland impact than that contemplated for Parcel 3 but was eliminated from consideration due in part to the presence of "regulated open water features" (Transco, Supplemental Information to Freshwater Wetlands Individual Permit, July 17, 2017). It was further indicated that these features may present permitting challenges under the Flood Hazard Area Control Act. However, if these features are man-made drainage ditches, which is what they appear to be (as two of the features connect at a 90-degree angle), they may not meet the definition of a regulated water. If that is the case, the filling of a ditch would be far less difficult and would likely result in far less ecological impact than a natural stream under either New Jersey's Flood Hazard Area Control Act or the FWPA. Lastly, as indicated previously, the combination of adjacent parcels such as 8, 27, and 5 would also serve to reduce wetland impacts as well as move the compressor station further from residences. Transco's analysis did not contemplate the identification of adjacent parcels

[16] See figure in Attachment 3 (LIDAR Generated Topography, Parcels 8 and 27).

as a means to reduce wetland impacts and instead limited its selection criteria to individual parcels.

With regard to site selection, it is not our intent in the above discussion to identify an alternate site for Transco but rather to point out the problems and lack of objectivity in Transco's alternatives analysis. It is also important to understand that Transco is the owner of Parcel 3 (see section 2.3.4 of the DEIS for this Project) and it is therefore not in their best interest as it relates to FWPA compliance to find an alternative site since it would impact Transco's initial goal of providing gas for the 2019/2020 winter heating season.[17]

The timing of gas delivery also appears to be important to FERC as the DEIS uses, at least in part, Transco's requested in-service date as a way to eliminate from consideration the expansion of another pipeline system and states in section 3.2.1 that the expansion of another pipeline system "in place of NESE would result in unreasonable delay to meet the requested in-service date of the customers of the NESE Project." However, due to Transco failure to adequately respond to the requirements of the FWPA in its alternatives analysis, the NJDEP should not feel compelled to place any importance on Transco's in-service date and instead require full compliance with all of New Jersey's applicable regulations.

Lastly, the selection of five sites -- through Transco's alternatives analysis -- that are all forested with areas of forested wetland highlights yet another flaw in the company's analysis. Transco's Chesterfield compressor station (NJDEP DLUR File # 0300-15-0002.2, FWW150001) resulted in approximately 4.7 acres of mostly emergent wetland impact. Importantly, the NJDEP's decision document of March 13, 2017 indicated that wetlands on an alternative site would have had far greater environmental impact because it was forested. The NJDEP provided the following text to describe their rationale for the decision:

Some of the forested wetlands on the alternate site have been wooded wetlands since as far back as 1930. The remainder of the trees in the forested wetlands were established by 1987 and possesses approximately 50% mature trees ("crown cover"). The quality of wetland functions served by a forested wetland are heightened due to the undisturbed vertical structure of the vegetation. Rainwater storage is increased due to uptake by the various strata of vegetation, including herbaceous, shrub, saplings and mature trees. Very little sediment is released from a forested wetland during rain events as the soil is not disturbed and the canopy slows rain water. The habitat diversity of forested wetlands is high. There are at least five vegetation strata of habitat present within the existing forested wetlands. They include ground level, herbaceous, shrub, sapling, and mature tree canopy. Together these strata form an ecosystem. Each level provides foraging,

[17] *See* Transco's NESE website ("Williams is developing the Northeast Supply Enhancement project to expand the existing Transco natural gas pipeline system by the 2019/2020 winter heating season to provide important gas supply that will help the City reach its clean air goals."), *available at* http://northeastsupplyenhancement.com/.

resting and breeding habitat to various species. For instance, the ground level provides foraging habitat for worm eating birds such as robins, and insectivore mammals such as opossum. The species that use each layer vary by strata and seasonal behavior. The various layers of vegetation provide food at different times of the year. Forested wetlands have a greater habitat diversity than modified agricultural wetlands. In addition to habitat and food sources available within forested wetlands, resting and perching locations are often provided for birds foraging in adjacent farm fields.[18]

Although it is apparent that Transco has conveniently forgotten the details of this recent permit decision[19], Princeton Hydro is hopeful that the NJDEP remains consistent in its view of the value of New Jersey's forested wetlands and requires Transco to perform a more robust alternatives analysis designed to satisfy the requirements of the FWPA.

The FWW IP application submitted by Transco indicates in Table 4-1-2 on page 4-13 that "No critical habitat for state or federally listed threatened or endangered species is present on any of the five sites. The following layers were examined using the NJ-GeoWeb: Landscape Project Version 3.3 – Species Based Habitat (SBH) – Piedmont Plains; Natural Heritage Priority Sites; and Natural Heritage Grid Map. Although sites contain forest and the potential exists for protected species, no positive confirmation of species resulted from the NJ-GeoWeb search." Although Transco's application indicated that the potential exists for listed species, it is apparent that no site specific surveys were performed to support the absence of listed species. Importantly, recent surveys performed by Wander Ecological Consultants conclude that there is suitable forest habitat on Transco's site as well as on adjacent properties to support barred owl. It is important to acknowledge that diabase ridges in the region are frequently covered by older growth forest as these areas are generally unsuitable for farming due to shallow bedrock and wetness. As this species is listed as "threatened," its presence would mandate that the forested wetlands in the vicinity of the Transco site be designated as being "of exceptional resource value" and possess a 150 foot transition area, pursuant to N.J.A.C. 7:7A-3.3(d)1. In addition, the application must satisfy the requirements of N.J.A.C. 10.2(b)3 that states that the Department will issue an IP only if the regulated activity will "not destroy, jeopardize or adversely modify a present or documented threatened or endangered species; and shall not jeopardize the continued existence of a local population of a threatened or endangered species." It is relative to this requirement for an IP that the removal of any forest to construct the compressor station has the potential to impact the local barred owl population.

Lastly, based on recent information regarding the presence of barred owl in the vicinity of the compressor station, it is likely that the project will reduce the current remnant patch of forest habitat currently available for this threatened species. Based on the level of

[18] NJDEP's decision document of March 13, 2017 regarding Transco's Chesterfield compressor station, Garden State Expansion Project.

[19] *id*

fragmentation in this part of Franklin Township, it is possible-- if not likely -- that the existing population of barred owl is a remnant population that may currently be associated with a suboptimal territory and, as such, the population would be very susceptible to further reduction in habitat. The continued degradation and loss of the remnant patches of forest in the vicinity of the proposed project should be of deep concern to the NJDEP. The presence of this species should have been included in the site selection process as well as any discussion of project impacts. The NJDEP must evaluate the impacts of the proposed compressor station relative to the impacts to barred owl habitat as well as that of any other listed species or species of concern.

Due to a variety of reasons, Princeton Hydro still believes that Transco's alternatives analysis lacked objectivity and was biased toward selecting the site, as it is the site Transco wanted and already owned. As such, we do not believe that there was adequate effort put into identifying a location that minimized wetland impacts. Transco's problems with completion of a stormwater design that complies with New Jersey regulations (as discussed below) is directly related to the selection of a site on a diabase ridge. The difficulty in developing these sites is the reason for the extensive forest cover and, in this case, the recent finding of suitable habitat for barred owl.

The proposed NESE Project is a development project proposed by a private, for profit entity and should be held to the same regulatory standards as any other development project and not given any deference. The excessive level of proposed wetland impacts identified in Transco's FWW IP application could have been avoided if New Jersey's wetland regulations were given any serious consideration during Transco's far from exhaustive site selection analysis. Instead, Transco applied a relatively simplistic alternatives analysis and selected a site -- one that it already owns -- that will result in extensive wetland impacts and impacts to listed species.

C. Horizontal Directional Drilling Issues

New Jersey's current regulations encourage the use of Horizontal Directional Drilling (HDD) to avoid direct impacts to sensitive resources. Based on the number of recent HDD failures in Ohio and Pennsylvania (discussed below), the regulations are naive with regard to a realistic understanding of this technology and that it is prone to failures. The failure of HDD is often the result of the inadvertent returns (IR) (also termed frac-out) which is the uncontrolled loss of drilling mud. This concern is especially relevant with regard to the problems of performing HDD in the loose sands and gravels of New Jersey's Coastal Plain or the hard rock geology of northern New Jersey. In the FEIS, FERC acknowledges that "the risk of an inadvertent return of drilling fluid occurring is generally low, except near the drill entry and exit points where the risk would be higher." [20] No discussion of the potential for inadvertent return of drilling mud into wetlands or State open waters (freshwater) was provided in the FWW or WDP IP.

[20] FERC FEIS page 2-27

As an inadvertent return of drilling mud is possible along any HDD pipeline installation, there is a need for a sufficiently comprehensive regulatory standard to guide the design, placement, operation and development of contingency plans in the case of an inadvertent return. The NJDEP's current Freshwater Wetlands Protection Act regulations at 7:7A-7.2 simply state that "If a utility line is jacked or directionally drilled underground, so that there is no surface disturbance of any freshwater wetlands, transition areas, or State open waters and there is no draining or dewatering of freshwater wetlands, no Department approval is required under this chapter. Jacking or directional drilling is regulated under this chapter if any disturbance occurs to the ground surface in the freshwater wetlands, transition area, or State open water; for example, if the drilling is conducted from a pit located in a freshwater wetland or transition area." The language of this current regulation is written in such a way that does not acknowledge that inadvertent returns and HDD failures are possible and thus places New Jersey's wetlands and surface waters at risk. Until such time as New Jersey can make sufficient changes in its regulation to address the issues associated with HDD, the NJDEP can, in accordance with N.J.A.C. 7:7A-13.2, establish permit conditions that can require additional materials on a case by case basis to assure compliance with **"***all applicable requirements of the Federal Act, the Freshwater Wetlands Protection Act, the Water Pollution Control Act, this chapter and other applicable rules or regulations. For the purposes of this subsection, an applicable requirement is a statutory or regulatory requirement which takes effect before the Department's final administrative decision on a permit, or before the modification or termination and reissuance of a permit*." Additional requirements may include "*any requirements necessary to comply with water quality standards established under applicable Federal or State law*". At a minimum the inclusion of an operation and contingency plan should be required as a condition of every proposed HDD project. Importantly, both Pennsylvania and Ohio have regulations in place to guide HDD projects. Sadly, the need for updated requirements was facilitated in both states by the significant release of drilling mud into wetlands and surface waters.

The NJDEP should also make applicants contemplating the use of HDD aware that an inadvertent release impacting wetlands or streams will be considered to be an illegal discharge in violation of the Freshwater Wetlands Protection Act and 401 Water Quality Certification and subject to enforcement-driven mitigation requirements and fines similar to those imposed on more traditional real estate developers. Unlike New Jersey's regulations, which do not anticipate the likelihood of inadvertent returns during HDD operations, other jurisdictions contemplate that releases are possible. For example, the 2017 Nationwide (NWP) Regional Permit Conditions for New Jersey, including NWP 2 for Utility Lines, specify that "This NWP does not authorize the discharge of any drilling muds that may be generated through such methods as directional boring or drilling. Further, any directional drilling or boring activities must include a plan that addresses prevention, containment and cleanup of any accidental discharges known as 'frac-out'." If a frac-out occurs, the plan addressing containment and clean up shall be immediately implemented and the Corps of Engineers shall be notified of the frac-out within 24 hours."

Inclusion of language regarding the possibility of inadvertent returns indicates that such releases are not rare and should be the subject of proper planning or, more importantly, projects should be designed to avoid ecologically sensitive areas where an inadvertent return would result in substantial environmental harm. In light of the number of recent projects in Ohio and Pennsylvania that have experienced inadvertent returns (discussed below), the continued belief by the NJDEP that HDD is a sound alternative is not only flawed but fosters an approach that jeopardizes the sensitive ecological resources of New Jersey.

New Jersey's lack of established protocols for inadvertent releases has the potential to place the state's sensitive natural resources at risk. A Washington Post article by Steven Mufson dated May 8, 2017 [21](See Attachment 4) provides a much clearer description of an inadvertent release that occurred during construction of the Rover Pipeline in Ohio. In this instance, the article indicates that a spokesman for the company said that the leaks, which he said were "inadvertent releases that come up through natural fissures in the soil and rock," were "anticipated in the permit." The NJDEP should provide clear language in its regulations that inadvertent returns are not acceptable and it will consider them to be illegal discharges in violation of the Freshwater Wetlands Protection Act and subject to enforcement-driven mitigation requirements and fines. For example, Ohio EPA considers an inadvertent discharge to be subject to enforcement and, depending on the case, can include the following: both civil/criminal enforcement actions, criminal violations (either through negligence or done knowingly), federal violations of the Clean Water Act can be misdemeanors and felonies and lastly, enforcement driven mitigation requirements can be more severe than permitted mitigation requirements.

In addition, the Mufson article indicated that "The director of the Ohio Environmental Protection Agency on Monday blasted the pipeline company Energy Transfer Partners for a 'pattern' of 18 spills of drilling materials and said that the size of the biggest spill could reach 5 million gallons, more than double original estimates." This type of spill would significantly impact the sensitive wetlands and streams of New Jersey. The fine, textured materials of drilling mud would clog the pore space of soils, which would ultimately affect soil chemistry, hydrology, and pH. The maintenance of wetlands characteristics such as these are essential to the maintenance of the services provided by functioning wetlands. In addition, the discharge of drilling mud to the surface of a wetland or shallow water body would smother the organisms that live in the substrate. The above photograph was taken from an article by Susan Cosier (2018) (See Attachment 5) regarding the inadvertent release of drilling mud during construction of the Rover pipeline in Ohio[22]. It is readily apparent from this photograph that a substantial release of drilling mud would

[21] Steven Mufson dated May 8, Attachment 4

[22] Cosier, Susan. February 26, 2018. https://www.nrdc.org/stories/following-spills-ohio-wants-reroute-rover-pipeline-lacks-muscle

be extremely difficult to clean up and have a significant impact on sensitive wetlands and surface waters. [23]

Understanding that inadvertent returns are rare occurrences and that the damage they can cause to regulated resources can be significant should dictate that the placement of HDD entry and exit sites should not occur in sensitive resources. For example, the placement of an HDD entry site in an exceptional resource value wetlands or near surface waters should be reviewed with a high level of concern. The FEIS states that "Workspaces required at HDD entry and exit points are locations with an increased likelihood of inadvertent releases of drilling fluids and are typically located away from the water bodies crossed to minimize potential impacts."[24] Transco, however, located one of its HDD entry sites, Milepost 11.48, entirely within an exceptional resource value estuarine wetland within 30 feet of a tidal stream. The placement of an HDD entry site in an exceptional resource value wetlands should not be allowed to avoid gambling that an "inadvertent return" will not occur.

In addition, the secondary impacts associated with the clean-up process should also be evaluated during the permit review process as it is likely that these activities may result in additional physical damage to the wetland site. This is especially relevant when HDD traverses remote areas with limited access or large areas of wetlands. Significant failures of HDD also recently occurred in Pennsylvania where the PADEP has fined Energy Transfer Partners approximately 12.6 million dollars for a series of inadvertent returns some as much as 150,000 gallons (See Attachment 6)[25]. The failure to understand the geology in areas proposed for HDD is highlighted by the recent HDD failures experienced during construction of the Mariner East II pipeline in Pennsylvania.

The Freshwater Wetlands Protection Act at 13:9B-2 states in part that "it is in the public interest to establish a program for the systematic review of activities in and around freshwater wetland areas designed to provide predictability in the protection of freshwater wetlands; that it shall be the policy of the State to preserve the purity and integrity of freshwater wetlands from random, unnecessary or undesirable alteration or disturbance." As illustrated in this report, there is considerable evidence that HDD is not a perfect technology and that failures should be contemplated when it is proposed. It is in this light that the NJDEP must not continue to consider HDD as an ideal way to avoid direct impacts but, rather, develop standards that allow the state to more rigorously regulate this technology in order to no longer allow pipeline companies to gamble that their project will not be subject to an inadvertent return. One only needs to look at the recent damage to wetlands and surface waters being experienced in Ohio and Pennsylvania to understand the negative consequences of this type of gambling.

[23] https://www.washingtonpost.com/news/energy-environment/wp/2017/05/08/pipeline-spill-by-dakota-access-company-could-have-a-deadly-effect/?noredirect=on&utm_term=.3224fbc7dcbc

[24] FERC FEIS page 4-91

[25] Jon Hurdle, State Impact Pennsylvania. September 25, 2018

D. Public Interest

The FWPA regulations for a FWW IP require consideration of seven different factors designed to determine whether a project is "in the public interest." Rather than address each of the seven different requirements at N.J.A.C. 7:7A-10.2(b)(12) to demonstrate how public interest is being satisfied, in its FWW IP application Transco simply relies on its description of "Project Benefit" -- including in the Purpose and Need Section of Resource Report No.1 *Project Description*[26] -- to satisfy this regulation. Similar language is used by Transco in its application to FERC for a Certificate of Public Convenience and Necessity ("FERC Certificate") (dated March 2017).[27] Transco's application to FERC states on page 15 that "Although it is not possible to eliminate all effects of the Project, Transco will mitigate adverse effects to the extent practicable. The public benefits the Project offers are far more substantial than its potential adverse effects." This language is based on the requirements of the FERC Certificate process and should not be considered equivalent to satisfying the "public interest" requirements of the FWPA when evaluating the merits of a FWW IP application. Instead, the NJDEP must focus its review on all of the requirements set forth at N.J.A.C. 7:7A-10.2(b)(12), as it would normally do for any other development project.

The application for a FERC Certificate requests applicants to describe the purpose and commercial need for the project, the transportation rate to be charged to customers, proposed project facilities, and the way in which the company plans to comply with all applicable regulatory requirements. In contrast, the FWPA at N.J.A.C. 7:7A-10.2 (entitled, "Standard requirements for all individual permits") defines "public interest" very differently.

N.J.A.C. 7:7A-7.2(b)(12)(i) requires the NJDEP to consider whether the "public interest in preservation of natural resources" is being served by a project. Here, the impacts to 22.1 acres of forest, including 2.64 acres of permanent impact to forested wetlands, related to the compressor station, associated with this FWW IP application is proof that Transco failed to give any serious consideration to the protection of New Jersey's natural resources when selecting the preferred site for Compressor Station 206. N.J.A.C. 7:7A-7.2(b)(12)(iii) requires the NJDEP to consider "the practicability of using reasonable alternative locations and methods, to accomplish the purpose of the proposed regulated activity." As discussed above in this report, Transco's alternatives analysis was flawed. As previously stated, all five of Transco's short list of sites possessed a significant amount of wetland resources and its selection was based on picking the site with the least amount of wetland and transition area impact "while still allowing for activities

[26] Williams. Resource Report 1 – General Project Description. Pages 1-4 to 5.

[27] *See* http://northeastsupplyenhancement.com/wp-content/uploads/2017/05/7c-Natural-Gas-Certificate-Application.pdf.

necessitated for successful implementation of the proposed Project." Therefore, NJDEP should be able to confidently conclude that the Project is not serving the public interest by preserving natural resources unless Transco shows that no suitable alternative locations exist that can satisfy the requirements of the FWPA.

The NJDEP cannot allow Transco to rely solely on the language it developed to satisfy the FERC process and its claim that the NESE Project is in the public interest. Instead, the NJDEP must consider the language and intent of N.J.S.A. 13:9B-1, et seq., the Freshwater Wetlands Protection Act. The Legislative findings and declarations are particularly applicable here:

The Legislature therefore determines that *in this State*, where pressures for commercial and residential development define the pace and pattern of land use, *it is in the public interest to establish a program for the systematic review of activities in and around freshwater wetland areas designed to provide predictability in the protection of freshwater wetlands; that it shall be the policy of the State to preserve the purity and integrity of freshwater wetlands from random, unnecessary or undesirable alteration or disturbance*; and that to achieve these goals it is important that *the State* expeditiously assume the freshwater wetlands permit jurisdiction currently exercised by the United States Army Corps of Engineers pursuant to the Federal Act…and implementing regulations.[27]

The NJDEP has an obligation, based on its own definition of public interest "in this State,"[28] to protect freshwater wetlands and, thus, should not consider the language used in a FERC application as being analogous to the NJDEP's independent evaluation under the FWPA. Just because the Project may ultimately obtain a FERC Certificate, this does not replace the NJDEP's obligation to fully apply all of the requirements of the FWPA and its Rules to this Project and, therefore, evaluate Transco's FWW IP application against those rigorous standards. As described above, Transco's current application does not even meet New Jersey's minimum standards.

III. Stormwater Management Comments related to Compressor Station 206

Stormwater Review Summary

The basins as currently designed are still not in compliance with New Jersey's stormwater management rules. As such, in accordance with N.J.A.C. 7:7A-10.2(b)15, the Department cannot issue a FWW IP as the project does not comply with the Stormwater Management Rules at NJAC 7:8. The various deficiencies in the design will necessitate that the basin be once again redesigned and -- just due to the use of the

[28] N.J.S.A. 13:9B-2

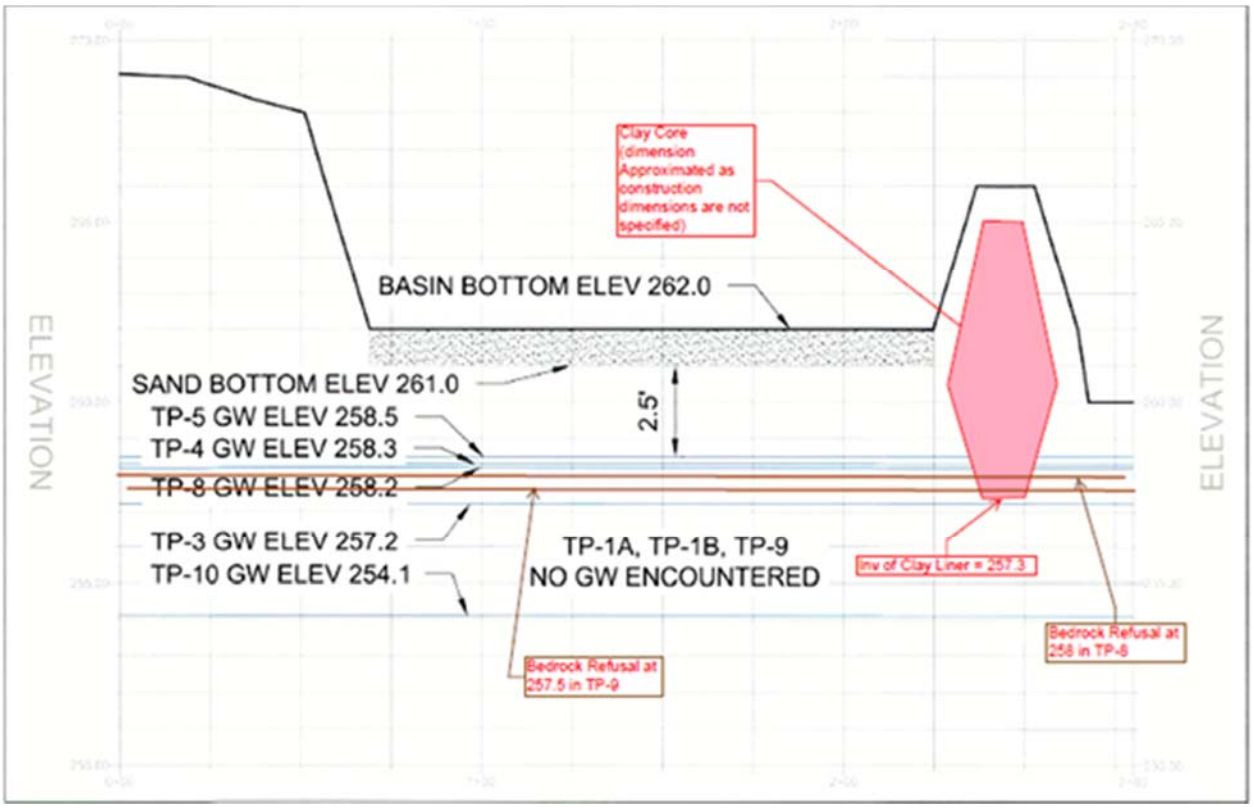
correct hydrologic soils group -- the basin will need to be larger. Until such time as Transco can design a stormwater facility that fully complies with New Jersey's regulations, this FWW IP cannot be approved. The following subsections describe these various design deficiencies in more detail.

1. Comment:
The NJDEP's infiltration and recharge requirements cannot be satisfied as a direct result of the proposed dam design.

Justification:
The proposed dam design will restrict the flow of lateral flow of groundwater, which will result in the creation of a mound within the basin. The mounding of groundwater in the basin will modify the depth to seasonal high and compromise the ability of the basin to infiltrate water as designed. The clay core proposed within the dam is designed to be installed to a depth where it ties into the underlying bedrock. Please refer to the depth of bedrock identified in test pits 8 and 9 (see the figure below). The clay core will intercept the groundwater traveling above the impermeable rock indicated in Test pits 4, 5, and 8. The inclusion of an impermeable clay core in the dam which will be in contact with the underlying bedrock will restrict flow in all directions with the exception of upgradient flow into the basin. In conclusion, the design as currently proposed will cause the groundwater to mound within the proposed infiltration basin and compromise the ability of the basin to function as contemplated.

2. Comment:
The mounding analysis is no longer valid as it assumes pre-development hydraulic conditions that provide for infiltration to occur both laterally and vertically. This basin design will not allow this to occur as the clay core of the proposed dam will restrict the lateral flow of groundwater.

Justification:
As stated above in comment 1, the installation of a clay core within the embankment of the dam in accordance with dam safety regulations will inhibit the existing groundwater flow path to be maintained. This restriction to lateral groundwater flow will serve to mound groundwater within the basin and reduce the depth of separation



between the infiltration surface and groundwater. The post-construction mounding resulting from the proposed design will likely result in the failure of the basin to satisfy the requirements of New Jersey's stormwater rules.

3. Comment:
There is significant discrepancy between the plans and design calculations for the proposed infiltration basin; these are critical to the performance and ultimate compliance of the proposed stormwater management system.

Justification:
The outlet structure in the calculations (HydroCAD) is not consistent with the outlet structure shown in the details on the plans. There are two (2) discrepancies with the outlet dimensions. The rectangular outlet is shown on the plans as 6 inches high by 18 inches wide but is modeled at 6 inches high and 12 inches wide. The opening for the grated horizontal orifice are modeled much larger than the actual opening. The modeled dimensions are 48 inches by 24 inches -- these do not take into consideration the thickness of the concrete. The actual opening for water flow is 36 inches by 12 inches and does not include the space occupied by the grate. These discrepancies will affect the flow rates from the basin and water depths during larger storms. The modeled opening is larger than the actual opening based on the details provided on the plan sheets.

AECOM's failure to use the correct opening size in the outlet structure calculations will require model and the design plan revisions as the basin's current design will not manage the 100 year storm as required.

4. Comment:
The berm on the downstream (eastern) side of the proposed infiltration basin meets the definition of a dam in accordance with N.J.A.C. §7:20-1.2.

Justification:
The engineer has not provided documentation that the structure will meet the design requirements outlined in N.J.A.C. §7:20-1.3(a)1 with respect to the emergency spillway design flow.

Under N.J.A.C. 7:20, ""Dam" means any artificial dike, levee or other barrier, together with appurtenant works, which is constructed for the purpose of impounding water, on a permanent or temporary basis, that raises the water level five feet or more above the usual, mean, low water height when measured from the downstream toe-of-dam to the emergency spillway crest or, in the absence of an emergency spillway, the top-of-dam." All potential ways to calculate the height of the dam indicate that the proposed structure satisfies the NJDEP's definition of a dam.

As the proposed structure is a dam, the following design requirements are necessary:
- Dimensions of the clay core will need to be provided
- Dam Safety no longer supports the use of the anti-seep collars as indicated on the plans and instead favors the use of diaphragms and/or drains along the core to prevent piping failure.
- Refer to the dam safety compliance section (see below) for additional comments.

The review of these types of stormwater structures normally falls under local (county or municipal) review during the site plan approval process, but -- as this is a FERC project and preempts local review -- the NJDEP must review this plan as part of the FWW Individual Permit review process in order for this facility to comply with New Jersey regulations. Based on the April 3, 2019 email correspondence from Mr. Christopher Jones (NJDEP) to Mr. Joseph Dean (Williams): "The stormwater basin is also classified as a Class IV dam. According to our Division of Dam Safety and Flood Control (Dam Safety), the Dam Safety Rules require local approval for the dam. However, Dam Safety also informs us that if the local government will not approve the dam or if local approval is not needed because FERC preempts, the dam is then required to meet the requirements of a Class III Dam and requires approval from the Division of Dam Safety and Flood Control." As such, Princeton Hydro supports the position that Transco must submit a complete application to the Division of Dam Safety for review and approval.

5. Comment:

The proposed side slopes of the detention basins are too steep for stability and are not within standard engineering standards.

Justification:
The proposed side slopes around detention basins, including off the edge of the entrance driveway, are proposed to be 2 feet horizontal to 1 feet vertical. The standard maximum slope for vegetated soil slopes is 3 feet horizontal to 1 foot vertical or shallower. Additionally, with the proximity to the edge of the access drive and no shoulder or buffer proposed, there is a significant risk of failure of the slope resulting in the gravel access becoming narrower (a direct source of sediment and gravel into the basin bottom) and ultimately basin failure or malfunction.

6. Comment:
The scales depicted on the plan views are inconsistent and inaccurate.

Justification:
The plan view shown on sheet 6 of 13 and 12 of 13 state the scale is 1" = 50'. If this is the case, the proposed basin shown is not consistent in size and the one shown on sheet 12 is at least two times larger. This plan discrepancy needs to be reviewed in light of the models to make sure the proper areas were being used**.**

IV. Dam Safety Compliance

The stormwater management facility proposed by Transco at the Compressor Station 206 site satisfies the definition set forth at N.J.A.C. 7:20-1.8(a)4 to be considered a Class IV dam. Although the Dam Safety Standards state that "Owners and operators of Class IV dams...are not required to file documents with nor obtain a permit from the Department," they must meet several requirements -- including (1) that the "Design must be based upon a spillway design storm that results in rainfall of 50 percent greater than a 24-hour, 100-year, Type III storm" and (2) that it must obtain "all necessary local approvals." Importantly, it seems that Transco did not understand that the proposed stormwater basin satisfied the definition of a dam at N.J.A.C. 7:20 until the NJDEP pointed it out in an April 3, 2019 email from Chris Jones (NJDEP) to Joseph Dean (Transco).

Due to FERC's preemption of the local review process, Transco has been able to circumvent the local review process for this facility. However, the April 3, 2019 email from the NJDEP states that the dam "requires approval from the Division of Dam Safety and Flood Control." As Transco has (to date) circumvented a formal review by both the NJDEP and local government, a complete submission to dam safety to review the facility is warranted. In addition, until the recent submission of revised plans such as the spillway design (dated April 22, 2019), Transco did not acknowledge that the proposed basin is a dam. Moreover, it is important to note that Transco's recent changes to the basin design -- in an attempt to satisfy the requirements of N.J.A.C. 7:20 -- has been done in a manner that precludes input from the public. As such, Princeton Hydro concurs with the NJDEP

recommendation that, in the absence of a formal municipal review, Transco make a formal submission to the NJDEP so that the Bureau of Dam Safety can review and comment on the proposed dam at Compressor Station 206.

As mentioned in the stormwater section above, the design parameters necessary to satisfy N.J.A.C. 7:20 have not been met. As previously indicated, compliance with the stormwater regulations -- specifically, for recharge and separation from seasonal high groundwater -- will not be met in the post-construction phase due to the restriction of lateral groundwater flow and mounding. In addition, the dam must comply with the following requirements:

- N.J.A.C 7:20-1.9 (g) 4: "Drainage filters or other methods approved in writing by the Department must be installed to control seepage along the conduit;"
- N.J.A.C. 7:20-1.9 (g) 8: "An emergency spillway shall be provided"; and
- N.J.A.C. 7:20-1.9 (n): "Freeboard requirements are as follows:
    1. Sufficient freeboard shall be provided to prevent overtopping of the dam or any dike or levee due to passage of the design flood or due to frost damage, ice damage or wave action.
    2. For all dams the minimum elevation of the top of the dam must be that necessary to pass the design storm with at least one foot of freeboard to the top of the dam.
    3. Where special conditions of severe frost damage, ice damage or wave action may occur, higher elevations than required in (n)2 above may be required and should be considered by the applicant."

Additionally, as part of the required submission to the Division's technical specification for the construction of the embankment, must include a description of the material and dimensions of the clay core, spillway design stormwater routing and an analysis of downstream impacts based on the breach of the embankment during the spillway design storm. These design requirements must be satisfied and reviewed by the NJDEP, as per the requirements of N.J.A.C. 7:20.

Conclusion Regarding Onshore Water Resources

Transco's permit applications to the NJDEP relating to the onshore water impacts of the NESE Project remain incomplete and fail to demonstrate regulatory compliance in a number of important areas. In fact, Transco is still submitting information to the NJDEP in order to satisfy many of these regulatory requirements, which means that information may not be readily available for public review and comment. Based on the information available, Princeton Hydro lists below several -- but not all -- of the key failures in Transco's applications relating to the onshore water impacts.

1. Individual permit compliance not shown: N.J.A.C. 7:7A-16.7(a)4ii of the FWPA Rules indicates that an applicant shall include a description of "All proposed regulated activities; the size, location, and details of any proposed structures, roads, or utilities; details of any clearing, grading, filling, excavation, and dredging; the location and area of wetlands, transition areas, and/or State open waters that will be disturbed and the limits of disturbance." As previously stated, no detail regarding regulated activities (such as earth moving or dewatering) was provided in the FWW IP application. Failure to satisfy this requirement makes it impossible to assess the project's impacts. As Transco fails to satisfy this requirement, the application remains incomplete and should be denied.

2. Relating to Transco' failure to thoroughly describe regulated activities, Princeton Hydro believes that Transco continues to misrepresent the severity of the project's impacts. For example, it is apparent that Transco will be grading areas proposed as temporary workspace that are located within wetland transition areas. Transco views these activities as temporary impacts, but -- in accordance with 7:7A-2.3 (b)2 -- these impacts are significant and should be considered permanent impacts. Transco's failure to adequately identify and characterize the project's impacts as required under N.J.A.C. 7:7A-16.7(a)4ii of the FWPA Rules is yet another reason to deny this application.

3. The presence of acid producing clays in the project area warrants the need for Transco to identify where these clays will be encountered as a result of grading in or near regulated areas, such as within steeply sloping transition areas. It is essential to identify where these acid producing clays will be encountered in order to identify potential short- and long-term project impacts to these regulated resources. Princeton Hydro remains concerned that Transco has placed little concern on this issue and has failed to identify the presence of these clays within the project area.

4. The Stormwater basin satisfies NJDEP's definition of a dam and has avoided review by the Division of Dam Safety as Transco did not realize that the structure was a dam until April 2019. An application to dam safety must be submitted to NJDEP in accordance with N.J.A.C. 7:20. Transco's failure to understand what was designed necessitates the denial of the current application.

4. Based on recent information regarding the presence of barred owl in the vicinity of the Compressor Station 206 site, it is our position that the resource value of the forested wetlands will change to one of exceptional resource value. This will increase the site's constraints, as it is likely that -- if the project is allowed to proceed as currently designed -- it would reduce the current remnant patch of forest habitat currently available for this threatened species. Reducing the amount of forest available to this species would be inconsistent with the requirements under NJAC 7:7A-10.2(b)3.

5. The proposed stormwater basin is designed as an infiltration basin, but -- based on its design -- it will not work as envisioned. The design (as currently proposed) will cause the groundwater to mound within the proposed infiltration basin and compromise the ability

of the basin to function as contemplated. The creation of an impermeable clay core in the proposed dam, which will be in contact with the underlying bedrock, will restrict flow in all directions (with the exception of upgradient flow into the basin) and create a mound. The mounding of stormwater will compromise the desired function of the basin. Failure to satisfy the stormwater rules provides sufficient reason to deny the FWW IP application.

V. Offshore Water Resources (Coastal Wetlands Permit, In-Water Waterfront Development Individual Permit, and Upland Waterfront Development Individual Permit)

Overview of Deficiencies

Princeton Hydro reviewed Transco's Coastal Wetlands Permit, In-Water Waterfront Development Individual Permit, and Upland Waterfront Development Individual Permit applications for their compliance with New Jersey's Coastal Zone Management Rules, N.J.A.C. 7:7. In addition, given that the NESE Project requires a Water Quality Certificate from NJDEP, we also reviewed these offshore permit applications for compliance with New Jersey's Surface Water Quality Standards (N.J.A.C. 7:9B). We also reviewed FERC's DEIS and FEIS for the NESE Project and Transco's submissions to the U.S. Army Corps of Engineers in order to better understand the Project's environmental impacts and, thus, inform our analysis of these state permit applications. We outline in detail below why these state permit applications fail to satisfy the relevant portions of the Surface Water Quality Standards and the Coastal Zone Management Rules and, therefore, must be denied by NJDEP.

