Federal Energy Regulatory Commission
Office of Energy Projects

June 2017

National Fuel Gas Supply Corporation **Docket No. CP16-28-000**

Line Q, QP, and Queen Storage Facility Project

Environmental Assessment

Washington, DC 20426

Cooperating Agencies
United States Army Corps of Engineers
United States Department of Agriculture - Forest Service
Pennsylvania Fish and Boat Commission

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 3
National Fuel Gas Supply Corp.
Line Q, QP, and Queen Storage
Facility Project
Docket No. CP16-28-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared an environmental assessment (EA) for the Line Q, QP, and Queen Storage Facility Project, proposed by National Fuel Gas Supply Corporation (National Fuel) in Forest and Warren Counties, Pennsylvania. National Fuel proposes to abandon by sale its existing Queen Storage Field and Queen Compressor Station (collectively Queen Storage Facilities), and about 5.5 miles of existing 6-inch-diameter natural gas pipeline (Line Q). National Fuel would construct about 5 miles of 4-inch-diameter plastic natural gas pipeline (Line QP) and a regulatory station to maintain service to its existing local distribution customers. The purpose of the project is to abandon capacity in National Fuel's natural gas storage system and to provide that capacity to other gathering system suppliers in Pennsylvania while maintaining service to existing local distribution customers.

The EA assesses the potential environmental effects of the construction and operation of the Line Q, QP, and Queen Storage Facility Project in accordance with the requirements of the National Environmental Policy Act (NEPA). The FERC staff concludes that approval of the proposed project, with appropriate mitigating measures, would not constitute a major federal action significantly affecting the quality of the human environment.

The U.S. Department of Agriculture-Forest Service, U.S. Army Corps of Engineers, and the Pennsylvania Fish and Boat Commission participated as cooperating agencies in the preparation of the EA. Cooperating agencies have jurisdiction by law or special expertise with respect to resources potentially affected by the proposal and participate in the NEPA analysis.

The FERC staff mailed copies of the EA to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and groups; and libraries in the project area. In addition, the EA is available for public

viewing on the FERC's website (www.ferc.gov) using the eLibrary link. A limited number of copies of the EA are available for distribution and public inspection at:

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

Any person wishing to comment on the EA may do so. Your comments should focus on the potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. The more specific your comments, the more useful they will be. To ensure that the Commission has the opportunity to consider your comments prior to making its decision on this project, it is important that we receive your comments in Washington, DC on or before **July 1, 2017.**

For your convenience, there are three methods you can use to file your comments with the Commission. In all instances, please reference the project docket number (CP16-28-000) with your submission. The Commission encourages electronic filing of comments and has expert staff available to assist you at 202-502-8258 orFERCOnlineSupport@ferc.gov.

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

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

(3) You can file a paper copy of your comments by mailing them to the following address:

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

Any person seeking to become a party to the proceeding must file a motion to intervene pursuant to Rule 214 of the Commission's Rules of Practice and Procedures (18 CFR 385.214).[1] Only intervenors have the right to seek rehearing of the Commission's decision. The Commission grants affected landowners and others with environmental concerns intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding that no other party can adequately represent. **Simply filing environmental comments will not give you intervenor status, but you do not need intervenor status to have your comments considered.**

Additional information about the project is available from the Commission's Office of External Affairs, at **(866) 208-FERC,** or on the FERC website (www.ferc.gov) using the eLibrary link. Click on the eLibrary link, click on "General Search," and enter the docket number excluding the last three digits in the Docket Number field (i.e., CP16-28). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

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

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

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TECHNICAL ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effect
AQCR	Air Quality Control Region
amsl	above mean sea level
BA	biological assessment
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
Commission	Federal Energy Regulatory Commission
CWA	construction work area
dBA	Decibels on the A-weighted scale
EA	Environmental Assessment
ECS	*Environmental Construction Standards*
EI	Environmental Inspector
ESA	Endangered Species Act
ESCAMP	Erosion Sedimentation Control and Agricultural Mitigation Plan
FERC	Federal Energy Regulatory Commission
FERC Plan	FERC *Upland Erosion Control, Revegetation, and Maintenance Plan*
FERC Procedures	FERC *Wetland and Waterbody Construction and Mitigation Procedures*
g	Gravity
GHGs	Green House Gases
HCA	high consequence areas
Ldn	day-night sound level Ldn
Leq	24-hour equivalent sound level
MLV	mainline valve
MSHCP	Multi-Species Habitat Conservation Plan
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NFS	National Forest Systems
NGA	Natural Gas Act
NHPA	National Historic Preservation Act

NMFS	National Marine Fisheries Service
NPS	National Park Service
NOI	Notice of Intent
NO_x	nitrogen oxides
NRHP	National Register of Historic Places
O_3	ozone
OEP	Office of Energy Projects
PGA	peak ground acceleration
PADEP	Pennsylvania Division of Environmental Protection
PFBC	Pennsylvania Fish and Boat Commission
Project	Line Q, QP, and Queen Storage Facility Project
PM_{10}	particles with an aerodynamic diameter less than or equal to 10 microns
$PM_{2.5}$	particles with an aerodynamic diameter less than or equal to 2.5 microns
Secretary	Secretary of the Commission
SHPO	state historic preservation office(r)
SO_2	sulfur dioxide
SPCC	*Spill Prevention, Containment, and Control Plan*
USACE	United States Army Corps of Engineers
USDA-FS	United States Department of Agriculture- Forest Service
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compounds

A. PROPOSED ACTION

1.0 Introduction

On December 3, 2015, National Fuel Gas Supply Corporation (National Fuel) filed an application with the Federal Energy Regulatory Commission (Commission or FERC) in Docket No. CP16-28-000. National Fuel seeks a Certificate of Public Convenience and Necessity (Certificate) and authorization under Section 7(b) and 7(c) of the Natural Gas Act (NGA) to abandon certain facilities and construct new gas pipeline in Forest and Warren Counties, Pennsylvania. National Fuel's proposed project, referred to as the Line Q, QP, and Queen Storage Facility Project (Project) would include abandoning by sale its existing Queen Storage Field and Queen Compressor Station (collectively Queen Storage Facilities) and approximately 5.2 miles of existing 6-inch-diameter natural gas transmission pipeline (Line Q). Also, National Fuel would construct, operate, and maintain a plastic 4-inch-diameter natural gas transmission pipeline (Line QP) and a regulator station to maintain service to its existing local distribution customers.

We[2] prepared this Environmental Assessment (EA) in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations for implementing NEPA under Title 40 of the Code of Federal Regulations (CFR) Parts 1500 1508 (40 CFR 1500-1508), and the Commission's implementing regulations under 18 CFR 380.

The FERC is the lead federal agency for the preparation of this EA. The U.S. Department of Agriculture-Forest Service (USDA-FS), U.S. Army Corps of Engineers (USACE), Pittsburgh District, and the Pennsylvania Fish and Boat Commission (PFBC) are cooperating agencies that assisted us in preparing this EA because they have jurisdiction by law or special expertise with respect to environmental impacts associated with National Fuel's proposal.

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

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

[2] "We," "us," and "our" refer to environmental staff of the Commission's Office of Energy Projects (OEP).

2.0 Purpose and Need

According to National Fuel, the purpose of the Project is to abandon capacity in its natural gas storage system and to provide that capacity to other gathering system suppliers in Pennsylvania. National Fuel's Queen Storage Field is a small field with 300 million cubic feet (MMcf) of working gas capacity, and is no longer necessary to provide storage service to National Fuel's existing customers. EmKey Energy, LLC (EmKey) expressed interest in purchasing the Queen Storage Facilities and the associated 6-inch-diameter natural gas transmission pipeline, Line Q, connecting to the Queen Storage Facilities. Consequently, National Fuel is proposing to abandon by sale its Queen Storage Facilities and Line Q, which primarily provides connection of the storage field to National Fuel's transmission system.

National Fuel states that the two existing 6-inch-diameter Line Q crossings of the Allegheny River (only one of the two pipes is actively flowing gas) are exposed from scour and may be compromised. To alleviate risk to human health and the environment, National Fuel would remove exposed portions Line Q, and replace the Line Q pipe from a point just south of the Allegheny River to National Fuel's existing Tidioute South Station just north of the Allegheny River in Tidioute Borough, Warren County, Pennsylvania (approximately 0.18 miles) prior to sale of facilities to EmKey. National Fuel would replace the Line Q Allegheny River crossing segment with a non-jurisdictional 12-inch-diameter steel pipeline. In addition, National Fuel would construct a 4-inch-diameter plastic line (Line QP) concurrent with the replacement of Line Q and along the same alignment as the 12-inch-diameter pipeline, to allow National Fuel to continue to serve its local distribution company (LDC) customers.

Under section 7(c) of the NGA, the Commission determines whether interstate natural gas transportation facilities are in the public convenience and necessity and, if so, grants a Certificate to construct and operate them. The Commission bases its decisions on technical competence, financing, rates, market demand, gas supply, environmental impact, long-term feasibility, and other issues concerning a proposed project. Section 7(b) of the NGA specifies that no natural gas company shall abandon any portion of its facilities subject to the Commission's jurisdiction without the Commission first finding that the abandonment will not negatively affect the present or future public convenience and necessity.

National Fuel's proposed Project is located nearly entirely within the bounds of the Allegheny National Forest (ANF), which is administered by the USDA-FS. The USDA-FS purpose of the action is to respond to National Fuel Gas Company's request for special use authorization. Similarly, Emkey would need to secure a special use permit for the pipeline right-of-way associated with Line Q. To help inform this special use decision, Forest Service-specific language and analysis has been added to this EA. Actions on National Forest Service (NFS) lands are guided by the Allegheny National Forest Land and Resource Management Plan (USDA-FS 2007). This plan establishes the types of land uses that are

suitable in each management area and provides a suite of standards and guidelines to guide project activities. The proposed right-of-way is within management areas 3.0, 2.2 and 8.1. These management areas are suitable for the proposed use. Additional information on these management areas is included in section B.4.

3.0 Public Review and Comment

3.1 FERC Scoping

On January 20, 2016, we issued a *Notice of Intent to Prepare an Environmental Assessment for the Proposed Line Q, QP, and Queen Storage Facility Project and Request for Comments on Environmental Issues* (NOI). The NOI was published in the Federal Register and was mailed to 144 interested parties, including federal, state, and local government representatives and agencies; elected officials; affected landowners; environmental and public interest groups; potentially interested Native American tribes; other interested parties; and local libraries and newspapers.