New Jersey's Surface Water Quality Standards

There are a number of N.J.A.C. 7:9B Surface Water Quality Standards that the Williams/Transco NESE Project would be in violation of if allowed to proceed. Not only does the proposed work in Raritan Bay violate these regulations by introducing sediments into the water column, but it also does so by the introduction of contaminants that are currently sequestered in that sediment. Trenching for the intended installation of pipe in the bottom of Raritan Bay will cause turbidity that will affect the health and behavior of organisms in the Bay, particularly the benthic community and migratory fishes. N.J.A.C. 7:9B-1.5(d)1 states that "Existing uses shall be maintained and protected. Designated uses shall be maintained or, as soon as technically and economically feasible, be attained wherever these uses are not precluded by natural conditions" with "the maintenance, migration, and propagation of threatened or endangered species (as defined under the Federal Endangered Species Act of 1973 as amended, 16 U.S.C. 1531 et seq., and/or the New Jersey Endangered and Nongame Species Conservation Act N.J.S.A. 23:2A-1 et

seq.) is considered an existing use that must be maintained." Further, the restoration of saline waters to levels which permit unrestricted shellfish harvesting is an objective of the Department as per N.J.A.C. 7:9B-1.5(a)7 which will become impossible with the increased disturbance from the proposed pipeline enhancements.

In addition to turbidity affecting the marine community, the resuspension of various contaminants in the waters of Raritan Bay violate the following:

- N.J.A.C. 7:9B-1.5(a)4, "Toxic substances in waters of the State shall not be at levels that are toxic to humans or the aquatic biota, or that bioaccumulate in the aquatic biota so as to render them unfit for human consumption,"
- N.J.A.C. 7:9B-1.14(d), "General Surface Water Quality Criteria for FW2, SE and SC Waters:"
- N.J.A.C. 7:9B-1.14(d)7 iii. SS. None of which would render the water unsuitable for the designated uses.
    - N.J.A.C. 7:9B-1.14(d)12i. None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota, produce undesirable aquatic life, or which would render the waters unsuitable for the designated uses.
    - N.J.A.C. 7:9B-1.14(d)12 iii. Toxic substances shall not be present in concentrations that cause acute or chronic toxicity to aquatic biota, or bioaccumulate within an organism to concentrations that exert a toxic effect on that organism or render it unfit for consumption."

- and NJAC 7:9B-1.14(f) and (g) for copper specifically.

As such, the effects of turbidity and toxins from contaminated sediments on the designated uses of Raritan Bay violate New Jersey's Surface Water Quality Standards and, thus, the NESE Project should not be allowed to proceed.

Suspended Sediment Levels

Overall, pipeline construction activities would lead to increased turbidity along hundreds of acres across the sea floor. The act of dredging and filling, like the kind undertaken to construct this offshore pipeline, can temporarily suspended sediments in the water column, increasing turbidity there. Further, deeper drilling has been approved in some NY areas, having further reaching effects on the timeline and backing into the work in NJ.

The proposed route for offshore dredging increases risk of drilling fluid into the environment but it is stated that the fluid is non-toxic, thereby having less potential impact and much less certain direct impact. These are based on Transco's calculations, which have been found to be inaccurate for Compression Station 206, indicating that these figures are also subject to error. Further, accidental release of drilling fluid during HDD

drilling could also lead to turbidity and sedimentation after drilling fluid becomes entrained in the water column and is transported to other locations.

Incidence of HABs are likely to increase due to the increase of resuspended sediments; there is not sufficient evidence to contradict these impacts. This issue is not addressed in the NJDEP Waterfront Development (WFD) permit. The FEIS contends that a study done on placement of dredged materials in a freshwater ecosystem does not have any direct link to HAB incidence. Though admitting to the fact that the study was not done in a saltwater environment similar to the project area, FERC maintains that this would have a negligible effect on potential for HAB formation. However, the study was just of placement of dredge sediment with little mention of its level of contamination. Part of what we have seen influencing HAB occurrence, even in freshwater, is the conversion of nutrients that are bound in the upper layer of sediment and unavailable to plankton for growth into a more biologically available form. This happens due to shifts in environmental conditions, not unlike the removal of sediment from dredging. The study presented in the FEIS only addresses disturbance to the water column from addition of sediment, not the resuspension of nutrients into the water column by exposure from direct removal and disturbance; adding sediment involves clean fill and just turbidity issues, while exposure of buried sediment adds the potential for reintroducing buried contaminants as well. This study does not provide a reliable comparison and cannot be relied on in this context. There is still concern for the increase of HAB occurrence. This would violate N.J.A.C. 7:9B-1.14(d)12i. in that "None, either alone or in combination with other substances, in such concentrations as to affect humans or be detrimental to the natural aquatic biota, ***produce undesirable aquatic life***, or which would render the waters unsuitable for the designated uses."

The Raritan Bay Loop route and temporary construction workspace avoids the surf clam bed identified by the NJDEP specifically on Flynn's Knoll. However, the Project will directly disturb benthic habitat containing surf clam in other New Jersey waters. Surf clams in the seabed adjacent to the disturbed area may also be impacted by construction of the Raritan Bay Loop because of elevated levels of suspended sediments and additional sedimentation. Not only does turbidity effects on benthic communities violate N.J.A.C. 7:9B-1.5(d)1, but it also makes compliance with N.J.A.C. 7:9B-1.5(a)7 -- restoration of saline waters for unrestricted shellfish harvesting -- impossible to achieve.

The project will unavoidably impact soft-bottom benthic habitats along the proposed route, including areas within the NJDEP "special restricted" harvest area for hard clams and surfclams. Impacts to benthic resources, including shellfish, need to be fully assessed and mitigated for. The application provides only a draft mitigation framework for proposed compensatory mitigation. The application lacks (1) detail on the extent of the proposed impacts to benthic resources, including shellfish; (2) proposed compensatory mitigation measures; and (3) performance measures for ensuring mitigation measures are successful.

At least one study has observed that turbidity has adverse effects on hard clams, a species that dwells throughout the Project Area. In this study, hard clam adults experienced reduced growth after exposure to suspended sediment concentrations of 100 ppm. Hard clam larvae experienced 10 percent mortality after exposure to suspended sediment concentrations of 750 ppm.

Interestingly, Transco reports that the dominant shellfish community in NY waters near the Rockaway Delivery Lateral Project Transfer Point was the Atlantic Surfclam, Spisula solidissima, but that post-construction surveys show that concentrations and sizes of surfclams are declining in this area. The decline has also contributed to substantial decreases in harvesting due to small surfclam sizes. If Transco's NESE project is allowed to proceed, further harm will be imposed on the already vulnerable surfclam populations of both NJ and NY.

The construction of the pipeline trench will severely compromise the clam population in many ways and further impair the ecological services that are critical to the health of the Raritan Bay. The analyses of these species is also suspect. Hard clam densities studied by Transco show a large standard deviation for the data in the Alternative Route samples, skewing the possible interpretation of the data. Nonetheless, the number of sampling sites compared for hard clam density is relatively small (22 from preferred and 18 from alternative, from 69 total sampling sites along the preferred route) and not very divergent from the preferred route (many of the sites sampled as the alternate route are within the preferred route temporary workspace and will be impacted by construction on the preferred route anyway).

According to the FERC FEIS, pelagic species (fish that inhabit the water column, as opposed to dwelling near the bottom or the shore) are even more sensitive to turbidity, as are fish eggs and larvae.

Toxic Sediments

There are many points along the proposed route that exceed acceptable contamination levels; minimal to no testing was done to test sediment along other alternate routes to determine if there were routes with less contamination. FERC maintains, "Concentrations of organic contaminants were greater than upper level effects thresholds at approximately 33 percent of the sample sites. Approximately 83 percent of the sample sites had at least one exceedance of an inorganic (metal) threshold." Such proposed work would disturb these sediment s and resuspend toxins into the water, violating N.J.A.C. 7:9B-1.5(a)4 and N.J.A.C. 7:9B-1.14(d).

FERC states "Transco applied the Theoretical Bioaccumulation Potential model to the hard clam (*M. mercenaria*) and *Nereis virens*, a common polychaete worm species in the New York Bight, using the highest polychlorinated biphenyl (PCB) concentrations that were detected in the sampling effort." The species used in the model do not exhibit full

effects of any contaminated sediment exposure to the full benthic community. These species only represent a very small portion of infauna, and no representation of an epifaunal or sensitive species was included, neglecting to fully address the extent to which NJAC 7:9B-1.5(a)4 may have still been violated. Further, although the available data allow for prediction of the recovery rate for small-bodied taxa such as polychaetes (which dominate data sets for sandy sediment communities), less abundant, long-lived, and hence more vulnerable species could recover more slowly.

The sediment modelling does not address the effects of the different toxins in the contaminated sediments to various species of benthic organisms relative to using potentially contaminated sediment for backfill. Backfilling with contaminated sediments not only potentially reintroduces toxins into the water column where it is excavated, but then also introduces the compounds to where the backfill is taking place. Such an oversight underscores Transco's intentional focus on sediment transport and misdirection away from what is actually in the sediment. Very little analysis, if at all, has been done on the impacts of the various chemical toxins to any of the marine species (benthic or pelagic, migratory or otherwise) that may be exposed to those chemicals.

Transco's analysis of effects to the benthic community uses outdated data (a study from 1983) to help prove that the pipeline's impact would be low. This is highly manipulative and does not reflect the urgent need to protect historic improvements to the clam population. When compared to a 2001 study by NJDEP, Transco's analysis of potential PCB concentrations in hard clams indicates that those amounts would be three times as high as the maximum amount found in 2001.

Most of the more recent maps and data may have been passable for purposes of analysis at the time of sampling and then initial reporting, but may not be accurate at the time of construction -- depending on environmental conditions, incidence of storms, and sediment transport in the dynamic system of Raritan Bay. The levels at which contaminated sediments are found may change in the interim and more contaminated sediments may be deposited on the Raritan Bay loop post-construction than anticipated. If concentrations of contaminants (e.g. lead) exceed acceptable thresholds, remediation would be required. However, the remediation method set forth is to dredge the contaminated sediments; this cannot be done above the newly installed pipeline, especially in areas like the Raritan Bay Slag superfund site. No other alternate remediation protocol is proposed -- leaving exposed, contaminated sediment unaddressed.

Overall negative impact to designated uses and aquatic life

There is no clear explanation as to why Horizontal Directional Drilling (HDD) is not proposed for a greater portion of the Raritan Loop. HDD conducted on a higher percentage of the project could minimize direct impacts to the benthic community and migratory and spawning organisms (fish, various crabs, marine mammals, etc.). The FEIS

states that 64% of excavation will be done by jet trencher and 31% by clamshell dredge with environmental bucket, and only 5% HDD.

Since it is maintained that clamshell dredge and jet trenching will be the methods used on a majority of the pipeline installation, Transco has stated that there will be 100% mortality to any sedentary organisms along the proposed route, including various species of shellfish. Determinations have been made for NJ Shellfish Growing Water Classifications Areas to prohibit clam harvesting in the waters of Monmouth County where the pipeline is planned. Removing clams from these areas by mortality from dredging further depletes the ecosystem's ability to filter out the contaminants that are causing this determination to begin with, further impairing the environment's natural ability to recover from anthropogenic pollutant inputs that already exist, making the state's objective of restoring areas for shellfish harvesting even more difficult to achieve (N.J.A.C. 7:9B-1.5(a)7).

Of the hard clams found in the area, 76% are measured as in the "small" category; therefore, any impact will have a major effect on recruitment. Transco states that "No hard clam harvesting has occurred in the area since 2013, although NYSDEC may reinitiate the transplantation program in the future if it again becomes economically feasible for commercial harvesters (Barnes 2016)." However, at a 100% mortality rate to any sedentary benthic organism, it will not return to being economically viable since the Project Area goes right through areas of high QPX incidence and QPX is known to break out when the host is compromised.

The NJDEP Waterfront Development (WFD) and Coastal Wetlands (CSW) permit application does not address QPX disease in New Jersey's clam populations. The FEIS discusses QPX in clams found in Raritan Bay but cites a prevalence rate of 10% in clams after a 2002 mortality event due to QPX. This study is over 14 years old and the event occurred 17 years ago; data from this study do not accurately represent the status of QPX in clams within even the past 5 years. Based on the information presented, the Transco claim that "we conclude that the short-term disturbance associated with Project construction is not likely to result in a measurable increase in QPX occurrence, severity, or transmission" is merely speculative and based on information that does not carry strong contextual support.

Violation of NJAC 7:9B-1.5(d)1i of New Jersey's Surface Water Quality Standards

The maintenance, migration, and propagation of threatened or endangered (T&E) species is considered an existing use that must be maintained. Williams/Transco's proposed pipeline route and methods will have negative effects populations of all aquatic life in Raritan Bay, but will impact the sensitive T&E species more specifically. Impacting migration and propagation of these species has much more significant impacts to the overall population in the long-term than just harm to those individuals. Migratory routes may shift to the detriment of the species and impacts to spawning cause

decreases in recruitment, decreasing over time the overall population of the affected species. The following subsections discuss negative impacts to the following species: Horseshoe Crabs, Fish – Sturgeon, Birds, and Turtles & Marine Mammals.

Horseshoe Crabs (Limulus polyphemus)

The FEIS states that "The most recent stock assessment report for horseshoe crab concluded that, since the ASMFC's initial horseshoe crab stock assessment in 1998, declining abundance in the New York region is evident, and the trend has not reversed (ASMFC, 2013a)…In the 9 years of monitoring conducted by BRWC, there has been no sign of sustained recovery, and the population remains at about 25 percent of its carrying capacity (Reynolds, 2017)." This is likely due to diminished water quality, lack of spawning habitat, and constant disturbance; any action by Transco for development, especially during spawning season, will further disrupt important ecological process relating to the horseshoe crab and eliminate any possibility of potential recovery -- particularly in NJ, where there are spawning populations. Several studies (including those done by the National Park Service) document small but viable breeding populations in portions of NY and along the southern coast of Raritan Bay in NJ; all of these areas would be impacted by the Transco NESE pipeline project. Due to the nature of the size of the Limulus populations that occupy Raritan Bay and nest on the surrounding shorelines, any impact to the benthic environment would have significant and potentially irreversible impacts on their habitat, food resources, and recruitment.

Other studies document how the male:female ratio of breeding crabs specifically in Raritan Bay ranges from 15:1 to 30:1; the average male:female ratio for horseshoe crabs should be between 5:1 and 10:1. This is caused by a rapid decline in the number of females in Raritan Bay over a 5-year period and underscores how vulnerable the population is in the project area. In Cliffwood Beach, NJ, it was reported that there were 1,066 males and only 8 females in 2017, further emphasizing the species vulnerability in the area.

Transco has chosen to request flexibility with Time of Year Restrictions (TOYR) for this species over infringing on the TOYR of other sensitive species. Horseshoe crabs are threatened, and their status directly impacts that of at least one other species on the federally endangered list, the red knot. At this point, Transco is choosing to forego avoidance measures during a critical time of year for this species and also not proposing any mitigation measures. It seems that there is no adherence at all to the "avoid, minimize, mitigate" practice relative to the horseshoe crab whatsoever. This is unacceptable and cannot be allowed to proceed without directly complying with these measures more completely. The encroachment of the TOYR on Horseshoe crab mating and nesting period makes it more likely that there will be an adverse impact on an endangered species' population. Compliance with N.J.A.C. 7:7-9.36(a)3(b) (*which states Development of endangered or threatened wildlife or plant species habitat is prohibited unless it can be demonstrated, through an endangered or threatened wildlife or plant*

species impact assessment as described at N.J.A.C. 7:7-11, that endangered or threatened wildlife or plant species habitat would not directly or through secondary impacts on the relevant site or in the surrounding area be adversely affected) has not been satisfied. This is also a clear violation of NJAC 7:9B-1.5(d)1i.

Fish – Sturgeon

Transco's sediment transport analysis/modeling seems to only account for the 2-dimensional surface area of the benthic substrate relative to the entire Raritan Bay. The project is proposed to happen in the 3-dimensional real-world and the actual area of direct impact should at the very least include the entire volume/space of excavated sediment, the surface of the water above it, the entire water column in between, and any part of the water column and benthic substrate affected by any sediment plume; more accurate impacted areas should also include any area/space where supplemental backfill is sourced and other sediment disposal sites, along with any water column and sediment plume areas associated with these activities.

Migratory fish pathways lie within the water column above the proposed pipeline path, where sediment will be resuspended and where vessels will be travelling to conduct the proposed work. Many of the species will be impacted during their annual migration through the water column and not just along the bottom, specifically sturgeon.

TOYR flexibility will not only affect benthic communities in NJ like the horseshoe crab, but it will also adversely affect sturgeon, winter flounder, and other migratory and economically important species like blue crab and river herring. Acoustic modeling was done to show unlikely impacts to species like sturgeon and sea turtles and it was determined that "Project-related sound for certain activities is anticipated to exceed the threshold criteria for fish and sea turtles (Tables 3 and 4). During impact pile driving, peak source levels for 36-inch and 60- inch piles were measured at 210 dB re 1µPa (California Department of Transportation 2015), which exceeds the injurious thresholds" though at isopleths that appear to make it unlikely to affect the species noted. However, it is stated that, "Transco conservatively estimates a total of 42.5 days (70.25 hours) for pile installation beginning June 6th, 2019 through August 9th, 2019, and a total of 23 days (46.25 hours) for pile removal beginning July 25th , 2019 through August 27th, 2019, to complete the in-water construction activities for 163 steel piles." If TOYR were adhered to as required (3/1-6/30 for strugeon), then potential acoustic impact to these species can confidently be reduced significantly. If TOYR flexibility is granted, then impact to these sensitive species is much more likely.

Raritan Bay is a major habitat for Atlantic sturgeon. Atlantic sturgeon feed on bottom-dwelling invertebrates. Transco acknowledges that those species—clams, crustaceans, etc.—would be the most directly and adversely impacted by construction. Transco estimates that it would take 1-3 years for these species to recuperate. Sturgeon consume large amounts of mud and sand as they feed, making them susceptible to the plumes of toxic sediments for 3-12 hours per day of construction activity, along with reducing and

poisoning their prey. Transco does not adequately address the long-term implications of any of this, especially considering that sturgeon are slow to mature and reproduce; males take at least 12 years to mature and females reach maturity at 18 years.

These effects to sturgeon populations violate N.J.A.C. 7:7-9:36 as well as NJAC 7:9B-1.5(d)1i.

Birds

As mentioned, the request for flexibility in Time of Year Restrictions (TOYR) for specific species over others is particularly concerning and has farther reaching impacts than just to the species that will be impacted during construction that occurs when there would normally be a TOYR for them. For example, horseshoe crabs' TOYR is being compromised for TOYR of other species, despite knowing this will impact the Red Knots, an endangered migratory bird, and its habitat.

All migratory birds are afforded protection under the Migratory Bird Act Treaty (MBTA). Both Executive Order 13186 and the MOU between MMS and FWS, which stem from the MBTA, require that Birds of Conservation Concern (BCC) and federally listed species be given priority when considering the effects on migratory birds. Executive Order 13186 states that emphasis should be placed on species of concern, priority habitats, and key risk factors, and that particular focus should be given to addressing population-level impacts. Then emphasis should be placed on impacts to red knots and the key risk factors that could have effects on their population. This would include impacts to their food resources (e.g. horseshoe crab eggs). Following Executive Order 13186, protecting the red knot under the MBTA, and adherence to the MOU between MMS and FWS would require giving protections to *Limulus polyphemus* a higher priority in FERC impact analysis as a food resource of an endangered species. Otherwise, such oversight would be considered a violation of the MBTA, MOU, and Executive Order 13186.

This constitutes a violation of N.J.A.C. 7:7-9.36 and 7:7-9.37 and a violation of N.J.A.C. 7:9B-1.5(d)1i).

Turtles and Marine Mammals

Acoustic impacts and harassment of marine mammals will be intensified with an increase in work activity as Transco attempts to squeeze the amount of work originally proposed to be done over 15 months into only 9 months. Further, acoustic impacts are not fully addressed for fish or turtles relative to updated timelines.

Conclusion Regarding Offshore Water Resources

Princeton Hydro concurs with the following comment submitted by the Natural Resources Defense Council (NRDC) to the New York State Department of Environmental Conservation in regards to the NESE Project:

> In predicting effects of pipeline construction on mobile species (i.e., fish, sea turtles, and marine mammals), the assumption is often that they can avoid impacts by moving to other available habitat for the duration of the activities of concern...This habitat avoidance is generally considered to have no negative impact on the species in question. In our view, this is an unsupported assumption. A greater understanding of the extent to which animals vacate areas during loud activity is needed before assuming that the action will not result in harm.

Based on the information available, Princeton Hydro lists below several -- but not all -- of the key failures in Transco's applications relating to the offshore water impacts.

1. The impacts of suspended sediment are not fully addressed and will produce impact that is inconsistent with N.J.A.C. 7:9B-1.5. Though proposed to be temporary, the impacts of sediment resuspension have been downplayed and will have lasting effects on the ecosystem.

2. Contamination in the sediment will have more long-lasting effects to the benthic community and will further impair the Raritan Bay, beyond a point at which will dramatically hinder future restoration efforts. The toxic sediments that will be exposed will significantly impact the ecosystem as well, in the water column and on the benthic community, violating N.J.A.C. 7:9B-1.5(a)4 and N.J.A.C. 7:9B-1.14(d).

3. The multitude of impacts to marine life in Raritan Bay are enough to provide sufficient reason to deny the Waterfront Development (In-Water and Upland) and a Coastal Wetlands Permit applications. Not only are there severe issues with the exposure of sediment and toxins, but the request for flexibility on TOYR imperils many migratory and sensitive species, some of which are commercially important.

Thank you in advance for considering the comments provided in this report. If you have any questions or comments regarding this report, please do not hesitate to contact me at 908.237.5660.

Sincerely,
Princeton Hydro

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May 2, 2018

VIA EMAIL AND U.S. MAIL
Matthew Resnick
Division of Land Use Regulation
Department of Environmental Protection
Mail Code 501-02A
P.O. Box 420
Trenton, NJ 08625-0420

Re: Comments on Proposed Northeast Supply Enhancement Project (Program Interest #: 0000-01-1001.3)

- **Freshwater Wetlands Individual Permit** (Application #: FWW 180001)
- **In-Water Waterfront Development Individual Permit** (Application #: WFD 180001) & **Upland Waterfront Development Individual Permit** (Application #: WFD 180002)
- **Coastal Wetlands Permit** (Application #: CSW 180001)
- **Flood Hazard Area Individual Permit** (Application # FHA180001) & **Flood Hazard Area Verification** (Application # FHA180002)

Dear Mr. Resnick:

We are providing comments on behalf of our clients, NY/NJ Baykeeper, Food & Water Watch – New Jersey, Central Jersey Safe Energy Coalition, and the Princeton Manor Homeowners Association, regarding the permit applications (listed above) from Williams/Transco ("Transco") for the proposed Northeast Supply Enhancement ("NESE") Project. The New Jersey Department of Environmental Protection ("DEP") has the right and obligation to conduct an independent and probing review to ensure that Transco is in compliance with the full scope of the New Jersey statutes and regulations. This type of comprehensive review is entirely consistent with DEP's (1) delegated authority under Section 401 of the federal Clean Water Act and (2) authority under the federal Coastal Zone Management Act ("CZMA") to concur with or object to Transco's request for CZMA Consistency Certification.

A thorough examination based on the law and science reveals that each of Transco's permit applications fails to satisfy the applicable New Jersey statutes and regulations and, therefore, must be denied by DEP. Our clients' review and analysis continues because Transco recently submitted to DEP and the Clerk's Office of Franklin Township, NJ (on or about April 24, 26 and May 2, 2019) new and/or revised applications. Given how close these materials were submitted to DEP's May 2, 2019 deadline to receive public comments, our clients and their experts are

continuing to review and analyze them. Consequently, on our clients' behalf, we reserve the right to supplement these comments at a later date.

I. A PROBING AND INDEPENDENT REVIEW UNDER THE FRESHWATER WETLANDS PROTECTION ACT REQUIRES DEP TO DENY THE FRESHWATER WETLANDS (FWW) INDIVIDUAL PERMIT APPLICATION.

A. The FWW Individual Permit Application Must be Denied Because it Fails to Protect the Public Health, Provide Economic Value, Prove Need, Examine Data For Alternatives, or Demonstrate Extraordinary Hardship.

DEP has the right and obligation to ensure that Transco is in compliance with the full scope of the Freshwater Wetlands Protection Act ("FWPA") and Rules. The FWPA and Rules together provide DEP with the authority to consider water impacts and a number of other "non-water" factors and require certain "non-water" conditions.[i] Here we briefly summarize Transco's (1) deficiencies under certain non-water factors and (2) failure to satisfy certain non-water conditions, before turning to why – in light of two expert reports – Transco's FWW Permit Application must also be denied on the basis of the regulated activity's wetlands and water impacts.

The non-water factors include: (1) the need for the Project, (2) public health, and (3) economic value. The non-water conditions include demonstrating that: (1) there are no practicable alternatives to the Project and that (2) there is either a compelling public need for the Project or that denial of this FWW Permit would impose an extraordinary hardship on the company. These non-water factors and conditions are entirely consistent with DEP's delegated authority under Section 401 of the federal Clean Water Act to grant or deny certifications to applicants seeking certain Federal licenses or permits. The analysis contained in our April 25, 2019 comments to DEP shows Transco's deficiencies under the above non-water factors and failure to satisfy the above non-water conditions.

Most significantly, DEP must make an independent review of the need for the NESE Project from the perspective of the overall public interest and should not defer to FERC's decision on this issue. In such an independent review, DEP should consider two independent reports that indicate that the additional natural gas supplied by NESE is, in fact, not needed. Transco overestimated (1) future gas demand and (2) the required number of oil-to-gas boiler conversions. Meanwhile, better alternatives to increased gas are currently available, including energy efficiency, demand response, and heat pumps. In addition, DEP cannot make an independent determination of whether other system alternatives to Compressor Station 206 are viable without having viewed certain "system process parameters" exhibits Transco submitted to FERC as confidential Critical Energy/Electric Infrastructure Information ("CEII"). Overall, Transco's deficiencies under the various non-water factors and failure to satisfy certain non-water conditions provide additional grounds – aside from the regulated activity's wetlands and water impacts – on which DEP must deny the FWW Permit Application.

B. The Wetland and Water Impacts of the Proposed Project Will Violate the Law and Harm the Environment.

As with Transco's previously submitted permit applications to DEP (that were withdrawn in June 2018), our wetlands and water experts at Princeton Hydro analyzed Transco's FWW Individual Permit, Coastal Wetlands Permit, In-Water Waterfront Development Individual Permit, and Upland Waterfront Development Individual Permit. In addition, Wander Ecological Consultants investigated the presence of Endangered and Threatened species, and other protected wildlife and habitats, that bear on Transco's ability to comply with the relevant New Jersey statutes and regulations. Here we provide a brief summary of Princeton Hydro's attached report[ii] (supported by the attached Wander Ecological Consultants report[iii]) as it pertains to Transco's FWW Individual Permit, which demonstrates why this permit application must be denied on the basis of the proposed wetlands and water impacts.

i. The Proposed Project Fails to Lawfully Manage Stormwater on the Proposed Compressor Station 206 Site.

Princeton Hydro has determined that Transco's proposed stormwater basin has multiple design errors and thus fails to meet the minimum requirements or design standards for an infiltration facility. Consequently, the proposed project does not protect human health and the environment due to the increase risks of stormwater management failure.

These design errors preclude the proposed basin from complying with New Jersey's Stormwater Management Rules.[iv] Importantly, DEP must deny the application for a FWW Individual Permit because of the technically inadequate stormwater design.[v]

ii. The Application Fails to Protect the Exceptional Resource Values of the Forested Wetlands

Overall, this permit application (1) does not provide a detailed account of the natural resources associated with the project site; (2) fails to satisfy the requirements of an alternatives analysis under the FWPA, which seeks to first avoid and then minimize wetland impacts before engaging in mitigation; and (3) does not sufficiently describe the Project's impacts to regulated resources, including wetlands, wetland transition area, and surface waters. Some examples of impacts to regulated areas that were not adequately analyzed include steep slopes in various locations, the presence of acid-producing clays underlying the geology of the Project's proposed Madison Loop, and the modification of hydrology – particularly groundwater discharge – due to project construction.

Wander Ecological Consultants determined that the forested wetlands on and adjacent to the proposed compressor station have exceptional resource values because of the presence of Barred Owl habitat. Consequently, 150 ft. transition areas (buffers) must be provided and the wetland and upland trees must be protected to preserve the integrity of the habitat.

Princeton Hydro also notes that, given the number of recent Horizontal Directional Drilling ("HDD") failures in Ohio and Pennsylvania, the DEP must make a realistic assessment of the

HDD proposed here. In this case, DEP must deny the application because the proposed HDD techniques fail to protect the environment as required by law.

II. THE APPLICATIONS FOR WATERFRONT DEVELOPMENT INDIVIDUAL PERMITS AND COASTAL WETLANDS PERMIT ARE NOT CONSISTENT WITH THE COASTAL ZONE MANAGEMENT ACT, THUS MUST BE DENIED TO PROTECT RARITAN BAY

Princeton Hydro advises that the proposed work in Raritan Bay will lead to the suspension of sediment and toxins in the water column, undermine the designated uses of the water body, and harm populations of marine organisms. The benthic community will be directly affected, as there will be 100% mortality of sedentary organisms. Disturbance to sediments will affect any visual predators and migratory species, especially since the application proposes flexibility with Time of Year Restrictions on constructions activities. Further magnifying the impacts is the fact that the proposed project timeline has been condensed from 15 months to only 9 months, forcing Transco to have to increase the pace of work and therefore increase the environmental impact and risk of negligence.

III. THE FLOOD HAZARD AREA INDIVIDUAL PERMIT APPLICATION MUST BE DENIED

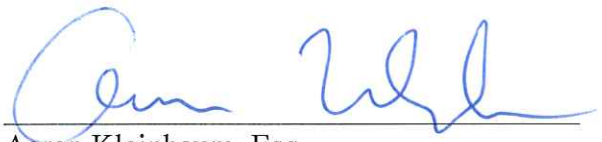
We provided comments on the deficiencies of Transco's Flood Hazard Area (FHA) IP application in our August 3, 2018 letter to Commissioner McCabe. Here we restate these comments for the record. The Flood Hazard Area Control Act Rules require that "an application for [a Flood Hazard Area] individual permit shall include an environmental report."[vi] This report must include "[a]n analysis of any potential temporary and/or permanent adverse environmental impact(s)…of the proposed regulated activity or project" which shall contain, in part, "[a] plan to mitigate the effects of all adverse environmental impacts."[vii]

One of the regulated activities associated with Transco's Flood Hazard Area (FHA) IP application is excavation. In its FHA IP application, Transco describes this as a "temporary" activity, thus causing temporary environmental impacts and requiring commensurate mitigation efforts. But a "temporary" activity, as defined at N.J.A.C. 7:13–1.2, "means a regulated activity that occupies, persists, and/or occurs on a site for no more than six months." The definition provides the example of a fill or structure, which is "temporary" if "within six months of its placement, the fill or structure is removed from the site, all disturbed regulated areas are restored to their original topography, and all necessary measures are implemented to ensure that the original vegetative cover onsite is restored to its previous (or an improved) condition."[viii] By this standard, excavation – digging into natural soils – is not "temporary" but rather a "permanent" activity with "permanent" environmental impacts since the original vegetative cover cannot be restored to its previous condition. This is especially true on steep slopes that may be subject to instability as a result of a regulated activity. Thus, Transco has failed to satisfy N.J.A.C. 7:13-18.6(a) by both mischaracterizing part of its Project's environmental impacts and, in turn, the level of mitigation it will require.

Conclusion

As the foregoing analysis (supplemented by our April 25, 2019 comments) and two enclosed expert reports demonstrate, each of Transco's permit applications is substantively deficient. As a result, DEP must deny these permit applications. As stated above, EELC reserves the right to supplement these comments at a later date once we have conducted a review of the new permit-related materials that Transco recently submitted to DEP and the Clerk's Office of Franklin Township, NJ. We also reserve the right to supplement these comments at a later date should Transco submit additional permit-related materials before DEP's deadline to approve or deny these applications.

Respectfully submitted,



Aaron Kleinbaum, Esq.
Eastern Environmental Law Center

Enclosures:

- Princeton Hydro's Report on Transco's NESE NJDEP Permit Applications (May 2018)
- Wander Ecological Consultants Report on Endangered and Threatened Species and Vernal Habitats Affecting the NESE Project (April 30, 2019)

cc: Ruth Foster (DEP)
Virginia Kop'kash (DEP)
Christopher Jones (DEP)

---

[i] *See* EELC Comments on Transco's Freshwater Wetlands Permit Application for the Northeast Supply Enhancement (NESE) Project (dated April 25, 2019), which are incorporated herein by reference. The terms "non-water" factors and "non-water" conditions are being used in a colloquial sense. The non-water factors and conditions are embedded throughout the FWPA and Rules as either public interest factors, standard requirements, or additional requirements for non-water dependent activities. The term "non-water" will appear without quotes throughout these comments.

[ii] Incorporated herein by reference.

[iii] Incorporated herein by reference.

[iv] N.J.A.C. 7:8 et seq.

[v] N.J.A.C. 7:7A-7.2(b)15

[vi] N.J.A.C. 7:13-18.6(a)

[vii] N.J.A.C. 7:13-18.6(a)(3).

[viii] N.J.A.C. 7:13–1.2

From: Olson, Karen

Sent: Wednesday, May 8, 2019 7:10 PM

To: 'Jones, Christopher'; Mochrie, Sara; Horner, Scott; Dean, Joseph

Cc: Resnick, Matthew

Subject: RE: NESE questions

Attachments: Transco_NESE_Additional_AA_050819.pdf

Hi Chris and Matt –

See attached for responses to your questions imbedded in the alternatives analysis language below. New text is in red bold, old text is struck through. Since this included revisions to the text it will be sent to the municipal clerks.

Let me know if you have any additional questions.

Thanks,

Karen

Karen Olson | Environmental Specialist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Sent: Friday, May 3, 2019 1:10 PM
To: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>; Horner, Scott <Scott.Horner@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Subject: [EXTERNAL] NESE questions

All,

Going through the alternatives analysis I highlighted areas in yellow that were not clearly understood and require further explanation. Can you clarify these items? Thanks. And don't hesitate to contact me if you have any questions.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment

(609) 984-6216

Electric Motor-Drive Compression at Compressor Station 206

According to Transco, electric motor-driven compression at Compressor Station 206 would require additional aboveground power grid infrastructure, including high voltage power lines and a substation, to provide at least 22,000 kilowatts of power.

Using aerial photography, Transco developed a transmission route based on the location of the nearest electrical substation. Transco's developed route sought to avoid residences and to co-located the transmission line adjacent to existing roadways or other ROW's. Transco determined that the transmission line would be 3.89 miles long and would begin at the existing substation on Ridge Road in South Brunswick Township, approximately 2.5 miles south of the Compressor Station 206 location. The route follows Ridge Road for a half a mile and then at the junction of Ridge Road and Route 1 takes a north-northeast route to avoid residences before continuing another 1.5 miles on Route 27 to Transco's Mainline. The transmission route then follows Transco's Mainline until reaching the proposed Compressor Station 206 site. Transco estimated that the impacts associated with this alternative would be 8.37 acres of wetlands (construction), 15.5 acres of forested uplands, (11.62 acres of wetlands operational impacts, what is the difference between operational impacts and construction impacts?) and 2.11 acres of public open space (2.08 acre figure given as well for open space. Why is the different than the 2.12 acres?) Does Electric Motor-Drive Compression replace CS 206 or augment it?

Combined HDD Alternative

Transco concluded that combining these Loops was not a practicable alternative because a mainline valve is proposed as close as possible to the shoreline as a safety measure for the existing Class 3 and HCS locations. What are these? A mainline valve must be installed where the pipeline is near to the surface and not in a deep HDD location. The location for the mainline valve was identified near the junction of the Madison Loop and the Raritan Loop. The combined Morgan Shore Approach HDD and the Lockwood Marina HDD would require the valve to be located more inland than proposed. Why is that not good?

Transco is currently proposing to integrate cathodic protection (CP) for the Raritan Bay Loop by installing a power cable and anode sled. Relocating the start point of the Morgan Shore Approach to the west would prevent the CP cable from being integrated into the pipeline system at the beginning of the Raritan Bay Loop near the shoreline (Why?) and would require additional CP length installed to connect the pipeline approximately 0.5 miles to the west. (why is this bad?) While the conceptual length of approximately 1 mile of the combined HDD may be technically feasible in the expected soil conditions, there were other factors considered by Transco in their decision to conduct two separate HDD's. In particular, Transco identified increased risks associated with the added duration of offshore assets (meaning?), increased workspaces and logistical issues needed for the increased length of pullback string offshore (what are the logistical issues?), added offshore pit volume excavation and associated increased drilling fluid volume offshore, and increased horizontal curvature into the HDD alignment to maneuver the pipeline between the entry and exit pits.

Compression-Intensive Alternative

Two compression-intensive alternatives were considered to the Madison and Raritan Bay Loops. The first alternative involved the addition of compression at Compressor Station 207. Transco concluded that this was not a practicable alternative because even with the added compression, the increased pressure drop caused by the additional Project volumes would not allow for the existing and incremental Project volumes to be delivered without the addition of facilities downstream of Compressor Station 207. What are the additional facilities? Loops? CS's?

This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.

From:	Usarek-Witek, Magda
To:	Mochrie, Sara
Cc:	Horner, Scott; Arnett, Jan; Resnick, Matthew; Jones, Christopher; Dietrick, Suzanne; Tamagno, Joslin; Eakin,Megan; Sundar, Nischint; Perry, Katharine; Olson, Karen
Subject:	RE: repackaging the new application
Date:	Thursday, June 20, 2019 1:36:20 PM

Hi Sara,

I would call the townships to ask if you provided a CD, would they be able to provide a way to view it to the public? If not, then I would default to all hard copy.

Thanks

Magda

Magda Usarek-Witek

Environmental Specialist II

Office of Dredging and Sediment Technology

New Jersey Department of Environmental Protection

Magda.Usarek-Witek@dep.nj.gov | (609) 777-1866

Mailing address:

Attn: Magda Usarek-Witek

DEP, Division of Land Use

501 East State Street

Mail Code 501-02A

PO Box 420

Trenton NJ 08625

(609)984-0921

NJDEP

NOTE: This E-mail is protected by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This E-Mail and its contents, may be Privileged & Confidential due to the Attorney-Client Privilege, Attorney Work Product, and Deliberative Process or under the New Jersey Open Public Records Act. If you are not the intended recipient of this e-mail, please notify the sender, delete it and do not read, act upon, print, disclose, copy, retain or redistribute it.

From: Mochrie, Sara <SMochrie@ene.com>
Sent: Thursday, June 20, 2019 2:55 PM
To: Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov>
Cc: Horner, Scott <Scott.Horner@williams.com>; Arnett, Jan <Jan.Arnett@dep.nj.gov>; Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Jones, Christopher <Christopher.Jones@dep.nj.gov>; Dietrick, Suzanne <Suzanne.Dietrick@dep.nj.gov>; Tamagno, Joslin <Joslin.Tamagno@dep.nj.gov>; Eakin,Megan <MEakin@ene.com>; Sundar, Nischint <NSundar@ene.com>; Perry, Katharine <KPerry@ene.com>; Olson, Karen <Karen.Olson@williams.com>
Subject: [EXTERNAL] Re: repackaging the new application

NJDEP Team - one quick question.

Please confirm the submittal to the municipality must be all hard copy and large files can't be placed on CD.

Thanks
Sara

Sent from my iPhone

On Jun 20, 2019, at 2:38 PM, Usarek-Witek, Magda <Magda.Usarek-Witek@dep.nj.gov> wrote:

> Hi Sara and Scott,
>
> I attached the attendee list for our meeting conducted today (6/20/19) for your reference. Please pass this along to the rest of your crew.
>
> I spoke with Jan Arnett about the format of the new application.
>
> Please submit 2 hard copies of the application, 5 hard copies of the plans, and 1 CD of the entire copy (including the plans).
>
> The new application should include:
>
> - A compliance statement that addresses the rules and refers to any reports provided to us to demonstrate compliance as well as narratives to explain

minimization etc.

- **Any reports that are mentioned in the compliance statement can be referenced and provided on a CD.** You do not have to give us a paper copy for reports such as sediment analysis, modeling figures and analysis, feasibility and comparison of different pipeline analysis, etc.
  - We ask that you provide us two copies of the CDs for the report so we can have a copy on hand for the public as well as one for us.
  - Additionally, please label the CDs with the date and title of the report, especially if there were different version of updated information such as multiple sampling plans and multiple feasibility analysis, etc.

- An appendix to any new information or any communication that you need to summarize or reference to demonstrate updates from the previous application
- All administrative requirements

Please let me know if anything is unclear and we can discuss it over the phone.

Thank you,

Magda Usarek-Witek

Environmental Specialist II

Office of Dredging and Sediment Technology

New Jersey Department of Environmental Protection

Magda.Usarek-Witek@dep.nj.gov | (609) 777-1866

Mailing address:

Attn: Magda Usarek-Witek

DEP, Division of Land Use

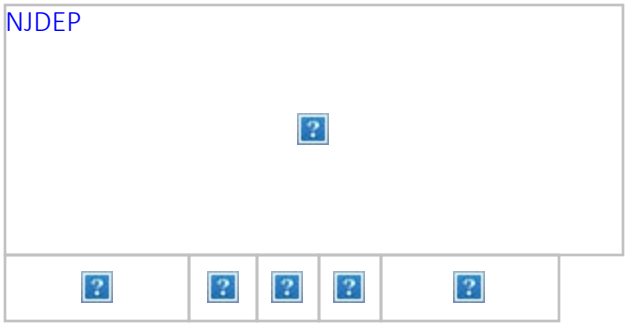
501 East State Street

Mail Code 501-02A

PO Box 420

Trenton NJ 08625

(609)984-0921



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<Meeting Attendance 6-20-19 TRANSCO - NJDEP.pdf>

Sundar, Nischint

From: Czapka, Stephen J.
Sent: Tuesday, June 25, 2019 3:04 PM
To: Natlands@dep.nj.gov
Cc: Olson, Karen; Mochrie, Sara; Eakin,Megan; Sundar, Nischint; Perry, Katharine
Subject: Data Request
Attachments: CS206_workspace_20190625.piz; Madison_Raritan_Loop_Onshore_20190625.piz; ContractorYard_CMEfacility_20190625.piz; ContractorYard_Hwy35_20190625.piz; ContractorYard_Lowes_20190625.piz; ContractorYard_Manzo1_20190625.piz; ContractorYard_Manzo2_20190625.piz; ContractorYard_WeeksMarine_20190625.piz

Categories: Red Category

Greetings,
We are assisting a client with site evaluations. I have attached 8 zip files corresponding to 8 sites/requests. For each site, we are requesting information regarding the occurrence of rare plants, animals, or natural communities within or in the vicinity of the site.

Each attached zip file contains the following (NOTE: I renamed the ".zip" to ".piz" to avoid having the attachments stripped by security programs. Please rename to ".zip" before attempting to open the file):

1) A completed Natural Heritage Request form (in PDF format)
2) A PDF Map of the Site on a USGS Quad map
3) Shapefiles of the site boundary (including a readme .txt file with projection information)

Please send all invoices to my attention. Please let me know if you require additional information, have issues opening the files, or have any other questions.

We have previously submitted requests for these sites, however most responses are more than a year old and we want to make sure we are using the most up to date information.

Thank you!

Sincerely,
Steve Czapka

ecology and environment, inc.

Stephen J. Czapka, *Certified Wildlife Biologist*
348 Southport Circle, Suite 101, Virginia Beach, VA 23452
Phone: 757-456-5356 ext. 5008 • Cell: 757-945-9899
sczapka@ene.com • www.ene.com

State of New Jersey
Mail Code 501-04
Department of Environmental Protection
Natural Heritage Data Request Form

The New Jersey Natural Heritage Program
DEP-Office of Natural Lands Management
P.O. Box 420, Trenton, New Jersey 08625-0420
(609) 984-1339
Fax No.: (609) 984-1427

PLEASE PRINT AND SUBMIT COMPLETED FORM WITH ATTACHMENTS TO THE ADDRESS ABOVE
(Fields shown in bold font must be completed in order for data request to be processed.)

1. **Name:** **Stephen Czapka** Agency/Company: Ecology and Environment, Inc.

   Address: **200 Bendix Road, Suite 250** **City**: **Virginia Beach**

   State: **VA** **Zip:** **23452** **Daytime Phone:** **757-456-5356** Ext.: 5008

   Cell Phone: Email: Sczapka@ene.com

2. **Project Name:** **CME Facility Contractor Yard**

   Municipality(ies): Elizabeth City County(ies): Union County

   Block(s): 4 Lot(s): 1461, 1462, 1463

   N.A.D. 1983 State Plane Coordinates (feet) 6 digits only: E (x): 658,722 N (y): 576,965

3. **Project Description:** Construction laydown area.

4. **USGS Quad:** **X** A copy of a USGS quad map(s) that clearly indicates the site boundary is included with this form. Specify name of USGS quad(s): Elizabeth City

   (USGS quad maps are required, unless prior arrangements have been made to submit site boundaries in an alternate format. Responses will be delayed if site locations are not delineated in a suitable format.)

5. **Flood Hazard Control Act Use:** **Is this request submitted as part of a Flood Hazard Area Control Act rule (N.J.A.C. 7:13) application? Yes X No**

6. **Acknowledgement & Signature:** Any material supplied by the Office of Natural Lands Management will not be published without crediting the Natural Heritage Database as the source of the material. It is understood that there will be a charge of $70.00 per hour for the services requested. An invoice will be sent with the request response and payment should be made by check or money order payable to "Office of Natural Lands Management."

Signed **Date** 06/25/2019

Time Frame for Response:
Data requests are processed in the order in which they are received; please allow 30 days for response. If you would like to send in your data request via email, you may do so by sending it to **Natlands@dep.nj.gov** . Due to the number of attachments, we cannot fax results. Unless you specifically request that your response be mailed or the response is unusually large, your response will be emailed to the address you provide.

FOR OFFICE USE ONLY

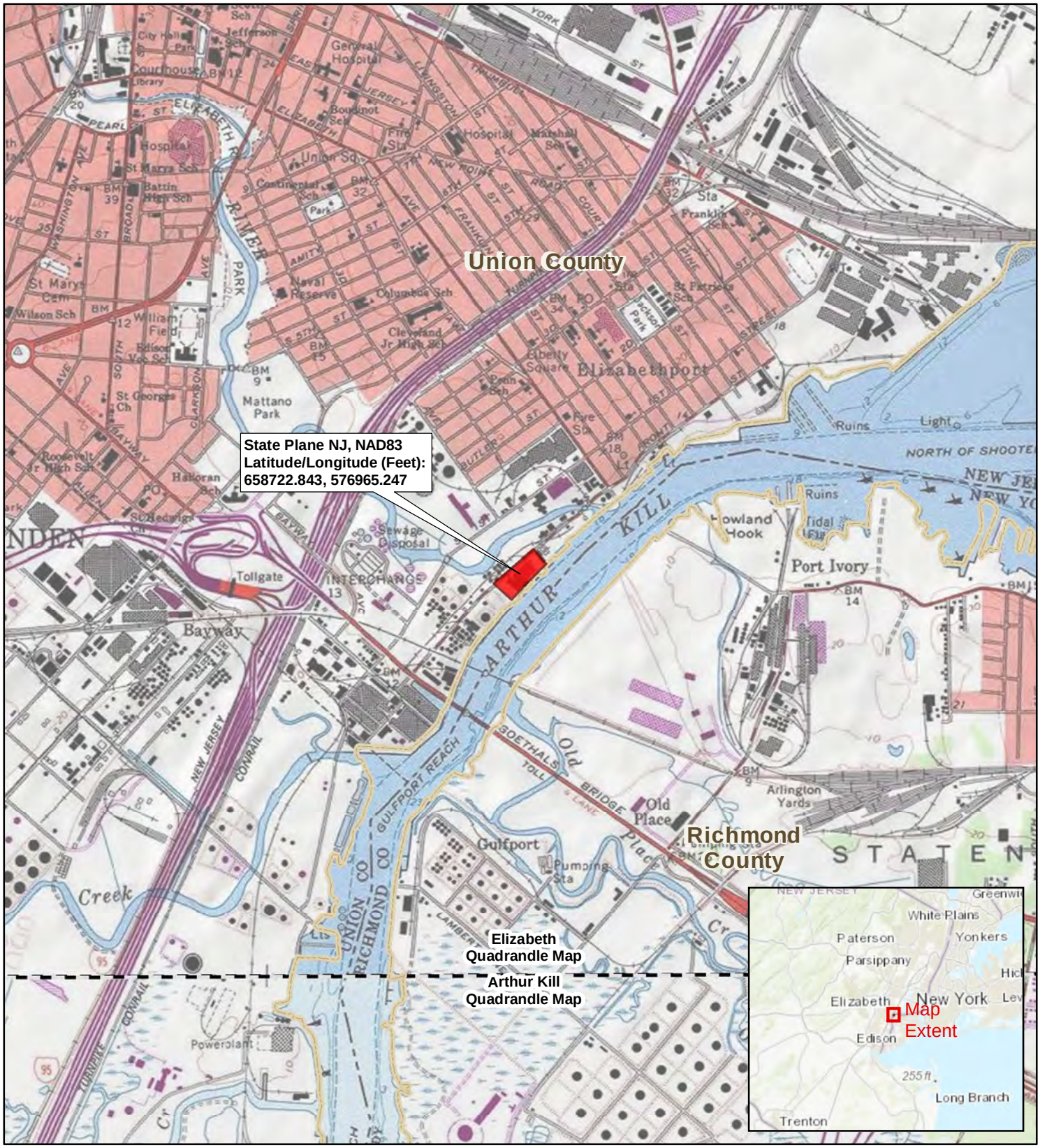
DATE RECEIVED

Item Code: REG ST RTC NC REGEO STEO RTCEO NCEO

Hrs:

Project Code: Inv. #:

Document Path: \Map\MXDs\NJ_NHP_Request\RBL_CY_CME_Facility_8x11_topo_20190607



0 0.2 0.4 Miles

0 0.2 0.4 0.6 Kilometers

CME Facility Workspace

County Boundary

USGS Topo Sheet Index

Sources:
USGS 2016; ESRI 2012; E&E 2017

USGS Topographic Map of the CME Facility Workspace
Union County, New Jersey

USGS 7.5 Minute Quad: Elizabeth

NJ Land Block/Lot: 4/1461, 4/1462, 4/1463

State of New Jersey
Mail Code 501-04
Department of Environmental Protection
Natural Heritage Data Request Form

The New Jersey Natural Heritage Program
DEP-Office of Natural Lands Management
P.O. Box 420, Trenton, New Jersey 08625-0420
(609) 984-1339
Fax No.: (609) 984-1427

PLEASE PRINT AND SUBMIT COMPLETED FORM WITH ATTACHMENTS TO THE ADDRESS ABOVE
(Fields shown in bold font must be completed in order for data request to be processed.)

1. **Name:** **Stephen Czapka** Agency/Company: Ecology and Environment, Inc.

   Address: **200 Bendix Road, Suite 250** **City**: **Virginia Beach**

   State: **VA** **Zip:** **23452** **Daytime Phone:** **757-456-5356** Ext.: 5008

   Cell Phone: Email: Sczapka@ene.com

2. **Project Name:** **Compressor Station 206**

   Municipality(ies): Franklin Township County(ies): Somerset County

   Block(s): 5.02 Lot(s): 9, 10, 11.01, 11.02, 12, 16, 17, 23, 25

   N.A.D. 1983 State Plane Coordinates (feet) 6 digits only: E (x): 464,972 N (y): 571,578

3. **Project Description:** Natural gas compressor station.

4. **USGS Quad:** **X** A copy of a USGS quad map(s) that clearly indicates the site boundary is included with this form. Specify name of USGS quad(s): Monmouth Junction

   (USGS quad maps are required, unless prior arrangements have been made to submit site boundaries in an alternate format. Responses will be delayed if site locations are not delineated in a suitable format.)

5. **Flood Hazard Control Act Use:** **Is this request submitted as part of a Flood Hazard Area Control Act rule (N.J.A.C. 7:13) application? Yes X No**

6. **Acknowledgement & Signature:** Any material supplied by the Office of Natural Lands Management will not be published without crediting the Natural Heritage Database as the source of the material. It is understood that there will be a charge of $70.00 per hour for the services requested. An invoice will be sent with the request response and payment should be made by check or money order payable to "Office of Natural Lands Management."

Signed **Date** 06/25/2019

Time Frame for Response:
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FOR OFFICE USE ONLY

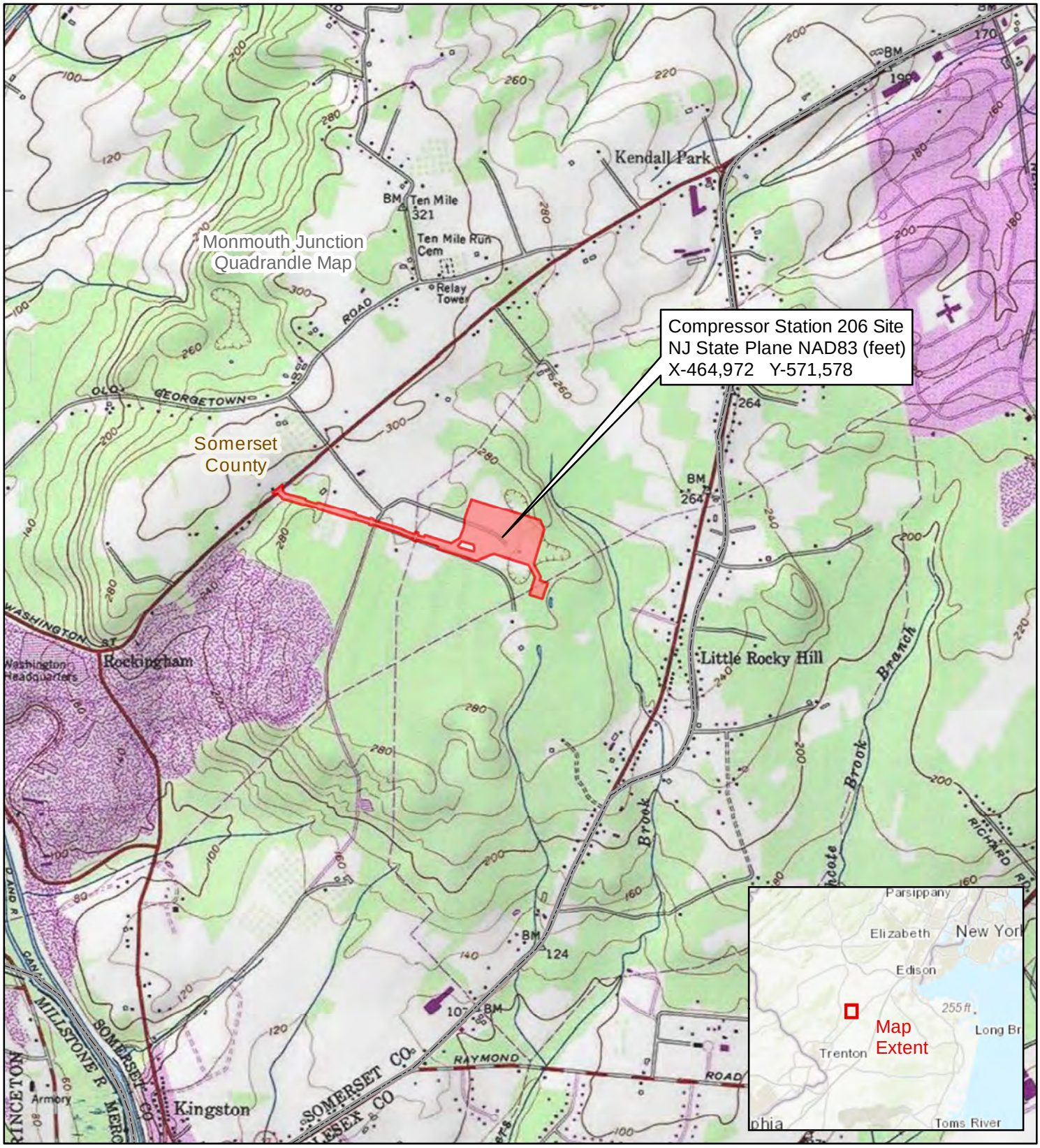
DATE RECEIVED

Item Code: REG ST RTC NC REGEO STEO RTCEO NCEO

Hrs:

Project Code: Inv. #:

Document Path: \Map\MXDs\NJ_NHP_Request\CS206_8x11_topo_20190607



0 0.2 0.4 Miles

0 0.2 0.4 0.6 Kilometers

Compressor Station 206
Limits of Disturbance

USGS Topographic Map of
Compressor Station 206 Site
Somerset County, New Jersey

USGS 7.5 Minute Quad: Monmouth Junction

Portions of NJ Land Block: 5.02
Lots: 9, 10, 11.01, 11.02, 12, 16, 17, 23, 25

Sources:
USGS 2016; ESRI 2012; E&E 2016; Somerset County, NJ 2014.

State of New Jersey
Mail Code 501-04
Department of Environmental Protection
Natural Heritage Data Request Form

The New Jersey Natural Heritage Program
DEP-Office of Natural Lands Management
P.O. Box 420, Trenton, New Jersey 08625-0420
(609) 984-1339
Fax No.: (609) 984-1427

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1. **Name:** **Stephen Czapka** Agency/Company: Ecology and Environment, Inc.

   Address: **200 Bendix Road, Suite 250** **City**: **Virginia Beach**

   State: **VA** **Zip:** **23452** **Daytime Phone:** **757-456-5356** Ext.: 5008

   Cell Phone: Email: Sczapka@ene.com

2. **Project Name:** **Hwy 35 Contractor Yard**

   Municipality(ies): Old Bridge Township County(ies): Middlesex County

   Block(s): 1051 Lot(s): 51

   N.A.D. 1983 State Plane Coordinates (feet) 6 digits only: E (x): 564,818 N (y): 588,279

3. **Project Description:** Construction laydown area.

4. **USGS Quad:** **X** A copy of a USGS quad map(s) that clearly indicates the site boundary is included with this form. Specify name of USGS quad(s): Keyport

   (USGS quad maps are required, unless prior arrangements have been made to submit site boundaries in an alternate format. Responses will be delayed if site locations are not delineated in a suitable format.)

5. **Flood Hazard Control Act Use:** **Is this request submitted as part of a Flood Hazard Area Control Act rule (N.J.A.C. 7:13) application? Yes X No**

6. **Acknowledgement & Signature:** Any material supplied by the Office of Natural Lands Management will not be published without crediting the Natural Heritage Database as the source of the material. It is understood that there will be a charge of $70.00 per hour for the services requested. An invoice will be sent with the request response and payment should be made by check or money order payable to "Office of Natural Lands Management."

Signed **Date** 06/25/2019

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FOR OFFICE USE ONLY

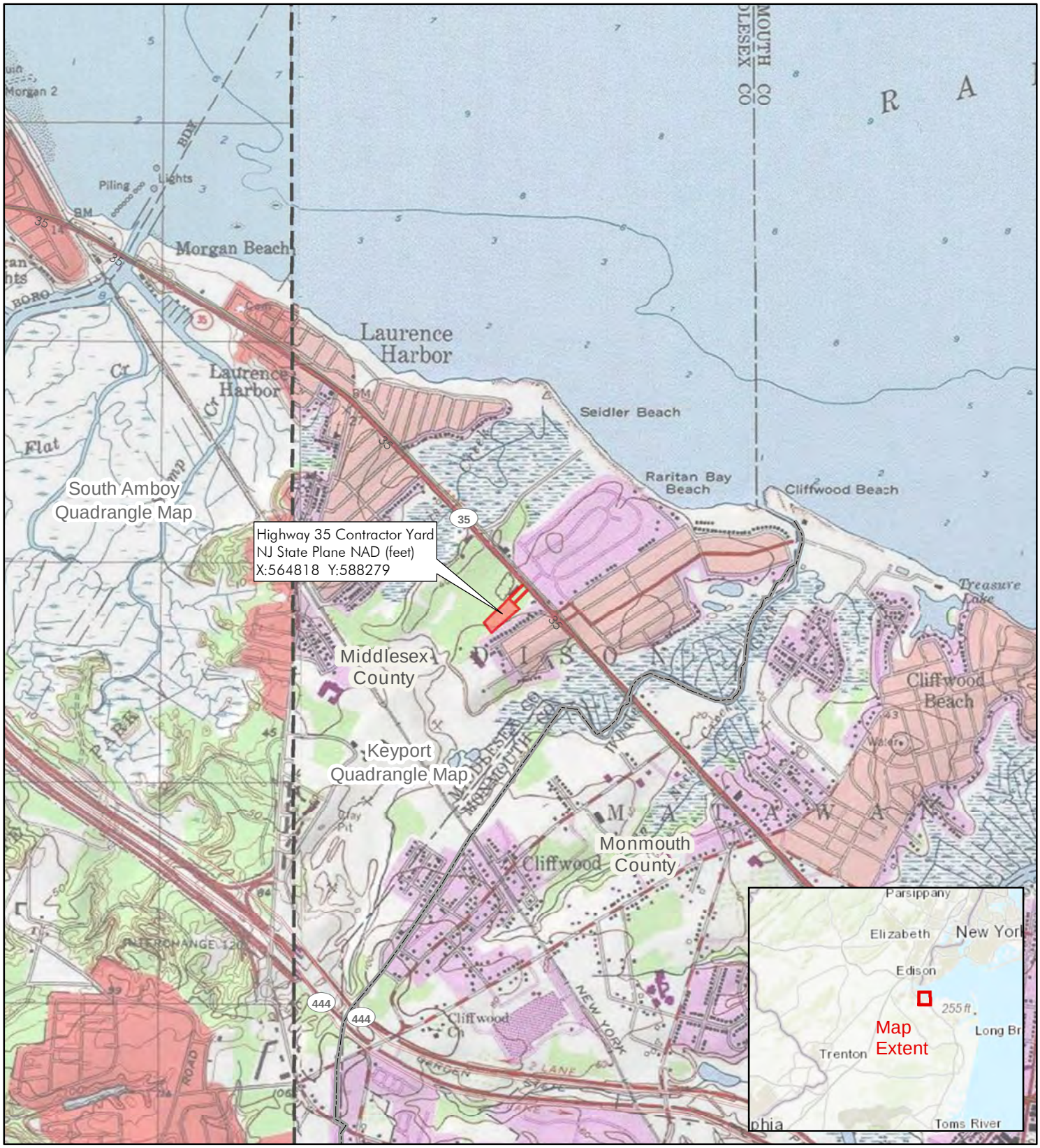
DATE RECEIVED

Item Code: REG ST RTC NC REGEO STEO RTCEO NCEO

Hrs:

Project Code: Inv. #:

Document Path: L:\Buffalo\Williams_NYRE\Map\MXDs\NJ_NHP_Request\Madison_CY_Hwy35_8x11_topo_20190607.mxd



0 0.2 0.4 Miles

0 0.2 0.4 0.6 Kilometers

Hwy 35 Contractor Yard

County Boundary

USGS Topo Sheeet Index

USGS Topographic Map of
Highway 35 Contractor Yard Site
Middlesex County, New Jersey

USGS 7.5 Minute Quad: Keyport

NJ Land Block/Lot: 1051/4

Sources:
USGS 2016; ESRI 2012; E&E 2018; Somerset County, NJ 2014.

State of New Jersey
Mail Code 501-04
Department of Environmental Protection
Natural Heritage Data Request Form

The New Jersey Natural Heritage Program
DEP-Office of Natural Lands Management
P.O. Box 420, Trenton, New Jersey 08625-0420
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Fax No.: (609) 984-1427

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1. **Name:** **Stephen Czapka** Agency/Company: Ecology and Environment, Inc.

   Address: **200 Bendix Road, Suite 250** **City**: **Virginia Beach**

   State: **VA** **Zip:** **23452** **Daytime Phone:** **757-456-5356** Ext.: 5008

   Cell Phone: Email: Sczapka@ene.com

2. **Project Name:** **Lowes' Parking Lot Contractor Yard**

   Municipality(ies): Old Bridge Township County(ies): Middlesex County

   Block(s): 6302 Lot(s): 2

   N.A.D. 1983 State Plane Coordinates (feet) 6 digits only: E (x): 547,130 N (y): 584,322

3. **Project Description:** Construction laydown area.

4. **USGS Quad:** **X** A copy of a USGS quad map(s) that clearly indicates the site boundary is included with this form. Specify name of USGS quad(s): South Amboy

   (USGS quad maps are required, unless prior arrangements have been made to submit site boundaries in an alternate format. Responses will be delayed if site locations are not delineated in a suitable format.)

5. **Flood Hazard Control Act Use:** **Is this request submitted as part of a Flood Hazard Area Control Act rule (N.J.A.C. 7:13) application? Yes X No**

6. **Acknowledgement & Signature:** Any material supplied by the Office of Natural Lands Management will not be published without crediting the Natural Heritage Database as the source of the material. It is understood that there will be a charge of $70.00 per hour for the services requested. An invoice will be sent with the request response and payment should be made by check or money order payable to "Office of Natural Lands Management."

Signed **Date** 06/25/2019

Time Frame for Response:
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FOR OFFICE USE ONLY

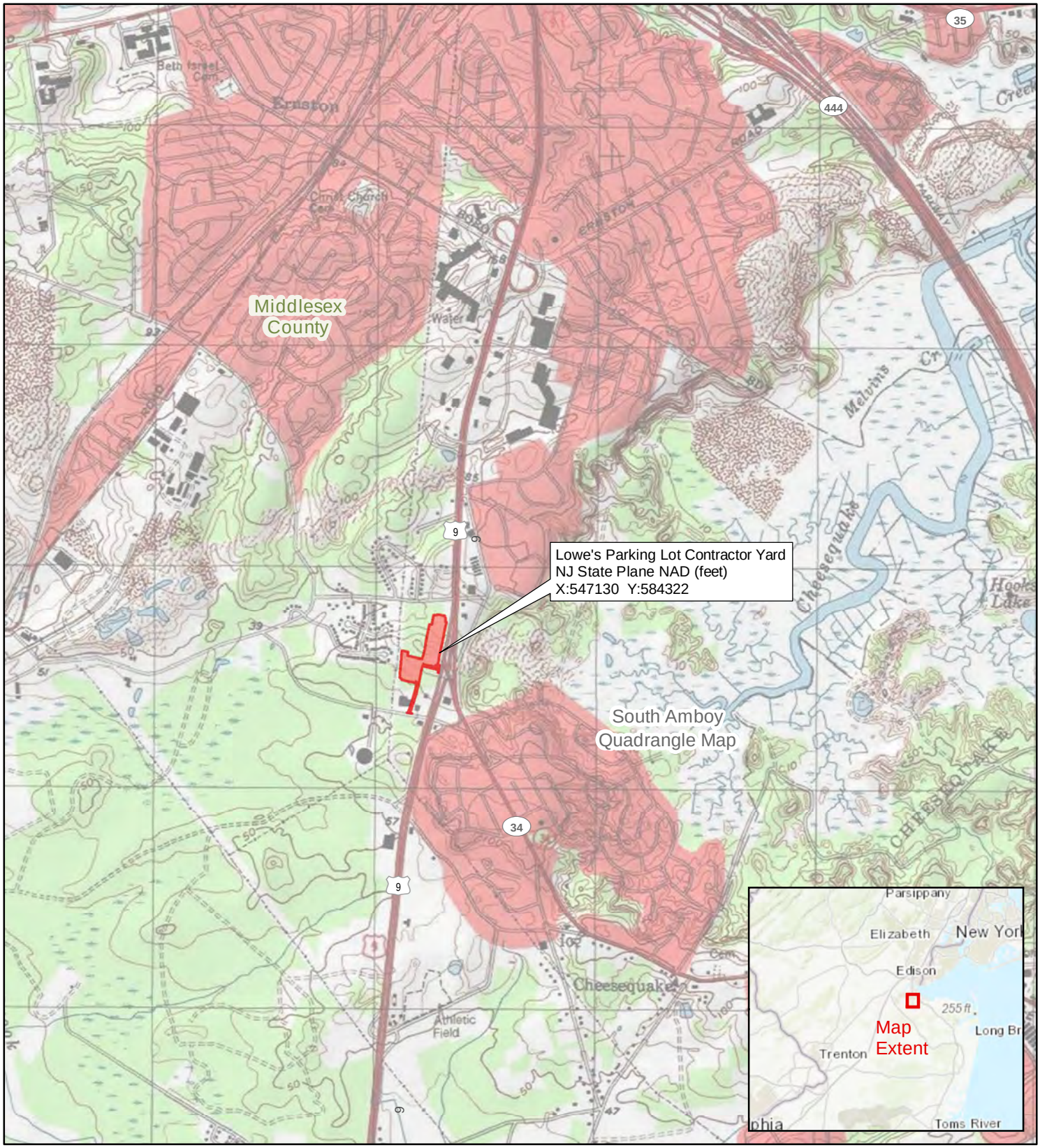
DATE RECEIVED

Item Code: REG ST RTC NC REGEO STEO RTCEO NCEO

Hrs:

Project Code: Inv. #:

Document Path: L:\Buffalo\Williams_NYRE\Map\MXDs\NJ_NHP_Request\Madison_CY_Lowes_8x11_topo_20190607.mxd



USGS Topographic Map of Lowe's Parking Lot Contractor Yard Site

Middlesex County, New Jersey

0 0.2 0.4 Miles

0 0.2 0.4 0.6 Kilometers

Lowe's Parking Lot Contrctor Yard

USGS 7.5 Minute Quad: South Amboy

NJ Land Block/Lot: 6302/2

Sources:
USGS 2016; ESRI 2012; E&E 2018; Somerset County, NJ 2014.

State of New Jersey
Mail Code 501-04
Department of Environmental Protection
Natural Heritage Data Request Form

The New Jersey Natural Heritage Program
DEP-Office of Natural Lands Management
P.O. Box 420, Trenton, New Jersey 08625-0420
(609) 984-1339
Fax No.: (609) 984-1427

PLEASE PRINT AND SUBMIT COMPLETED FORM WITH ATTACHMENTS TO THE ADDRESS ABOVE
(Fields shown in bold font must be completed in order for data request to be processed.)

1. **Name:** **Stephen Czapka** Agency/Company: Ecology and Environment, Inc.

   Address: **200 Bendix Road, Suite 250** **City**: **Virginia Beach**

   State: **VA** **Zip:** **23452** **Daytime Phone:** **757-456-5356** Ext.: 5008

   Cell Phone: Email: Sczapka@ene.com

2. **Project Name:** **Madison and Raritan Bay Loops**

   Municipality(ies): Old Bridge and Sayreville County(ies): Middlesex County

   Block(s): Lot(s):

   N.A.D. 1983 State Plane Coordinates (feet) 6 digits only: E (x): 551,468 N (y): 588,231

3. **Project Description:** Natural gas pipeline in existing pipeline ROW.

4. **USGS Quad:** **X** A copy of a USGS quad map(s) that clearly indicates the site boundary is included with this form. Specify name of USGS quad(s): South Amboy

   (USGS quad maps are required, unless prior arrangements have been made to submit site boundaries in an alternate format. Responses will be delayed if site locations are not delineated in a suitable format.)