The Commission received one comment from the USACE identifying permit and consultation requirements for the Project. The USACE commented that a known population of federally listed endangered mussel species would be adversely affected and formal consultation under Section 7 of the Endangered Species Act (ESA) must occur with the U.S. Fish and Wildlife Service (USFWS). The USACE also noted that the Project is located within a designated Wild and Scenic River portion of the Allegheny River. The USDA-FS, Region 9, Regional Forester must give approval that the proposed Project is in compliance with the National Wild and Scenic Rivers Act of 1968 prior to the issuance of any USACE authorization for activities in this portion of the Allegheny River. If the USDA-FS concludes the project would have an effect on the Wild and Scenic Corridor, then the USACE cannot issue a permit.

The Commission is required to comply with the ESA. Our consultations with the USFWS as required by section 7 of the ESA are summarized in the section B.3.2.4 of this document. Additionally, we have prepared this EA with the cooperation of the USDA-FS and the USACE. Furthermore, we recommend in section C of this EA that any potential Certificate that may be issued require all federal permits to be received prior to work commencing.

3.2 U.S. Forest Service Scoping

On November 4, 2016, the USDA-FS initiated a 30-day scoping period for the special use authorization request from National Fuel to perform work on national forest land. Due to the fact that the USDA-FS is a cooperating agency and to streamline the NEPA process, this EA will address the comments received by the USDA-FS.

The USDA-FS received a comment from the Allegheny Defense Project (ADP) that EmKey's special use request be included in this environmental review. While the FERC has no jurisdiction over the proposed EmKey project, EmKey's proposal is considered in

the cumulative effects analysis (section B.7). The Queen Storage Facilities and the 6-inch-diameter transmission pipeline that EmKey wishes to purchase have already been constructed. There would be no additional environmental impacts, with exception of the river crossing in which both the 12-inch-diameter Line Q replacement segment, and the 4-inch-diameter Line QP pipe would be placed in one trench. The impacts from river construction are analyzed in this document.

The USDA-FS received a comment from ADP during the scoping period recommending an environmental impact statement (EIS), rather than an EA, be prepared to assess the impact of the project. An EA is a concise public document that serves to provide sufficient evidence and analysis for determining a finding of no significant impact. Pursuant to 18 CFR 380.6(b) "If the Commission believes that a proposed action…may not be a major federal action significantly affecting the quality of human environment, an EA, rather than and EIS, will be prepared first. Depending on the outcome of the EA, an EIS may or may not be prepared." In preparing this EA, we are fulfilling our obligation under NEPA to consider and disclose the environmental impacts of the project. As noted above, this EA addresses the impacts that could occur on a wide range of resources, should the project be approved and constructed. Based on our analysis and the extent and content of comments received during the scoping period, we conclude that the impacts associated with this project can be mitigated to support a finding of no significant impact. Thus, an EIS is not warranted.

The USDA-FS received a comment from ADP that this document must consider an alternative that does not involve increasing capacity. The proposed non-jurisdictional 12-inch-diameter pipeline in the river crossing would tie into the 6-inch-diameter pipeline that connects to the Queen Storage Facility that EmKey intends to purchase. National Fuel indicates that EmKey is not proposing to increase the capacity of natural gas.

The USDA-FS received a comment from ADP that the EA should disclose the indirect and cumulative effects of oil and gas development in the Allegheny National Forest. The project does not involve increasing capacity, and would have no causal relationship to oil and gas development in the Allegheny National Forest; therefore, there are no indirect impacts associated with oil and gas development to analyze in the EA. Cumulative impacts are discussed in section B.7.

The U.S. Environmental Protection Agency (USEPA) submitted comments with regard to; purpose and need, alternatives, aquatic resources, water quality, Section 404 of the Clean Water Act, geology, waterbody crossings, biological resources, threatened and endangered species, land use, air, climate change, environmental justice, cultural resources, and cumulative impacts. The comments are noted and incorporated into the appropriate sections of this document.

4.0 Proposed Facilities

The locations of the pipeline and associated facilities are depicted in figure 1 and described below. The Project would consist of the following:

- abandon by sale the existing Queen Storage Field and Queen Compressor Station (collectively Queen Storage Facilities), property interests related thereto, and approximately 5.5 miles of the 6-inch-diameter natural gas transmission pipeline Line Q from Queen Compressor Station to a point just south of the Allegheny River in Limestone Township, Warren County, Pennsylvania;

- abandon in-place 0.18 mile of existing Line Q pipeline crossing the Allegheny River, with the exception of exposed portions that would be removed, and replace the crossing with a non-jurisdictional 12-inch-diameter natural gas transmission pipeline that would be sold to EmKey;

- install approximately 5 miles of new 4-inch-diameter natural gas transmission pipeline (Line QP) within the Line Q right-of-way; and

- construct a new regulator station and two service taps.

Lines Q and QP would cross approximately 2.4 miles of National Forest System lands. Currently, National Fuel has an existing 35-foot-wide pipeline right-of-way. Upon Project completion, Lines Q and QP would be co-located in a right-of-way (under two special use permits). This right-of-way would be either 41.5 feet wide (north of Route 337) or 49.5 feet wide (south of Route 337).[3]

Line QP would be designed for a maximum allowable operating pressure (MAOP) of 124 psig from the tie-in to the remaining Line Q at Tidioute South Station to the new regulator station in Limestone Township, Warren County and a MAOP of 60 psig from the new regulator station south to the tie-in with existing National Fuel distribution mains approximately 2,000 feet west of the Queen Compressor Station.

Aerial photo based maps of the pipeline and aboveground facilities are included in appendix A. Minor alignment shifts or additional temporary workspace may be required prior to and during construction to accommodate currently unforeseeable site-specific constraints related to construction, safety, engineering, landowner, and/or environmental concerns. All such alignment shifts or workspace needs would be subject to review and approval by FERC and the other appropriate permitting agencies prior to construction, with

[3] The Allegheny National Forest Land and Resource Management Plan divides the Forest into "Management Areas" (MA). This ROW crosses three MAs: 2.2 (Late Structural Linkages), 3.0 (Even-aged Management), and 8.1 Wild and Scenic River Corridor. All three of these MAs allow right-of-ways and utility corridors.

the exception of minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

4.1 Pipeline and Storage Facilities

Queen Storage Facilities

National Fuel proposes to abandon by sale, without modification, the existing Queen Storage Field, including 30 storage wells and associated well lines and gathering lines, appurtenant facilities, and all applicable rights-of-way, easements, and property interests. The Queen Storage Facilities, inclusive of the Queen Compressor Station, would be sold as-is to EmKey and would include approximate 72.8 acres of permanent easement and owned land. The associated storage pool and buffer area being sold to EmKey totals approximately 2,688.6 acres.

Line Q

National Fuel proposes to abandon by sale approximately 5.2 miles of Line Q, from the existing Queen Storage Facilities in Hickory Township to a point just south of the Allegheny River in Limestone Township. National Fuel proposes to abandon approximately 0.18 mile of existing Line Q from the point just south of the Allegheny River crossing to the Tidioute South Station. National Fuel proposes to remove portions of the existing 6-inch-diameter Line Q pipeline that are exposed due to scour within the river and cap the remaining pipe to be left abandoned in place. A second, inactive existing 6-inch-diameter steel Line Q crossing would also be abandoned in place.

Prior to abandonment by sale to EmKey, National Fuel would construct a new Allegheny River crossing for Line Q, consisting of a 12-inch-diameter steel pipeline. National Fuel would tie the new crossing into the existing Line Q pipe to be abandoned by sale on the south side of the Allegheny River. This replacement crossing would be completed as a non-jurisdictional activity. [4]

Line QP

To maintain service to existing LDC customers, National Fuel is proposing to install a replacement pipeline (Line QP) along the length of Line Q to be abandoned by sale. The replacement pipeline would be approximately 5 miles long and would start at the Tidioute South Station and terminate approximately 2,000 feet west of Queen Compressor Station in Hickory Township.

[4] National Fuel intends to replace the abandoned pipeline with a new 12-inch-diameter steel pipe for EmKey's future use. EmKey, as the proposed buyer, would tie-in the new crossing to its facilities on the north side of the Allegheny River after the sale is finalized. Total permanent easement to be sold to EmKey is approximately 21.1 acres.

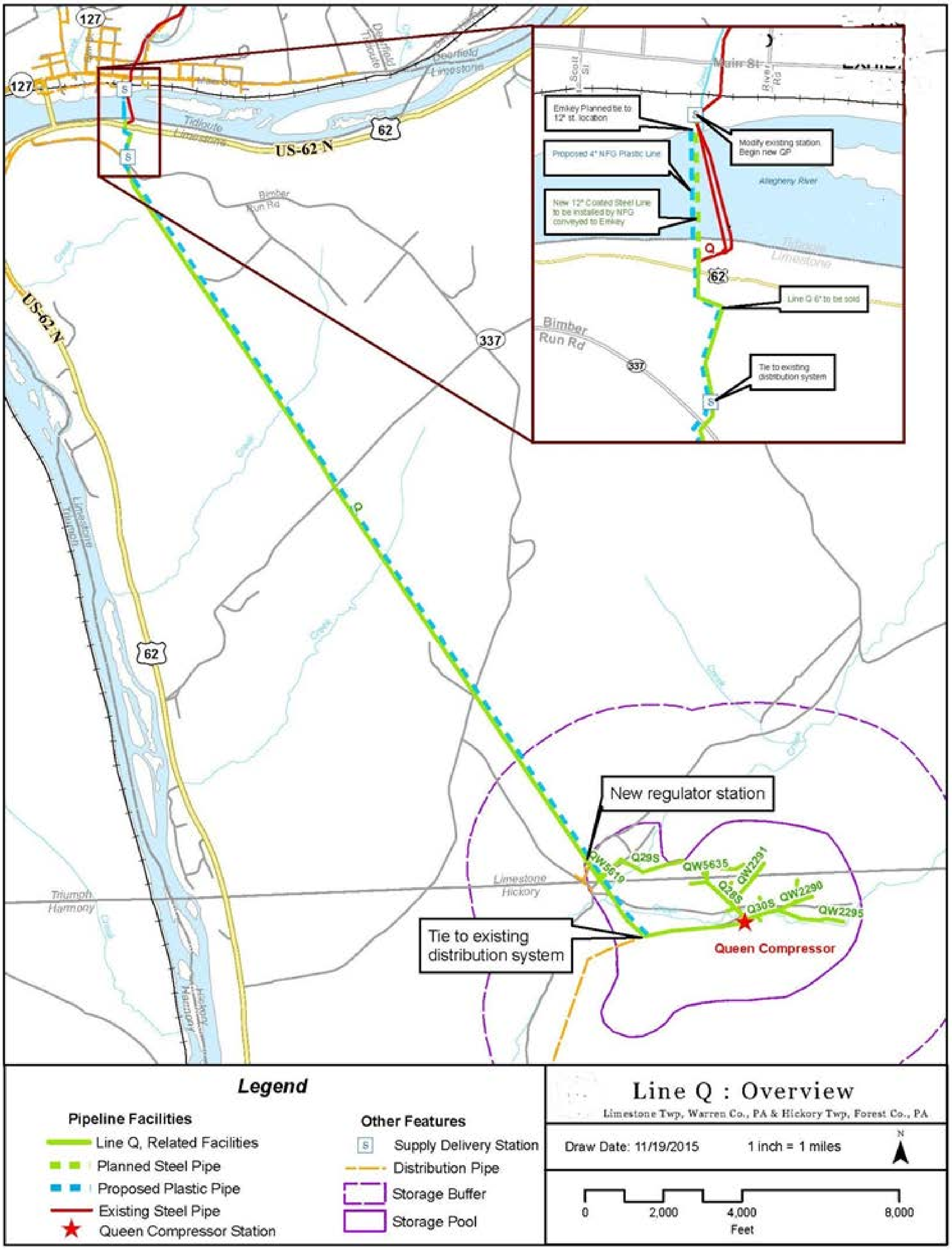
The replacement plastic pipeline would be constructed and manufactured in accordance with the American Petroleum Institute (API) specifications for polyethylene line pipe for use in conveying gas in the natural gas industries (API 15LE).