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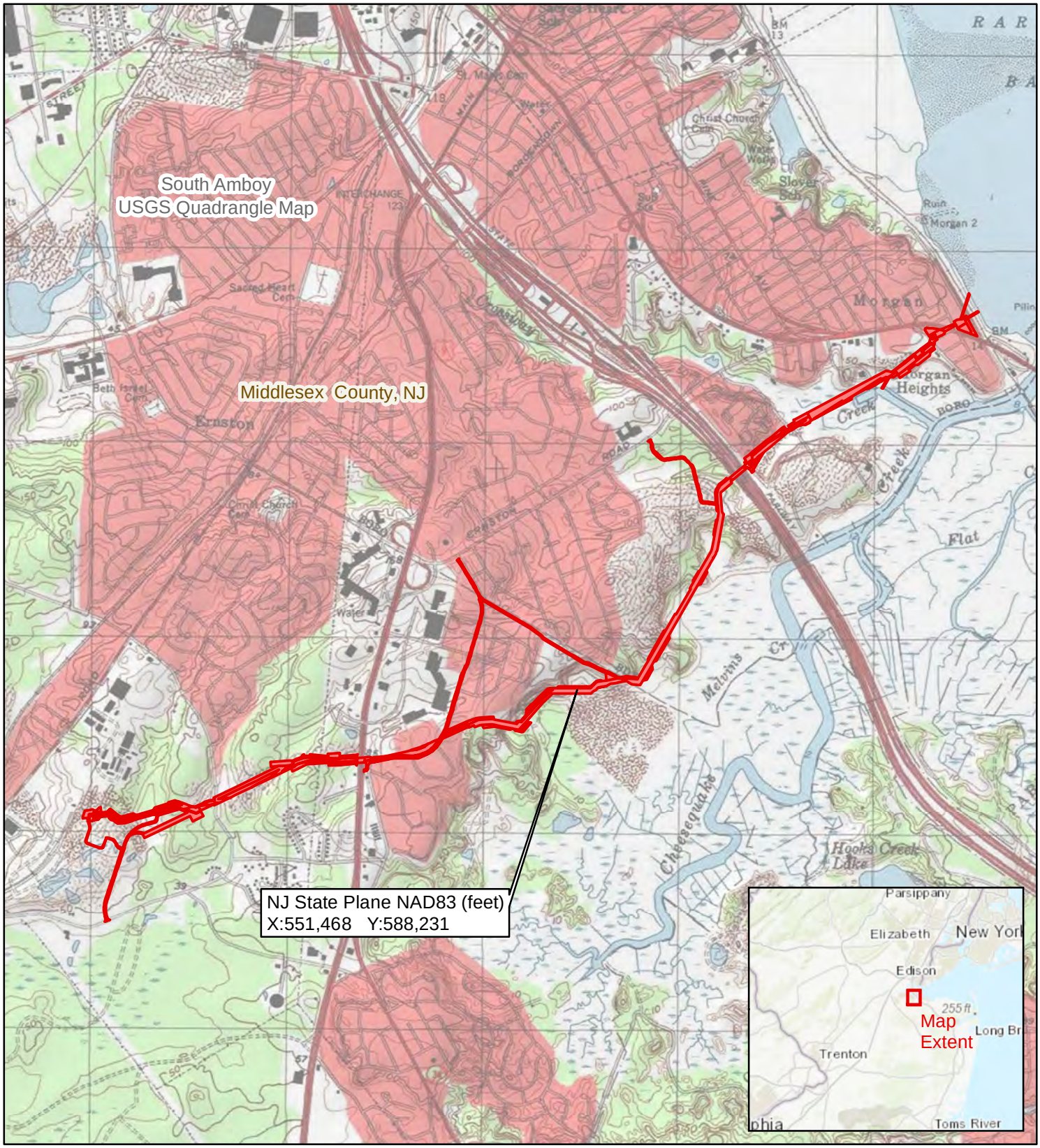
Item Code: REG ST RTC NC REGEO STEO RTCEO NCEO

Hrs:

Project Code: Inv. #:

Document Path: \Map\MXDs\NJ_NHP_Request\MadisonLoop_8x11_topo_20190607



N

0 0.2 0.4 Miles

0 0.2 0.4 0.6 Kilometers

Madison/Raritan Bay Loops Onshore
Limits of Disturbance

USGS Topographic Map of
Madison Loop and
Onshore Raritan Bay Loop
Middlesex County, New Jersey

USGS 7.5 Minute Quad: South Amboy

Sources:
USGS 2016; ESRI 2012; E&E 2016, Middlesex County, NJ 2014.

State of New Jersey
Mail Code 501-04
Department of Environmental Protection
Natural Heritage Data Request Form

The New Jersey Natural Heritage Program
DEP-Office of Natural Lands Management
P.O. Box 420, Trenton, New Jersey 08625-0420
(609) 984-1339
Fax No.: (609) 984-1427

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(Fields shown in bold font must be completed in order for data request to be processed.)

1. **Name:** **Stephen Czapka** Agency/Company: Ecology and Environment, Inc.

   Address: **200 Bendix Road, Suite 250** **City**: **Virginia Beach**

   State: **VA** **Zip:** **23452** **Daytime Phone:** **757-456-5356** Ext.: 5008

   Cell Phone: Email: Sczapka@ene.com

2. **Project Name:** **Manzo 1 Contractor Yard**

   Municipality(ies): Old Bridge Township County(ies): Middlesex County

   Block(s): 5001 Lot(s): 13.14, 13.16, 13.17

   N.A.D. 1983 State Plane Coordinates (feet) 6 digits only: E (x): 545,237 N (y): 586,498

3. **Project Description:** Construction laydown area.

4. **USGS Quad:** **X** A copy of a USGS quad map(s) that clearly indicates the site boundary is included with this form. Specify name of USGS quad(s): South Amboy

   (USGS quad maps are required, unless prior arrangements have been made to submit site boundaries in an alternate format. Responses will be delayed if site locations are not delineated in a suitable format.)

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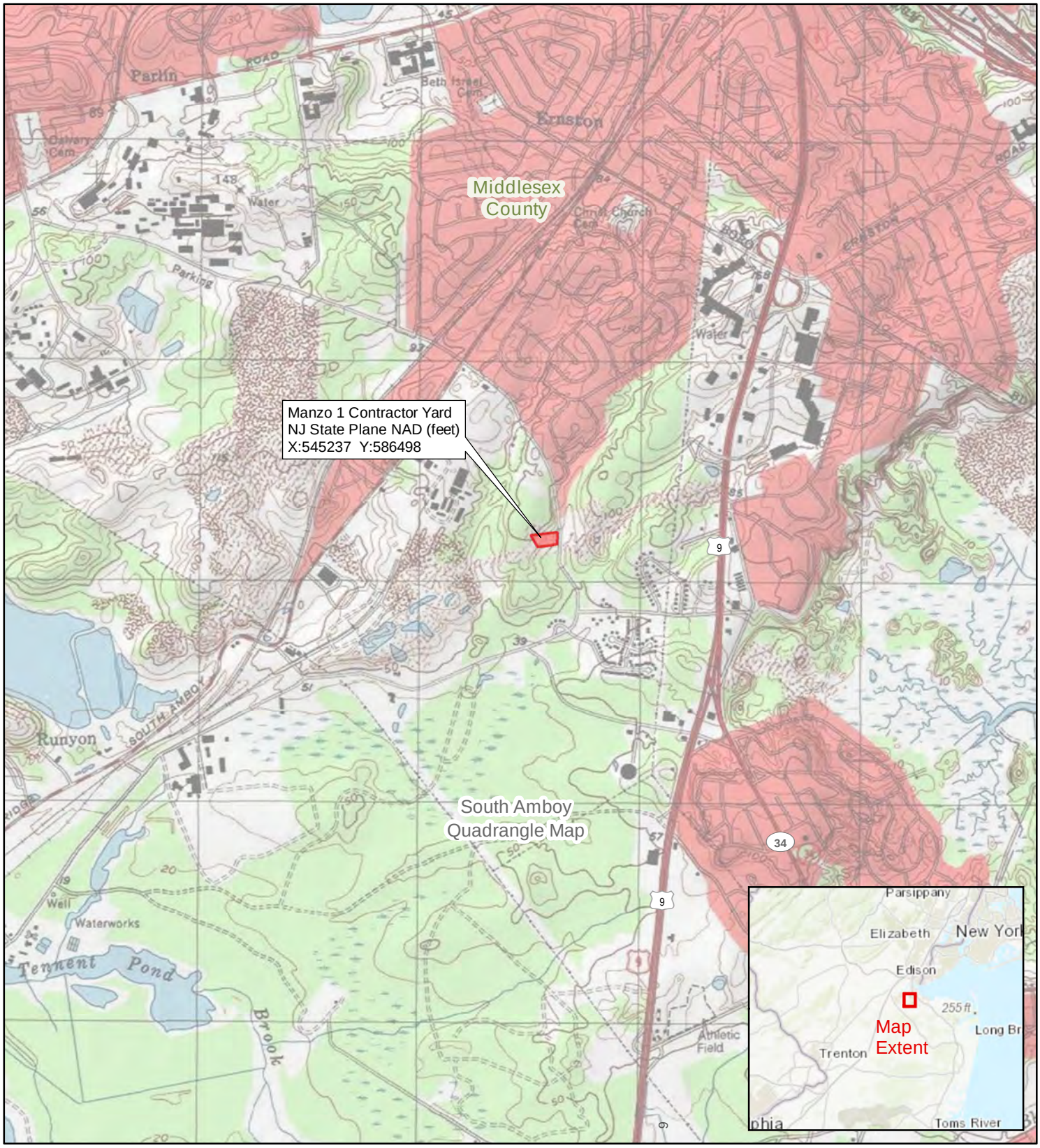
Hrs:

Project Code: Inv. #:

Document Path: L:\Buffalo\Williams_NYRE\Map\MXDs\NJ_NHP_Request\Madison_CY_Manzo1_8x11_topo_20190607.mxd



USGS Topographic Map of
Manzo 1 Contractor Yard Site
Middlesex County, New Jersey

0 0.2 0.4 Miles
0 0.2 0.4 0.6 Kilometers

Manzo 1 Contractor Yard

USGS 7.5 Minute Quad: South Amboy

NJ Land Block/Lot: 5001/13.14, 13.16, 13.17

Sources:
USGS 2016; ESRI 2012; E&E 2018; Somerset County, NJ 2014.

State of New Jersey
Mail Code 501-04
Department of Environmental Protection
Natural Heritage Data Request Form

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DEP-Office of Natural Lands Management
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   Address: **200 Bendix Road, Suite 250** **City**: **Virginia Beach**

   State: **VA** **Zip:** **23452** **Daytime Phone:** **757-456-5356** Ext.: 5008

   Cell Phone: Email: Sczapka@ene.com

2. **Project Name:** **Manzo 2 Contractor Yard**

   Municipality(ies): Old Bridge Township County(ies): Middlesex County

   Block(s): 5001 Lot(s): 13.16

   N.A.D. 1983 State Plane Coordinates (feet) 6 digits only: E (x): 543,887 N (y): 585,236

3. **Project Description:** Construction laydown area.

4. **USGS Quad:** **X** A copy of a USGS quad map(s) that clearly indicates the site boundary is included with this form. Specify name of USGS quad(s): South Amboy

   (USGS quad maps are required, unless prior arrangements have been made to submit site boundaries in an alternate format. Responses will be delayed if site locations are not delineated in a suitable format.)

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Hrs:

Project Code: Inv. #:

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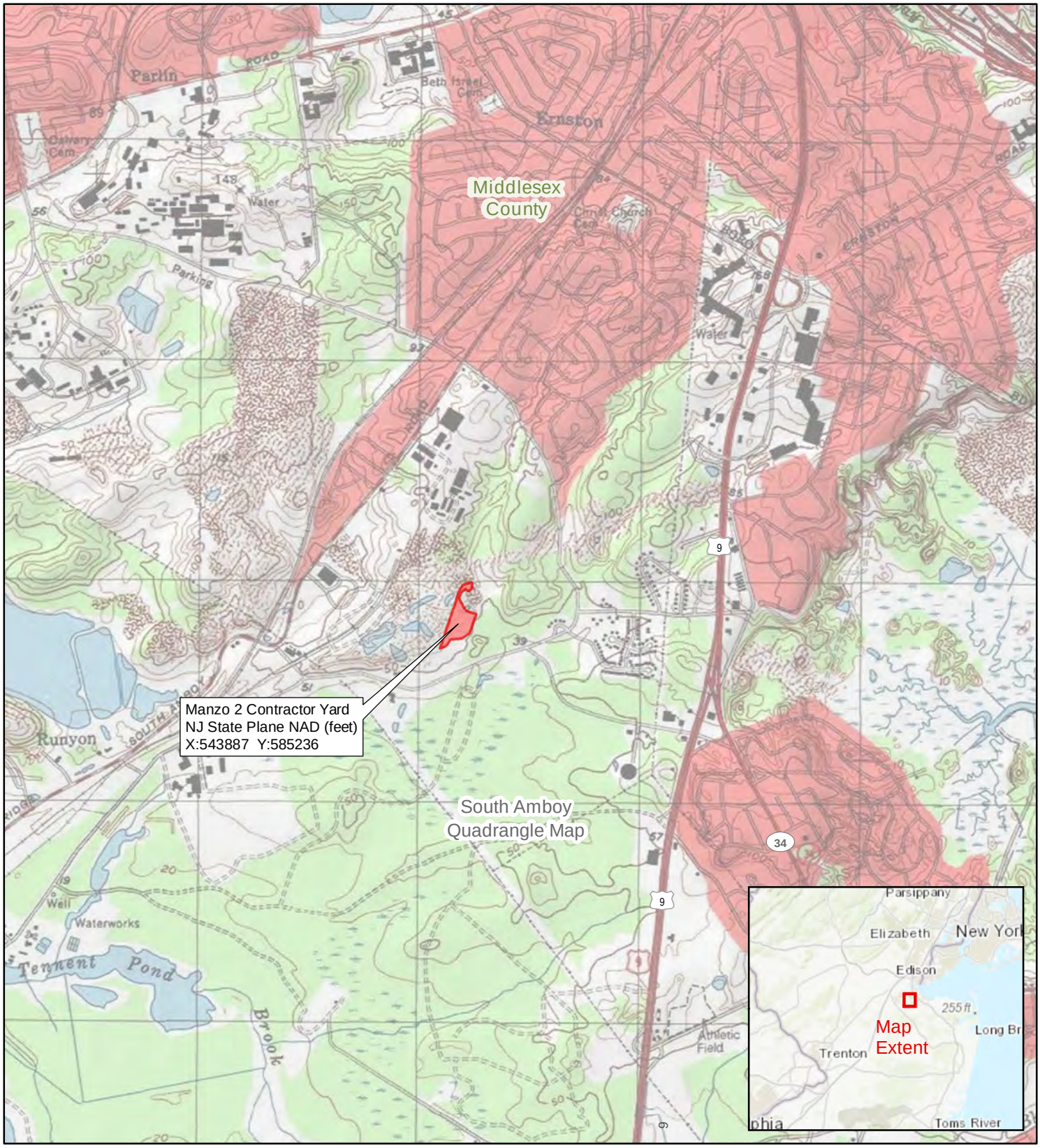


USGS Topographic Map of Manzo 2 Contractor Yard Site

Middlesex County, New Jersey

0 0.2 0.4 Miles

0 0.2 0.4 0.6 Kilometers

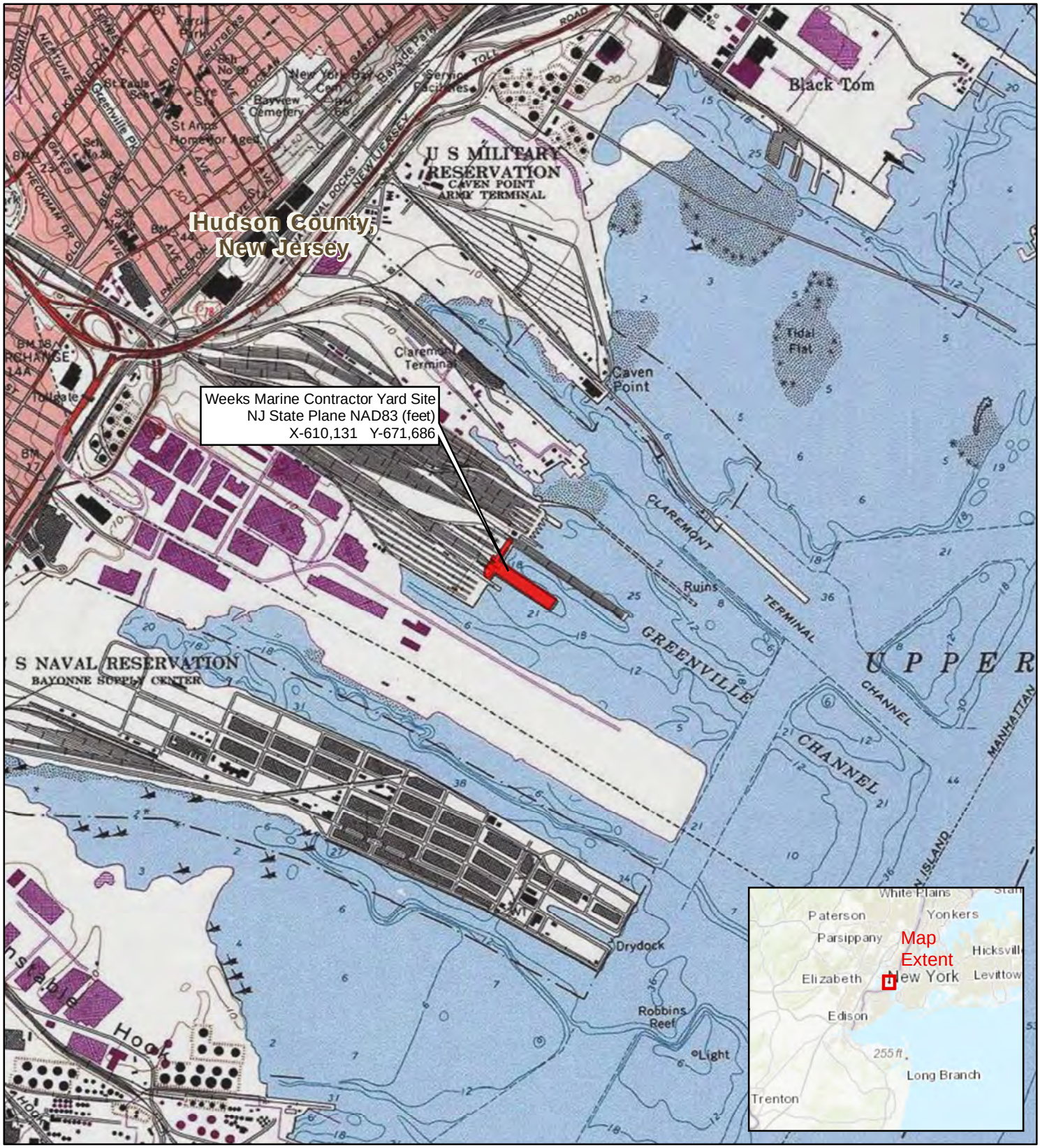
Manzo 2 Contractor Yard

USGS 7.5 Minute Quad: South Amboy

NJ Land Block/Lot: 5001/13.16

Sources:
USGS 2016; ESRI 2012; E&E 2018; Somerset County, NJ 2014.

Document Path: \Map\MXDs\NJ_NHP_Request\RBL_CY_WeeksMarine_8x11_topo_20190607



N

0 0.2 0.4 Miles

0 0.2 0.4 0.6 Kilometers

Weeks Marine Contractor Yard Workspace

USGS Topographic Map of the Weeks Marine Contractor Yard Workspace
Hudson County, New Jersey

USGS 7.5 Minute Quad: Jersey City

NJ Land Block/Lot: 30501/1

Sources:
USGS 2016; ESRI 2012; E&E 2017

Czapka, Stephen J.

From: DEP NATLANDS <NATLANDS@dep.nj.gov>
Sent: Tuesday, June 25, 2019 6:13 PM
To: Czapka, Stephen J.
Subject: FW: Data Requests - 7 of 8 are complete

Good Afternoon Steve,

Please respond to this updated email instead of the one sent a few minutes ago. The incomplete data request is the sixth, not seventh, of the set of eight.

We have received your eight Data Requests, though **only seven will be forwarded for processing. The sixth of eight requests, named Weeks Marine Contractor Yard Workspace, is missing a completed Natural Heritage Data Request Form – please resend it along with the relevant data files.**

Time Frame for the seven Responses:
Data requests are processed in the order in which they are received; **please allow 30 days for responses**.

Thank you
The Natural Heritage Program
609-984-1339

From: Czapka, Stephen J. <SCzapka@ene.com>
Sent: Tuesday, June 25, 2019 3:04 PM
To: DEP NATLANDS <NATLANDS@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>; Eakin,Megan <MEakin@ene.com>; Sundar, Nischint <NSundar@ene.com>; Perry, Katharine <KPerry@ene.com>
Subject: [EXTERNAL] Data Request

Greetings,
We are assisting a client with site evaluations. I have attached 8 zip files corresponding to 8 sites/requests. For each site, we are requesting information regarding the occurrence of rare plants, animals, or natural communities within or in the vicinity of the site.

Each attached zip file contains the following (NOTE: I renamed the ".zip" to ".piz" to avoid having the attachments stripped by security programs. Please rename to ".zip" before attempting to open the file):

1) A completed Natural Heritage Request form (in PDF format)
2) A PDF Map of the Site on a USGS Quad map
3) Shapefiles of the site boundary (including a readme .txt file with projection information)

Please send all invoices to my attention. Please let me know if you require additional information, have issues opening the files, or have any other questions.

We have previously submitted requests for these sites, however most responses are more than a year old and we want to make sure we are using the most up to date information.

Thank you!

Sincerely,
Steve Czapka

Stephen J. Czapka, *Certified Wildlife Biologist*
348 Southport Circle, Suite 101, Virginia Beach, VA 23452
Phone: 757-456-5356 ext. 5008 • Cell: 757-945-9899
sczapka@ene.com • www.ene.com

Czapka, Stephen J.

From: Czapka, Stephen J.
Sent: Wednesday, June 26, 2019 9:34 AM
To: DEP NATLANDS
Subject: RE: Data Requests - 7 of 8 are complete
Attachments: RBL_ContractorYard_WeeksMarine_20190607.piz

Good Morning,
Sorry for the omission. I'm resubmitting the Weeks Marine package, which now includes the Data Request Form.
Thank you,
Steve

Stephen J. Czapka, Certified Wildlife Biologist, Ecology and Environment, Inc.
200 Bendix Road, Suite 250, Virginia Beach, VA 23452 | t: 757-456-5356 ext. 5008 | m: 757-945-9899 | f: 888-350-6877 | www.ene.com

---

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Sent: Tuesday, June 25, 2019 6:13 PM
To: Czapka, Stephen J. <SCzapka@ene.com>
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The Natural Heritage Program
609-984-1339

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Sent: Tuesday, June 25, 2019 3:04 PM
To: DEP NATLANDS <NATLANDS@dep.nj.gov>
Cc: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>; Eakin,Megan <MEakin@ene.com>; Sundar, Nischint <NSundar@ene.com>; Perry, Katharine <KPerry@ene.com>
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State of New Jersey
Mail Code 501-04
Department of Environmental Protection
Natural Heritage Data Request Form

The New Jersey Natural Heritage Program
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   Address: **200 Bendix Road, Suite 250** **City**: **Virginia Beach**

   State: **VA** **Zip:** **23452** **Daytime Phone:** **757-456-5356** Ext.: 5008

   Cell Phone: Email: Sczapka@ene.com

2. **Project Name:** **Weeks Marine Contractor Yard**

   Municipality(ies): Jersey City County(ies): Hudson County

   Block(s): 30501 Lot(s): 1

   N.A.D. 1983 State Plane Coordinates (feet) 6 digits only: E (x): 610,131 N (y): 671,686

3. **Project Description:** Construction laydown area.

4. **USGS Quad:** **X** A copy of a USGS quad map(s) that clearly indicates the site boundary is included with this form. Specify name of USGS quad(s): Jersey City

   (USGS quad maps are required, unless prior arrangements have been made to submit site boundaries in an alternate format. Responses will be delayed if site locations are not delineated in a suitable format.)

5. **Flood Hazard Control Act Use:** **Is this request submitted as part of a Flood Hazard Area Control Act rule (N.J.A.C. 7:13) application? Yes X No**

6. **Acknowledgement & Signature:** Any material supplied by the Office of Natural Lands Management will not be published without crediting the Natural Heritage Database as the source of the material. It is understood that there will be a charge of $70.00 per hour for the services requested. An invoice will be sent with the request response and payment should be made by check or money order payable to "Office of Natural Lands Management."

Signed **Date** 06/25/2019

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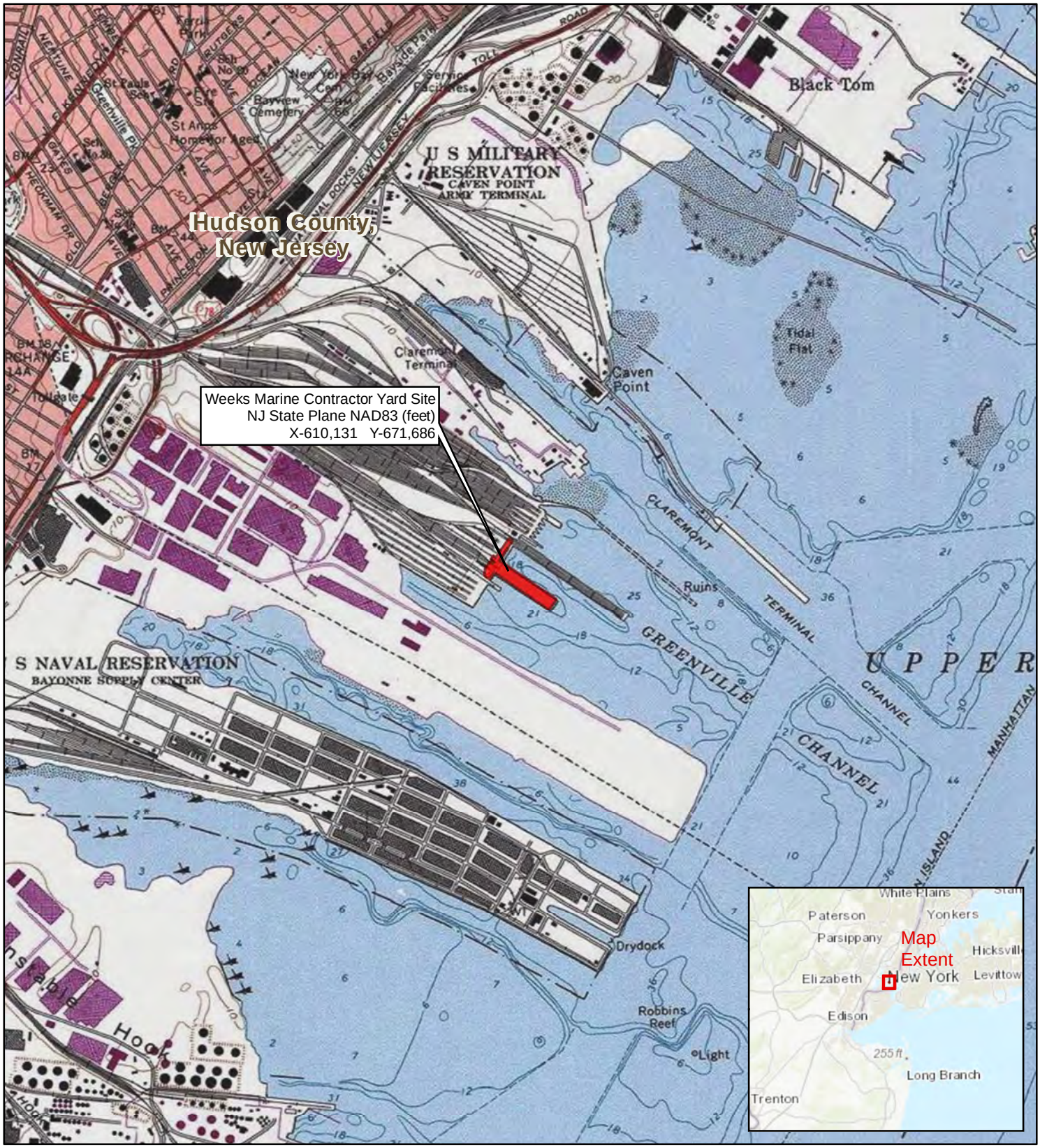

N

0 0.2 0.4 Miles

0 0.2 0.4 0.6 Kilometers

Weeks Marine Contractor Yard Workspace

USGS Topographic Map of the Weeks Marine Contractor Yard Workspace
Hudson County, New Jersey

USGS 7.5 Minute Quad: Jersey City

NJ Land Block/Lot: 30501/1

Sources:
USGS 2016; ESRI 2012; E&E 2017

Czapka, Stephen J.

From: DEP NATLANDS <NATLANDS@dep.nj.gov>
Sent: Wednesday, June 26, 2019 12:26 PM
To: Czapka, Stephen J.
Subject: RE: Data Requests - 7 of 8 are complete

No problem. Your revised Request has been received and sent forward for processing.

Time Frame for Response:
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Thank you
The Natural Heritage Program
609-984-1339

From: Czapka, Stephen J. <SCzapka@ene.com>
Sent: Wednesday, June 26, 2019 9:34 AM
To: DEP NATLANDS <NATLANDS@dep.nj.gov>
Subject: [EXTERNAL] RE: Data Requests - 7 of 8 are complete

Good Morning,
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Thank you,
Steve

Stephen J. Czapka, Certified Wildlife Biologist, Ecology and Environment, Inc.
200 Bendix Road, Suite 250, Virginia Beach, VA 23452 | t: 757-456-5356 ext. 5008 | m: 757-945-9899 | f: 888-350-6877 | www.ene.com

---

From: DEP NATLANDS <NATLANDS@dep.nj.gov>
Sent: Tuesday, June 25, 2019 6:13 PM
To: Czapka, Stephen J. <SCzapka@ene.com>
Subject: FW: Data Requests - 7 of 8 are complete

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The Natural Heritage Program
609-984-1339

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Cc: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara <SMochrie@ene.com>; Eakin,Megan <MEakin@ene.com>; Sundar, Nischint <NSundar@ene.com>; Perry, Katharine <KPerry@ene.com>
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Sincerely,
Steve Czapka

ecology and environment, inc.

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Phone: 757-456-5356 ext. 5008 • Cell: 757-945-9899
sczapka@ene.com • www.ene.com

Sundar, Nischint

From: Sundar, Nischint
Sent: Wednesday, June 26, 2019 3:16 PM
To: Sundar, Nischint
Subject: RE: Can you please address the following comments?

From: Olson, Karen <Karen.Olson@williams.com>
Sent: Wednesday, December 12, 2018 2:00 PM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Mochrie, Sara <SMochrie@ene.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: RE: Can you please address the following comments?

Hi Matt, apologies for the delayed response, we wanted to make sure we were providing a thorough response for your records. Responses to your other outstanding questions/comments are forthcoming.

Let me know if you have any questions.

Thanks,
Karen

Transco considered its existing ROW (the "Trap Rock ROW") (Figure 1) as an access road alternative and assessed the practicability of this access with respect to wetland and waterbody impacts, engineering considerations, construction and operational logistics, and the ability to accomplish the overall project purpose per NJAC 7:7A-10.2 and 7:7A-10.3. Transco did not consider access along the adjacent Sunoco ROW as it is unlikely that Sunoco would allow permanent access to Transco's facility utilizing their ROW. After assessing the alternate access road footprint with respect to the location of the proposed tie-in facility, the location of existing mapped wetlands and state open waters, the additional engineering considerations to construct the alternate access road situated on top of and adjacent to existing pipelines, Transco determined that the alternate access road was not a practicable alternative. Furthermore, Transco has made reasonable attempts to identify, remove, and accommodate these constraints associated with the alternate access road as summarized below.

Upon further review, the alternate access road would have to be routed around the tie-in facility, increasing overall wetland impacts to approximately 6.75 acres. The 6.75 acres of wetland impact along the alternate access road is a conservative impact estimate based on a minimum 85-foot wide corridor and assumes utilities could be placed under the road. This 6.75 acres represents an increase of nearly two and a half times the total wetland impact as compared to the proposed access road location (Table 1).

Table 1. Revised Impact Estimates for the Alternate Access Road at the Proposed CS206 Location

Facility	**Wetland Type (Cowardin, 1979)**	**Acreage**
Alternate Access Road – Permanent Impacts	PEM	2.09
	PSS	2.97
	PFO	1.69
Alternate Access Road – Permanent Impacts Total		**6.75**
Alternate Access Road Length = 4,425ft		
Existing Access Road – Permanent Impacts	PEM	0.47
	PSS	0.31
	PFO	2.07
Existing Access Road – Permanent Impacts Total		**2.85**

Existing Access Road Length = ~ 3,250ft		

Additional detailed engineering design could result in some areas of impact reduction within that 85-foot wide corridor, but also would likely result in areas of greater impact due to site-specific conditions. As previously mentioned, Transco determined that the alternate access road would have to be routed around the tie-in facility to reach the compressor station, further increasing wetland impacts by approximately 0.70 acres. As detailed in Transco's January 16, 2018 submittal containing supplemental information related to the permit application package, Transco identified a limited milepost range along Mainlines A and C where the tie-in facility could be sited. The tie-in assembly can only be installed into straight segments of pipe; therefore siting the tie-in assembly upstream (northeast) of where currently proposed is not possible due to the presence of bends in Mainlines A and C. Siting the tie-in assembly downstream (southwest) would increase the length of suction and discharge piping and associated wetland impacts and would not eliminate the need for the alternate access road to be routed around the tie-in facility.

Additional site-specific conditions that would impact the width of the alternate access road include the presence Transco's Mainlines A and C, over which the alternate access road would have to be constructed. Additionally, a Sunoco pipeline is located adjacent to the Transco ROW. The presence of these large-diameter utilities presents a constructability consideration that would likely result in additional workspace needs beyond the assumed 85-foot corridor. Specific constructability considerations include the following:

- Underground utilities likely could not be placed under the road due to the presence of existing infrastructure (existing pipelines).
- An access road situated on top of existing large-diameter pipelines would require a larger corridor to construct a stable base between the existing pipelines and the access road, especially in wetlands.
- An access road situated on top of existing pipelines impedes access to the pipeline for routine maintenance activities such as anomaly digs or replacements. Large excavations are required for inspection of large-diameter pipeline, thus interrupting access to the facility.
- The 85-foot corridor assumption does not account for infrastructure required to meet stormwater requirements, which would be a challenge to install in this area due to the presence of wetlands. Additionally the topography in the area slopes toward the Sunoco pipeline right-of-way and it is unlikely that Sunoco would allow stormwater controls within their ROW.

Each of these engineering and constructability considerations would expand the road corridor outside of the existing, disturbed ROW, thus increasing overall forested impacts, including forested wetland impacts.

Based on the site-specific conditions described above, field data collected along the Trap Rock ROW demonstrating much of the ROW corridor is wetland (Figure 1), and the additional length of the alternate access road (over 1,100 feet), Transco did not further pursue detailed engineering since the impacts to wetlands would be significantly greater when compared to the proposed access road and the basic project purpose cannot reasonably be accomplished if there is a reduction in the size, scope, or configuration of the alternate access road. In accordance with N.J.A.C 7:7A, Transco has taken steps to reduce wetland impacts along the proposed access road for Compressor Station 206. Based on these impact reductions and an analysis of the alternate access road wetland impacts and construction/operational constraints, Transco has determined that the alternate access road is not a practicable alternative that meets the requirements of N.J.A.C 7:7A-10.2 (b)1 i and ii.

Karen Olson | Environmental Scientist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Friday, November 30, 2018 1:22 PM
To: Olson, Karen <Karen.Olson@williams.com>; Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Dean, Joseph <Joseph.Dean@Williams.com>

Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] RE: Can you please address the following comments?

Karen,

Regarding the SUNOCO access ROW alternative. Was the entire rationale for selecting the preferred alternative over the SUNOCO access strictly raw impacts numbers to wetlands? IE 2.85 acres of wetland impact for the proposed access road vrs 5.34 acres of wetland impact for the SUNOCO ROW? Also, I note that the proposed access road has been refined since the original proposal, reducing some of the forested wetland impacts, have those same refinements been used when looking at the alternative? Could sidesloping be reduced further to minimize the roadside embankments? Could drainage and utilities be moved under the road?

From: Olson, Karen <Karen.Olson@williams.com>
Sent: Friday, November 30, 2018 11:57 AM
To: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>; Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] RE: Can you please address the following comments?

Hi Matt, responses to the comments below are included in the attached. Let us know if you need any additional information.

Have a great weekend!

Karen

Karen Olson | Environmental Scientist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
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Before printing, think about your responsibility and commitment to the environment!

From: Resnick, Matthew [mailto:Matthew.Resnick@dep.nj.gov]
Sent: Thursday, November 08, 2018 2:14 PM
To: Mochrie, Sara (SMochrie@ene.com) <SMochrie@ene.com>; Olson, Karen <Karen.Olson@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Cc: Jones, Christopher <Christopher.Jones@dep.nj.gov>
Subject: [EXTERNAL] Can you please address the following comments?

Good afternoon Sara, Karen and Joe,

At the public hearing on November 5th, a few of the speakers raised a couple of interesting questions. Could you please address the following comments?

1. Can you please provide the property ownership information for lot 23, block 5.02, for the suction/discharge pipe? A commenter claimed that Transco doesn't own the property and doesn't have permission to install the connection pipes.
2. Regarding the access road. Someone questioned the feasibility of using the Trap Rock ROW that we had used during out site visit to CS 206. Can you provide a full analysis of using that route into site 3 and why is was considered not practicable?
3. One of the written comments questioned why combinations of adjacent blocks and lots could not be used to create large enough areas of upland areas to construct CS 206. For example, they cited that Sites 8 and 27 could be combined to create a developable upland area further reducing impacts to wetlands.

Thank you very much.

This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.

This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.

Legend

- Existing Transco Mainline
- Parcel Boundary

Alternative and Proposed Access Road Workspace Configurations

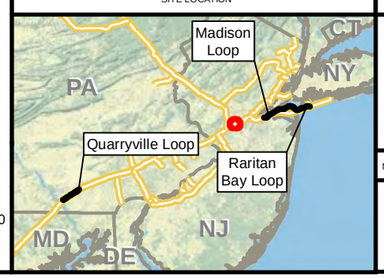
- Permanent Workspace
- Temporary Workspace
- Remotely Sensed Feature
- PEM Wetland
- PFO Wetland
- PSS Wetland
- Waterway
- Waterbody

N

0 200 400 600 800 1,000

Feet

SITE LOCATION



DRAWING NO.	REFERENCE TITLE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	12/12/2018	MK	ISSUED FOR PERMITTING REFERENCE	1000891	AL	

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
ALTERNATIVE ACCESS ROAD
COMPRESSOR STATION 206 – SITE 3
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY

Williams

DRAWN BY: MK	DATE: 12/12/2018	ISSUE FOR BID: N/A	SCALE:
CHECKED BY: AL	DATE: 12/12/2018	ISSUE FOR CONSTRUCTION: N/A	Project features ver20
APPROVED BY:	DATE:	DRAWING NUMBER:	SHEET 1 OF 1
WO: 1000891		12:11 PM 12/12/2018	

FIGURE 1

Data Sources: NJDEP 2012; Williams 2017; E&E 2017; ESRI 2012, 2017.

L:\Buffalo\Williams_NYRE\Map\MXDs\ResourceReport\RR10\CS206_Working_Maps\Fig1_CS206_Alt3_AltAccessRd_in_ROW_rev2.mxd

Northeast Supply Enhancement (NESE) Project

NESE Project Meeting Minutes

Date: July 26, 2018
Time: 3:00 pm to 4:20 pm (Eastern)
RE: NOAA Fisheries/NJDEP - Species Time of Year (TOY) Restrictions (near Morgan shore)

Participants

Ursula Howson, NOAA Fisheries	Kelly Davis, NJDEP
Scott Horner, Transco	Steven MacLeod, E & E
Sarah Behrends, Transco	Sara Mochrie, E & E
Chris Martinez, Transco	Lyndie Hice-Dunton, E & E
Sue Quackenbush, Amy S. Greene	Katie Guttenplan, E & E

Meeting Summary

- Following introductions, Mr. MacLeod of Ecology and Environment, Inc. (E & E) summarized the background for the meeting with respect to agency recommendations on time-of-year (TOY) restrictions for offshore construction and the previous Transcontinental Gas Pipe Line Company, LLC (Transco) requests for flexibility to allow specific construction activities during the "shoulder" periods of some TOY restrictions. Particular reference was made to the interagency conference call on April 9, 2018. Mr. MacLeod noted the goal of the present call was to establish the likelihood that the NOAA National Marine Fisheries Service (NOAA Fisheries) and the New Jersey Department of Environmental Protection (NJDEP) would approve Transco's flexibility requests for activities near the Morgan, NJ shoreline (i.e., within approximately 3 miles of the mouth of Raritan River and Cheesequake Creek).

- The group reviewed the TOY restrictions associated with sensitive marine species that have been proposed by the agencies (particularly NOAA Fisheries, NJDEP, and the New York State Department of Environmental Conservation [NYSDEC]).
    a. TOY restrictions were previously established (as of April 2018) for Atlantic sturgeon, blue crab, river herring (alewife and blueback herring), and winter flounder as follows:

- Atlantic Sturgeon TOY Restriction: 3/1 – 6/30 and 10/1 – 11/30.
  Areas of concern: MP12.0 – MP14.25 (Morgan Shore to NJ/NY Border – spring only), MP30.0 – MP35.5 (Ambrose Channel to Rockaway Transfer Point).
- River Herring TOY Restriction: 3/1 – 6/30
  Areas of concern: MP12.0 – MP15.3 (Morgan Shore to a point approximately 3 miles from Raritan River and Cheesequake Creek based on radius for migration).
- Flounder TOY Restriction: 12/15 – 5/31
  Areas of concern: MP12.0 – MP30.66 (Morgan Shore to NJ/NY State Line east of Ambrose Channel), in waters shallower than -20 feet mean lower low water (MLLW).
- Blue crab harvest TOY Restriction: 12/1 – 4/30
  Areas of concern: Within 500 feet of both Ambrose Channel and Chapel Hill Channel (excluding Richmond County).

b. Additional TOY restrictions were recommended by NJDEP in its July 18, 2018 comments on the Project's Draft EIS as follows:
   - Horseshoe Crab / Shorebirds: 4/15 – 9/15
     Areas of concern: "Nearshore (i.e., the beach) and offshore" in NJ (MP12.2 to MP14.0 and MP26.6 to MP30.6)
   - Harbor Seal: 11/1 – 4/30
     Areas of concern: "Species occurrence areas" (near Sandy Hook?)

c. Transco also anticipates that the NOAA Fisheries Office of Protected Resources would recommend the following TOY restriction if pile installation or removal activities were proposed during this period:
   - North Atlantic Right Whale: 11/1 – 4/30
     Areas of concern: Ensonified areas near pile installation and removal activities

d. Mr. MacLeod asked Mr. Davis to provide insight on the newly recommended offshore TOY restrictions related to harbor seals, horseshoe crab, and migratory birds. Mr. Davis was uncertain of the "species occurrence areas" that would apply for the harbor seal and was not clear why the offshore Project activities would be of particular concern for horseshoe crab and shorebirds given the distances of known spawning/foraging shore habitats in New Jersey from the Project's work areas. He will follow up with the NJDEP Endangered and Non-game Species Program to confirm where the new TOY restriction recommendations may apply.

e. Dr. Howson noted that a TOY restriction for winter flounder migration may also apply with respect to dredging of the Sandy Hook/Navy Earle Entrance Channel areas as a source of backfill. This TOY restriction would likely be in November and December, but is expected to be limited to the west (landward) side of the Sandy Hook Peninsula. Dr. Howson will confirm this TOY restriction with her supervisor.

- Transco's TOY restriction flexibility requests were reviewed, with a focus on sturgeon, herring and winter flounder TOY restrictions as they relate to dredging and pile installation activities near the Morgan shore.
    a. E & E staff noted that Transco has been working to optimize the schedule to avoid construction during the anticipated TOY restrictions for aquatic species. However, Transco cannot accommodate all anticipated restrictions from various agencies unless some work is allowed during "shoulder periods" of the anticipated TOY restrictions.
    b. The offshore construction schedule has been postponed by one year, to begin in spring 2020, but the previous TOY restriction flexibility requests generally still apply to the new schedule.
    c. Mr. MacLeod said that the USACE may impose a deeper burial depth requirement at channel and anchorage crossings, in which case flexibility in the TOY restrictions will be even more important to completing the offshore construction within one year and minimizing overlap with other TOY restrictions.

- The group discussed the anticipated effect of Project-generated suspended sediment plumes and associated deposition of dredging activities proposed within 3 miles of the Morgan shoreline.
    a. Mr. MacLeod noted that the plumes and areas of deposition will be minimized through best management practices, particularly the use of an environmental bucket and no scow overflow (dewatering) at the dredge site.
    b. Based on the modeling results, Mr. MacLeod suggested that the Project-related suspended sediment would not interfere with herring or sturgeon migration into Cheesequake Creek or Raritan River.
    c. Dr. Howson noted that the deposition would still be a concern for winter flounder larvae even if the activity occurred in late May, at the end of the recommended TOY restriction.

- The group discussed the potential effect of pile installation and removal on fish, particularly river herring (a type of clupeid) and sturgeon species.
    a. Regarding the high frequency clupeid hearing memo that E & E submitted to NOAA Fisheries and NJDEP staff prior to the call, Dr. Howson concurred with the findings of the memo that pile installation activities would not be a concern for disturbing clupeid hearing in the higher frequency range because these activities produce the greatest noise levels at lower frequencies.
    b. Mr. MacLeod summarized the modeled extent of several lower-frequency noise levels that would be generated during pile installation, which reflected information provided to NOAA Fisheries and NJDEP staff prior to the call. While the modeled noise levels for larger piles could disturb fish near the mouth of Raritan River and Cheesequake Creek, Mr. MacLeod noted that this would be for a limited duration at the end of the proposed TOY restriction period for river herring and Atlantic sturgeon.

c. Dr. Howson asked if impact pile driving was necessary, or if the work could be completed with vibratory hammers alone. Ms. Behrends indicated that Transco intends to use vibratory hammers to the extent possible, but an impact hammer is expected to be necessary for the last few meters of pile installation for certain piles based on Transco's geotechnical analysis. Dr. Howson said NOAA Fisheries would likely recommend BMPs for the use of impact hammers, such as soft starts. Ms. Guttenplan responded that Transco has already committed to such BMPs in its latest application to NOAA Fisheries for a marine mammal Incidental Harassment Authorization.
d. Ms. Guttenplan explained that the underwater noise modeling would be updated based on recent feedback from the NOAA Fisheries Office of Protected Resources, but that the overall extent of the noise levels was expected to be similar to the previously predicted results. Ms. Guttenplan noted that Ms. Julie Crocker, who is overseeing the NOAA Fisheries Endangered Species Act (ESA) review, was also being kept in the loop.

- Considering the information presented, Mr. Davis and Dr. Howson were asked to confirm the likelihood that flexibility in the TOY restrictions could be granted near the Morgan shore.
    a. With respect to the TOY restriction for river herring, Mr. Davis and Dr. Howson agreed that both dredging and pile installation would likely be allowed in June. They expected that most of the fish will have migrated upriver by that time.
    b. With respect to the TOY restriction for sturgeon, Mr. Davis thought that dredging and pile installation could also be allowed in June, but that NJDEP would likely defer to the NOAA Fisheries ESA group on this decision.
    c. With respect to the TOY restriction for winter flounder, Dr. Howson and Mr. Davis felt that NOAA Fisheries and NJDEP would maintain their recommendations to prohibit dredging through May 31 in the shallow waters near the Morgan shore. Mr. MacLeod noted that dredging would be required in advance of pile installation, so this TOY restriction would effectively prohibit pile installation, as well.
    d. Dr. Howson advised Transco to submit the flexibility request(s) in writing (e.g., memo format) so it may be circulated to the appropriate reviewers and an official response will be provided.

----- End Summary -----

Sundar, Nischint

From: Mochrie, Sara
Sent: Monday, September 17, 2018 5:16 PM
To: 'Resnick, Matthew'; christopher.jones@dep.nj.gov
Cc: Olson, Karen; Horner, Scott (Scott.Horner@williams.com); Eakin,Megan; Sundar, Nischint
Subject: NJDEP Package submission dates
Attachments: NJDEP Submissions & Meetings (20016 -Sep 2018) 9-17-18.xlsx

Matt,

Attached the requested summary:

Two sheets in file.

- Submissions
- Meetings (2016 – Present)

Please let us know if you need anything else.

Thanks
Sara

From: Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
Sent: Thursday, September 13, 2018 1:23 PM
To: Mochrie, Sara <SMochrie@ene.com>
Subject: Package submission dates

Sara,

I'm beginning work on my report and analysis for Transco. Part of my report includes an administrative history of the entire package. Given the number of documents, meetings, and phone calls we've had over the course of the review, I'd like to double check my history vrs what you have a record of to make sure the administrative history is complete.

Submission	Submission Date	Type of Submission	Year	State/Federal	Primary Agency Submitted To
Flood Hazard Area (FHA) Permit	6/22/2017	Permit	2017	NJ	NJDEP
Freshwater Wetlands (FWW) Permit	6/22/2017	Permit	2017	NJ	NJDEP
Waterfront Development Permit (WFD)	7/6/2017	Permit	2017	NJ	NJDEP
Responses to NJDEP Technical Deficiency Letter for FWW & FHA - dated July 17, 2017 (EIR)	8/16/2017	NJDEP response	2017	NJ	NJDEP
Supplemental Information to WFD	12/22/2017	Permit	2017	NJ	NJDEP
Supplemental Information for FHA & FWW Permit	1/16/2018	Permit	2018	NJ	NJDEP
FHA, FWW & WFD **(Resubmittal)**	6/22/2018	Permit	2018	NJ	NJDEP
Responses to NJDEP Technical Deficiency Letter for FWW, FHA & WDP - dated July 18, 2018 (EIR - DLUR and OPC)	8/31/2018	NJDEP response	2018	NJ	NJDEP

NESE - New Jersey Department of Environmental Protection (NJDEP) Meetings (2016 - Present)

Type	From		To		Date	Subject
	Entity	Person	Entity	Person		
Meeting	Transco	Kellogg, Horner, Bush, DeSanctis	NJDEP	Gray	April 8, 2016	NESE Meeting Offshore Survey
Meeting	R. Christopher Goodwin & Associates and E & E	Hornum, Schmidt, Wright	NJDEP, NJ HPO	Rosenthal, Moresca	July 11, 2016	Cultural Resource Surveys & Reporting
Meeting	Transco, E & E, Amy S. Greene Environmental Consultants, Environmental Resource Management	Clements, Ham, Martinkewiz, Archer, Olson, Horner, Kellog, Quakenbush, Albers, Mochrie, Woodruff, Hahn, Angyal	NJDEP	Flite, Harris, Kettig, Watkins, Dielmo, Davis, Normant, Rosenthal, Dow, Kessler, Sheppard, KopKash, Kelly, Jones, Dacanay, Hassell, Foster, Bearce, Komar	July 12, 2016	Initial Permit Coordination
Meeting	Transco & ERM	Archer, Hahn, Angyal	NJDEP	Kettig, Qayyum, Le	October 4, 2016	NESE Project and CS 206 with Regard to Air
Meeting	Transco, E & E, Amy S. Greene Environmental Consultants	Dean, Ham, Horner, Kellogg, Martinkewiz, Olson, Ryan, Mochrie, Eakin, Albers, Wright, Quakenbush, Macholdt	NJDEP	Daher, Davis, Foster, Friebel, Harris, Jones, Rosenthal, Wolff	December 13, 2016	Permit Coordination - Madison Loop and CS 206
Meeting	Transco, E & E	Martinez, Horner	NJDEP, NJ HPO	Rosenthal, Marcopul	December 13, 2016	Offshore cultural Resource Surveys
Meeting	Transco & ERM	Kellog, Archer, Angyal, Hahn	NJDEP	Davis, Skrowronek, Papalski	March 13, 2017	General Conformity
Meeting	Transco, E & E, Amy Greene Environmental Consultants, PS&S	Mochrie, Albers, Olson, Horner, Ham, Quakenbush, Macholdt, Salmon	NJDEP	Foster, Palmquist, Rosnick, Jones, Welch, Daher	March 22, 2017	Land Use
Meeting	Transco, E & E, Amy Greene Environmental Consultants, PS&S	Mochrie, Albers, Olson, Horner, Ham, Quakenbush, Macholdt, Salmon	NJDEP	Foster, Palmquist, Rosnick, Jones, Welch, Daher	March 22, 2017	Land Use
Meeting Minutes	Transco, E & E, Amy S. Greene Environmental Consultants	Olson, Horner, Eakin, Perry, Macholdt	NJDEP	Jones, Resnick, Welch, Foster	July 31, 2017	Freshwater Wetlands/Flood Hazard Area Individual Permit Application Comment Letter Review Meeting
Meeting Minutes	Transco, E & E, Amy S. Greene Environmental Consultants, PS&S, AECOM	Olson, Horner, Mochrie, Eakin, Macholdt, Salmon, Schooling, Haas	NJDEP	Jones, Schaffer	August 3, 2017	Freshwater Wetlands/Flood Hazard Area Individual Permit Application Comment Letter Review Meeting (Engineering Items)
Meeting Minutes	Transco, E & E	Olson, Mochrie	NJDEP	Jones, Welch	August 24, 2017	Flood Hazard Area/Fresh Water Wetlands Permit Application Comment Response Follow-up and Waterfront Development Permit Application Comment Letter
Meeting	Transco, E & E, Amy Greene Environmental Consultants, PS&S	Mochrie, Albers, Olson, Horner, Ham, Quakenbush, Macholdt, Salmon	NJDEP	Foster, Palmquist, Rosnick, Jones, Welch, Daher	March 22, 2017	Land Use
Meeting	Transco, AECOM, E & E	Olson, Horner, Brewster, Mochrie	NJDEP	Komar	September 21, 2017	Water Allocation and Well Permitting
Meeting	Transco, E & E, Amy Greene Environmental Consultants, PS&S	Mochrie, Albers, Olson, Horner, Ham, Quakenbush, Macholdt, Salmon	NJDEP	Foster, Palmquist, Rosnick, Jones, Welch, Daher	March 22, 2017	Land Use
Meeting	Transco, E & E, Amy Greene Environmental Consultants, PS&S	Mochrie, Albers, Olson, Horner, Ham, Quakenbush, Macholdt, Salmon	NJDEP	Foster, Palmquist, Rosnick, Jones, Welch, Daher	March 22, 2017	Land Use
Meeting	Transco, E & E, ASGECI, PS&S	Mochrie, Albers, Olson, Horner, Ham, Quakenbush, Macholdt, Salmon	NJDEP	Foster, Palmquist, Rosnick, Jones, Welch, Dare	March 22, 2017	Land Use meeting to discuss land use, project updates, and schedule updates.
Meeting	Transco, E & E, Amy Greene Environmental	Olson, Ham, Jaaskelainen, Kellogg, Markowski, Mason, Sheppard, Macholdt, Quakenbush	NJDEP	Resnick, Jones	October 26, 2017 & November 8, 2017	Walkover Summary NJDEP agency walkover for Madison Loop
Meeting	Transco, E & E, NJDEP	Kellogg, Olson, Mochrie	NJDEP	Dow, Jones, Resnick	November 30, 2017	Permits
Meeting	Transco, E & E, Amy Greene Environmental	Clements, Olson, Jaaskelainen, Dean, Mochrie, Perry, MacLeod, Macholdt, Quankenbush	NJDEP	K. Davis, Jensen, Foster, Usarek-Witek, M. Davis, Jones, Resnick	February 27, 2018	Permits
Meeting	Transco, E & E, Amy S. Greene Environmental	Behrends, Clements, Horner, Johnson, Winston, MacLeod, Perry, Macholdt, Quackenbush	NJDEP	Daniels, Foster, Jones, Resnick, Usarek-Witek	April 25, 2018	Permits - Conference call held to discuss technical aspects of the Project with respect to Transco's application for a Waterfront Development Permit, including the offshore construction design process, suspended sediment modeling and turbidity mixing zones. The call was a follow-up to an in-person meeting at NJDEP's office on February 27, 2018.

Northeast Supply Enhancement (NESE) Project

Meeting Minutes

To: Williams NESE Team
From: E&E NESE Team
Date: January 31, 2019
RE: Onshore wetland and riparian mitigation for New Jersey

Participants

Williams: Joe Dean, Brian Ham, Scott Horner, Su-Lin Jaaskelainen, Steve Kellogg

E&E: Meghan Albers, Megan Eakin, Jeff Mason, Sara Mochrie

Amy Greene: Doug Freese, Bill Macholdt

NJDEP: Anika Andrews, Chris Jones

Meeting Summary

1) A conference call was held with New Jersey Department of Environmental Protection (NJDEP) on January 31, 2019 to discuss wetland and riparian zone mitigation for the New Jersey components (Madison Loop and Compressor Station [CS] 206) of the Northeast Supply Enhancement Project (Project). The call was opened with introductions. NJDEP indicated that Matt Resnick (the Project Manager) was on vacation.
2) Mr. Jones indicated that he had not spoken with Mr. Resnick prior to the meeting and that the mitigation numbers that he currently had may not match the numbers that Mr. Resnick had provided via email correspondence and to Anika Andrews of the Mitigation Unit. The overall total wetland impact acreages for the Project that Mr. Jones reported during the meeting were;
    a. Permanent impacts: 3.601 acres
    b. Temporary impacts: 2.126 acres
    c. Total impacts: 5.727 acres
3) Transco asked how NJDEP considered temporary impacts if restoration could not begin within six months. Transco indicated that typical construction through wetlands would be to construct and restore the individual wetlands within six months, but there may be a situation where tree clearing would need to occur in one season and continue construction in a later season. NJDEP stated that within the rules, restoration must begin within six months to be considered a temporary impact. NJDEP requested that Williams provide NJDEP a list of these areas that may exceed the six months and the reasons why that would be needed for further consideration.

4) E&E stated that Mr. Resnick's numbers from the table he previously provided via email correspondence appear to match what the team had calculated for the Project with a few minor corrections and this is what would be used to begin to develop a conceptual mitigation plan.
5) NJDEP stated that the expectation is that mitigation is conducted prior to or concurrently with construction. Additionally, NJDEP explained that the hierarchy of mitigation options are as follows; 1) purchase credits, 2) on-site option, which NJDEP stated may not be feasible for the Project, and 3) off-site option. Transco stated purchasing credits is their preferred first option.
6) Within WMA 9, NJDEP indicated that the Cranberry Mitigation Bank had credits available for both wetlands and riparian zones. Within WMA 12, two mitigation banks had available credits, Manasquan River and Marsh Bog Phase 1 and 2. NJDEP stated that they have no control over the price of the credits. NJDEP did state that the numbers for flood hazard (riparian zones) need to be refined. Table 11.2 is used to determine how much disturbance is allowable and what mitigation options there are.
    a. NJDEP provided an example in the case where 1 acre of riparian zone mitigation is needed for the Project. If a ½-credit was available through a mitigation bank, then an off-site project could be used for the other ½ acre needed. NJDEP indicated that WMA 9 and 12 are very busy, with credits being sold regularly, so it is likely that Transco may have to supplement with an off-site project in the watershed.
7) Transco asked regarding mitigation what would NJDEP need in order to issue the permits for the Project. NJDEP stated their preference is for the mitigation plan to be submitted with the application, but it is not required, however it does help to speed up the review. They are able to issue permits with standard conditions, but construction cannot start until a mitigation plan is in place. NJDEP indicated that Transco can do a purchase agreement with the bank to hold the credits for a set period of time in advance. For an off-site project, the requirements are available on the NJDEP checklist (Document: mit_005) on their website. It is Transco's responsibility to work with a consultant for an off-site Project.
8) Transco stated they would work to finalize their options within the next 4 to 6 weeks, so that a conceptual plan can be put in place for NJDEP. NJDEP indicated Transco can submit their plan at any time, as it would not hold up the permit decision. NJDEP recommended that Transco check the endangered and protected mapping when determining their temporary impacts, where things are forest dependent. Transco confirmed that the 6 month time period for restoration to begin is in regulated areas only, which NJDEP confirmed. Transco stated they would provide NJDEP the list of areas where they may have trouble meeting this requirement for NJDEP review.
9) NJDEP stated they would send along the sign in sheet for those in attendance.

--End Meeting--

From: Mochrie, Sara
To: Resnick, Matthew
Cc: Jones, Christopher; Eakin,Megan; Albers, Meghan
Subject: Re: [EXTERNAL] Re: Request for New Submissions from Transco for NESE-related Permit Applications
Date: Thursday, February 21, 2019 11:03:13 AM

Matt,

Additional copies of submissions will arrive at the municipalities tomorrow.

If you need any additional information please let us know.

Thanks
Sara

On Feb 21, 2019, at 9:19 AM, Resnick, Matthew <Matthew.Resnick@dep.nj.gov> wrote:

> Sara, can you provide an update regarding the townships receipt of all additional submitted information?
>
> ---
>
> **From:** Mochrie, Sara <SMochrie@ene.com>
> **Sent:** Tuesday, February 19, 2019 2:53 PM
> **To:** Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
> **Cc:** Jones, Christopher <Christopher.Jones@dep.nj.gov>; Eakin,Megan <MEakin@ene.com>; Albers, Meghan <MAlbers@ene.com>
> **Subject:** Re: [EXTERNAL] Re: Request for New Submissions from Transco for NESE-related Permit Applications
>
> Matt - I will confirm receipt and then let you and Chris know so you can respond.
>
> Thanks
> Sara
>
> Sent from my iPhone
>
> On Feb 19, 2019, at 11:19 AM, Resnick, Matthew <Matthew.Resnick@dep.nj.gov> wrote:
>
> > Sara can you confirm that the new information was submitted to the relevant township/county clerks offices?
> >
> > **From:** William Bittinger <wbittinger@easternenvironmental.org>
> > **Sent:** Friday, February 15, 2019 4:48 PM
> > **To:** Resnick, Matthew <Matthew.Resnick@dep.nj.gov>
> > **Cc:** Jones, Christopher <Christopher.Jones@dep.nj.gov>; Aaron Kleinbaum <akleinbaum@easternenvironmental.org>

Subject: [EXTERNAL] Re: Request for New Submissions from Transco for NESE-related Permit Applications

Hi Matthew,

I wanted to pass along that, after my conversation with you today, we at EELC have checked to see if any of these new submissions from Transco have also been sent to the Municipal Clerks' offices in Franklin Township, Sayreville, or Old Bridge. A local citizen said she contacted the Municipal Clerk's office in Franklin Township and apparently there is nothing new there from February 6, 2019. We have contacted the Municipal Clerks' offices in Sayreville and Old Bridge but have been unable to determine if they have anything new.

We would appreciate DEP's help in providing us access to or copies of these new submissions as soon as possible. This will enable EELC to provide comments on them in a timely fashion.

Thank you,
Will

Will Bittinger
Staff Attorney*
Eastern Environmental Law Center
50 Park Place, Suite 1025
Newark, NJ 07102
Office: 973-424-1166

* Admitted in New Hampshire only. Not admitted in New Jersey.

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On Fri, Feb 15, 2019 at 11:33 AM William Bittinger <wbittinger@easternenvironmental.org> wrote:

> Hi Matthew,
>
> It was good speaking with you just now on the phone. As we discussed, EELC would like copies of the new submissions from Transco for its NESE-related permit applications to DEP. According to DEP's Dataminer, these new submissions (referred to as "technical deficiency information") were received by DEP on February 6, 2019.
>
> Just to be clear, the applications I am referring to are listed under Program Interest #: 0000-01-1001.3 and are for a Freshwater Wetlands Individual Permit, Flood Hazard Area Individual Permit & Verification, Waterfront Development Individual

Permit (In-Water & Upland), and Coastal Wetlands Permit.

Please pass along EELC's request to the appropriate DEP staffers.

Thank you,
Will

Will Bittinger
Staff Attorney*
Eastern Environmental Law Center
50 Park Place, Suite 1025
Newark, NJ 07102
Office: 973-424-1166

* Admitted in New Hampshire only. Not admitted in New Jersey.

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To: Sundar, Nischint
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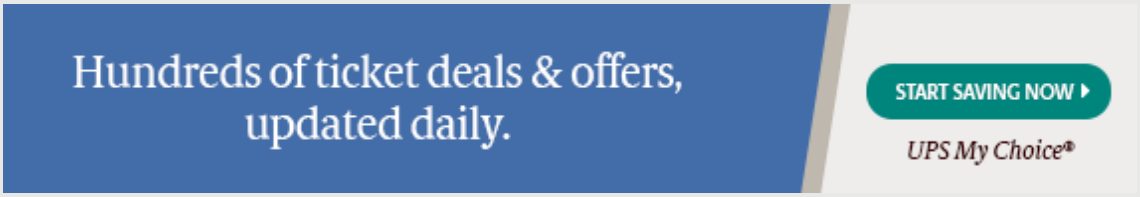

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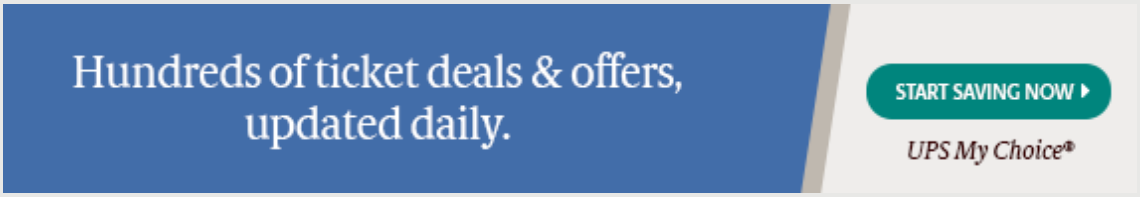

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Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

February 11, 2019

Dr. Ursula Howson ursula.howson@noaa.gov
NOAA National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
Habitat Conservation Division
James J. Howard Marine Sciences Laboratory
74 Magruder Rd.
Highlands, NJ 07732

and

Ms. Julie Crocker julie.crocker@noaa.gov
NOAA National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office
Protected Resources Division
55 Great Republic Drive
Gloucester, MA 01930

Re: Northeast Supply Enhancement Project – Time-of-Year Restriction Request

Dear Dr. Howson and Ms. Crocker:

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of Williams Partners, L.P., is proposing the Northeast Supply Enhancement Project (Project) to expand its existing interstate natural gas pipeline system to provide 400,000 dekatherms per day of incremental capacity to National Grid, which services the New York City and Long Island metropolitan region. To provide the incremental capacity, Transco plans to expand portions of its system from the existing Compressor Station 195 in York County, Pennsylvania, to the Rockaway Transfer Point in New York State waters. The Rockaway Transfer Point is the interconnection point between Transco's existing Lower New York Bay Lateral and existing offshore Rockaway Delivery Lateral, which is located approximately 3 miles seaward of the Rockaway Peninsula in Queens Borough, New York. The offshore portion of the Project includes the Raritan Bay Loop, a pipeline that will cross 23.33

miles of Raritan Bay, Lower New York Bay, and the Atlantic Ocean between the Morgan, New Jersey shoreline and the Rockaway Transfer Point (see Figure 1 below).

On March 27, 2017, Transco filed an application with the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity for the Project (FERC Docket No. CP17-101-000). The FERC issued a Draft Environmental Impact Statement (EIS) for the Project on March 23, 2018. The FERC issued a Final EIS for the Project on January 25, 2019. If FERC issues a Certificate for the Project and Transco obtains the applicable permits and authorizations from other relevant agencies, Transco anticipates that construction of the Raritan Bay Loop will begin in the second quarter of 2020 to meet an in-service date in the fourth quarter of 2020.

Transco is aware that several species-related time-of-year (TOY) restrictions would apply to the Project's offshore construction activities based on previous communications with resource agencies, including the NOAA National Marine Fisheries Service's (NOAA Fisheries) Habitat Conservation Division (HCD) and Protected Resources Division (PRD), the U.S. Fish and Wildlife Service (USFWS), the New York State Department of Environmental Conservation (NYSDEC), and New Jersey Department of Environmental Protection (NJDEP)[1]. These recommended TOY restrictions include the following[2]:

- **Atlantic sturgeon** (*Acipenser oxyrinchus oxyrinchus*)
  Dates: 3/1 – 6/30 and 10/1 – 11/30
  Project Locations: MP12.2 to MP14.0 [Spring only] and MP30.0 to MP35.5

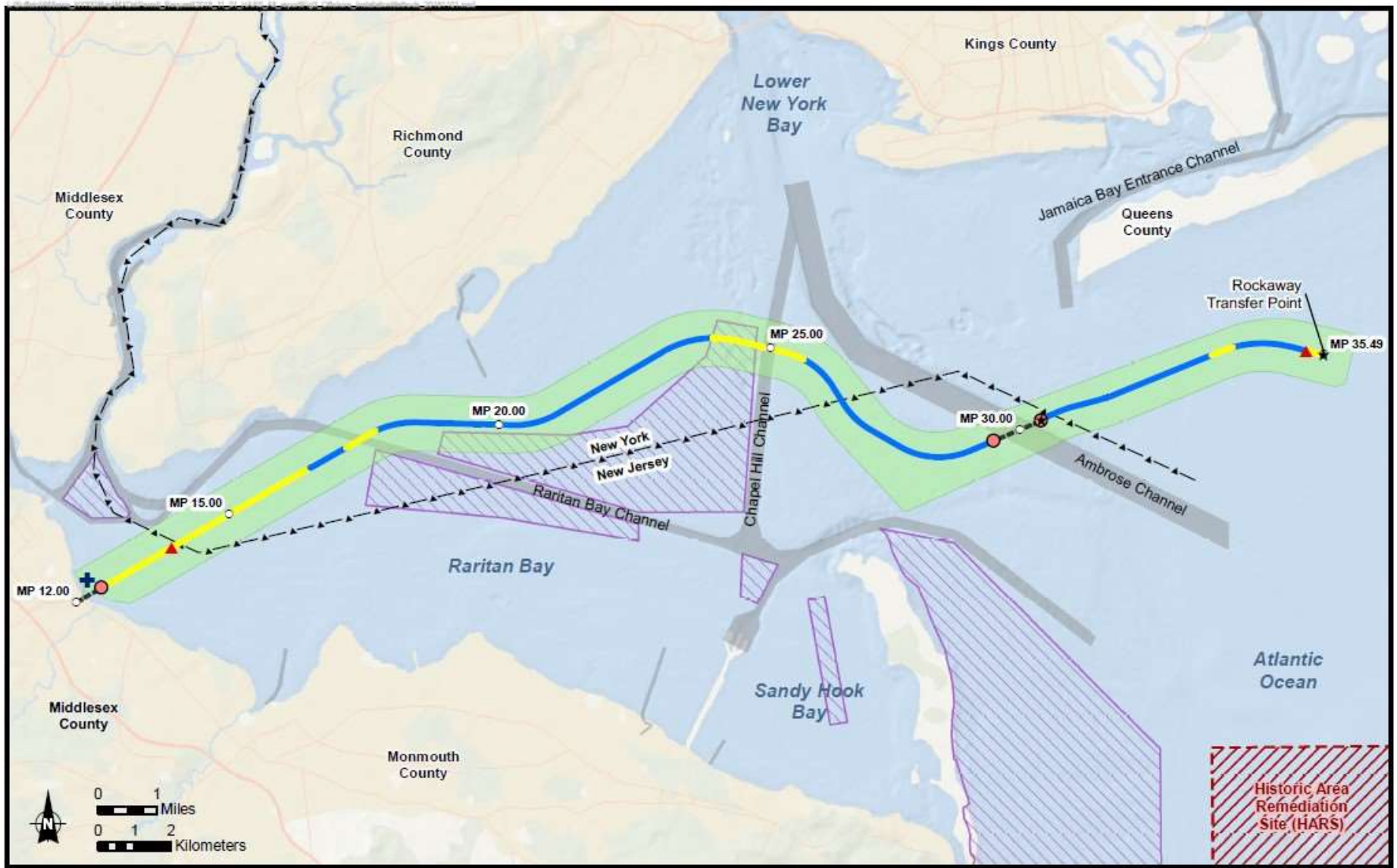
- **River herring** (*Alosa aestivalis* and *Alosa pseudoharengus*)
  Dates: 3/1 – 6/30
  Project Locations: MP12.2 to MP15.3

- **Winter flounder** (*Pseudopleuronectes americanus*)
  Dates: 12/15 – 5/31
  Project Locations: MP12.2 to MP30.6 (Shallower than -20 feet MLLW and within 500 feet of -20-foot MLLW contour)

- **Blue crab** (*Callinectes sapidus*).
  Dates: 12/1 – 4/30
  Project Locations: Approximate MP25.0 (within 500 feet of Chapel Hill Channel) and Approximate MP30.0 (within 500 feet of Ambrose Channel)

[1] Examples of previous agency communications in 2018 alone relating to offshore TOY restrictions include, but are not limited to: Conference calls on 3/15 (NOAA Fisheries PRD/HCD), 4/9 (NOAA Fisheries PRD/HCD, NYSDEC, NJDEP, and USFWS), 7/26 (NJDEP and NOAA Fisheries HCD), and 12/13 (NYSDEC); In-person meetings on 2/27 (NJDEP), 8/1 (NJDEP), and 11/9 (NOAA Fisheries and NYSDEC); and, Individual agency letters to FERC dated 5/14 regarding the Draft EIS (NOAA Fisheries HCD, NYSDEC, and NJDEP).