The replacement crossing of the Allegheny River for Line QP would be constructed by installing Line QP within a 6-inch-diameter steel casing attached to the non-jurisdictional 12-inch-diameter Line Q replacement in a single trench. New steel pipe used as casing for the crossing would be manufactured in accordance with the API specifications for seamless and welded steel line pipe for use in conveying gas in the natural gas industries (API 5L). Permanent easement of the Line QP Allegheny River crossing would consist of a 41.5-foot-wide corridor centered on the final alignment.

Access Roads

The Project would require the use of three temporary access roads as shown on the maps in appendix A. The temporary access roads would be used for constructing the pipeline facilities only. Once temporary access roads are no longer necessary, they would be returned to their as-found condition or better, subject to provisions of applicable permits and landowner agreements. Access roads would be designed and constructed in accordance with local and state standards and codes (e.g., with respect to specifications, materials, adequate drainage). All other access would be from existing public roadways. Access roads and staging areas across NFS lands would require approval by the Forest Service Permit Administrator. These roads, regulator station, and staging areas would, if practical, avoid wetlands and riparian areas.

Figure 1



Emkey Planned tie to 12" st. location
Modify existing station. Begin new QP
Proposed 4" NFG Plastic Line
New 12" Coated Steel Line to be installed by NFG conveyed to Emkey
Allegheny River
Line Q 6" to be sold
Tie to existing distribution system
Main St
Bimber Run Rd
US-62 N
New regulator station
Tie to existing distribution system
Queen Compressor
QW5619
Q29S
QW5635
QW2291
Q28S
Q30S
QW2290
QW2295
Legend
Pipeline Facilities
Line Q, Related Facilities
Planned Steel Pipe
Proposed Plastic Pipe
Existing Steel Pipe
Queen Compressor Station
Other Features
Supply Delivery Station
Distribution Pipe
Storage Buffer
Storage Pool
Line Q : Overview
Limestone Twp, Warren Co., PA & Hickory Twp, Forest Co., PA
Draw Date: 11/19/2015
1 inch = 1 miles
0
2,000
4,000
8,000
Feet

5.0 Land Requirements

Constructing and operating the Line Q and Line QP facilities would impact land both temporarily and permanently. Temporarily affected lands would be restored to pre-existing conditions or better upon completion.

The Line QP pipeline facilities would be installed within a 41.5-foot to 49.5-foot-wide permanent right-of-way, which would be shared between National Fuel and EmKey, in accordance with applicable governmental regulations, permit requirements and authorizations, and landowner agreements. The Line QP permanent easement would consist of 15 to 25 feet of the shared easement.[5] During construction, 25 feet of temporary workspace (TWS) would be available, overlapping with EmKey's permanent easement for Line Q and adjacent to Line QP easement, for a total typical construction width ranging from about 50 to 60 feet. In areas where additional working width is necessary, additional temporary workspace (ATWS) would be used, up to 25 feet, to accommodate construction methods, materials, and/or equipment. Locations where ATWS is typically necessary include road and foreign utility crossings, equipment turnarounds, and adjacent to wetland and waterbody crossings. Similarly, in areas where the right-of-way must be restricted (e.g., near residential areas) the right-of-way would be reduced. The amount of ATWS would be expanded or restricted as necessary (i.e., by length and/or width), as shown on maps in appendix A, to accommodate crew needs and site conditions.

With the exception of the Allegheny River crossing, National Fuel would maintain a minimum separation distance of 10 to 15 feet between Line QP and the existing Line Q. Right-of-way configurations for various workspace arrangements are provided in appendix A.

In total, National Fuel would abandon about 72.8 acres of permanent easement and owned land. The associated storage pool and buffer area being sold to EmKey totals approximately 2,688.6 acres.

Additional Temporary Workspace

ATWS is needed at locations requiring additional excavation; soil stockpiling; or staging of additional equipment and/or materials. Examples include:

- road and railroad crossings;
- wetland and waterbody crossings;
- horizontal direction drill (HDD) workspace;
- areas with steep slopes (greater than 25 percent) and side hills;
- areas requiring topsoil segregation (e.g., agricultural lands);

[5] On NFS lands, an easement is not available. Both Emkey and National Fuel Gas will be required to apply for a special use permit for a right-of-way.

- equipment turn-arounds; and
- equipment and material staging areas.

On NFS lands, these temporary work areas would need to be approved by the Forest Service Permit Administrator and avoid wetlands and riparian areas, where possible. ATWS would be needed on NFS lands to the south of the Allegheny River within the riparian corridor and would require about 0.58 acres of disturbance to the floodplain.

The size and configuration of an ATWS is dependent upon its purpose as well as the existing site conditions at each proposed work location. A summary of proposed ATWS and staging areas is provided on table 1.

5.1 Pipeline Facilities

Right-of-way arrangements are provided in appendix A, and table 2 summarizes land requirements for the Project.

The Project would affect a total of about 45.3 acres of land during construction of the pipeline facilities. This includes the disturbances associated with the construction right-of-way, access roads, ATWS, and staging areas. Operation of Line QP facilities would permanently affect 19.8 acres of land, which would be primarily within the existing utility right-of-way, and temporarily impact about 0.97 acre associated with replacement activities in the Allegheny River.

The existing right-of-way occupies about 10 acres of NFS land. The proposed expansion of the right-of-way would impact 14.3 acres total, an increase of 4.3 acres. In addition, on NFS lands, temporary work spaces may impact another 7 acres. These temporary work spaces are not included in the permanent right-of-way and, after construction, would be allowed to return to natural conditions. This calculation does not include the up-to 25 feet additional work spaces that may be needed for construction.

Table 1
Proposed Extra Work and Staging Areas

Facility	County	ID	Milepost	Location	Existing Land Use(s)[a]	Permanent/ Temporary	Approximate Length(ft) / Dimensions[b]	Approximate Acreage	Reason For Variance
Pipeline ATWS	Warren	WS-1	0.0	South of Stream 2	Forest	Temporary	Irregular	0.18	Extra Workspace for Allegheny River Crossing
		WS-2	0.0	South of Stream 2	Forest	Temporary	Irregular	0.40	Extra Workspace for Allegheny River Crossing
		WS-3	0.1	South of Route 62	Forest	Temporary	10 feet x 50 feet	0.01	Road Crossing
		WS-4	0.2	South of Route 337	Open	Temporary	Irregular	0.05	Road Crossing
		WS-5	4.3	North of Jaybuck Lane	Developed	Temporary	25 feet x 75 feet	0.04	Road Crossing
		WS-6	4.3	North of Wetland T	Developed	Temporary	25 feet x 50 feet	0.03	Road, Residential Crossing
		WS-7	4.4	South of Delight Lane	Developed	Temporary	25 feet x 50 feet	0.03	HDD workspace
	Forest	WS-8	4.5	North of Queen Pumping Station	Developed	Temporary	25 feet x 100	0.05	HDD workspace
		WS-9	4.6	South of Wetland V	Developed	Temporary	25 feet x 100	0.06	HDD workspace
		WS-10	4.7	West of TAR-3	Forest	Temporary	Irregular	0.10	Equipment Turn-Around, Tie-in Facilities
Access Roads	Warren	TAR-1	0.0	North of Route 62	Forest/Open	Temporary	970 feet	1.1	--
		TAR-2	0.2	North of Route 337	Open	Temporary	70 feet	0.05	--
	Forest	TAR-3	4.7	West of Queen Compressor Station	Open	Temporary	2,300 feet	2.7	--
Staging Areas	Warren	SA-1	TS-0	South of Main Street	Open Land	Temporary	Irregular	2.9	--
	Forest	SA-2	N/A	North of Queen Compressor Station	Open Land	Temporary	Irregular	0.92	--

a Land use was identified using publically-available database of existing land use and rectified by review of aerial photographs and field review evidence.
b Area dimensions provided conform to station locations provided on project maps (appendix A); Areas calculated for workspaces and access roads are based on actual dimensions.

5.2 Aboveground Facilities

The new aboveground facilities, including a regulator station and two service taps, would be installed within the proposed permanent right-of-way and would not require the use of ATWS. Land required for aboveground facilities is provided on table 2.

Table 2
Land Requirements

Facility	Length (miles)/ Number of Sites	Land Affected During Construction	Land Affected During Operation (acres) [b]
Construction/Replacement Activities			
Proposed Line QP	5 miles	36.4	19.8
ATWS	10 Sites	1.2	0
Access Roads	0.63 miles	3.8	0
Staging Areas	2 Sites	3.9	0
Line Q Replacement	0.18 miles	0.97	N/A
Regulator Station and taps		0.06	0.03
Total Disturbances	**5.7 miles**	**46.3**	**19.8**

a Land affected during construction is shown on the project maps (appendix A), and is inclusive of temporary (construction) and permanent (operation) impacts. See appendix A for typical right-of-way cross sections.
b Permanent (operation) requirement acreage for the pipeline based on a 25 to 35 foot permanent right-of-way for length of pipeline. Select aboveground facilities, fall within this land requirement acreage.

6.0 Construction Schedule and Workforce

National Fuel anticipates constructing the pipeline facilities within one construction season using a single construction spread. Pipeline and aboveground facility construction would require approximately 75 working days to complete. National Fuel anticipates completing in-stream work within the Allegheny River during low-flow conditions, as recommended by federal and state agencies.

Constructing the Project would require an estimated peak work force of 20 personnel. No new full-time permanent or part-time staff positions would be generated as a result of this project. During construction, National Fuel must comply with applicable United States Department of Labor, Occupational Safety and Health Administration regulations concerning construction worker safety.

7.0 Construction, Operation, and Maintenance Procedures

The Project would be constructed, operated, and maintained in accordance with applicable requirements defined by United States Department of Transportation (USDOT) regulations in 49 CFR 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards; the Commission's Siting and Maintenance Requirements in 18 CFR 380.15; and other applicable federal and state safety regulations. During the performance of work, contractors would comply with the Minimum Federal Safety Standards adopted by the USDOT under the Natural Gas Pipeline Safety Act of 1968, as well as National Fuel's corporate construction and inspection specifications and procedures.

To avoid, minimize, and mitigate effects of construction, National Fuel would implement the procedures and measures contained in the Project's Erosion Sedimentation Control and Agricultural Mitigation Plan (ESCAMP). The Project ESCAMP incorporates the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures), without modification.

7.1 Pipeline Construction Procedures

Line QP Allegheny River Crossing

National Fuel would install the plastic 4-inch-diameter Line QP within a steel 6-inch-diameter casing attached to the steel non-jurisdictional 12-inch-diameter Line Q replacement. The steel casing would be laid out in a staging area, welded together, inspected, and pressure tested prior to any in-stream activities. The Allegheny River would be open-cut by an excavator and experienced operator. The casing would be laid in the trench and then backfilled. All in-stream work would be completed within 48 hours. Once the trench is backfilled, Line QP would be inserted into the steel casing. A site-specific crossing plan has been developed for the Allegheny River crossing and is included as appendix C.

Line QP Pipeline

Construction of Line QP would be completed using standard overland pipeline construction techniques as described below. Construction would take place within approved workspace limits and would generally maintain a 15-foot offset (10-foot minimum) from the existing Line Q pipe south of the Allegheny River and outside of the crossing.

Surveying and Staking

Surveys would be performed to identify and mark the pipeline centerline, construction right-of-way limits, ATWS, other utilities, and sensitive environmental resources.

Clearing and Grading

The pipeline construction right-of-way would be cleared of vegetation and graded to create safe working conditions. Vegetation clearing would be limited to only what is necessary for safe pipeline installation. Timber cleared from the construction right-of-way would be removed or set aside (in accordance with landowner agreements). Tree tops, slash, brush, and other debris would be disposed of in an appropriate manor.

Once the right-of-way is cleared, the surface would be graded to remove localized undulations and to create a level work space. Displaced soils would be stockpiled along the right-of-way. However, in locations where the construction right-of-way is restricted, these soils may be stockpiled at a different location. In areas where topsoil segregation requirements exist, topsoil would be segregated and stockpiled in such a manner that it is segregated from subsoils and can be returned to the construction right-of-way during restoration.

Steep Side Slope Construction

National Fuel would utilize cut and fill construction techniques, including "two-tone" construction, where necessary, in areas containing steep side slopes and rolling terrain. The cut and fill technique involves cutting the uphill side of the construction right-of-way and using this material to fill the downhill side. The two-tone construction technique involves two levels at different elevations. One level is used for the equipment travel lane and work area and the second level is used for the trench and pipeline installation. These techniques typically require ATWS to accommodate high wall and fill areas to provide a level construction workspace. Following pipeline installation and backfill of the trench, excavated material is placed back in the cut and compacted to restore the area to the approximate original contours. Once completed, the disturbed areas are stabilized.

Topsoiling

Topsoiling is the segregation of topsoils (i.e., including sensitive soils) from subsoils to protect the quality and quantity of topsoil present. In designated areas (e.g., agricultural or residential lands) topsoils are segregated from subsoils during grading activities with heavy equipment. Topsoiling would be performed in accordance with National Fuel's

Best Management Practices[6] (BMPs) and the ESCAMP, unless more stringent regulatory requirements apply or variance(s) are sought by this application.

Topsoil would be segregated and preserved on NFS lands. This would preserve nutrients, provide native seed source, and promote revegetation.

Temporary Environmental Controls

In tandem with, or immediately following ground-disturbing activities (which may include clearing activities), temporary environmental controls (i.e., erosion and sediment controls) would be installed where necessary. Temporary environmental controls primarily consist of installing barriers (e.g., silt fence, silt logs, hay bale structures) or diversion structures (e.g., temporary/permanent slope breakers) to prevent sediment-laden waters from migrating off approved work areas. Temporary/Permanent slope breakers would be spaced in accordance with National Fuel's BMPs and its ESCAMP.

Once installed, these controls would be monitored and maintained so they function as intended until the area has been stabilized or permanent environmental controls are installed.

Trenching and Pipe Lay

Trenching would be accomplished with excavators and/or mechanical trenching machines. The trench width and depth (with a minimum of 24 inches [typically 30 inches] of cover) would vary based on site conditions (e.g., soil types, bedrock, and presence of groundwater). At certain crossings (e.g., road, waterbody) the trench depth would be greater in order to achieve the greater depth of cover requirements. In areas where shallow bedrock and/or large boulders are present, specialized construction techniques to remove the rock may be necessary (e.g., rock hammer). As necessary, flume pipes (e.g., appropriately sized steel or plastic piping) or diversion berms/ditches may be used to direct stormwater across the trench and away from the construction right-of-way. Trench plugs may also be used to prevent water from scouring the bottom of the trench line.

Sections of pipe would be strung along the construction right-of-way adjacent to the trench. Pre-manufactured factory bends may also be used in severe terrain. After stringing and bending are complete, pipe sections would be aligned and butt-fused or coupled with fitting. All pipe joining would be performed in accordance with National Fuel's Specifications and by qualified personnel who have passed specified Operator Qualifications.

[6] National Fuels BMPs and ESCAMP can be viewed on the FERC Internet website at http://www.ferc.gov. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20151203-5235 in the "Accession Number" field.

Once the pipe has been inspected, and just prior to lowering-in, the trench bottom and sides would be checked for sharp rocks that could damage the pipe. Any hazards would be removed from the trench prior to pipe installation.

Pipe would typically be placed into the trench by hand or with an excavator. Once the pipe is lowered-in, trench breakers, made of sand, clay, bentonite, or foam would be installed on sloping terrain and/or at sensitive environmental crossings to prevent the subsurface piping of water along the trench line. Clean fill (e.g., soil, sand) would be used where needed as padding material to provide protection to the pipe. The material used for padding would be selected in accordance with permit conditions and Project engineering specifications and under no circumstances would topsoil be used as padding or backfill material. The trench would then be backfilled to protect the pipe until final restoration can be completed. Pipeline warning tape would be buried approximately one foot above the pipeline. No foreign materials (e.g., construction debris) would be permitted to be used as backfill material. If allowed by permit conditions and landowner agreements, excess rock and woody debris (e.g., stumps, brush) may be buried onsite within the construction right-of-way, burned, or windrowed along the edge of the construction right-of-way. Otherwise these materials would be properly disposed of off-site as construction debris.

Dewatering

Dewatering activities may be necessary to remove excess water from the trench line during periods of excessive precipitation or high water table. Dewatering activities would be performed in accordance with National Fuel's BMPs and ESCAMP. To the extent practicable, discharges would occur in well-vegetated uplands areas on stable, non-erosive surfaces. If dewatering locations are selected that are not within or immediately adjacent to the construction right-of-way, they would be sited to minimize impacts off of the right-of-way. If dewatering locations must occur within sensitive areas (e.g., designated wetland areas), prior approval from FERC and other appropriate agencies would be sought and (if approved) multiple sediment controls would be used consistent with National Fuel's ESCAMP.

Pressure Testing and Final Tie-Ins

As part of the commissioning of the pipeline, the entire pipeline would be pressure tested in accordance with engineering specifications and regulatory approvals. The pipe would be tested with air to a pressure 1.5 times the MAOP for a specified period of time. Upon completion of testing, final tie-ins would take place.

Cleanup, Restoration, and Revegetation

Cleanup of Project activities would include removal of construction debris, unused and surplus materials, temporary construction structures, and equipment. Restoration consists of returning the construction right-of-way and areas disturbed by construction

activities to pre-existing contours and hydraulic regimes. Normally, final restoration occurs within 10 to 20 days of rough backfilling. Although not anticipated, if construction extends past November 1, National Fuel would submit a Winter Stabilization Plan to the FERC prior to constructing in the winter timeframe. Permanent erosion and sediment controls would be installed or stabilized (e.g., waterbars on sloping terrain) and the construction right-of-way would be re-seeded and/or mulched according to permit requirements and landowner agreements. Pipeline markers would be installed. Soil adjuncts and fertilizers may be added where necessary. Temporary erosion controls would be removed when the area has been stabilized in accordance with Project requirements

7.2 Special Pipeline Construction Procedures

In addition to the standard construction practices listed above, special construction procedures may be used to install the pipeline, as described below.

Residential Areas

Construction in areas with residents within 25 feet of construction workspaces would be accomplished in accordance with site-specific Residential Mitigation Plans, which were designed specific to each residential property and are shown in appendix D. The Residential Mitigation Plans would utilize additional construction restrictions and/or mitigation measures including restricting the construction right-of-way width, limiting the hours of construction, and the installation of safety fencing. National Fuel would coordinate with residence owners and/or tenants prior to construction activities occurring inside a residential mitigation area.

Road Crossings

National Fuel would use standard boring techniques to cross roads except where, following consultation with the appropriate authority (e.g., town, county), an open-cut crossing is determined to be acceptable and feasible. Minor roadways and drives would be crossed by open trenching. Once completed, roadways would be restored in accordance with engineering specifications, to pre-construction conditions or better. Furthermore, when construction activities occur within public roadways, provisions would be made for appropriate signage and, when necessary, temporary detours or other traffic control measures to allow safe traffic flow during construction. Road crossings along with proposed crossing methods are represented in table 3.