[2] Project locations are identified by Transco-assigned mileposts (MPs) along the Raritan Bay Loop route, rounded to the nearest tenth of a mile. The shore-crossing location in Morgan, New Jersey is at approximate MP 12.2. The Rockaway Delivery Lateral tie-in location in New York is at approximate MP 35.5.



Sources: ESRI 2015; E&E 2003 Williams 2015; NOAA 2017; USCG 2016.

FIGURE 1
TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
PROPOSED OFFSHORE PIPELINE
INSTALLATION METHODS
NORTHEAST SUPPLY ENHANCEMENT PROJECT
NEW JERSEY, NEW YORK

Williams

Revision Date: 11/5/2018

We acknowledge that some of the restrictions identified above are more extensive than those recommended in the NOAA Fisheries letter to FERC dated May 14, 2018; the differences reflect input from the relevant state agencies.

To accommodate the recommended TOY restrictions, Transco has undergone an extensive schedule optimization exercise in an effort to reduce the overall duration of offshore construction while taking into consideration the anticipated TOY restrictions for sensitive marine species. To meet the proposed in-service date and reduce overall impacts on sensitive marine species when considering the multiple TOY restrictions and the necessary sequence of construction events, Transco formally requests approval to conduct certain construction activities during portions of the TOY restriction periods identified above. These TOY restriction flexibility requests, along with justifications for the requests, are summarized below in Table 1. Transco's understanding is that the flexibility requests presented in Table 1 are acceptable based on consultations to date with NOAA Fisheries, NYSDEC, and NJDEP. For each affected species subject to your office's jurisdiction, **please confirm** that each of the listed flexibility requests are acceptable.

Table 1: Species-related Time-of-year Restriction (TOYR) Flexibility Requests

Activity	Location	Request	Requested Activity Start Date[a]	Requested Activity End Date[a]	Applicable Species TOYR	Justification	Potential Impact on Species
Clamshell Dredging	**New York and New Jersey** - MP12.5 to MP15.3	Allow dredging to overlap with river herring and Atlantic sturgeon TOYR in June, or based on temperature threshold	6/1/2020	6/30/2020	River herring (and Atlantic sturgeon in NJ) (3/1 – 6/30)	Adherence to the current TOYR would push construction campaign into fall sturgeon TOYR	Sediment disturbance, suspended sediment, and deposition
Platform Pile and Goal Post Installation	**New Jersey** - Morgan HDD Pit (MP12.5)	Allow pile/platform installation during river herring and Atlantic sturgeon TOYR in May, or based on temperature threshold	6/9/2020	6/30/2020	River herring (and Atlantic sturgeon in NJ) (3/1 – 6/30)	Adherence to the current TOYR would push construction campaign into fall sturgeon TOYR	Noise from pile driving/vibratory hammer
Hand Jet/ Submersible Pump at Manifold	**New York** - Rockaway Transfer Point (MP35.49)	Allow low-impact sediment-disturbing activities during Atlantic sturgeon TOYR in spring (preferred) and/or fall	6/15/2020 OR 10/1/2020	6/30/2020 OR 11/10/2020	Atlantic sturgeon (3/1 – 6/30)	Allowance of low-impact activities would minimize the overall duration of construction activities if existing pipeline cannot be depressurized during preferred activity period in July.	Sediment disturbance, suspended sediment, and deposition
Spool Installation, Hydrotesting, and Drying	**New York** - Rockaway Transfer Point (MP35.49)	Allow low-impact installation activities during Atlantic sturgeon fall TOYR	10/1/2020 Duration of activity: <30 days	11/30/2020	Atlantic sturgeon (10/1 – 11/31)	Allowance of low-impact activities would minimize the overall duration of construction activities	Limited impacts; no sediment disturbance
Spool Installation	**New Jersey** - Ambrose East HDD Pit (MP30.4)	Allow low-impact installation activities within Atlantic sturgeon fall TOYR	10/1/2020 Duration of activity: ~7 days	10/31/2020	Atlantic sturgeon (10/1 – 11/31)	Allowance of low-impact activities would minimize the overall duration of construction activities	Limited impacts; no sediment disturbance

Table 1: Species-related Time-of-year Restriction (TOYR) Flexibility Requests

Activity	Location	Request	Requested Activity Start Date[a]	Requested Activity End Date[a]	Applicable Species TOYR	Justification	Potential Impact on Species
Reinstatement of Ambrose HDD Pits	**New Jersey** - Ambrose East and West HDD Pits (MP30.4 and MP29.5)	Allow backfilling and reinstatement during blue crab TOYR	12/1/2020	12/10/2020	Blue crab (12/1 – 4/30)	Allowance of activity would minimize the overall duration of construction and help avoid risk of exposed pipeline during winter flounder TOYR (6+ months)	Sediment disturbance, suspended sediment, and deposition
Reinstatement of Channel Crossings	**New York** - Raritan Bay Channel (MP17.6) and Chapel Hill Channel (MP25.0)	Allow backfilling and reinstatement during winter flounder TOYR	12/15/2020 Duration of activity: Raritan ~42 days Chapel Hill ~27 days	1/1/2021	Winter flounder (12/15 – 5/31)	Allowance of activity would minimize the overall duration of construction and help avoid risk of damage to exposed pipeline from traffic in channels during winter flounder TOYR (6+ months)	Sediment disturbance, suspended sediment, and deposition
Reinstatement of Chapel Hill Crossing	**New York** - Chapel Hill Channel (MP25.0)	Allow backfilling and reinstatement during blue crab TOYR	12/1/2020 **Activity is also restricted by Winter Flounder TOYR*	1/1/2021	Blue crab (12/1 – 4/30)	Allowance of activity would minimize the overall duration of construction and help avoid risk of damage to exposed pipeline from traffic in channels during blue crab and winter flounder TOYR (6+ months)	Sediment disturbance, suspended sediment, and deposition

[a] The start/end dates identify the portion of the activity work period that would overlap with a species' TOYR.

Key:

HDD = Horizontal Directional Drill
MP = Milepost
TOYR = Time-of-year restriction

The following information is attached in support of these flexibility requests; some information was previously provided to NOAA Fisheries staff as noted:

- **Attachment A** – Memo regarding noise modeling for pile installation and removal activities with respect to fish and turtles [*sent via e-mail from S. MacLeod to U. Howson and J. Crocker on July 13, 2018*]
- **Attachment B** – Memo regarding clupeid hearing in relation to pile installation activities [*sent via e-mail from S. MacLeod to U. Howson on May 30, 2018*]
- **Attachment C** – Figures of predicted cumulative suspended sediment plumes[3] associated with clamshell dredging activities between MP12.5 and MP16.6 (modeling Scenarios B-2 and B-4) [*sent via e-mail from S. MacLeod to U. Howson on May 30, 2018*]
- **Attachment D** – Figures of predicted deposition associated with backfilling at Chapel Hill Channel crossing (Scenario C-10), Raritan Bay Channel crossing (Scenario C-12), Ambrose HDD East Pit (Scenario C-13), Ambrose HDD West Pit (Scenario B-22)
- **Attachment E** – Comprehensive summary table of modeled suspended sediment and deposition levels for currently proposed offshore activities.

If you have any questions or require additional Project information to aid your evaluation of the above requests, please do not hesitate to contact Mr. Scott Horner at (713) 215-4953 or via email at Scott.Horner@williams.com. Alternatively, you can contact Ms. Sara Mochrie at Ecology and Environment, Inc. at (716) 684-8060 or via email at smochrie@ene.com.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Joseph Dean
Manager, Environmental Health and Safety

cc (via e-mail): Karen Greene, NOAA Fisheries
Michael Pentony, NOAA Fisheries
Christine E. Allen, FERC
Stephen Kellogg, Transco
Blake Clements, Transco
Scott Horner, Transco
Daniel Merz, J.D., Transco
Yvonne Hennessey, Barclay Damon, LLP

[3] Note that the cumulative plume figures do not represent a suspended sediment plume that is predicted for any given time. Rather, they present the highest concentrations of suspended sediments that are predicted for each model cell at any time during the modeled scenario.

cc (cont.): Christine Roy, Esq., Rutter and Roy, LLP
Sara Mochrie, E & E
Megan Eakin, E & E
Steven MacLeod, E & E
Lyndie Hice-Dunton, PhD, E & E
Jonathan Binder, Esq., NYSDEC
Chris Hogan, NYSDEC
Karen Gaidasz, NYSDEC
Kim McKown, NYSDEC
John Maniscalco, NYSDEC
Chris Jones, NJDEP
Matthew Resnick, NJDEP
Kelly Davis, NJDEP
Steve Sinkevich, USFWS
Carlo Popolizio, USFWS

Enclosures

Sundar, Nischint

From: MacLeod, Steven
Sent: Thursday, April 4, 2019 1:16 PM
To: Julie Crocker - NOAA Federal
Cc: Mochrie, Sara; Horner, Scott; Clements, Blake
Subject: RE: FERC revised Section 7 determinations for Transco's NESE Project

Julie,
Thanks for the update.
Yes, it would be helpful if you could provide a formal statement of "no objection" to our TOYR flexibility request (dated 2/11/2019) with respect to Atlantic sturgeon. Perhaps you can include that statement in your comment letter back to FERC regarding the FEIS.

Regards,
Steve

ecology and environment, inc.

Steven MacLeod, *Environmental Scientist*
368 Pleasant View Drive, Lancaster, NY 14086
Office Phone: 716-684-8060 x3907 • Work Cell: 716-462-0845
smacleod@ene.com • www.ene.com

From: Julie Crocker - NOAA Federal <julie.crocker@noaa.gov>
Sent: Wednesday, April 3, 2019 9:18 PM
To: MacLeod, Steven <SMacLeod@ene.com>
Cc: Mochrie, Sara <SMochrie@ene.com>; Horner, Scott <Scott.Horner@williams.com>; Clements, Blake <Blake.Clements@williams.com>
Subject: Re: FERC revised Section 7 determinations for Transco's NESE Project

Apologies for the delay - I ended up being out of the office last week and that got in the way of my getting the comments to you!

I am wrapping up my write up of comments on the EIS/BA and should have them to you by COB tomorrow.

I have no objections to the time of year flexibility for Atlantic sturgeon that you have requested - we can put that in a letter if that is the preferred approach...just let me know what you need.

Julie

On Wed, Apr 3, 2019 at 11:57 AM MacLeod, Steven <SMacLeod@ene.com> wrote:

> Hi Julie,
>
> Please advise on the status of your comments on the FEIS for the NESE Project, and FERC's associated Section 7 effects determination.

Also, please let us know when we might expect a response on Transco's formal request for flexibility in time-of-year restrictions for Atlantic sturgeon, which was sent via email on February 11th.

Feel free to call if it would help to further discuss either of these items.

Thank you,

Steve

Steven MacLeod, *Environmental Scientist*

ecology and environment, inc.

368 Pleasant View Drive, Lancaster, NY 14086

Office Phone: 716-684-8060 x3907 • Work Cell: 716-462-0845

smacleod@ene.com • www.ene.com

From: MacLeod, Steven
Sent: Wednesday, March 6, 2019 11:58 AM
To: Julie Crocker (julie.crocker@noaa.gov) <julie.crocker@noaa.gov>; 'Jordan Carduner - NOAA Affiliate' <jordan.carduner@noaa.gov>
Cc: Horner, Scott (Scott.Horner@williams.com) <Scott.Horner@williams.com>; Mochrie, Sara <SMochrie@ene.com>; Guttenplan, Katherine (Katie) <KGuttenplan@ene.com>; Clements, Blake <Blake.Clements@williams.com>; Eakin,Megan <MEakin@ene.com>
Subject: FERC revised Section 7 determinations for Transco's NESE Project

Julie and Jordan,

Thanks very much for your input last week. Attached for your review is a contact report of our discussions. Please reply with any suggested edits by next **Wednesday, March 13th**.

Also attached for your review is our compilation of corrections and updates to statements in Section 4.5 (Wildlife and Aquatic Resources) and 4.6 (Threatened, Endangered, and Other Special Status Species) of the FEIS that pertain to offshore construction.

Jordan, Please provide us with any questions on our latest IHA application by this Friday (3/8), if possible, or next week at the latest so we have time to respond by the end of March.

Julie, Please provide us with any Section 7-related questions on the FEIS before or concurrently with your submittal to FERC.

Note that during the call we anticipated an early April FERC Order, but Transco has since requested the certificate by late March. See attached email notification from FERC.

Regards,

Steve

Steven MacLeod, *Environmental Scientist*

368 Pleasant View Drive, Lancaster, NY 14086

Office Phone: 716-684-8060 x3907 • Work Cell: 716-462-0845

smacleod@ene.com • www.ene.com

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Julie Crocker

Endangered Fish Branch Chief

Greater Atlantic Regional Fisheries Office

Protected Resources Division
National Marine Fisheries Service

55 Great Republic Drive

Gloucester, MA 01930

office: (978)282-8480

cell: (978)559-9664

--
Julie Crocker
Endangered Fish Branch Chief

Greater Atlantic Regional Fisheries Office
Protected Resources Division
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930
office: (978)282-8480
cell: (978)559-9664

Sundar, Nischint

From: Ursula Howson - NOAA Federal <ursula.howson@noaa.gov>
Sent: Wednesday, April 17, 2019 10:05 AM
To: MacLeod, Steven
Cc: Martinez, Chris; Mochrie, Sara; Gavelek, Jim (Jim.Gavelek@Williams.com); Clements, Blake; Horner, Scott; Behrends, Sarah; Christine Allen; Karen Greene - NOAA Federal
Subject: Re: Transco formal TOYR flex request - EFH species

Categories: Agency Communication

Steve,

This email is confirming that we have agreed to Transco's relief requests for our EFH timing restrictions for the NESE project, as outlined in your February 11, 2019 memo to us. We will provide a formal letter indicating the same within the next few weeks. The relief requests are listed below.

Thank you,
Ursula

River herring - MP12.5 - MP 15.3, allow dredging 6/1/20 - 6/30/20
River herring - Morgan HDD Pit (MP12.5), allow pile/platform installation 6/9/20 - 6/30/20
Blue crab - MP 29.5 and 30.4, allow backfilling and reinstatement 12/1/20 - 12/10/20
Winter flounder - MP 17.6, MP 25, allow backfilling and reinstatement 12/15/20 - 1/1/21
Blue crab - MP 25, allow backfilling and reinstatement 12/1/20 - 1/1/2021

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

July 28, 2019

A. Eric Howard, Chief
Acting Chief, Gas Branch 2
Division of Gas – Environment and Engineering
Federal Energy Regulatory Commission
Office of Energy Products
Washington, DC 20426

RE: Docket No. CP17-101-000; Transcontinental Gas Pipe Line Company, LLC; Northeast Supply Enhancement Project; Raritan Bay, Lower New York Bay, Atlantic Ocean

Dear Mr. Howard:

In May 2018, we provided your office comments on the March 2018 essential fish habitat (EFH) assessment and Draft Environmental Impact Statement for the Transcontinental Gas Pipe Line Company (Transco), LLC's Northeast Supply Enhancement Project (NESE). The aquatic portion of the Transco NESE pipeline runs between Middlesex County, NJ and the Rockaway Delivery Lateral pipeline in Queens County, NY, crossing Raritan Bay, Lower New York Bay, and the Atlantic Ocean and includes:

- the Madison Loop, 3.4 miles of 26- inch diameter natural gas pipeline loop in Middlesex County, NJ;
- the Raritan Bay Loop, 23.5 miles of 26-inch diameter natural gas pipeline loop in Middlesex and Monmouth Counties, NJ and Richmond and Queens Counties, NY; and
- ancillary facilities in Middlesex County, NJ and Richmond County, NY.

Transco proposes to construct the subaqueous portions of the pipeline using a combination of trenching techniques including an environmental bucket dredge, horizontal directional drilling (HDD), jet trenching, and hand jetting. Dredging activities would directly impact 117.2 acres, and indirectly impact 1,091 acres of benthic habitat. The project also includes onshore temporary impacts to 2.82 acres of tidal wetlands.

Our May 2018, letter included a number of EFH conservation recommendations provided pursuant to Section 305 (b)(4)(A) of the Magnuson Stevens Fishery Conservation and Management Act (MSA) to avoid, minimize, and offset adverse impacts to EFH that will result from the construction of the proposed project. At that time, the construction schedule and methods had not yet been fully defined by Transco. As a result, we agreed to reevaluate our EFH conservation recommendations as additional information was provided to us by Transco as they refined their construction schedule and methods and provided us with a more detailed evaluation of the effects of the construction activities on aquatic resources. We have reviewed

the additional information provided by Transco and have evaluated their request for modifications to some of our EFH conservation recommendations. Listed below are our original EFH conservation recommendations, the proposed modification and our rationale for accepting the proposed changes.

Original EFH conservation recommendation:

> No dredging or pile-driving from 3/1 to 6/30 of each year from MP 12 to MP 15 to minimize impacts to migrating anadromous species including alewife and blueback herring, prey species for a number of federally managed species.

Proposed modification:

> Allow dredging between MP 12.5 to MP 15.3 and pile/platform installation at the Morgan HDD pit (MP12.5) from 6/1 to 6/30/20.

Because it is expected that anadromous species will have moved upstream past this area before June 1, we agree with this proposed modification.

Original EFH Conservation Recommendation:

> No dredging from December 1 through April 30 of each year in Ambrose Channel and Chapel Hill Channel including a 500 foot buffer on either side of each channel to protect overwintering blue crabs.

Proposed modification:

> Allow backfilling and pipeline reinstatement to continue into timing restriction, from 12/1/20 to 12/10/20 at Ambrose East and West HDD pits (MP 29.5 and MP 30.4) and from 12/1/20 to 1/1/21 at MP 25.

Because it is expected that blue crabs will avoid settling in these disturbed areas due to the on-going construction activities, we agree with this proposed modification.

Please note that as stated in our previous letter, Section 305(b)(4)(B) of the MSA requires you to provide us with a detailed written response to our EFH conservation recommendations, including a description of measures you have adopted to avoid, mitigate, or offset the impact of the project on EFH. In the case of a response that is inconsistent with these conservation recommendations, Section 305(b)(4)(B) of the MSA also indicates that you must explain your reasons for not following the recommendations. Included in such reasoning would be the scientific justification for any disagreements with us over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects pursuant to 50 CFR 600.920(k).

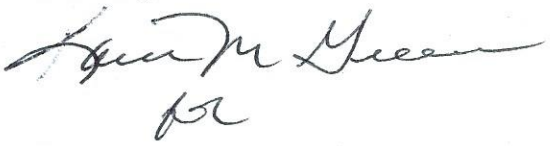
Please also note that a distinct and further EFH consultation must be reinitiated pursuant to 50 CFR 600.920(1) if new information becomes available or the project is revised in such a manner

that affects the basis for the above modifications to the original EFH conservation recommendations.

Endangered Species Act
Our Protected Resources Division will be proving comments separately. Questions regarding the status of their review should be directed to Julie Crocker at (978) 282-8480 or julie.crocker@noaa.gov.

Our comments above pertain only to the proposed modifications to our EFH conservation recommendations. We understand that there are a number of outstanding issues related to the project's consistency with New York and New Jersey's Coastal Zone Management programs. Our comments above are not intended to indicate that we endorse the proposed project or affect either state's permitting authorities. If you have any questions or need additional information, please do not hesitate to contact Karen Greene in our Highlands, NJ field office at karen.greene@noaa.gov or (732) 872-3023.

Sincerely,



Louis A. Chiarella
Assistant Regional Administrator
for Habitat Conservation

cc: NY ACOE – S. Ryba, N. Handell
FERC – C. Allen
PRD – J. Crocker
NYSDEC – K. Gaidasz
NJDEP – K. Davis

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

July 8, 2019

Stephen Czapka
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Re: CME Facility Contractor Yard
Elizabeth City, Union County

Dear Mr. Czapka:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

NHP File No. 19-4007462-17021

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 19-4007462-17021

Mail Code 501-04
Department of Environmental Protection
New Jersey Forest Service
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

Invoice

Date	Invoice #
7/8/2019	17021

Bill to:
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Make check payable to:
DEP - Office of Natural Lands Management
And forward with a copy of this statement to:
Mail Code 501-04
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 19-4007462-17021	$ 70.00	$ 70.00
Stephen Czapka Project Name: CME Facility Contractor Yard		**Total**	$ 70.00

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	**Included**	**Number of Pages**
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Least Tern	Sternula antillarum	Foraging	4	NA	State Endangered	G4	S1B,S1N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Tricolored Heron	Egretta tricolor	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	3	NA	State Threatened	G5	S2B,S2N
Osteichthyes								
	Atlantic Sturgeon	Acipenser oxyrinchus	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1
	Shortnose Sturgeon	Acipenser brevirostrum	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Cattle Egret	Bubulcus ibis	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Least Tern	Sternula antillarum	Foraging	4	NA	State Endangered	G4	S1B,S1N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Tricolored Heron	Egretta tricolor	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	3	NA	State Threatened	G5	S2B,S2N
Osteichthyes								
	Atlantic Sturgeon	Acipenser oxyrinchus	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1
	Shortnose Sturgeon	Acipenser brevirostrum	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Bald Eagle	Haliaeetus leucocephalus	Nest	4	NA	State Endangered	G5	S1B,S2N
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Cattle Egret	Bubulcus ibis	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Least Tern	Sternula antillarum	Foraging	4	NA	State Endangered	G4	S1B,S1N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N
	Osprey	Pandion haliaetus	Nest	3	NA	State Threatened	G5	S2B,S4N
	Peregrine Falcon	Falco peregrinus	Urban Nest	4	NA	State Endangered	G4	S1B,S3N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Tricolored Heron	Egretta tricolor	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	3	NA	State Threatened	G5	S2B,S2N
Insecta								

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Checkered White	Pontia protodice	Breeding/Courtship	3	NA	State Threatened	G5	S2
Osteichthyes								
	Atlantic Sturgeon	Acipenser oxyrinchus	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1
	Shortnose Sturgeon	Acipenser brevirostrum	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1

Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Vertebrate Animals					
Malaclemys terrapin terrapin	Northern Diamondback Terrapin			G4T4Q	S3

Total number of records: 1

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

July 8, 2019

Stephen Czapka
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Re: Highway 35 Contractor Yard
Old Bridge Township, Middlesex County

Dear Mr. Czapka:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

NHP File No. 19-4007442-17022

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

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Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 19-4007442-17022

Mail Code 501-04
Department of Environmental Protection
New Jersey Forest Service
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

Invoice

Date	Invoice #
7/8/2019	17022

Bill to:
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Make check payable to:
DEP - Office of Natural Lands Management
And forward with a copy of this statement to:
Mail Code 501-04
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 19-4007442-17022	$ 70.00	$ 70.00
Stephen Czapka Project Name: Highway 35 Contractor Yard		**Total**	$ 70.00

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	**Included**	**Number of Pages**
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Brown Thrasher	Toxostoma rufum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Amphibia								
	Pine Barrens Treefrog	Hyla andersonii	Vernal Pool Breeding	3	NA	State Threatened	G4	S2
Aves								
	American Kestrel	Falco sparverius	Non-breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Bald Eagle	Haliaeetus leucocephalus	Nest	4	NA	State Endangered	G5	S1B,S2N
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Brown Thrasher	Toxostoma rufum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N
	Osprey	Pandion haliaetus	Nest	3	NA	State Threatened	G5	S2B,S4N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
Reptilia								

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Atlantic Loggerhead	Caretta caretta	Occupied Habitat	5	Federally Listed Threatened	State Endangered	G3	S1

Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Vertebrate Animals					
Malaclemys terrapin terrapin	Northern Diamondback Terrapin			G4T4Q	S3

Total number of records: 1

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

July 8, 2019

Stephen Czapka
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Re: Lowe's Parking Lot Contractor Yard
Old Bridge Township, Middlesex County

Dear Mr. Czapka:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

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For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

NHP File No. 19-4007443-17023

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

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Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 19-4007443-17023

Mail Code 501-04
Department of Environmental Protection
New Jersey Forest Service
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

Invoice

Date	Invoice #
7/8/2019	17023

Bill to:
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Make check payable to:
DEP - Office of Natural Lands Management
And forward with a copy of this statement to:
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Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 19-4007443-17023	$ 70.00	$ 70.00
Stephen Czapka Project Name: Lowe's Parking Lot Contractor Yard		**Total**	$ 70.00

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	**Included**	**Number of Pages**
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Vernal Pool Habitat
In the Immediate Vicinity of
Project Site Based on Search of
Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1759

Total number of records: 1

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Amphibia								
	Fowler's Toad	Anaxyrus fowleri	Occupied Habitat	2	NA	Special Concern	G5	S3
	Fowler's Toad	Anaxyrus fowleri	Vernal Pool Breeding	2	NA	Special Concern	G5	S3
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Bald Eagle	Haliaeetus leucocephalus	Nest	4	NA	State Endangered	G5	S1B,S2N
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N
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	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	3	NA	State Threatened	G5	S2B,S2N
Reptilia								
	Eastern Box Turtle	Terrapene carolina carolina	Occupied Habitat	2	NA	Special Concern	G5T5	S3

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Spotted Turtle	Clemmys guttata	Occupied Habitat	2	NA	Special Concern	G5	S3

Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1745
Potential vernal habitat area	1759
Potential vernal habitat area	1763

Total number of records: 3

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
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PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

July 8, 2019

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Virginia Beach, VA 23452

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Old Bridge Township, Middlesex County

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NHP File No. 19-4007443-17024

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Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 19-4007443-17024

Mail Code 501-04
Department of Environmental Protection
New Jersey Forest Service
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

Invoice

Date	Invoice #
7/8/2019	17024

Bill to:
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200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Make check payable to:
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And forward with a copy of this statement to:
Mail Code 501-04
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 19-4007443-17024	$ 70.00	$ 70.00
Stephen Czapka Project Name: Manzo 1 Contractor Yard		**Total**	$ 70.00

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	**Included**	**Number of Pages**
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
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3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
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Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N
	Osprey	Pandion haliaetus	Nest	3	NA	State Threatened	G5	S2B,S4N
	Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	3	NA	State Threatened	G5	S2B,S2N

Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1759
Potential vernal habitat area	1763

Total number of records: 2

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

July 8, 2019

Stephen Czapka
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Re: Manzo 2 Contractor Yard
Old Bridge Township, Middlesex County

Dear Mr. Czapka:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

NHP File No. 19-4007443-17025

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 19-4007443-17025

Mail Code 501-04
Department of Environmental Protection
New Jersey Forest Service
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

Invoice

Date	Invoice #
7/8/2019	17025

Bill to:
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Make check payable to:
DEP - Office of Natural Lands Management
And forward with a copy of this statement to:
Mail Code 501-04
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 19-4007443-17025	$ 70.00	$ 70.00
Stephen Czapka Project Name: Manzo 2 Contractor Yard		**Total**	$ 70.00

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	**Included**	**Number of Pages**
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N
	Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	3	NA	State Threatened	G5	S2B,S2N

Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1745
Potential vernal habitat area	1759
Potential vernal habitat area	1763

Total number of records: 3

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

July 8, 2019

Stephen Czapka
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Re: Madison and Raritan Bay Loops
Old Bridge Township and Sayreville Borough, Middlesex County

Dear Mr. Czapka:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

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For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

NHP File No. 19-4007443-17027

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 19-4007443-17027

Mail Code 501-04
Department of Environmental Protection
New Jersey Forest Service
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

Invoice

Date	Invoice #
7/8/2019	17027

Bill to:
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Make check payable to:
DEP - Office of Natural Lands Management
And forward with a copy of this statement to:
Mail Code 501-04
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 19-4007443-17027	$ 70.00	$ 70.00
Stephen Czapka Project Name: Madison and Raritan Bay Loops		**Total**	$ 70.00

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	**Included**	**Number of Pages**
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Bald Eagle	Haliaeetus leucocephalus	Nest	4	NA	State Endangered	G5	S1B,S2N
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N
	Osprey	Pandion haliaetus	Nest	3	NA	State Threatened	G5	S2B,S4N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
Reptilia								
	Atlantic Loggerhead	Caretta caretta	Occupied Habitat	5	Federally Listed Threatened	State Endangered	G3	S1

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	Yes	1 page(s) included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Immediate Vicinity of the Project Site
Based on Search of Natural Heritage Database
Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Regional Status	Grank	Srank	Identified	Last Observed	Location
Vascular Plants									
Juncus torreyi	Torrey's Rush		E	LP, HL	G5	S1	Y	2016-08-29	Transco Gas Pipeline, Sayreville Borough, Middlesex County. From US Route 9 north to Ernston Road proceed northeast ca. 0.8 mile to Nathan Boulevard. Continue approximately 0.5 mile to Fernandez Court. From end of court continue about 0.83 yards southeast. Ca.100 feet east of pipeline right-of-way. Approximately 400 yards northwest of Garden State Parkway south crossing with Cheesequake Creek.
Platanthera ciliaris	Yellow Fringed Orchid			LP, HL	G5	S2	Y	2012-06-22	0.65 miles Northeast of the intersection of Route 9 and Route 34 in Old Bridge Township, Middlesex County. Cedar swamp at edge of marsh, Cheesequake State Park.

Total number of records: 2

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Bald Eagle	Haliaeetus leucocephalus	Nest	4	NA	State Endangered	G5	S1B,S2N
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N
	Osprey	Pandion haliaetus	Nest	3	NA	State Threatened	G5	S2B,S4N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
	Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	3	NA	State Threatened	G5	S2B,S2N
Reptilia								
	Atlantic Loggerhead	Caretta caretta	Occupied Habitat	5	Federally Listed Threatened	State Endangered	G3	S1

Vernal Pool Habitat
In the Immediate Vicinity of
Project Site Based on Search of
Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1759
Potential vernal habitat area	1763
Potential vernal habitat area	1772

Total number of records: 3

Other Animal Species
In the Immediate Vicinity of the Project Site Based on
Additional Species Tracked by
Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Vertebrate Animals					
Malaclemys terrapin terrapin	Northern Diamondback Terrapin			G4T4Q	S3

Total number of records: 1

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	Yes	1 page(s) included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Plant Species Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Regional Status	Grank	Srank	Identified	Last Observed
Vascular Plants								
Juncus torreyi	Torrey's Rush		E	LP, HL	G5	S1	Y	2016-08-29
Schoenoplectus maritimus	Saltmarsh Bulrush		E	LP, HL	G5	S1	Y	2012-07-20

Total number of records: 2

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Amphibia								
	Fowler's Toad	Anaxyrus fowleri	Occupied Habitat	2	NA	Special Concern	G5	S3
	Fowler's Toad	Anaxyrus fowleri	Vernal Pool Breeding	2	NA	Special Concern	G5	S3
	Pine Barrens Treefrog	Hyla andersonii	Vernal Pool Breeding	3	NA	State Threatened	G4	S2
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Bald Eagle	Haliaeetus leucocephalus	Nest	4	NA	State Endangered	G5	S1B,S2N
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Brown Thrasher	Toxostoma rufum	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Least Bittern	Ixobrychus exilis	Breeding Sighting-Confirmed	2	NA	Special Concern	G5	S3B,S3N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Osprey	Pandion haliaetus	Foraging	3	NA	State Threatened	G5	S2B,S4N

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Osprey	Pandion haliaetus	Nest	3	NA	State Threatened	G5	S2B,S4N
	Saltmarsh Sparrow	Ammodramus caudacutus	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
	Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	3	NA	State Threatened	G5	S2B,S2N
Reptilia								
	Atlantic Loggerhead	Caretta caretta	Occupied Habitat	5	Federally Listed Threatened	State Endangered	G3	S1
	Eastern Box Turtle	Terrapene carolina carolina	Occupied Habitat	2	NA	Special Concern	G5T5	S3
	Spotted Turtle	Clemmys guttata	Occupied Habitat	2	NA	Special Concern	G5	S3

Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Vernal habitat area	2874
Potential vernal habitat area	1738
Potential vernal habitat area	1745
Potential vernal habitat area	1750
Potential vernal habitat area	1759
Potential vernal habitat area	1763
Potential vernal habitat area	1772

Total number of records: 7

Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Vertebrate Animals					
Malaclemys terrapin terrapin	Northern Diamondback Terrapin			G4T4Q	S3

Total number of records: 1

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Commissioner

July 8, 2019

Stephen Czapka
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Re: Weeks Marine Contractor Yard
Jersey City, Hudson County

Dear Mr. Czapka:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

NHP File No. 19-4007461-17035

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 19-4007461-17035

Mail Code 501-04
Department of Environmental Protection
New Jersey Forest Service
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

Invoice

Date	Invoice #
7/8/2019	17035

Bill to:
Ecology and Environment, Inc.
200 Bendix Road, Suite 250
Virginia Beach, VA 23452

Make check payable to:
DEP - Office of Natural Lands Management
And forward with a copy of this statement to:
Mail Code 501-04
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 19-4007461-17035	$ 70.00	$ 70.00
Stephen Czapka Project Name: Weeks Marine Contractor Yard		**Total**	$ 70.00

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	**Included**	**Number of Pages**
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Tricolored Heron	Egretta tricolor	Foraging	2	NA	Special Concern	G5	S3B,S3N
Osteichthyes								
	Atlantic Sturgeon	Acipenser oxyrinchus	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1
	Atlantic Sturgeon	Acipenser oxyrinchus	Migration Corridor - Juvenile Sighting	5	Federally Listed Endangered	State Endangered	G3	S1
	Shortnose Sturgeon	Acipenser brevirostrum	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	**Included**	**Number of Pages**
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Black-crowned Night-heron	Nycticorax nycticorax	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Bobolink	Dolichonyx oryzivorus	Breeding Sighting	3	NA	State Threatened	G5	S2B,S3N
	Cattle Egret	Bubulcus ibis	Foraging	3	NA	State Threatened	G5	S2B,S3N
	Glossy Ibis	Plegadis falcinellus	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Little Blue Heron	Egretta caerulea	Foraging	2	NA	Special Concern	G5	S3B,S3N
	Savannah Sparrow	Passerculus sandwichensis	Breeding Sighting	3	NA	State Threatened	G5	S2B,S4N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Tricolored Heron	Egretta tricolor	Foraging	2	NA	Special Concern	G5	S3B,S3N
Osteichthyes								
	Atlantic Sturgeon	Acipenser oxyrinchus	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1
	Atlantic Sturgeon	Acipenser oxyrinchus	Migration Corridor - Juvenile Sighting	5	Federally Listed Endangered	State Endangered	G3	S1

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Shortnose Sturgeon	Acipenser brevirostrum	Migration Corridor - Adult Sighting	5	Federally Listed Endangered	State Endangered	G3	S1

Sundar, Nischint

From: Olson, Karen <Karen.Olson@williams.com>
Sent: Wednesday, October 16, 2019 10:19 AM
To: Tamagno, Joslin
Cc: Horner, Scott; Dean, Joseph
Subject: RE: Transco

Hi Joslin, per your request, please see the additional breakdown of impacts below. Let me know if you need anything further.