Table 3 Summary of Road Crossings			
Milepost	**Road Name**	**Road Type**	**Proposed Crossing Method**
0.03	Route 62	US	HDD
0.21	Route 337 (Bimber Run Road)	State	HDD
0.86	Johnson Road	Town	Bore
2.09	Red House Hill Road	Town	Bore
2.97	Pipeline Road	Private	Open Cut
2.98	Kelly Lane	Private	Open Cut
3.02	Turkey Lane	Private	Open Cut
3.02 – 3.20	Pipeline Road	Private	Open Cut
3.29	Kelly Hill Road	Town	HDD
4.29	Jaybuck Lane	Private	Open Cut
4.38	Private Road (Delight Lane)	Private	Open Cut
4.46	Ziegler Road	Private	Bore
4.48	Queen Pumping Station Road	Private	Bore

Horizontal Directional Drilling

The HDD method involves drilling a pilot hole under the waterbody, or targeted feature, then enlarging that hole through successive reaming until the hole is large enough to accommodate the pipe. Throughout the process of drilling and enlarging the hole, a slurry (drilling mud) made of naturally occurring non-toxic materials such as bentonite clay and water would be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and hold the hole open. Pipe sections long enough to span the entire crossing would be staged and welded along the construction work area and then pulled through the drilled hole. This crossing method requires ATWS for the HDD entry and exit points, but generally avoids impacts on the feature being crossed, with the exception of hand-clearing minimal vegetation to lay the HDD guide wire and the potential return of drilling mud to the surface, known as an inadvertent return. National Fuel anticipates using HDD for two road crossings where an open-cut crossing is not determined to be feasible and the roadway authority (e.g., town, county) finds this method acceptable.

8.0 Environmental Compliance Inspection and Monitoring

Prior to construction, National Fuel would conduct environmental training for the company and contractor supervisory personnel. The training program would focus on the requirements of the ESCAMP, Certificate conditions, other Project-specific permit conditions, and Project-specific mitigation plans.

National Fuel would assign or designate environmental inspectors (EI) in accordance with the Project's permit requirements. It is anticipated that one EI would be assigned to monitor the Allegheny River crossing and another would monitor the remaining pipeline spread during project construction and mitigation.

The role of the EI would be to monitor compliance with the construction and mitigation procedures identified in the filed application, as well as those identified in the federal, state, and county permits. The EIs would have stop work authority for activities they determine to be out of compliance with the Project's environmental requirements. National Fuel's Environmental Compliance Manager would maintain supervision over the EIs during the construction. The EI's responsibilities would also include:

- taking corrective actions, including issuing stop-activity orders to the contractor;
- documenting compliance with environmental requirements; and
- preparing status reports for submittal to the Commission's environmental staff and, upon request, the staff of other applicable agencies.

National Fuel would conduct post-construction monitoring to document restoration and revegetation of the right-of-way and other disturbed areas, and to address any landowner concerns in accordance with the ESCAMP.

National Fuel's Project Management Team would be responsible for the overall Project compliance. As such, each of the individuals would receive copies of pertinent compliance materials and documents.

In addition, Commission staff would oversee environmental compliance throughout construction and restoration of the Project.

9.0 Operations and Maintenance

Operation of the facilities would be performed in accordance with National Fuel's procedures and commitments. Maintenance of the proposed facilities would be performed in accordance with Nation Fuel's ESCAMP.

10.0 Related Facilities

As described previously, National Fuel proposes to replace the existing 6-inch-diameter steel Line Q pipeline crossing of the Allegheny River with a new 12-inch-diameter steel pipe crossing. This crossing would be conveyed to EmKey prior to use and would therefore not require FERC authorization. However, this replacement would be conducted in conjunction with jurisdictional activities and therefore the environmental impacts of this replacement are addressed in this analysis. Once work is completed on the Allegheny

National Forest, National Fuel would operate and maintain the pipelines under the requested special use authorization. Operation and maintenance of pipelines sold to a different company would require a separate special use authorization. National Fuel would maintain the entire right-of-way until Line Q is sold. If the Line Q is sold or transferred to different ownership, a new maintenance plan would be established and special use authorization would be required by the USDA-FS.

EmKey intends to install approximately 14 miles of new 8- or 12-inch-diameter steel, natural gas gathering pipeline from its existing facilities in Rome Township, Crawford County, Pennsylvania to the proposed tie-in of Line Q in Tidioute Borough, Warren County, Pennsylvania. The purpose of EmKey's pipeline would be to connect the facilities being sold to it by National Fuel (Queen Storage Facilities and Line Q) with its existing gas gathering system in order to ultimately transfer gas to EmKey Gas Processing, LLC's processing facility in Union City, Erie County, Pennsylvania. Where possible, the new line would be co-located with existing pipeline right-of-ways and/or existing logging trails/access roads. Pipe construction would require a construction right-of-way that is generally 60 feet in width and a permanent right-of-way that is generally 40 feet in width. It is anticipated that the project area would be approximately 110 acres and that approximately 70 acres of tree clearing would be necessary. The installation of EmKey's pipe would be completed in accordance with applicable governmental regulations, permit requirements and authorizations, and landowner agreements as completed by EmKey. We have considered the impacts of this non-jurisdictional project in the cumulative impacts analysis included in section B.7 of this EA.

11.0 Permits, Approvals, and Regulatory Consultation

Table 4 lists the federal and state permits required to construct and operate the Line Q, QP, and Queen Storage Facility Project.

Table 4
Permits, Approvals, and Consultations [a]

Agency	Permit/Approval/Consultation	Date Approved or Anticipated [b]
Federal		
FERC	Certificate of Public Convenience and Necessity, NEPA Compliance	Pending
USACE Pittsburgh District	Department of the Army Permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act (Joint Permit Application)	*September 2017*
USFWS Pennsylvania Field Services Office	Consultation under Section 7 of the ESA	*September 2017*
USDA Forest Service, Allegheny National Forest, Bradford Ranger District	Special Use Permit, Permit For Archaeological Investigations (ARPA Permit), Wild and Scenic Rivers Approval Special Use Permit (SUP), Pipeline right-of-way	ARPA Permit granted September 11, 2015. Wild and Scenic River Determination- *October 2017* Pipeline right-of-way SUP *December 2017*

Table 4
Permits, Approvals, and Consultations [a]

Agency	Permit/Approval/Consultation	Date Approved or Anticipated [b]
Pennsylvania		
Pennsylvania Historical and Museum Commission Pennsylvania State Historic Preservation Office (PA SHPO) Commonwealth of Pennsylvania	National Historic Preservation Act of 1966, Section 106 Consultation.	May 5, 2016
Pennsylvania Department of Environmental Protection (PA DEP)	Clean Water Act, 33 U.S.C. 1251 et seq., Section 401 Water Quality Certification; Dam Safety And Encroachments Act, P.L. 1375, No. 325; Submerged Lands License Agreement	*September 2017*
Pennsylvania Natural Heritage Program, Pennsylvania Natural Diversity Inventory (PNDI)	Rare, Threatened, and Endangered (RTE) Species Consultation with PA Game Commission, PA Department of Conservation and Natural Resources, and PA Fish and Boat Commission	*July 2017*
Pennsylvania Department of Transportation Engineering District 1-0	Heavy Hauling Permits Highway Occupancy Permits	*July 2017*
Pennsylvania Fish and Boat Commission	Aid to Navigation Plan approval	September 8, 2016
Local		
Warren County Conservation District (WCCD)	Approvals required for Erosion and Sediment Control Plans and Stormwater Management (General Permit ESCGP-2 under Chapter 102) pursuant to 25 Pa. Code §102.5(m)	*September 2017*

a National Fuel would be responsible for obtaining all permits and approvals required to construct and operate the projects, regardless of whether or not they appear in this table
b *Anticipated dates in italics*

B. ENVIRONMENTAL ANALYSIS

This analysis describes the condition of the existing natural and human environment and the potential impacts (and affects) on it resulting from construction and operation of the Project. As described previously, the Queen Storage Facilities and the 5.2 miles of Line Q would be abandoned by sale. The sale of these facilities is an administrative activity that would not impact the environment; therefore they are not considered or discussed further in this analysis. Constructing and operating the Line Q replacement and QP pipelines would result in temporary, short-term, long-term, and permanent impacts on the environment. A temporary impact generally occurs during construction with the resource returning to pre-construction condition immediately after restoration or within a few months. A short-term impact could last for up to 3 years following construction. A long-term impact would last more than 3 years, but the resource affected would eventually return to its pre-construction condition. A permanent impact would modify a resource to the extent that it would not return to its pre-construction condition. For each resource, our analysis collectively addresses the direct and indirect effects of the proposed action. Cumulative impacts are discussed in section B.7 of this EA.

To minimize impacts on the environment, National Fuel has collocated and overlapped its pipeline facilities and construction workspace with an existing natural gas transmission pipeline easement. A single trench would be utilized to reduce impacts to the Allegheny River. To further minimize impacts on the environment, National Fuel would implement numerous impact avoidance, minimization, and mitigation measures as described in its ESCAMP and other Project plans. As appropriate, measures identified in these plans are included in our analysis.

As discussed throughout this document, the Project would cross lands administered by the USDA-FS. The USDA-FS has expressed several concerns regarding biological resources potentially affected by the Project. As appropriate, these concerns are addressed in the EA. USDA-FS-specific concerns and resources are also addressed in a Biological Evaluation (BE) prepared by National Fuel, provided directly to the USDA-FS, and included as appendix H to this EA. National Fuel would also comply with the USDA-FS' ANF Forest Plan and the USDA-FS' Mitigations and Guidelines on NFS Lands (Appendix K).

1.0 Geology and Soils

1.1 Geology

The proposed Project is located within the High Plateau Section of the Appalachian Plateau Province of northwestern Pennsylvania. Elevations within the Project range from 1,110 feet (at the Allegheny River) to 1,660 feet at two separate summits within the Project interior.

The High Plateau Section of the Appalachian Plateau Province consists of broad, rounded to flat uplands cut by deep angular valleys. The uplands are underlain by flat-lying sandstones and conglomerates.

Mineral Resources

The principal materials mined in the vicinity of the Project area include sand and gravel as well as oil and gas. The closest surface mining operation to the project facilities is a collection of sand and gravel mining pits that are located approximately 0.5 miles to the southwest of the pipeline from MP 0.8 to MP 1.2. According to National, Fuel, these sand and gravel mines are owned by IA Construction Corp.

Oil and gas resources are abundant in the Project region. Natural gas and oil production or storage is occurring within and near the Project area as shown in table 5. Two oil and gas fields (West Hickory and Tidioute) and four associated oil and gas pools (Queen Storage, Red House, Dennis Run, and Camp Run) are crossed by the pipeline and a total of 12 oil/gas wells (excluding National Fuel Gas Queen Storage Field Wells) are located within 0.25 miles of the pipeline route. A majority of the wells are plugged and abandoned, or were reportedly never drilled based on Pennsylvania Division of Environmental Protection (PADEP) records. Five of the wells are currently active, all five of which are located in Warren County. The closest well (ID SERIAL # 5616 5616) is located approximately 195 feet northeast of the proposed pipeline right-of-way at MP 4.5, which is approximately 0.07 miles north of the Warren/Forest county line. The trench for the pipeline would be relatively shallow (not more than 5 feet deep), while the oil and gas resources are drilled to extract petroleum reserves in much deeper formations. Project construction activities are not expected to adversely affect active oil and gas production or storage facilities. Based upon these factors, we conclude that the Project would not affect mineral resources.

Table 5 Mineral Resources Crossed by Line QP		
Operation	**Approximate Milepost(s)**	**Distance/Direction from right-of-way (feet)**
Proposed Oil/Gas well (never materialized) – Belden & Blake Corp.	0.1	1275 feet east/southeast
Active Vertical Conventional Gas Well (ID HEINRICH 1) – Range Resources Appalachia LLC	0.1	1475 feet east/southeast
Tidioute Gas Field (discovered 1860), Formation(s) Venango, Bradford, Medina (Tuscarora) Group Producing Sands	0.2 to 1.0	Crossed
Sand and Gravel Mine, Ia Construction Corp: PADEP ID is 5902	0.4 to 1.1	2575 feet west/southwest
Active Vertical Oil well (ID MCGRAW 29) – Ziegler A H	1.2	1115 feet southwest
Red House Oil/Gas Pool (discovered 1922), Bradford Group Sands	1.7 to 2.2	Crossed
Plugged Oil/Gas well (Clinger PGE 1) - Range Resources Appalachia LLC	1.9	975 feet east/northeast
Proposed oil well (reportedly never drilled) Well ID: SIGGINS L22 – Armac Resources	2.0	1055 feet west/southwest
Active Vertical Oil/Gas well (ID CLINEGR PGE 2) – Enervest OPR LLC	2.1	595 feet west/southwest
Active vertical oil well (ID SIGGINS L21) – Waste Trmt Corp	2.1	1475 feet west/southwest
Proposed oil well (reportedly never drilled) Well ID: SIGGINS L23 – Waste Trmt Corp	2.1	1015 feet west/southwest
Plugged Oil/Gas well (Siggins L24) – Waste Trmt Corp	2.1	1445 feet west/southwest
Undetermined Orphan Oil/Gas well (ID: W A BYERS 500080 2) – Beach Ryan	2.1	495 feet east/northeast
Queen Oil/Gas Pool (discovered 1888), Venango & Bradford Group Sands	2.4 to 2.8	Crossed
Queen Storage Gas Pool (discovered 1889, Active since 1920) Part of the West Hickory Gas Field; Venango and Bradford Group Sands	3.7 to End	Crossed
Active Gas Storage Well (ID: CLAIRE TIPTON 5617) – National Fuel Gas Supply Corp.	4.3	755 feet northeast
Plugged Oil/Gas well (ID: SERIAL 5616 5616) – National Fuel Gas Supply Corp.	4.3	195 feet northeast
Gas Storage Well Field – Queen Storage Pool – Various wells – National Fuel Gas Supply Corp	4.1 to End	595 feet to 2075feet north/ northeast and southeast

Geologic Hazards

Geologic hazards are naturally occurring physical conditions that are capable of producing property damage and loss of life. Typically, these potential hazards could include seismic related issues such as ground rupture due to faulting, strong ground shaking, liquefaction, subsidence, slope stability and landslides, flash floods, and karst terrain. These conditions are discussed below.

Seismicity

Seismic hazard mapping by the USGS (2008) shows there is very little seismicity known to occur in the region, which is characterized as having a low earthquake hazard. The 2008 USGS Seismic Hazard Map demonstrates peak ground accelerations as percent "g" within a 2 percent probability of exceedance in 50 years for the northeastern United States. The seismic hazard for the Project area is between 0.04 and 0.08. This is based on a rating system from 0 through 1.60+, where zero indicates the lowest hazard and 1.60+ indicates the highest hazard. There have been no nearby epicenters in the last 50 years.

A review of the available fault mapping of Pennsylvania indicates that the nearest fault line to the project is over 45 miles to the southwest, in the southern end of Elk County. Due to the overall low risk of earthquake activity in the region, the risk to the proposed Project facilities is expected to be very low. Given these conditions, we conclude that there is a low potential for damage due to prolonged ground shaking, ground rupture, or soil liquefaction to occur within areas of the Project facilities.

Landslides and Slope Stability

Landslides involve the down-slope movement of earth materials under the force of gravity due to natural or man-made causes such as removal of vegetative cover, triggered by events such as prolonged rainfall saturating soil conditions. Landslide susceptibility mapping by the USGS (USGS 1997) delineates areas that are susceptible to landslides and areas where landslide events (incidence) have occurred. Warren and Forest Counties are considered generally low susceptibility, but include local areas of high to moderate landslide potential, such as adjacent to Route 62, south of the Allegheny River. In areas of steep valley walls, soils may be unstable and present problems with erosion management when disturbed, and may require various erosion and sediment control and construction measures during pipeline construction.

If side slopes requiring special construction are encountered, the upslope side of the pipeline right-of-way would be cut during grading, as described in section A.7.1. Any springs or seeps found in the cut would be conveyed downslope through shallow rock lined open ditches, PVC pipe and/or gravel-filled French drains installed as part of the cut

restoration. National Fuel is prepared to implement mitigation during construction and restoration in areas of potential landslide and/or slope instability, should indications of such conditions occur.

Flooding

Flooding associated with heavy rainfall can occur throughout the majority of the project area(s). The greatest potential for flash flooding to occur is at the Allegheny River crossing. No other areas are within the mapped Federal Emergency Management Agency 100-year floodplain. As discussed, the Project facilities would be constructed within or adjacent to existing National Fuel rights-of-way. National Fuel would install the proposed facilities in accordance with the USDOT depth of cover requirements; therefore, we do not anticipate operational impacts due to flooding. Further, the pipeline would occupy very minimal flood storage capacity and should not exacerbate flood hazards. No aboveground facilities would be constructed in floodplain.

Karst Terrain

Karst terrain and the potential for karst features such as sinkholes, and/or surface collapse can occur within areas underlain by soluble carbonate bedrock and can be problematic during construction. Based on current mapping from the USGS and on conditions observed along National Fuel's existing pipeline corridor, there are no known karst features that may affect pipeline construction or operations. National Fuel routinely inspects its pipeline right-of-way and pipeline integrity, which would provide monitoring in the event karst features or subsidence develops under the pipeline. If observations indicating subsidence are found, National Fuel would take corrective measures (such as evaluating allowable stresses on pipe, importing fill or evaluating relocation of pipeline) to maintain the integrity of the pipeline. The hazard from surface subsidence due to karst is considered low.

Blasting

Based on field reconnaissance and review of soils and bedrock mapping within the Project area, shallow bedrock (less than five feet from the surface) may be encountered at various locations along the proposed alignment. Shallow bedrock encountered during trenching would be addressed using one of a number of techniques, which might include conventional excavation with a backhoe, ripping with a dozer, and/or hammering with a hydraulic hammer backhoe attachment. National Fuel does not anticipate utilizing blasting techniques for installation of Line QP.

1.2 Soils

Existing Soil Resources

Soil series, as established by the National Resources Conservation Service (NRCS), are soils that are grouped together because of their similar soil chemistry and physical properties. Each soil series is delineated as a single map unit and represent the dominant soil patterns or characteristics. Descriptions of the soil crossed by the Project facilities were compiled from information presented in the USDA Soil Resource Reports for Warren and Forest Counties, Pennsylvania. Soils within the Project area consist mainly of shallow to deep, very poorly to excessively drained soils located on slopes, drainage ways, and ridgetops.

Prime Farmland and Vulnerable Soils

Impacts on Prime Farmland are of special concern because of the potential for decreases in long-term agricultural productivity. Of the 20 soil units that would be affected by the Project, four are classified as Prime Farmland as identified by the NRCS. The Project includes approximately 9.5 acres of Prime Farmland soils within the construction right-of-way.

Vulnerable agricultural soils are defined as areas of cropland, hayland or pasture which are more sensitive than other agricultural soils to construction disturbance due to slope, relative soil wetness, and/or shallowness to bedrock. Wetness conditions are the result of factors such as landscape position, soil texture, seasonal water table and/or slowly permeable subsoil horizons (e.g., areas of laterally draining subsoils). All vulnerable agricultural soils including, but not limited to, those identified on the county soil survey as fragipans, lacustrines, dense basal tills, soils with seasonally high water table, or soils with less than five feet of depth to bedrock are identified in the table in appendix B.

The Prime Farmland and vulnerable soils are not currently in use for agricultural purposes; there are no active (or inactive) croplands within the proposed pipeline right-of-way or adjacent to the Project. As such, impacts to agricultural productivity as a result of the Project are not anticipated.

Potential soil impacts from construction include soil erosion and resulting sedimentation, soil compaction, and topsoil mixing. During the construction period, short-term soil erosion may be experienced. Initial site preparation activities (clearing, grubbing, and grading) would occur within the designated work zone and would remove vegetation, exposing surfaces to wind and precipitation. Temporary erosion control measures would be installed in order to minimize the potential for soil erosion.

When soils are wet, operation of heavy construction equipment can result in compaction, rutting, and excessive amounts of mud within the construction area, which can impede work and create unnecessary environmental hazards. National Fuel would attempt to minimize compaction and rutting impacts in areas with sensitive soils through use of BMPs, restore any affected soils during Project restoration (in accordance with the ESCAMP), and implement a winterization plan, as necessary.

Grading, trenching, and backfilling activities have potential to cause mixing of the topsoil and subsoil, resulting in the loss of soil productivity. The use of topsoil segregation methods would be used in agricultural and residential areas to avoid or minimize potential soil mixing. Restoration would be undertaken in accordance with the Project ESCAMP to restore any affected agricultural soils horizons.

Overall, the extent and duration of disturbances caused by construction of the Project would be minimized by the implementation of National Fuel's ESCAMP and the Project-specific plans. To minimize Project impacts, restoration of the right-of-way and disturbed workspace areas would be restored using procedures and practices in the ESCAMP. National Fuel developed with the appropriate permitting agencies, site-specific plans. These plans include erosion control devices (ECDs). In addition, the Project-specific Stormwater Pollution and Prevention Plan (SWPPP) would incorporate applicable Pennsylvania state specifications (Pennsylvania Chapter 102 Erosion Regulations) for Erosion and Sedimentation Control.