- Access roadway to the compressor station, and natural gas discharge and suction piping:
  - Permanent freshwater wetlands disturbance = 3.711 acres EV = 1.587 ac. ; IV = 2.124 ac.
  - Temporary freshwater wetlands disturbance = 0.149 acres All IV
  - Permanent freshwater wetlands transition areas = 3.264 acres EV = 2.185 ac. ; IV = 1.079 ac.
  - Temporary freshwater wetlands transition areas = 0.449 acres EV = 0.273 ac. ; IV = 0.176 ac.
  - Permanent riparian zone vegetation disturbance = 0.476 acres All IV
  - Permanent state Open Waters = 0.006
- Madison Loop:
  - Permanent freshwater wetlands disturbance = 0.327 acres All IV
  - Temporary freshwater wetlands disturbance = 1.987 acres EV = 0.004 ac. ; IV = 1.983 ac.
  - Permanent freshwater wetlands transition areas = 1.143 acres EV = 0.113 ac. ; IV = 1.030 ac.
  - Temporary freshwater wetlands transition areas = 4.039 acres EV = 0.308 ac. ; IV = 3.731 ac.
  - Temporary State open waters = 0.157 acres All IV
  - Temporary coastal wetlands = 1.968 acres Coastal wetlands are not classified by resource value.
  - Permanent Riparian zone vegetation disturbance = 0.415 acres All 50 ft. riparian zones
  - Temporary Riparian zone vegetation disturbance = 0.65 acres All 50 ft. riparian zones
  - Riparian zone actively disturbed area = 0.669 acres All 50 ft. riparian zones

1. Please confirm the total length of the Madison Loop = 3.43 miles. Please breakdown the length within the WFD jurisdiction and the length outside the WFD jurisdiction. Total = 18,067 LF ; Within WFD = 2,683 LF; Outside WFD = 15,384 LF

Karen Olson | Environmental Specialist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222
Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Olson, Karen
Sent: Tuesday, October 15, 2019 9:35 AM
To: Tamagno, Joslin <Joslin.Tamagno@dep.nj.gov>
Cc: Horner, Scott <Scott.Horner@williams.com>; Dean, Joseph <Joseph.Dean@Williams.com>
Subject: RE: Transco

Received, thanks Joslin.

Karen Olson | Environmental Specialist
O: 713-215-4232 | C: 281-513-0667 | F: 713-215-2222

Atlantic-Gulf | **Engineering and Construction** | **Environmental Permitting**
Williams |2800 Post Oak Blvd., Level 11|Houston, TX 77056

Before printing, think about your responsibility and commitment to the environment!

From: Tamagno, Joslin <Joslin.Tamagno@dep.nj.gov>
Sent: Tuesday, October 15, 2019 9:32 AM
To: Olson, Karen <Karen.Olson@williams.com>
Subject: [EXTERNAL] Transco

Good morning Karen,
Pursuant to our telephone conversation earlier, please confirm/clarify the my questions/comments below. I'm sure I'll have more questions as the day/week progress. Thanks for your help.

1. Please confirm the proposed disturbances listed below. Additionally, please further breakdown the disturbance to int. vs. exp. Wetlands, int. vs. exp. TA, 50-ft. vs. 150-ft. RZ, etc. Can you also further breakdown the disturbances proposed for the

- Access roadway to the compressor station, and natural gas discharge and suction piping:
  - Permanent freshwater wetlands disturbance = 3.711 acres
  - Temporary freshwater wetlands disturbance = 0.149 acres
  - Permanent freshwater wetlands transition areas = 3.264 acres
  - Temporary freshwater wetlands transition areas = 0.449 acres
  - Permanent riparian zone vegetation disturbance = 0.476 acres
- Madison Loop:
  - Permanent freshwater wetlands disturbance = 0.327 acres
  - Temporary freshwater wetlands disturbance = 1.987 acres
  - Permanent freshwater wetlands transition areas = 1.143 acres
  - Temporary freshwater wetlands transition areas = 4.039 acres
  - Temporary State open waters = 0.157 acres
  - Temporary coastal wetlands = 1.968 acres
  - Permanent Riparian zone vegetation disturbance = 0.415 acres
  - Temporary Riparian zone vegetation disturbance = 0.65 acres
  - Riparian zone actively disturbed area = 0.669 acres

2. Please confirm the total length of the Madison Loop. Please breakdown the length within the WFD jurisdiction and the length outside the WFD jurisdiction.

Joslin C. Tamagno
Environmental Supervisor, ES4
Bureau of Urban Growth & Redeveloemnt
Division of Land Use Regulation

501 East State Street
Mail Code 501-02A
P.O. Box 420
Trenton, NJ 08625-0420

Joslin.Tamagno@dep.nj.gov
(Ph) 609-984-6216

This email originates outside of Williams. Use caution if this message contains attachments, links or requests for information.

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

November 26, 2019

Joslin C. Tamagno, Environmental Supervisor
Bureau of Urban Growth and Redevelopment
NJDEP Division of Land Use Regulation
Department of Environmental Protection
Division of Land Use Regulation
501 E. State Street, Second Floor
Trenton, New Jersey 08609

RE: Withdrawal of Applications Freshwater Wetlands Individual Permit; Flood Hazard Area Individual Permit; and Waterfront Development Individual Permit with 401 WQC and Coastal Zone Consistency Determination
Transcontinental Gas Pipe Line Company, LLC
Northeast Supply Enhancement Project
Compressor Station 206 – Franklin Township, Somerset County, NJ
Madison Loop – Old Bridge Township and Sayreville Borough, Middlesex County, NJ
DLUR File No.: 0000-01-1001.3: LUP 190001 and LUP 190003

Dear Ms. Tamagno,

Please accept this letter as notice that Transcontinental Gas Pipe Line Company, LLC (Transco) hereby withdraws its pending applications for a Freshwater Wetlands Individual Permit, Flood Hazard Area Individual Permit, and Waterfront Development Individual Permit with 401 WQC and Coastal Zone Consistency Determination Flood Hazard Area Control Act Individual Permit (LUP 190001 and LUP 190003) pursuant to N.J.A.C. 7:7A-19.9, N.J.A.C. 7:13-21.6, and N.J.A.C. 7:7-26.8. The reason for this withdrawal is to provide the New Jersey Department of Environmental Protection with additional time to comply with the timeframes established by N.J.A.C. 7:7A-19.2, N.J.A.C. 7:7-26.2, and N.J.A.C. 7:13-21.3.

Transco will be submitting new applications for the above permits at a later date.

Thank you. If you have any questions please do not hesitate to contact Karen Olson at (713) 215-4232 or Karen.Olson@williams.com or Scott Horner at (713) 215-4953 or Scott.Horner@williams.com.

Sincerely,

Joseph E. Dean Manager, Permitting

cc (via e-mail only):
Ginger Kopkash, Assistant Commissioner, NJDEP
Diane Dow, Director DLUR, NJDEP
Christopher Jones, Manager, DLUR, NJDEP
Stephen Kellogg, Transco
Karen Olson, Transco Brian Ham, Transco
Daniel L. Merz, Esq. Transco
Sara Mochrie, E & E

Northeast Supply Enhancement (NESE) Project

Project Meeting Minutes

Date: April 25, 2018
Time: 2:30 pm to 3:30 pm (Eastern)
Location: Conference Call
RE: New Jersey Department of Environmental Protection (NJDEP) Waterfront Development Permit

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Participants

NJDEP: Tim Daniels, Ruth Foster, Chris Jones, Matt Resnick, Magda Usarek-Witek,
Transco: Sarah Behrends, Blake Clements, Scott Horner, Ken Johnson, Webb Winston
E & E: Steven MacLeod, Katharine Perry
Amy S. Greene Environmental: Bill Macholdt, Sue Quackenbush

Meeting Summary

1) A conference call was held to discuss technical aspects of the Project with respect to Transco's application for a Waterfront Development Permit, including the offshore construction design process, suspended sediment modeling and turbidity mixing zones. The call was a follow-up to an in-person meeting at NJDEP's office on February 27, 2018.

2) Following introductions, Mr. MacLeod summarized the design goal to develop the Project with the least overall environmental impact, taking into account various factors, including technical feasibility, feedback from multiple regulatory agencies, equipment emissions, disturbance of sediment, sediment contaminants, existing infrastructure, marine users, etc. After approximately 2 years of analysis, Transco is proposing three main offshore pipeline installation methods as it would not be feasible to construct the offshore portion of the Project using just one method. Mr. MacLeod emphasized that the decision to propose a particular method along a given segment of the offshore route was based on a balance of several factors, not necessarily one single reason.

3) Ms. Usarek-Witek said she was familiar with the proposed installation strategy and her main question was whether it is possible to reduce the amount of clamshell dredging along the route between MP12.5 and MP16.6, and instead use a technique that disturbs less material. Transco's team suggested walking through the three main methods to explain why clamshell dredging was proposed for this segment.

4) Mr. Winston explained several aspects that were used to determine the design of the Morgan Shore horizontal directional drill (HDD) crossing from MP12.0 to MP12.5, including surface and sub-surface conditions, workspace size and access logistics, pipe stress analysis, risk of inadvertent release of drilling fluid, etc.
    a. Mr. Winston emphasized the additional logistical challenges of offshore HDD activities that are less of an issue for onshore HDD activities.
    b. Mr. Jones advised that it would be better to submit all the detail in writing, and suggested focusing on the broader picture. In particular, Mr. Jones noted that the outstanding request from the February meeting was for an explanation on whether the Morgan Shore HDD can be lengthened.
    c. Mr. Winston explained that the proposed length factored in all the conditions he had been discussing, including the minimum distance required for the 26-inch-diameter pipe (due to bending stress), and consideration for sediment conditions in portions of Raritan Bay (e.g., gravelly or loose clay) that would make an HDD more challenging. This resulted in the selection of a length that meets engineering design standards for a successful installation. An increase in length would increase the risk of HDD failure.

5) Ms. Usarek-Witek noted that a jet-sled was used to install the Neptune [power] cable across a similar area of Raritan Bay, and asked if that trenching technique could be used instead of clamshell dredging.
    a. Mr. MacLeod noted that the difference in the diameter of the power cable versus the proposed pipeline was an important consideration, and that a jet trencher had been identified as a better option for installing portions of the pipeline rather than a jet sled.
    b. Mr. Johnson clarified that a jet sled had been used recently to install a similar-diameter pipe for the Rockaway Delivery Lateral Project, but that was a much shorter project in deeper waters. Using a suitably-sized jet sled to install the pipe for the NESE Project was not a good option because the air-lift discharge pipes would rise above the water in the shallow areas of Raritan Bay and create water quality issues that are better controlled with a jet trencher.
    c. Mr. MacLeod compared several aspects of a jet trencher versus a clamshell dredge (with environmental bucket) that were used to help determine where each tool was proposed. For example, the clamshell dredge with environmental bucket can dredge much deeper and will have a smaller suspended sediment plume than the jet trencher. However, the jet trencher has a smaller cross-section and would install the pipe faster than the clamshell dredge, while requiring little to no backfill.
    d. Mr. Johnson further explained that one of the primary reasons for using a clamshell dredge between MP12.5 and MP16.6 is due to the “ultra-shallow” waters (i.e., 7 to 10 feet) in this nearshore area, which restricts access for the pipelay vessel. Additionally, use of the jet trencher requires the pipe to be laid on the seafloor before lowering, and feedback from the boating community indicates that this is a navigational concern in the ultra-shallow waters.

In contrast, trenching with a clamshell dredge would occur prior to pipelay, such that the pipe is immediately lowered into the trench, below the surrounding seafloor elevation.

e. Mr. MacLeod described recent sediment modeling results that showed how the jet trencher would have a larger suspended sediment plume than a clamshell dredge with an environmental bucket between MP12.5 and MP16.6. Considering that some of the sediment in this area contains elevated level of contaminants, this was another reason the clamshell dredge was proposed over the jet trencher for this segment of the route. Mr. MacLeod explained that the modeled plume size was related to the anticipated loss rate as well as the total volume to be excavated.
f. Ms. Usarek-Witek emphasized that an environmental bucket would be required when clamshell dredging in New Jersey waters.

6) Ms. Usarek-Witek stated that it would be helpful for Transco to send her an email with a map that depicted the proposed installation method for each section, with an explanation of why the method was chosen over other methods for that section. NJDEP would then review each component to determine if they concurred with Transco's selection of the best method for each section.
   a. Ms. Usarek-Witek acknowledged that some of the information may have been submitted previously, but asked that the relevant information be summarized and reformatted for ease of review.
   b. Mr. MacLeod noted that the oversized figures provided to NJDEP at the late February meeting laid out the installation methods by milepost, and offered to email an updated copy of those. Ms. Usarek-Witek agreed that could be helpful.
   c. Ms. Usarek-Witek further requested a copy of the slides that Transco was presenting, particularly since at least some of the NJDEP staff was unable to access the presentation during the call. Mr. MacLeod agreed to send the slides with a draft of the meeting minutes.

7) The group discussed the potential turbidity requirements and mixing zone provisions for the Project.
   a. Mr. MacLeod outlined New Jersey water quality rules related to turbidity and mixing zones under 7:7 and 7:9B N.J.A.C., and asked how these might be applied to the Project, especially in light of the suspended sediment modeling results.
   b. Ms. Usarek-Witek indicated that each project is reviewed individually for appropriate application of best management practices and implementation of adaptive management based on water quality monitoring, particularly with consideration for sediment contaminant levels.
   c. Mr. MacLeod asked what maximum turbidity thresholds and mixing zones might be applied to the Waterfront Development Permit according to New Jersey rules. This would help Transco anticipate what (additional) turbidity control measures might be needed in advance of construction to avoid a potential requirement to slow or stop construction once it is

underway. Mr. Jones said that NJDEP staff would check into the rule limitations and respond to the question at a later date.

d. Mr. MacLeod asked if turbidity limits in the permit would be set as an absolute value or as a level above background (ambient) conditions. Ms. Usarek-Witek said it would be measured as the level above background.

8) Ms. Usarek-Witek said she would prefer to follow-up on these topics on a question-and-answer basis via e-mail and possibly phone. She said she would probably not be available for another formal meeting until at least the end of May.

- End Summary -

9) **Important post-meeting updates:**
Ms. Usarek-Witek sent two email messages on 4/26 with specific questions stemming from the conference call discussion.

SUMMARY OF JUNE 6, 2019 CONFERENCE CALL BETWEEN TRANSCO AND NJDEP

Northeast Supply Enhancement (NESE) Project

To: Williams Offshore Team
From: Ecology and Environment, Inc.
Date: June 6, 2019
RE: NJDEP Deficiencies for Raritan Bay Loop in the Notice of Denial

Participants

Williams: Scott Horner
E & E: Megan Eakin, Steve MacLeod, Sara Mochrie
NJDEP: Suzanne Dietrick, Chris Jones, Magda Usarek-Witek

Meeting Summary

1) Transco, E & E, and NJDEP held a conference call to discuss the deficiency items in the Notice of Denial Letter for the Raritan Bay Loop. In particular, the Transco/E & E team wanted to understand the water quality standards the project would be required to meet.

2) E & E noted that many of the contaminants listed in the denial letter have multiple thresholds listed in NJAC 7:9B (acute, chronic, and/or human health) and asked which thresholds the project would need to comply with. NJDEP indicated that the acute thresholds would apply, and in the event an acute standard is not listed, the human health threshold should be considered, although the project may not be held to that directly. E & E stated that phenanthrene did not appear to have any thresholds listed in NJAC 7:9B. NJDEP stated they would confirm, but if one did not exist they would use the other contaminant modeling results as a proxy.

3) E & E then asked what mixing zone would apply for the contaminants modeled, i.e., at what distance should concentrations be evaluated. NJDEP asked what the TSS modeling results showed; E & E explained that TSS modeling was evaluated for 50 mg/L and 100 mg/L based on established New York criteria. New York identified different mixing zones ranging from 500 to 1,500 feet depending on location. However, New York applied the 500-foot mixing zone for contaminants at all locations with higher contaminant concentrations. NJDEP stated that the 500-foot mixing zone could be assumed for contaminants in New Jersey. E & E asked if NJDEP could supply the standards/guidance that would apply at the edge of the mixing zone. NJDEP stated they would, and confirmed that the values come from the tables listed in N.J.A.C. 7:9B for surface water quality standards.

4) Lastly, E & E asked if there was a way to address water quality concerns in the denial other than contaminant modeling, e.g., through implementation of best management practices (BMPs). The Bayonne Energy Center permit was provided as an example; E & E asked how water quality concerns were addressed in the application for that project. NJDEP indicated that changes to the speed of operation in conjunction with other BMPs are traditionally proposed for a dredging project. It would be helpful for Transco to provide assurances that all standard NJDEP-recommended conditions for dredging will be applied. In addition, NJDEP indicated that a water quality monitoring component would be required for this Project. NJDEP indicated that the permit would likely include a condition requiring the permittee to develop a monitoring plan that is subject to NJDEP review and approval.

-- End Summary --

SUMMARY OF JUNE 20, 2019 MEETING BETWEEN TRANSCO AND NJDEP

Northeast Supply Enhancement (NESE) Project

Northeast Supply Enhancement (NESE) Project

Project Meeting Minutes

To: NJDEP Review Team
From: NESE Project Team
Date: June 20, 2019
RE: Application Status Review

Participants

NJDEP: Diane Dow, Chris Jones, Suzanne Dietrick, Matt Resnick, Mark Collier, Shawn LaTourette, Ginger Kopkash, Magda Usarek-Witek, Jan Arnette, Sean Moriarty, Jung Kim
Williams/Transco: Lane Wilson, Amanda Mertens Campbell, Megan Stafford, Brian Ham, Joe Dean, Scott Horner, Karen Olson, Steve Kellogg*, Blake Clements*, Sarah Behrends*, Chris Martinez*, Dan Merz*, Jim Gavalek*, Brian O'Higgins*, Su-Lin Jaaskelainen*
E & E: Dave Albers, Sara Mochrie, Katharine Perry, Megan Eakin*, Meghan Albers*, Kathleen Marean*
ASGECI: Bill Macholdt
RPS: Daniel Mendelsohn*, Nathan Vinhateiro*, Deb Crowley*
PSI: Joe Desanctis
NJ Laborers Union: Steve Gardner
*participating by phone

Meeting Summary

1) New Jersey Department of Environmental Protection (NJDEP) staff opened the meeting with the objective that the applicant and their representatives would clearly understand what outstanding information is needed for NJDEP to complete its review.
    a. NJDEP indicated that its review of the application and response to the Notice of Denial (NOD) was ongoing but noted that results of the contaminant modeling requested in the NOD were outstanding.
    b. The NOD asked for additional information relative to the (1) Compressor Station 206 (CS206) access road and access road alternatives and (2) further justification as to why freshwater wetland impacts cannot be further minimized. NJDEP stated that the applicant needs to further demonstrate what communications and efforts have been made to date with the municipality, U.S. Environmental Protection Agency (EPA), and landowner to gain an access easement to the proposed CS026 via the Higgins Farm property.
    c. The applicant has not adequately explained the compelling public need or demonstrated hardship. A demonstration of compelling public need is a NJDEP regulatory requirement;

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the position that need is demonstrated by the Federal Energy Regulatory Commission (FERC) Certificate is not enough. The NJDEP requires a full-throated explanation as to how this requirement is met, including an examination of how the regulated activity (impact to wetlands) is necessary for the benefit of state and/or municipality.

d. With regards to the infiltration basin at the proposed CS206, NJDEP asked if borings were conducted for the redesigned basin. Williams confirmed that no additional borings were required because the basin was merely reduced in size, not relocated.

2) Williams stated that the Project needs NJDEP permits in August 2019 to comply with various time-of-year constraints established for onshore and offshore construction, and to meet its contractual in-service date.

Administrative Completeness and Application Format

1) The NJDEP has 20 working days to determine if the application is administratively complete. NJDEP staff are currently working on this determination. NJDEP identified two items needed immediately to determine that the application is administratively complete:
   a. Payment in the form of a check was not received at the correct location at the time of the meeting. NJDEP staff recommended canceling the check and sending a new one.
      i. During the meeting, Williams made arrangements to deliver a new check to DLUR later in the day (June 20th).
   b. NJDEP indicated that Williams over-noticed neighboring landowners (beyond that required). This is making it harder for NJDEP to confirm that the correct landowners were noticed of the new application. NJDEP requested that Williams send repackaged proof of notices that includes only the required notices (CS206 and aboveground structures).
      i. Williams will provide a revised list of landowners and proof of notices including only those required. This will be provided Friday, June 21, 2019.
2) NJDEP requested that Williams re-package the applications from June 10, 2019 as stand-alone applications, without incorporating the previous applications by reference. NJDEP staff receive a large number of Open Public Records Act (OPRA) requests for high profile projects, such as this one, and it would be helpful for NJDEP to have one application package to use in response to the OPRA requests instead of multiple pieces, as was provided in the June 10, 2019 submittal. This repackaged application should only contain current Project information (no need to include the many revisions that reduced environmental impacts form the initial application submission). NJDEP indicated that they will continue their review of the materials submitted on June 10, 2019. The repackaged application will be submitted June 28, 2019 to support a bulletin publication likely on July 3, 2019.
   a. Project Team asked if the repackaged applications should also be sent to the three municipalities, and whether this would increase the risk that it could be perceived that there is additional information was incorporated into these applications after they had been

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submitted to the bulletin. In addition, the format requested by NJDEP (no redline of new information or strike through of old information) would make it more difficult to pick out new information provided. NJDEP staff suggested that the repackaged application should include an additional chapter in the environmental report with a full narrative explaining the history of consultations and modifications made to the Project to date, which will outline all new information provided in the application.

b. As a follow up, NJDEP staff asked what printed application materials are currently available at the municipalities. As part of the application package submitted on June 10, 2019, Williams printed and submitted to municipalities the same package containing the NOD response and all application materials incorporated by reference.

c. Williams asked how previous email correspondence with NJDEP staff should be incorporated into the reorganized application, as there is a concern that only including new information in the reorganized application won't show the history of improvements resulting from consultation. NJDEP staff suggested that this history would be covered in the new section added to the environmental report.

Compelling Need and Hardship

1) Williams explained that this was an important Project for both New York and New Jersey, with an important impact on the regional economy and climate.
2) NJDEP asked Williams for further explanation of why the NJDEP permits were needed by August 2019 and the deadline for the in-service date.
    a. Williams explained that if tree clearing is delayed past October 2019, then this will have a cascading effect that will push the in-service date back to December 2021.
    b. Williams estimated that the NJDEP permits are needed in August 2019 based upon the timeline of the remaining federal permits and approvals. The U.S. Army Corps of Engineers (USACE) won't issue a permit until after New Jersey and New York issue their 401 Water Quality Certificates, and the FERC won't issue the Notice to Proceed for construction until after the USACE and the states have issued all permits.
    c. National Grid (the customer for the natural gas) has indicated that if the schedule slips and the in-service date of December 2020 isn't met, then they will not have the ability to serve customers and would have to move onto other options.

Alternative CS206 Access Road: Higgins Farm Access Road

1) NJDEP stated that if the Higgins Farm property was recorded as a protected agricultural easement in the state ARDA, then it would be almost impossible to break the easement and this alternative access road would not be feasible. If not, then it would be up to landowner to allow the access road on the property. NJDEP suggested that Williams clearly demonstrate the depth of the discussions held with property owner, township, and EPA.

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a. Williams explained that it appears the township has not submitted to state program at this time but could do so at any time. Williams has had back and forth conversations with the EPA on how an access road on the property can be used with regards to Record of Decision (ROD) for the Higgins Farm Superfund site. The EPA has expressed that they don't have property interest but have a right to execute the remedy and enforcement of the remedy, at any time during construction or operation of CS206 the EPA could claim hardship and could close down the access road on the Higgins Farm property, cutting off access to CS206. With regards to the easement on the property, the ROD also requires that property be put into ARDA program either during remediation or at conclusion of remediation. Williams has tried to get permission from property owner in advance of easement with no success. Williams has had multiple meetings with the township manager and attorney to discuss the pending easement on the property.
b. NJDEP explained that Williams needs to provide evidence that Williams has tried to acquire the property from the township and evidence of efforts to build the access road through the Higgins Farm property before the property is recorded in the ARDA. What was described regarding the Higgins Farm Superfund Site ROD also needs to be included in application. NJDEP also suggested that Williams renew efforts to reach out to the township.

CS206 Siting

1) Williams asked NJDEP if the CS siting alternatives analysis provided and reduction in impacts to exceptional value wetland transition areas was sufficient. NJDEP explained that they wanted to know if Williams could shift the basin further west, out of the small portion of transition area still impacted.
    a. In the application submitted on June 10, 2019, Williams reduced the footprint of the infiltration basin, reducing the impacts to the transition area. Borings collected to date still apply to the reduced infiltration basin, and new calculations were provided in the submittal on June 10, 2019.
    b. Williams agreed to make adjustments to the infiltration basin and avoid impact to small portion of the transition area

Offshore WQ

1) Williams stated that the contaminant modeling requested in the NOD will be provided as part of the repackaged application.
2) Project Team asked if NJDEP technical staff could speak to the outstanding questions regarding water quality screening criteria for specific contaminants that didn't have promulgated acute or chronic criteria. NJDEP indicated that they would be available to discuss this following the meeting as the majority of the group present didn't need to be included.

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3) NJDEP staff did not have any further offshore technical review questions at this point as they haven't finished reviewing the details of the application yet.

Offshore Dredging and Disposal

1) NJDEP asked for Williams to confirm if the Project included dredging material for backfill or purchasing backfill material from a vendor. Williams stated that backfill material would be purchased from a contractor with a USACE sand mining permit.
2) NJDEP asked for Williams to confirm that the Project was going forward with the assumption that all dredge material would be going to upland disposal. Williams confirmed that upland disposal was still the plan, as approval for disposal at the Historic Area Remediation Site (HARS) from the USACE has not yet been determined. The Project has reached a technical milestone; the EPA indicated the dredged material proposed for disposal at the HARS passed their technical review and is now waiting for action from the USACE.

General Conformity

1) Williams wanted to make sure that NJDEP were aware of on-going consultations with other NJDEP staff for general conformity. As laid out in the FERC Final Environmental Impact Statement, Williams has the option to purchase credits and/or pursue state-level air quality mitigation projects. In addition to purchasing credits, Williams is also pursuing air quality mitigation projects. Specific to New Jersey, Williams has been working with NJDEP staff on a New Jersey state project that is a partnership between NJDEP, New Jersey Transit, and motor truck companies to retrofit diesel and locomotive engines.

Post-Meeting Notes

1) Following the meeting, NJDEP provided further feedback on screening criteria for specific contaminants that didn't have promulgated acute or chronic criteria. For contaminants that do not have acute or chronic criteria, NJDEP instructed Williams to determine if all other results are indicative of a reduction and if it can be assumed levels of other contaminants (without acute or chronic criteria) will also be reduced.
    a. This reduction supported by modeling coupled with the best management practices Transco has committed to implement as well as monitoring during construction, may support a conclusion that any contaminants introduced into the water column during construction will not have a negative impact on water quality and any impacts will be short-term, temporary and localized.

DRAFT

PHIL MURPHY
Governor
SHEILA OLIVER
Lt. Governor

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CATHERINE R. McCABE
Commissioner

Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625-0420
www.nj.gov/dep/landuse

November 27, 2019

Transcontinental Gas Pipe Line Co.
c/o Mr. Tim Powell
2800 Post Oak Blvd., Suite 900
Houston, TX 77056

RE: Application for a Freshwater Wetlands Individual Permit, Flood Hazard Area Individual Permit, Waterfront In-Water Individual Permit, Waterfront Upland Individual Permit, Coastal Wetlands Individual Permit, Water Quality Certificate and Coastal Zone Consistency Determination
DLUR File No.: 0000-01-1001.3; LUP 190001 & 190003
Applicant: Transcontinental Gas Pipe Line Company Co.
Project: Northeast Supply Enhancement Project
Block: 5.0 Lots: 1.02 (formerly 9, 10, 12, 16 & 17), 11.02, 20 (formerly 23) & 25
Township of Franklin, Somerset County
Transco R.O.W.s
Township of Old Bridge and Borough of Sayreville, Middlesex County

Dear Mr. Powell:

On June 12, 2019 and on October 28, 2019 Transcontinental Gas Pipe Line Co. (Transco) submitted an application to the New Jersey Department of Environmental Protection (NJDEP) for the above-referenced permits for its Northeast Supply Enhancement (NESE) Project, which includes the proposed construction of a new compressor station and two new 26-inch diameter pipelines through freshwater wetlands, transition areas, coastal wetlands, flood hazard areas, riparian zones, and under the Raritan Bay under NJDEP's state authority and federally assumed authority under the Clean Water Act, specifically the Freshwater Wetlands Protection Rules (N.J.A.C. 7:7A), the Coastal Zone Management Rules (N.J.A.C. 7:7), which incorporate the NJDEP's consideration of water quality impacts and determination whether to issue a Water Quality Certificate pursuant to Section 401 of the federal Clean Water Act, and the Flood Hazard Control Act Rules (N.J.A.C. 7:13). By letter dated November 27, 2019, Transco requested withdrawal of each of the pending applications under review by this Department. This letter shall confirm that these applications are hereby considered withdrawn and that the Department shall take no further action on the NESE Project.

In addition, please be advised that in the event Transco submits a new application for the NESE Project under the aforementioned statutes and regulations, at a minimum, the following statutory and regulatory deficiencies associated with the withdrawn applications must be resolved to the Department's satisfaction:

Compelling Public Need. The NJDEP's governing rules, particularly N.J.A.C. 7:7A-10.4, require that the applicant demonstrate that there is a compelling public need for the proposed activity. To address the compelling public need requirement, Transco relies, in part, on the Federal Energy Regulatory Commission (FERC) May 3, 2019 Certificate of Public Convenience and Necessity and January 25, 2019 Final Environmental Impact Statement. According to Transco, this information demonstrates a public need for an increase in the capacity of the existing Northeast Supply line by 400,000 Dth/d of additional incremental transportation capacity to National Grid's existing service territory in order to serve National Grid's residential and commercial customers in the New York City area. While, in response to NJDEP's June 5, 2019 application denial, Transco provided additional information seeking to demonstrate the benefits of the project to New Jersey residents, such as increased reliability of the interconnected interstate gas delivery system, the primary recipient of the proposed capacity increase remains New York residents. In its latest application, Transco indicated that the NESE Project will support the growing demand for natural gas as a result of New York City's mandate requiring the conversion of buildings from heavy heating oils. According to Transco, in 2011, New York City began the planned phase-out of No. 4 heating oil by 2030. Transco states that the NESE Project will displace the use of No. 4 fuel oil in New York City and Long Island, resulting in significant reduction of ozone precursors of nitrogen oxides (NOx), sulfur dioxide (SO2), and particulate matter (PM). However, in order to fully establish a compelling public need, Transco must demonstrate concurrence from New York to confirm the purported public need, particularly in light of recent public statements by New York questioning that need, and to ensure that the project is not constructed in New Jersey without an endpoint for the proposed additional capacity.

Alternative Access Road for Compressor Station 206. The NJDEP's governing rules, particularly N.J.A.C. 7:7A-10.2, requires that the applicant demonstrate that there is no practicable alternative with less adverse environmental impacts. With respect to the site of the proposed compressor station (CS 206), Transco proposes to disturb or eliminate several acres of freshwater wetlands, transition area, open water and riparian zone vegetation. However, it appears that Transco has identified a means of accessing the site that could avoid or minimize these impacts. Transco's alternatives analysis identified an existing access road for the adjacent Higgins Farm Superfund Site, known as Block 5.20, Lot 26.01, as an alternative point for accessing the CS 206 site. Based upon an inspection of the site and the use of the NJDEP GIS wetland mapping, the NJDEP has determined that use or expansion of the existing Higgins Farm access road could avoid freshwater wetlands, State open waters and riparian zone vegetation. In the submitted application, Transco stated its expectation that it would not be able to pursue this alternative because of: (1) the status of Higgins Farm as a Superfund Site; (2) the existence of a conservation easement prohibiting non-agricultural development on the property; and (3) Transco's inability to obtain authorization from the FERC for use of the existing access road, including through condemnation. However, it appears that Transco has not taken steps necessary

to establish that the Higgins Farm access road does not represent a practicable alternative. To do so, Transco would be required to, at a minimum: (1) take further steps to acquire all property rights necessary for use of the existing Higgins Farm access road from the property owners and any easement holders, through negotiation and, if necessary, condemnation; (2) obtain authorization from FERC for use or expansion of the existing Higgins Farm access road to access the compressor station; and (3) coordinate with the Environmental Protection Agency to allow for the intended use, and any required extension, of the existing Higgins Farm access road.

New Dredging. The NJDEP's rules governing new dredging, particularly N.J.A.C 7:7-12.7, requires that the applicant demonstrate, among other things, that adverse environmental impacts are minimized to the maximum extent feasible. Due to suspected contamination of sediments along the proposed submerged pipeline route within Raritan Bay, the NJDEP required Transco to provide pre-dredging chemical and physical analysis of the dredged material, as well as additional testing to determine potential impacts to surface water quality and benthic communities. The results indicated that the proposed dredging could potentially adversely impact surface water quality. In response to the NJDEP's June 5, 2019 application denial, Transco provided additional modeling for chemical fate transport of certain contaminants in order to predict potential effects on water quality. Transco's June 26, 2019 report entitled *"NESE Contaminant Transport Modeling Results For New Jersey Waters"* relied in part on the implementation of dredging best management practices (BMPs). However, Transco did not provide any information as to the means of monitoring the proposed dredging and jet plow operation to ensure that BMPs and operational procedures would be properly implemented to comply with Surface Water Quality Standards (SWQS). Nor did Transco set forth any adaptive management procedures that could be implemented in the event of an exceedance of the SWQS, which would be necessary to return any operation to compliance with the standards.

In conclusion, all the above referenced applications are withdrawn. Naturally, if Transco submits a new application for the NESE Project and addresses the above-referenced deficiencies, the Department will thoroughly review any new information submitted for consistency with its statutes and regulations. If you have any questions regarding this letter, please contact me at (609) 984-6216.

Sincerely,

Christopher Jones, Manger
Division of Land Use Regulation
Bureau of Urban Growth & Redevelopment

c: Bureau of Coastal and Land Use Enforcement, Toms River
Borough of Sayreville Clerk and Planning Board
Township of Old Bridge Clerk and Planning Board
Township of Franklin Clerk and Planning Board

Mr. Joe Dean, Transco

From: DEP NATLANDS
To: Czapka, Stephen J.
Subject: Data Request for: CS206
Date: Friday, June 23, 2017 1:40:58 PM
Attachments: 12057-17-4007445.pdf

Good afternoon,
Attached, please find the results of the data request for the above-referenced project.

Please note the following changes to Natural Heritage Database Reports:
Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from the Landscape Project Version 3.3. This is an update from the previous Version 3.1 released in February of 2012. It contains approximately 3,400 new occurrences and three (3) previously unrepresented animal species: the Federally and State Endangered Atlantic sturgeon (*Acipenser oxyrinchus*), the Federally Threatened Northern myotis/Northern long-eared bat (*Myotis septentrionalis*), and the State Special Concern carpenter frog (*Lithobates virgatipes*).

There have been no changes to any of the other datasets and no changes to the format of the Heritage reports. All users will continue to receive reports listing all rare species and ecological communities that may be on their project sites. In 2016, the Natural Heritage Program, revised the reports for rare plant and ecological community data. There has been no change to these reports. For rare plant species, the standard database searches and those provided for projects subject to the Flood Hazard Control Act rules use slightly different search protocols. The 2016 revisions to the reports for rare plant species and ecological communities are summarized below:

All users will receive a consolidated report for all occurrences of rare plant species and rare ecological communities in the immediate vicinity (within ¼ mile) of their project sites. These reports include rare plant species and ecological communities in addition to those wetland plant species regulated by the Flood Hazard Area Control Act rules. These reports may include records for rare plant species for which the precise location of the occurrence is not known. These are often older records, and surveys are needed in order to determine the current condition and location of these occurrences in relation to proposed projects.

Users requesting reports for Flood Hazard Area Control Act (FHACA) permits will continue to receive the same reports for those wetland plant species identified by the FHACA regulations as being critically dependent on the watercourse. These reports are limited to precisely located records for these species within one mile of the project site. The Department of Environmental Protection, Division of Land Use Regulation (DLUR) will use this report to determine whether the habitat for any regulated plant species occurs on site or within one mile downstream. The Natural Heritage Program cannot make a regulatory determination about whether rare species occurrences on these reports are subject to the provisions of the FHACA. Applicants should contact the DLUR directly.

If you have any further questions, feel free to contact me.

Mark Wong

Mark Wong
GIS Specialist
State of New Jersey Department of Environmental Protection
NJ State Forestry Service - MC501-04
Office of Natural Lands Management

Natural Heritage Program
501 E. State Street, 4th Floor
PO Box 420
Trenton, NJ 08625-0420
(609) 984-0059
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State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Parks & Forestry
State Forestry Service
Mail Code 501-04
Office of Natural Lands Management – Natural Heritage Program
P.O. Box 420
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Tel. (609) 984-1339 Fax. (609) 984-1427

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

June 23, 2017

Stephen Czapka
Ecology and Environment, Inc.
348 Southport Circle, Suite 101
Virginia Beach, VA 23452

Re: CS206
Franklin Township, Somerset County

Dear Mr. Czapka:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by

the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 17-4007445-12057

Mail Code 501-04
Department of Environmental Protection
State Forestry Service
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420
Tel. (609) 984-1339 Fax. (609) 984-1427

Invoice

Date	Invoice #
6/23/2017	12057

Bill to:
Ecology and Environment, Inc.
348 Southport Circle, Suite 101
Virginia Beach, VA 23452

Make check payable to:
Office of Natural Lands Management
And forward with a copy of this statement to:
Mail Code 501-04
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420

Quantity (hrs.)	Description	Rate (per hr.)	Amount
1	Natural Heritage Database search for locational information of rare species and ecological communities. Project: 17-4007445-12057	$ 70.00	$ 70.00
Stephen Czapka Project Name: CS206		**Total**	$ 70.00

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	No	0 pages included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1705
Potential vernal habitat area	1719

Total number of records: 2

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N

Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1705
Potential vernal habitat area	1719

Total number of records: 2

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	No	0 pages included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Grasshopper Sparrow	Ammodramus savannarum	Breeding Sighting	3	NA	State Threatened	G5	S2B,S3N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N

Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1697
Potential vernal habitat area	1705
Potential vernal habitat area	1719
Potential vernal habitat area	1726
Potential vernal habitat area	1728

Total number of records: 5

Northeast Supply Enhancement (NESE) Project
New Jersey Department of Environmental Protection (NJDEP)
Field Review of the Jurisdictional Determinations and Delineations of Waters/Wetlands on the Proposed CS 206 Location and Madison Loop

To: Ms. Karen Olson
Williams/Transco
Northeast Supply Enhancement Project (NESE) Onshore Project Manager
2800 Post Oak Blvd – Level 11
Houston, TX 77056
(713) 215 - 2000

From: Jeffrey A. Mason, PWS
Ecology & Environment, Inc.
Chief Environmental Scientist
NESE Onshore Environmental Survey Manager
368 Pleasant View Dr.
Lancaster, NY. 14086
(716) 462 - 2543

Date: 12/07/2017

RE: **Northeast Supply Enhancement Project (NESE) – NJDEP Agency Walkover Summary for October 26th, 2017 at CS206 and November 8th, 2017 on the Madison Loop**

NJDEP Review Participants at CS 206 and the Madison Loop

Name	Affiliation	Email Contact	Walkover Dates
Mr. Matthew Resnick	New Jersey Department of Environmental Protection – Project Manager	Matthew.Resnick@dep.nj.gov	10/26/17 & 11/08/17
Mr. Christopher Jones	New Jersey Department of Environmental Protection – Project Manager	Christopher.Jones@dep.nj.gov	10/26/17 & 11/08/17
Ms. Karen Olson	Williams/Transco – Onshore Project Manager	Karen.Olson@williams.com	10/26/17 & 11/08/17
Mr. Brian Ham	Williams/Transco – Compressor Station Project Manager	Brian.Ham@Williams.com	10/26/17
Ms. Su Lin Jaaskelainen	Williams/Transco – Engineering Project Manager	SuLin.Jaaskelainen@williams.com	11/08/17
Mr. Steve Kellogg	Williams/Transco – Project Director	Steve.Kellogg@williams.com	10/26/17 & 11/08/17

Mr. Russell S. Markowski	Williams/Transco Manager of Operations - CS 207	Russell.S.Markowski@Williams.com	11/08/2017
Mr. Jeffrey Mason	Ecology & Environment, Inc. – Environmental Survey Manager	jmason@ene.com	10/26/17 & 11/08/17
Mr. Evan Sheppard	Ecology & Environment, Inc. – Lead WOTUS Delineator	esheppard@ene.com	10/26/17 & 11/08/17
Mr. William Macholdt	Amy S. Green Environmental Consultants, Inc.	bmacholdt@amygreene.com	10/26/17 & 11/08/17
Ms. Sue Quackenbush	Amy S. Green Environmental Consultants, Inc.	squackenbush@amygreene.com	11/08/17

MADISON Loop - WOTUS Agency Review and Walkover Summary

Dear Ms. Olson,

Included below is a draft summary of the October 26th, 2017 and November 8, 2017 New Jersey Department of Environmental Protection (NJDEP) agency field reviews of the jurisdictional determinations and delineations of New Jersey freshwater waters/wetlands at the proposed CS 206 location and along the Madison Loop. Persons in attendance at both agency field reviews are listed in the table above.

A) The October 26th, 2017 Agency review began at 9:00am at the Transco ROW adjacent to the proposed CS 206 location. Ms. Olson and Mr. Mason brought the meeting to order, which began with a brief round of introductions and a short health and safety moment.

Neither of the NJDEP agency personnel requested to see any specific locations or features on the proposed CS 206 location so a general review of the freshwater water/wetlands at the proposed location was conducted.

The following issues were addressed along the CS206 review during the field walkover on October 26th, 2017:

1) A request to revise jurisdictional line work to edit existing “open ended” features to reflect that the waters/wetland may continue and/or the area was not fully surveyed by removing the flags on those edges and indicating that the boundary is open-ended beyond the limits of disturbance (LOD).
2) There were two streams along the proposed access road that will be pulled from the freshwater permitting plans based on NJDEP input as there is no well-defined bed and bank (WW-T21-001 and WW-T21-001) and they are more likely defined as non-jurisdictional drainage features. Both non-jurisdictional drainage features occur within the existing delineated wetland W-T09-002C-1.

I) Bed and bank was defined to start for these features down-gradient at existing flags WW-T21-001-004 and WW-T21-002-002, respectively, which is where the riparian buffer will be applied.
II) Mr. Resnick noted that storm water controls that impact wetlands should be reassessed. Ms. Olson mentioned Transco will talk to soil conservation district to discuss how to reduce impacts while still meeting storm water control regulations.

3) NJDEP requested that Transco continue to assess the ROW tie-in location:
   I) NJDEP requested Williams assess different routes for the suction and discharge (S&D) piping, specifically regarding maximizing impacts to PEM and minimizing impacts to PFO.
   II) Ms. Olson offered that Transco would map out an alternate scenario and calculate impacts to show options
      a) Mr. Kellogg advised that Transco is limited by where engineering can tie in by bends in the existing pipeline and by the crossing of the adjacent Sunoco pipeline.
      b) NJDEP requested a narrative justification for why a short HDD is not feasible for crossing S&D piping under the Sunoco pipeline. Mr. Resnick stressed this needs to be in very simple terms.
4) Madison Loop Review
   I) NJDEP open to Madison Loop visit in lieu of meeting next week. Mr. Jones needed to determine if it still worked with his schedule and if he had a vehicle available. Ms. Olson told Mr. Jones she'd have Sara Mochrie from E&E follow up.
   II) Mr. Resnick wanted additional justification regarding two HDD pull backs – he felt that the justifications provided needed to be simplified further.

At the end of the meeting, Williams asked NJDEP if there was any additional information they required to continue processing the permit application. Mr. Jones specified that additional information about the alternatives analysis is required, which Ms. Olson noted is in progress. Ms. Olson relayed to Mr. Jones that Transco is planning to hold until after the site visit so that they could pair with any plan revisions and not be peppering him constantly with multiple submissions. Mr. Jones agreed that that is his preferred approach.

CS 206 Review Action Items to be Completed

Action	Lead	Timeframe	E&E Team
Transco (Brian/Jason/Karen) to sketch out S&D piping options based on information gathered on existing lines and accompanying narrative regarding options we did and did not assess and why	Transco	Dec 2017	BH, JS, KO,
Transco (Brian/Jason/Karen) to provide narrative justification for why HDD for S&D piping isn't feasible	Transco	Dec 2017	BH, JS, KO,

Transco (Karen and Brian) to discuss storm water along road with Somerset Union Soil Conservation District (11/1/17)	Transco/PADEP	Dec 2017/Spring 2018	KO, BH
E&E map out scenarios and conduct impact calcs, once received, using remote sensing if necessary	E&E	December 2017/January 2018	JM, JH, ES
Sara follow up with Chris regarding Madison Loop site visit possibility next week, or alternatively, a meeting about overall technical review status	E&E	December 2017/January 2018	SM,KO,BH, JM

B) The November 8th, 2017 NJDEP Agency field review of the Madison Loop began at Williams/Transco compressor station 207 located on the Madison loop at MP 8.6, adjacent to the beginning of the western end of the Madison Loop. The same individuals, with the exception of Brian Ham from Transco, listed above for the October 26th NJDEP field review meeting were in attendance. In addition, Ms. Su Lin Jaaskelainen and Mr. Russell Markowski from Transco, and Ms. Sue Quackenbush from Amy Green Environmental Consultants were in attendance for the November 8th field review. Ms. Olson brought the meeting to order and Mr. Markowski provided a short health and safety reminder regarding personal protective equipment (PPE) (Hi-Vis vests and fireproof clothing), and slips, trips, and fall hazards to the group.

Neither of the NJ DEP agency personnel requested to see any specific locations or features on the Madison Loop so a general review of the waters/wetlands along the portion of the Madison Loop under NJDEP freshwater wetlands jurisdiction was conducted.

The following issues were addressed along the Madison Loop review during the field walkover on November 8th, 2017:

1) No adjustments to jurisdictional boundaries/flagging were requested by NJDEP based on the visit.
2) No coastal waters/wetlands or waterfront development areas were reviewed. NJDEP stated there was no regulatory need for them to look at those areas.
3) NJDEP reported no future visits for review of the jurisdictional waters/wetlands on the Project are anticipated.
4) During the 206 site visit, Mr. Resnick had mentioned he was concerned about our HDD pull-back workspace impacting wetlands and water features. The field team looked at overview maps of the Madison Loop and explained the alignment required to complete the pull-back and the stringing consistent with the existing ROW and Mr. Resnick indicated he was satisfied with the response.
5) At the close of the meeting, Ms. Olson asked if Mr. Resnick had any further outstanding issues/questions/concerns with the FWW/FHA technical deficiency letter items related to the

Madison Loop and he replied that he did not. Williams/E&E will make sure the official notes document these two field reviews and are part of the official record for the New Jersey portion of the NESE Project.

6) Ms. Olson mentioned to NJDEP the ballpark timeframe of early December for plan resubmittal.
7) The following three deliverables were requested by NJDEP following the field reviews:
   I) A Complete sets of revisions upon resubmittal (i.e. not individual page updates) – this is the plan, no issues with request
   II) A HDD video explaining the process
   III) A Visual representation (video, perhaps, or figures) of the difference between the jet sled and the jet trencher for the off-shore portion of the project.

Madison Review Action Items to be Completed

Action	Lead	Timeframe	E&E Team
Complete sets of revisions upon resubmittal (i.e. not individual page updates)	Transco/E&E	Upon submittal	KO, SM, KP, JM
A HDD video explaining the process	Transco	Dec 2017/Jan 2018	SL J, Laney
A Visual representation (video, perhaps, or figures) of the difference between the jet sled and the jet trencher	Transco	Dec 2017/Jan 2018	KO

Please feel free to contact me if you have any questions or concerns regarding the NJDEP field review summaries provided above for CS 206 and the Madison Loop jurisdictional determinations and delineations that occurred on October 26th, 2017, and November 8th, 2017.

Sincerely Yours,

Jeffrey A. Mason, PWS

Ecology & Environment, Inc.

NESE Onshore Environmental Survey Coordinator

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

December 19, 2019

T. Lane Wilson
Senior Vice President and General Counsel
The Williams Companies, Inc.
One Williams Center, Suite 4900
Tulsa, Oklahoma 74172

Re: Higgins Farm Site, Franklin Township, NJ

Dear Mr. Wilson:

This letter follows up on our discussions regarding the request by the Williams Companies, Inc. and its subsidiary, the Transcontinental Gas Pipe Line Company, LLC (Transco) (collectively, WT), to improve and use an existing access road at the Higgins Farm Superfund Site (Site), located in Franklin Township, New Jersey. WT seeks access to the road to reach its pipeline on a property adjacent to the Site, in order to construct a compressor station. The road is currently used by the U.S. Environmental Protection Agency (EPA) and NCH Corporation (NCH) and its contractors to reach a groundwater treatment plant at the Site. NCH is performing the remedial action at the Site under a consent decree with EPA.

In a letter dated March 8, 2017, EPA provided information about measures that WT should take to ensure the integrity of the remedial action at the Site, assuming WT is able to obtain the right to use the access road from the owners. Based on the information provided by WT to date, and subject to confirmation by NCH, EPA believes that WT's proposed improvement, use and extension of the roadway can be carried out consistent with the measures described in the March 8, 2017 letter so as not to interfere with the ongoing remedial action at the Site.

EPA's right to have access to and use the roadway is pursuant to a 2007 judicial consent decree that the United States entered into with the Higgins family, not an easement for access. The Higgins family owns the entire Site property and their consent would be needed by WT in order for the company to have access to and improve, use and extend the roadway, that is, for the full 2,600 feet that WT proposes to use. It is our understanding that WT has initiated discussions with the Higgins family. Alternately, WT might exercise eminent domain power pursuant to the federal Natural Gas Act, 15 U.S.C. § 717 et seq.

In addition, the Township of Franklin holds the property's development rights under an agricultural easement that was granted to the Township by the Higgins family pursuant to the 2007 consent decree. It is EPA's understanding that the Township's consent would be needed for any changes to the property that conflict with the agricultural easement, unless, as with the Higgins family, WT was to exercise eminent domain power pursuant to the federal Natural Gas Act. The Higgins family and the Township of Franklin are the parties to the agricultural easement; EPA is not a party to the easement, though it has some rights to enforce the terms of the easement. If the parties to the easement agree to modify it and the

modification is consistent with our understanding of WT's proposed use, EPA would not object to the modification.

As noted above, to confirm that WT's proposed improvement, use and extension of the roadway will not have a negative impact on the remedial action, NCH will need to be consulted. EPA will shortly contact NCH to arrange a call among EPA, NCH and WT to discuss WT's proposed improvement and use of the existing access road, to confirm that those activities will not impede NCH's remedial work. Mazeeda Khan of EPA Region 2's Superfund and Emergency Management Division will contact Joseph Dean of Transco to arrange that discussion.

EPA's March 8, 2017 letter to counsel for Transco identified minimum measures that WT should take to ensure the integrity of the ongoing remedial action in the event that WT obtains access to the Site. Those measures, listed below, would apply to WT's proposed improvement, use and extension of the access road:

- WT must ensure that the design and construction of any alteration or extension of the access road does not limit, impede or otherwise affect EPA's or NCH's access to the Site for any purpose EPA deems necessary, including but not limited to overseeing or performing remedial activities, including operation of the treatment plant and access to the monitoring and extraction wells;
- WT must not block the roadway at any time and should refrain from using the access road in any manner that would interfere with or adversely affect the implementation, integrity or protection of the remedial measures performed or to be performed by EPA, its authorized representatives, or NCH at the Site;
- WT must implement stormwater management and erosion controls as necessary to ensure that any construction involving the roadway does not result in the discharge of additional stormwater to the area of the Site where NCH is performing remedial activities;
- WT and its contractors must provide evidence that their employees entering the Site to perform any road construction activities have taken Occupational Safety and Health Administration 40-hour Hazardous Waste Operations training;
- WT must require that any employee of WT or its contractors entering the Site attend any safety and security briefings scheduled by EPA, NCH or the U.S. Army Corps of Engineers; and
- WT must comply with any land use restrictions established in connection with the remedial action for the Site and must not impede the effectiveness or integrity of any future institutional or engineering controls established by EPA in connection with the remedial action.

If you have any questions regarding this matter, please contact Regional Project Manager Mazeeda Khan at 212-637-3715 or the undersigned at 212-637-3149.

Sincerely,

Sarah Flanagan

for

Deborah Schwenk
Assistant Regional Counsel

Northeast Supply Enhancement (NESE) Project

Project Meeting Summary

Date: December 20, 2019, 9:30-10:30 EST
RE: Higgins Farm Superfund Site – Use of EPA Access Road for Compressor Station 206 Access
Location: Conference Call

Participants

Jonathan Gorin, EPA
Mazeeda Khan, EPA
Neal Kolb, USACE
John Rolfe, De Maximus
Jim Power, O&M, Inc.
Mike Near, NCH
Joseph Dean, Transco
Karen Olson, Transco
Brian Ham, Transco
Jason Olivier, Transco
Scott Horner, Transco
Sara Mochrie, E & E
Dave Albers, E & E
Katharine Perry, E & E
Meghan Albers, E & E

Meeting Summary

A conference call was held with the U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (USACE), NCH Corp. (NCH), Transco, and Ecology and Environment, Inc. (E & E) to discuss the potential use and extension of the existing access road on the Higgins Farm Superfund Site for access to Transco's proposed Compressor Station 206. The following is a summary of what was discussed.

1) Introductions
   a) Participants introduced themselves, stated their affiliated company, and role on the Project
2) Project Introduction
   i) Transco provided an overview of proposed Compressor Station 206. Compressor Station 206 would be a two-turbine compressor station in Franklin Township on a parcel adjacent Transco's existing Mainline, and adjacent to the Higgins Farm Superfund Site. The Project will ultimately deliver additional volumes of natural gas to Long Island and the Queens area in New York.
   ii) An access road is needed to access the proposed site. Transco initiated communication with the EPA for potential use and extension of the existing Higgins road in 2016 and early 2017.
   iii) Transco's original applications to NJDEP included the use of an access road through the Trap Rock property. However, due to NJDEP deficiency letters stating that the Higgins Farm access road would result in significantly less wetland impacts relative to the Trap Rock access road, Transco is now pursing access rights for use of the proposed Higgins Farm access road.
3) Proposed Plan for Higgins Farm access road
   a) Transco proposes to use the existing access road that extends off Georgetown Franklin Turnpike/County Route 518 to the EPA's facility. However, to avoid impacts to NJDEP-regulated

wetland transition areas north and south of the existing access road, the road must extend through the southwest corner of the existing parking lot near the groundwater treatment building before veering south toward the proposed compressor station site. The preliminary access road design (as depicted on the figure provided in the meeting invite) would involve the following modifications to the EPA facilities:

i) Removal of the existing gate and relocation of the fence to follow the proposed access route through the southwest corner of the site.
ii) Installation of a separate sliding gate to provide secure access to the parking areas surrounding the facility (see also item 3.c.ii below).
iii) Relocation of one electric utility pole located at the southwest corner of the facility. (Note: Transco defers to EPA regarding the new location for the pole and will coordinate with the utility provider to complete the relocation.)
iv) Possible relocation of the facility office trailer. (Note: The current design would leave approximately 10 feet of space between the new gate/fence and the office trailer. At EPA's request, Transco would be willing to relocate this trailer to provide greater separation between the fence and trailer.)

b) EPA staff indicated that Transco will need to coordinate with NCH for use of the road because they are the operators of the facility.
c) Transco presented the general plan for the proposed road construction.
   i) Transco anticipates being able to use the existing site entrance but may need to temporarily increase and reinforce the apron in this area to allow for larger construction vehicles to pass through. Post construction, the entrance will be restored to its original state.
      (1) The County has specific requirements for width requirements. Additional reinforcements such as stone may be needed to avoid off-road travel and soil runoff.
      (2) Transco will identify overhead wires that may pose threats to construction to ensure no loss of power or communication to the EPA facility.
   ii) Transco proposes installation of two gates at the EPA facility: the first located to the north of the access road, which will provide access to the EPA facility (see 3.a.ii above), and the second to provide access to the monitoring wells located south of the Higgins property, on the property Transco now owns.
      (1) These gates would be actuated for convenience of site operators, with key card access and sensing loops on the inside so no manual lock and unlock are needed.
         a. Transco would provide key card access to necessary parties, including the fire department and other emergency service providers to access the proposed CS 206 property.
         b. Keypad access and manual rolling gates with locks were also discussed as options. Transco would ultimately defer to the EPA and NCH regarding their preference on gate access.
      (2) Avoiding the needs for two gates was discussed as a potential option if the service utility pole and trailer could be moved on the south side of the facility building. If this can't be accomplished, two gates would likely be needed.

(3) Overall, neither the EPA or NCH expressed issues or concerns regarding the proposed actuated gates.

iii) Once construction has reached the southern edge of the asphalt apron, a gravel road would be constructed to reach the compressor station.

iv) EPA noted that during normal business hours when someone is present at the EPA facility, the entrance from the road is left open. If the gates need to be left closed even when someone is on site, communication will need to be established from the gate to the facility itself so that deliveries can be made.

(1) Transco indicated that they could install a call box and camera and run a telecommunication system down the EPA road to allow separate communications with both the EPA facility and Transco's new compressor station. Transco, EPA, and NCH agreed that this should be discussed further at a site visit.

4) Questions and Comments

a) Will the compressor station road and parking area be gravel or asphalt?

i) Transco stated that the figure shows the road as 24-foot-wide asphalt road. It will likely need to transition to a gravel road because of stormwater permitting constraints.

b) The existing gravel pathway off the southeast corner of the EPA facility needs to remain in place for NCH to access the monitoring wells. Transco confirmed the road would not be fenced on either side and access to the pathway would not be interrupted.

c) NCH indicated that there is a wetland monitoring point near extraction well RW-11.

i) Transco is aware of these areas and has delineated around them to avoid disturbance.

d) Transco asked what the setback distance from existing wells should be from proposed workspace.

i) Transco has set the edge of the road 25-feet from all wells.

ii) Transco requested information pertaining to the underground infrastructure associated with the remediation and monitoring wells.

(1) NCH and EPA will provide the as-builts for Transco to review. This information is available at the EPA facility at the site.

iii) There will be an additional meeting the discuss existing infrastructure on the site.

e) NCH and EPA would like to review the engineering design, and long-term care and maintenance plans for the road.

i) Transco confirmed that restoration of the road following construction will be Transco's responsibility and that the road will be in as good, or better condition. Additionally, all future maintenance of the road would be handled by Transco.

f) Future use and needs of the road were discussed.

i) EPA noted that since Transco's needs for the access road will likely extend beyond those of the EPA, its worth considering whether the property rights of the road could be transferred now to Transco who would then provide access to EPA, USACE, and the facility operators.

(1) It was noted that Higgins gave access to EPA, and that the Higgins will also need to give Transco access to this site. Transco confirmed they are in discussion with Higgins regarding use of the site.

ii) Throughout construction, typical traffic would include several 1-ton trucks per day.

iii) Following construction, the station would be manned daily from approximately 6:00 am to 3:30 pm and traffic would be limited to station operators, and periodic deliveries. Any additional construction or vehicle access would be addressed on a case-by-case basis.
iv) Transco would plow the road and ensure it is maintained.

g) Potential office trailer relocation was further discussed.
   i) Would need to further investigate existing plumbing and electric connections to determine if relocation would be feasible.
   ii) This will be further discussed during a site visit with the operator.
h) NCH noted that the Higgins have granted access to their property for hunting.
i) EPA asked if a fire suppression/water supply well was planned. Transco noted that a private well is not proposed. If this changes, EPA and NCH will be informed.
j) EPA noted that all material brought in for road construction will need to meet state requirements. No recycled material can be used as it could contain contaminants. All road base or asphalt that Transco would use needs to be clean fill. Transco confirmed that only clean material free of contaminants will be used.
   i) EPA asked how power will be brought into the station and Transco indicated that power will be brought in via the new overhead wires along the existing powerline.
k) Transco explained that all excavation activities associated with the compressor station site will be outside the plume. During construction if contamination is detected, Transco has standard practices outlined in its Unanticipated Discovery of Contamination Plan that it would be followed. An environmental inspector would be on-site to ensure those practices and Transco's plan are followed. In the event contamination is encountered, Transco would collect and segregate the contaminated material and transport it to an appropriate disposal facility.
   i) EPA noted that if the contamination is located within the Superfund site or is identified as having originated from the Superfund site, the contaminated material would need to be disposed of at a certified CERCLA disposal facility. Coordination around disposal of contamination would also be needed with the EPA and USACE. EPA/NCH will share a list of approved CERCLA disposal facilities.
   ii) EPA noted that the Superfund site extends to the boundaries of the Higgins property and in the event that contaminated material is encountered, Transco should notify EPA.
   iii) The groundwater on the site is also classified as part of the Superfund site.
   iv) Transco noted that minor trench dewatering from the overburden will be needed, and that all collected water will be held in a frac tank and transported offsite for characterization, treatment, and disposal.

5) Transco will coordinate with meeting attendees regarding a date at the end of January/early February to meet at the site to further discuss details of the proposed access road.

Northeast Supply Enhancement (NESE) Project

Project Meeting Minutes

To: Transcontinental Gas Pipe Line Company, LLC
From: Ecology and Environment
Date: January 2, 2020
RE: December 30, 2019 NJDEP Pre-Application Conference Call Meeting Minutes

Participants

NJDEP: Chris Jones, Joslin Tomagno, Magda Usarek-Witek
Williams/Transco: Joe Dean, Scott Horner, Karen Olson, Steve Kellogg,
E & E: Sara Mochrie, Katharine Perry, Steve MacLeod

Meeting Summary

- Staff from Transcontinental Gas Pipe Line Company, LLC (Transco), Ecology and Environment, Inc. (E & E), and New Jersey Department of Environmental Protection (NJDEP) participated in a pre-application conference call on December 30, 2019 to review a number of questions with respect to Transco's NJDEP permit applications for the Northeast Supply Enhancement Project (Project).
- Transco noted that it was planning to submit applications for Waterfront Development Permit (WFD), Freshwater Wetlands Permit (FWW), and Flood Hazard Area Permit (FHA) on January 20, 2020. Transco noted that its goal in submitting the permit applications on January 20, 2020 was to target publication by NJDEP in the February 5, 2020 NJDEP bulletin.
- Transco plans to fully address the deficiencies outlined in NJDEP's November 27, 2019 letter on the Project.
- With respect to NJDEP's compelling public need deficiency outlined in the November 27 letter, Transco anticipates a decision on its permit applications in New York from the New York Department of Environmental Conservation in May of 2020.

Compressor Station 206 Access Road

- Transco noted that its forthcoming FWW and FHA permit applications will reflect the use of the Higgins Farm access road as the preferred alternative. The Trap Rock access road would still be evaluated and included within Transco's Alternatives Analysis.
- NJDEP noted that Transco's permit application should present a single proposed access road and NJDEP's expectation is that the access road proposed will be the Higgins Farm access road.
- Transco clarified that Transco's intention is to only propose the Higgins Farm access road, but Transco is currently working on obtaining the appropriate approvals necessary to move forward with the Higgins Farm access road. In the event that FERC denies Transco's use of the Higgins Farm

DRAFT

access road, or Transco is unable to obtain the necessary rights to the property, Transco intends to include all information necessary for NJDEP to evaluate the Trap Rock access road as an alternative to the Higgins Farm access road.

- Transco explained that the Higgins Farm access road to be included in Transco's FWW application as the preferred alternative will have no impacts to regulated features. Transco asked if NJDEP planned on conducting a site walkover to confirm the presence/absence of regulated features at the Higgins Farm access road. NJDEP noted that they may conduct a site walkover. In order to do so NJDEP will need landowner permission via the signed DLUR form. If that cannot be obtained than NJDEP would need proof of condemnation.

Waterfront Development Permit Application Questions

- The NJDEP team responsible for reviewing Transco's WFD permit application will be meeting within next couple of weeks to provide answers to the questions posed by Transco on December 19, 2019 and will provide feedback so Transco has what they need to address the deficiency outlined in the November 27, 2019 letter.
- Ms. Usarek-Witek stated that generally NJDEP would not require monitoring for chemical analytes but staff at NJDEP still needed to discuss what monitoring requirements will be required for the Project.
- Ms. Usarek-Witek stated that NJDEP can provide examples of water quality (WQ) monitoring plans for other NJDEP permitted projects.
- NJDEP will provide the basic parameters for the water quality monitoring plan. The plan should also include adaptive management strategies previously identified in Transco's prior application materials, including those shown by modeling to help control turbidity (e.g., slowing dredging rates and observance of slack-tide pauses).
- Ms. Mochrie emphasized that Transco's goal is to submit the new permit applications on January 20 and that they want to ensure they are being responsive to the items outlined in NJDEP's November 27, 2019 deficiency letter. NJDEP acknowledged this and reiterated that they plan to provide monitoring plan examples as well as further direction once they are able to meet and discuss internally; they confirmed additional feedback would be provided prior to January 20. NJDEP also noted that they are planning to work with Transco during the application review process to ensure that any outstanding requirements associated with the WQ Monitoring Plan are satisfied.
- Ms. Mochrie asked if it would help to submit a draft WQ monitoring plan prior to the submittal of the application; Ms. Usarek-Witek said it would not help, particularly given NJDEP staff limitations/obligations prior to January 20. Mr. Kellogg asked whether communications between NJDEP and Transco on the WQ Monitoring Plan following submittal of the permit applications would prevent Transco's permit applications from being deemed administratively or technically complete. Ms. Usarek-Witek stated that if Williams provides a proposal for monitoring with its application, NJDEP will find its application technically complete on this point and NJDEP will work through the plan with Transco to identify any remaining needs during the application review period.

- End Summary -

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Northeast Supply Enhancement (NESE) Project

Project Meeting Minutes

To: Transcontinental Gas Pipe Line Company, LLC
From: Ecology and Environment
Date: January 7, 2020
RE: January 6, 2020 NJDEP Waterfront Development Pre-Application Conference Call Meeting Minutes

Participants

NJDEP: Joslin Tomagno, Magda Usarek-Witek, Suzanne Biggins, Gary Nickerson
Williams/Transco: Scott Horner, Karen Olson, Blake Clements
E & E: Sara Mochrie, Katharine Perry, Steve MacLeod, Lea Cervi

Meeting Summary

- Staff from Transcontinental Gas Pipe Line Company, LLC (Transco), Ecology and Environment, Inc. (E & E), and New Jersey Department of Environmental Protection (NJDEP) participated in a pre-application conference call on January 6, 2020 to review the water quality monitoring requirements expected for Transco's NJDEP Waterfront Development permit application for the Northeast Supply Enhancement Project (Project). This call was held as follow-up to a conference call on December 30, 2019.
- E & E noted that Transco was planning to submit an application for a Waterfront Development Permit (WFD) on January 20, 2020.
- E & E asked if NJDEP has expectations regarding water quality monitoring and if NJDEP could provide some examples for water quality monitoring permit conditions/plans. NJDEP replied that they had examples, but that each construction/dredging project is treated uniquely with respect to monitoring.
- NJDEP asked whether Transco had received guidance from New York State Department of Environmental Conservation (NYSDEC) regarding anticipated water quality monitoring requirements and stated that NJDEP would like to align the NJDEP water quality monitoring requirements with NYSDEC.
- E & E stated that Transco had previously installed pipeline in New York waters as part of the Rockaway Delivery Lateral (RDL) Project. Transco conducted water quality monitoring as part of that project permit conditions and has not received any feedback from NYSDEC that the water quality monitoring requirements for the Project would differ from those required for the RDL.
- NJDEP asked what specific monitoring requirements were applied for the RDL construction. E & E replied that the New York State has a qualitative standard to identify whether there is a visual

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contrast in turbidity. In addition, New York has a quantitative total suspended solid (TSS) standard. As such, Transco made visual surface observations for turbidity and also collected water samples for TSS analysis at an onshore lab.

- NJDEP stated that they would expect similar monitoring requirements with three points of monitoring, including two control points outside of the area of construction and one point within the area of operation. The monitoring points and positions will be based on the tool in use and anticipated sediment plumes.
- At each monitoring station NJDEP will require visual observation and recording of turbidity and/or TSS to ensure sediment plumes are minimized. Monitoring events should occur twice daily, once during flood tide and once during ebb tide.
- For TSS monitoring NJDEP will require that Nephelometric Turbidity Units (NTUs) are measured at control and construction sampling points instead of waiting for TSS measurements results from the lab. NJDEP will establish a threshold for implementing adaptive management actions, e.g., if construction area measurements for turbidity are greater than 50% over the control (i.e., background) sampling measurements.
- NJDEP noted that adaptive management strategies should include items previously identified as part of Transco's WFD application, including slowing the rate of dredging and/or observing slack-tide pauses in construction, as well as any other potential best management practices that Transco can offer.
- Additionally, NJDEP noted that Transco should take environmental conditions into consideration when identifying monitoring station locations and when deciding which adaptive management strategies to apply, particularly areas along the route where elevated contaminant levels are present.
- E & E noted that during the RDL project, exceedances of turbidity and TSS were not observed and asked NJDEP what the expectations would be if very low NTU measurements were taken at the control sample sites as a 50% exceedance could occur due to natural variability. NJDEP stated that the 50% threshold might at least trigger a notification requirement, and NJDEP would then work with Transco to determine appropriate adaptive management solutions, if warranted. NJDEP noted that they would look to Transco to solve the issue if the proposed adaptive management strategies were not sufficient.
- NJDEP noted that Transco could determine the method of sampling (e.g., in-situ measurements using a sonde vs. grab samples). NJDEP mainly wants to ensure that Transco is adequately analyzing the sediment plume if one exists and that sampling occurs throughout the water column. E & E asked if surface, mid and bottom measurements will be sufficient. NJDEP confirmed, and indicated that only two depths may be sufficient when monitoring in shallow waters.
- NJDEP stated that daily reporting of the monitoring results would be required and can be done via a project portal or similar online tool to be established by Transco.
- E & E asked that if there is a mechanism to reduce monitoring requirements during construction if exceedances are repeatedly not observed. NJDEP noted that NJDEP could consider relaxing monitoring requirements; however, it would consider substrate, tidal conditions and construction activities and whether previous non-exceedances were observed under similar conditions as those of future activities.
- NJDEP stated that typically chemical contaminant monitoring is not required and that the TSS/turbidity sampling would be sufficient to evaluate whether surface water quality exceedances

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had occurred. However, NJDEP noted that Transco could propose contaminant sampling/monitoring and NJDEP would consider whether there would be value in sampling for contaminants.

- Transco asked whether NJDEP would review Transco's draft Water Quality Monitoring Plan prior to submittal of the WFD application. NJDEP declined this offer, stating that they would review the plan once submitted with Transco's permit application and would provide comment within the 20 days required by New Jersey's rules.
- E & E again asked if NJDEP could provide examples of previously approved water quality monitoring plans. NJDEP declined to provide any examples, reiterating that the plans are tailored to each project. NJDEP instead suggested that Transco use the plan they previously developed for RDL as a template.
- NJDEP invited Transco to contact them with additional questions but again advised Transco to submit a Water Quality Monitoring Plan with the WFD application based on the feedback provided thus far. NJDEP requested that Joslin Tamagno be copied on all related communications.

- End Summary -

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

OCT 2 8 2019

Eric Howard, Chief Gas Branch 2
Division of Gas – Environment and Engineering
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

RE: Endangered Species Act consultation for Northeast Supply Enhancement (CP 17-01-000; FERC/EIS-0280F)

Dear Mr. Howard:

We are responding to your August 27, 2019, request to initiate formal section 7 consultation under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 15311543), for the Transco Northeast Supply Enhancement Project. The Federal Energy Regulatory Commission is the lead Federal agency for this project; other federal agencies authorizing aspects of the project include the U.S. Army Corps of Engineers and the National Marine Fisheries Service's Office of Protected Resources. We will issue one Biological Opinion that considers effects of all federal actions on species listed under the ESA under our jurisdiction, including ESA listed marine mammals, sea turtles, and sturgeon.

All information required to initiate formal Section 7 consultation was included in your August 27, 2019, letter, the attached supporting documentation, or is otherwise accessible for our consideration and reference. Therefore, we are initiating formal consultation. The ESA and the section 7 regulations (50 CFR 402.14) require that formal consultation be concluded within 90 calendar days of initiation, and the biological opinion be delivered to the action agency within 45 days after the conclusion of formal consultation (i.e., January 9, 2020), unless we mutually agree on an extension. In the meantime, pursuant to section 7(d) of the ESA, you must not make any irreversible or irretrievable commitment of resources that would foreclose the formulation or implementation of any reasonable and prudent alternatives to avoid jeopardizing endangered or threatened species or destroying or adversely modifying designated critical habitat.

We look forward to working with your office during the formal consultation process. If you have any questions or concerns about the consultation, please contact Julie Crocker of my staff (978-282-8480 or julie.crocker@noaa.gov).

Sincerely,

Julie Crocker for

Jennifer Anderson
Acting Assistant Regional Administrator
for Protected Resources

cc: Crocker, Greene - F/GAR
Carduner, F/PR
Handell, USACE

File Code: Sec 7 FERC Formal – Northeast Supply Enhancement
GARFO-2019-00357