The timing of restoration is critical for successful revegetation of the right-of-way following construction. Following surface preparation, the right-of-way would be permanently seeded with an appropriate seed mix per local soil conservation recommendations.

The extent and duration of disturbances caused by construction would be minimized and appropriate procedures would be followed. Potential impacts on soils would be minor and not substantial.

2.0 Water Resources and Wetlands

2.1 Groundwater

In the Project area groundwater is contained in the underlying soils and bedrock (Venango Formation). Groundwater varies significantly throughout the area due to topography and the characteristics of the underlying hydrogeologic units. According to the U.S. Geological Survey (USGS), the development of groundwater in Warren County for domestic and municipal use has been difficult due to the presence of shallow petroleum reservoirs. The USGS also reports that analyses of water samples from wells in the Tidioute area indicate poor water quality. Excessive concentrations of iron, manganese,

aluminum, chloride, dissolved solids, and methane negated the use of these wells for public supply. National Fuel identified 11 private water supply wells within 150 feet of construction workspaces. Three of these wells are located within construction workspace and eight are within 25 feet of construction workspace. National Fuel would protect these wells during construction. There are no public water supply wells in the immediate vicinity of the project.

Installing the pipeline could affect groundwater (quality and flow) and nearby water supply wells. Clearing, grading, and excavation could cause turbidity in shallow groundwater, resulting in a temporary and localized adverse effect; and could also alter groundwater flow. Changes to groundwater quality and flow could affect nearby water supply wells. Additionally, an inadvertent release of equipment fluids during construction could adversely affect groundwater quality. Impacts on nearby wells would vary depending on distance to the well and the depth of the well.

To avoid and minimize impacts on groundwater, National Fuel would comply with any relevant aspects of the ANF Forest Plan and would implement numerous measures as described in its ESCAMP. These measures include: installing erosion control devices and temporary trench plugs; regulating fuel storage and refueling activities; and implementing spill response procedures. Furthermore, National Fuel would document flow capacities at nearby wells and conduct pre- and post-construction water quality testing. If a well is affected, National Fuel would repair or mitigate the damage.

Based on National Fuel's proposed construction procedures and the implementation of its impact avoidance and minimization measures, we conclude that potential impacts on groundwater would be temporary, minor, and localized. Therefore, we have determined that the Project would not significantly affect groundwater.

2.2 Surface Water Resources

As identified in appendix E, the pipeline would cross the Allegheny River and 18 other perennial, intermittent, and ephemeral waterbodies. The waterbody crossing table identifies waterbody type, class, crossing width, water quality classification, and the proposed crossing method. In addition to the Allegheny River, the pipeline would cross Myers, Dale, and Dunn Runs, East Hickory and Queen Creeks, and several other small waterbodies including tributaries to the Allegheny River and East Hickory Creek. In total, installing the pipeline would require 22 waterbody crossings (three waterbodies would each be crossed twice). Of the 22 waterbody crossings, 10 would be less than 10 feet wide at the point of crossing. With the exception of the Allegheny River as noted below, no impaired waterbodies would be crossed. Several high quality cold water fisheries would be crossed. Fisheries are addressed in section B.3.2. Lastly, the crossings of the Allegheny River and Hickory Creek would be completed within 3 miles of downstream industrial water intakes with the closet intake located approximately 1.0 mile downstream of the Hickory Creek

crossing. The Allegheny River crossing would be located approximately 2.4 miles from the closest water intake. Written notification would be provided to the authorities responsible for the industrial intakes previously listed at least one week prior to construction, as required by the ESCAMP. The Project is not expected to impact these water intakes.

Due to the linear nature of this Project and the unavoidable impact of having to cross and perform construction activities around streams on NFS lands, some guidelines applicable to NFS lands would not be met for this Project. The guidelines that would not be met on NFS lands are:

- trees should not be removed within 10 feet of stream channel banks except for road construction or road and trail maintenance;
- heavy equipment should not be operated within 10 feet of intermittent streams or within 50 feet of perennial streams except for facility, trail, and road maintenance, stream crossing construction or stream restoration; and
- construction of new facilities, roads, oil and gas developments, motorized trails, landings and buildings should be avoided within riparian corridors.

This Project includes installation of a new pipeline. The existing pipeline corridor is 35 feet wide and crosses all of the waterbody crossings listed in table 8. The pipeline corridor would expand to 49.5 feet at all of the waterbody crossings. This would remove some of the shade over these streams. The following streams are located on NFS lands (unnamed tributary to the Allegheny River (#5), Dale Run, Dunn Runn, and an unnamed tributary to Dunn Run (# 10, 11, and 12). On NFS lands, temporary workspace would be avoided in the riparian areas joining these streams.

Allegheny River Crossing

The Allegheny River would be crossed using open cut construction techniques. The designated Wild and Scenic Allegheny River is a major waterbody (at the point of crossing the Allegheny River is approximately 590 feet wide) which contains federally and state-listed threatened and endangered species. Protected species and special designations are addressed in later sections of this document. The Allegheny River is also listed on Pennsylvania's 303(d) impaired waters list due the presence of mercury in fish tissue. However, based on consultations between National Fuel and PADEP, it appears the presence of mercury in fish tissues is due to atmospheric deposition and mercury is not known to occur in the water column. Fisheries are addressed in section B.3.2.

The south bank of the Allegheny River at the existing and the new location of the pipeline is located on NFS lands. About 0.18 acres of riparian area along the Allegheny River at the existing pipeline crossing would be temporary disturbed during the removal of

the pipeline. An additional 0.4 acres of riparian and floodplain area along the Allegheny River would be temporary disturbed for the installation of the new pipeline.

To address concerns about the proposed Allegheny River crossings, a site-specific crossing plan was developed in consultation with the appropriate federal and state resource agencies (see appendix C). Based on our review of this plan and agency consultations, we find this plan to be acceptable. National Fuel would also use water from the Allegheny River to complete hydrostatic testing of the pipeline. Water withdrawals and discharges required for hydrostatic testing would be conducted in compliance with the applicable permits and/or authorizations.

Using an open cut construction technique to cross the Allegheny River would affect water flow, reduce the amount of available aquatic habitat (fisheries and protected species impacts are addressed later in this document), increase turbidity and sedimentation (addressed further below), and would result in a temporary adverse effect on water quality. Based on agency concerns about the proposed Allegheny River crossings, we requested that National Fuel model the anticipated turbidity and sedimentation that would result from installation of the pipelines.

National Fuel modeled three scenarios for the Allegheny River crossing; “Base Case”, “High Flow Case”, and “High Flow – High Fines Case”. The Base Case assumed an expected particle distribution for the excavated soil in the particle tracking model. The Base Case scenario reflects the expected conditions during the excavation. The High Flow Case simulated a condition with a higher river flow rate and a slightly higher water surface elevation compared to the Base Case. The High Flow - High Fines Case simulated the same water surface elevation and flow rates as the High Flow Case. However, it assumed a higher than expected percent of fine particles (e.g., silt) with low settling velocity. The models are included in appendix G. We reviewed the model’s methodology, assumptions, and findings and conclude they are adequate and supported.

Table 6 Summary of Simulated Maximum Sediment Deposition for Scenarios			
Distance from Excavation Area	Maximum Simulated Sediment Deposition Thickness (cm)		
	Base Case	High Flow Case	High Flow-High Fines
0 Ft	11	11	13
10 Ft	2.5	2.6	4.7
20 Ft	1.5	1.4	2.7
50 Ft	0.21	0.24	0.42
100 Ft	0.06	0.10	0.14
200 Ft	0.02	0.02	0.07
500 Ft	0.01	0.01	0.03
1,000 Ft	0.00	0.01	0.01
2,000 Ft	0.00	0.00	0.00
3,000 Ft	0. 00	0.00	0.00

Under the "Base Case" which is expected to occur at the time of crossing, installing the pipelines would increase turbidity and sedimentation. Total suspended solids (TSS) concentrations expected to occur as a result of installing the pipelines range from 300 milligrams per liter (mg/L) immediately at the crossing; dropping below 100 mg/L within 500 feet downstream; below 50 mg/L within 1,000 feet downstream; and below 20 mg/L within 1,200 feet downstream. TSS concentrations are expected to return to pre-construction levels shortly after construction is complete. According to National Fuel citing PADEP sampling, TSS concentrations within the Allegheny River typically range from below detectable levels to 253 mg/L. National Fuel also notes that TSS concentrations greater than 20 mg/L are generally associated with storm or high flow events. The sedimentation (deposition thickness) anticipated to occur as a result of installing the pipelines ranges from 11 centimeters (cm) immediately adjacent to the crossing; dropping below 2 cm within 20 feet downstream; 0.5 cm within 40 feet downstream; and below 0.25 cm within 50 feet downstream. Additionally, these sediments are expected to completely settle shortly after construction is complete.

To further minimize impacts on the Allegheny River, National Fuel would maintain stream bank vegetation, complete the pipeline installation and restoration in less than 48 hours, require the installation of erosion control devices immediately adjacent to the crossing, earthen plugs, spaces between instream spoil piles to maintain flow, sedimentation monitoring, and post construction monitoring. Also, the spoil piles would be removed from the river and the river bed and banks would be restored to match natural conditions. The Allegheny River bed would be disturbed for construction of the pipeline and restored within 48 hours. Stream bed conditions are expected to return to pre-construction after the first higher flow period that occurs. The ATWS area on the banks of the Allegheny River would be disturbed for up to several weeks, but upon completion of

the Project, the site would be restored to near natural conditions. To expedite site restoration, soils would be decompacted, covered with stockpiled topsoil, and seeded and mulched. A native riparian seed mix would be used. Disturbed areas more than 30 feet from the pipeline would be planted with native tree species. Except within the construction right-of-way and the stream crossing construction, no trees would be removed within 10 feet of the stream bank and heavy equipment would be kept 50 feet from the bank.

Other Waterbody Crossings

National Fuel, consistent with its ESCAMP, would install the pipeline across most of the identified waterbodies using dam and pump or flume methods. East Hickory and Queen Creeks would be crossed using an HDD.

Installing the pipeline using dam and pump or flume waterbody crossing methods would temporarily disrupt waterbody flow, reduce the amount of available aquatic habitat, increase turbidity and sedimentation, and could adversely affect water quality. Typically, these effects would be minor and localized. With exceptions, the use of an HDD would avoid impacts on crossed waterbodies. An inadvertent release of equipment fluids during an HDD or other crossing could affect water quality. However, these effects would typically be temporary and minor.

To avoid and minimize impacts on waterbodies, National Fuel would comply with any relevant aspects of the ANF Forest Plan and would implement numerous measures as identified in its ESCAMP and Spill Prevention and Response Procedures. As per National Fuel's ESCAMP, the right-of-way would be allowed to revert to original canopy cover over streams, except for trees within 15 feet of the pipeline with roots that could compromise pipeline integrity (these may be selectively cut and removed from the permanent right-of-way). Routine mowing to allow for a 10-foot-wide herbaceous corridor directly over the pipeline for periodic corrosion/leak surveys may be cleared, otherwise the streams corridors would permanently revegetate. Additional measures include:

- conducting crossings during low flow periods to the extent practical;
- limiting tree clearing to what is needed to safely construct the pipeline;
- installing erosion and sediment control devices;
- screening pump intakes and maintaining waterbody flow rates
- discharging hydrostatic testwater into vegetated uplands; and
- monitoring HDD pressures and activities and implementing response procedures in the event of an inadvertent return.

Based on the characteristics of the waterbodies that would be crossed, the collocation of the pipelines, the distance to downstream water intakes, the modeling of impacts on the Allegheny River, the implementation of proposed construction methods and

impact minimization measures, and the temporary nature of impacts, we have determined that installing and operating the pipelines would not significantly affect surface waters.

2.3 Wetlands

The pipeline would cross 14 wetlands within the Project area as summarized in table 7. Portions of each wetland would be temporarily affected by construction. The total delineated area amounts to 2.4 acres. Specifically, the pipeline would cross 13 palustrine emergent (PEM) and one palustrine scrub/shrub (PSS) wetland. These wetlands are commonly characterized by their vegetation components which generally include water tolerant herbaceous plants (PEM) and woody shrubs (PSS). Additionally, these wetlands are relatively small, isolated, and associated with naturally occurring or manmade depressions/features.

Approximately 0.86 acres of emergent wetland would be temporarily affected during construction. Wetland vegetation would be cleared, soils would be disturbed, and the hydrological characteristics of the affected wetlands (water retention and lateral movement) could be altered. However, these effects should be temporary as soils and grades would be restored and vegetation allowed to regenerate naturally. Following construction, approximately 0.41 acre of the wetlands disturbed in the temporary work space would revert to pre-construction use and conditions, and 0.45 acre would remain emergent wetland located in part of the permanent right-of-way. National Fuel would need to obtain a Section 404 permit from the USACE and a Section 401 permit from PA DEP in order to temporarily affect these wetlands.

Six wetlands are located on NFS lands (Wetland B, C, I, J, M, and O). The wetland impacts on NFS lands amount to 0.39 acres of the total delineated area of 0.61 acres located on NFS lands[7]. A Regional Forester Sensitive plant species, sweet-scented Indian-plantain (*Hasteola suaveolens*) was documented within a PEM wetland along the Allegheny River which included two occurrences (totaling 13 individual plants). See section B.3.3 Special Status Species for additional information and discussion.

[7] National Fuel delineated a larger corridor than it would affect during construction. On NFS lands the corridor contained 0.61 acre of wetland. However, the Project footprint would only affect 0.39 acre.

Table 7
Summary of Wetlands Crossed by the Project

Wetland ID [a]	MP	Length of wetland crossed by proposed pipeline (feet) [b]	Temporary Impacts (Acres)	NWI Class[c]	Delineated Wetland Size (Acres)
Line QP					
Wetland B	TS-0.16	59	0.07	PEM	0.07
Wetland C	TS-0.20	0	0.08	PEM	0.09
Wetland I	2.01	69	0.16	PEM	0.36
Wetland J	1.63	30	0.03	PEM	0.04
Wetland M	2.59	11	0.01	PEM	0.01
Wetland O	2.71	102	0.04	PEM	0.04
Wetland P	2.84	0	0.01	PEM	0.04
Wetland S	4.03	187	0.16	PEM	0.23
Wetland T	4.35	164	0.13	PEM	0.64
Wetland U	4.36	0	0	PSS	0.01
Wetland V	4.50	206	0.10	PEM	0.13
Access Roads					
Wetland E	TAR-1	N/A	0.05	PEM	0.05
Wetland X	TAR-3	N/A	<0.01	PEM	0.13
Wetland Y	TAR-3	N/A	0.02	PEM	0.54
	TOTAL	**828**	**0.86**		

a Field designations represent unique identifiers assigned to each wetland during field surveys.
b Wetland crossing length was calculated per actual linear footage crossed by the pipeline. Temporary impacts represent area of affected wetland within the temporary workspace. Length of crossing of Wetlands B and C calculated based on Line QP Variation 1 for Allegheny River crossing. If Variation2 is employed, crossing lengths for Wetlands B and C would be 0 feet and 29 feet, respectively. Acreage of impacts would remain the same.
c Wetland classifications are based on the NWI referenced Cowardin classification system whereby: (P = Palustrine; OW = Open Water; EM = Emergent; SS = Shrub Scrub; FO = Forested).
d Impacts to Wetland C by Line Q Replacement are included in proposed Line QP calculations.

Due to the linear nature of this Project and the unavoidable impact of having to cross and perform construction activities around wetlands on NFS lands, some guidelines

applicable to NFS lands would not be met for this Project. The guidelines that would not be met on NFS lands are listed below.

- Trees should not be removed within 25 feet of wetlands, including springs or seeps. From 25 feet to 100 feet, maintain at least an average of 50 percent canopy cover.
- Heavy equipment operation should be excluded within 25 feet of wetlands and within 100 feet of vernal pools except for facility, trail and road maintenance or wetland restoration.

To avoid and minimize impacts on wetlands, National Fuel would comply with any relevant aspects of the ANF Forest Plan and would implement numerous measures as identified in its ESCAMP. As per National Fuel's ESCAMP, the right-of-way would be allowed to revert to original canopy cover over wetlands, except for trees within 15 feet of the pipeline with roots that could compromise pipeline integrity (these may be selectively cut and removed from the permanent right-of-way). Routine mowing to allow for a 10-foot-wide herbaceous corridor directly over the pipeline for periodic corrosion/leak surveys may be conducted, otherwise the wetlands would be left to permanently revegetate the right-of-way. Additional measures in the ESCAMP include: marking wetland boundaries and buffers with signs and/or highly visible flagging until construction-related ground disturbing activities are complete; minimizing the clearing of vegetation and leaving existing root systems in place as practical; segregating topsoil; installing timber mats and erosion and sedimentation control devices; and annually monitoring wetlands restoration until successful.

Based on the minor amount of wetlands that would be crossed, the characteristics of these wetlands, the collocation of the pipeline, and National Fuel's implementation of its proposed construction methods and impact minimization measures, we have determined that installing and operating the pipeline would not significantly affect wetlands.

3.0 Vegetation and Wildlife

3.1 Vegetation

The pipeline would be located across lands characterized as mixed hardwood/coniferous forest, common upland shrubs and herbaceous grasses associated with forested edges (adjacent to the existing pipeline easement), and other common vegetation associated with rural housing and road development. The amount of vegetative cover affected is described in table 8. The forested vegetation crossed by the pipeline consists of a mix of northern hardwood forest, hardwood/coniferous forest, and hemlock forest. Additionally, as described previously, less than one acre of PEM and PSS wetland vegetation would be crossed by the pipeline. With the exception of one USDA-FS Regional Forester Sensitive Species (RFSS), vegetation surveys identified no

unique/sensitive or specially managed vegetation. The sweet-scented Indian-plantain occurs within the Project area and is addressed in section B.3.3 of this EA. Other RFSS are addressed in the BE (appendix H).

Mixed hardwood/coniferous forest commonly contains maples, oaks, pines, and other tree species. Its understory generally consists of juvenile tree species, berries, and shrubs such as witchhazel (*Hamamelis virginiana*). Where adjacent to the existing pipeline easement, the mixed hardwood/coniferous forest is disturbed and is commonly referred to as a "forest edge". Forest edges typically consist of the same species as the larger adjacent forest, but are generally considered lower quality and may contain higher rates of shade intolerant exotic or invasive/nuisance vegetation. Invasive plant species observed in the area include multiflora rose (*Rosa multiflora*), tartarian honeysuckle (*Lonicera tatarica*), and Japanese stiltgrass (*Microstegium vimineum*). Impacts from non-native invasive plant species would be minimized through implementation of the Invasive Species Control Plan.

Table 8
Vegetative Cover Summary Affected

Project Facility & Location	Vegetative Cover Type	Affected Areas	
		Temporary Work Areas Acreage Affected [1, 3]	Permanent Acreage Affected [2,3]
Line QP Warren County, PA	Forest	0.14	4.80
	Developed	1.26	1.59
	Open Land	12.10	12.39
	Open Water [4]	1.62	0.45
Line QP Forest County, PA	Forest	0	0.20
	Developed	0.38	0.37
	Open Land	0.66	0.63
	Open Water [4]	0	0.06
Total:		**16.16**	**20.49**

Notes:

1. Temporary Work Areas include acreage of TWS and ATWS along pipeline, temporary access roads, and staging areas. Impacts to these cover types are temporary only as these areas would be returned to their pre-construction condition.
2. Includes Permanent ROW only. There are no permanent access roads for this Project, and all aboveground facilities are located within the Permanent ROW.
3. All wetlands impacted are PEM wetlands. This includes, 0.14 acres and 0.03 acres of temporary and permanent impacts, respectively, in forest land, 0.03 acres and 0.13 acres of temporary and permanent impacts, respectively, in developed land, and 0.24 acres and 0.29 acres of temporary and permanent impacts, respectively, in open land.
4. Refers to Permanent ROW across the Allegheny River, East Hickory Creek, and Queen Creek. Direct impacts would be temporary in nature. East Hickory Creek and Queen Creek would be crossed by HDD, therefore no temporary work areas would affect these waterbodies.

Installing the pipeline would require the temporary and permanent clearing of vegetation. In areas where the right-of-way is expanded, woody vegetation would be removed and be replaced by herbaceous vegetation. The temporary and permanent loss of

woody vegetation, could affect soils, surface water flow, groundwater, and increase the potential for the introduction of exotic and invasive/nuisance plant species.

A commenter expressed concern that the permanent loss of woody vegetation could result in forest fragmentation. Because the forested lands crossed are already fragmented due to the existing pipeline, the installation of the pipeline would not result in new fragmentation, but would, as stated previously, result in the relocation of forested edges.

To further avoid and minimize impacts, National Fuel would comply with any relevant aspects of the ANF Forest Plan and would implement numerous measures as described in its ESCAMP, Invasive Species Control Plan, other Project-specific plans, and the USDA-FS' Guide to Noxious Weed Prevention Practices. These measures include the implementation of erosion control devices, revegetation measures, and post-construction monitoring.

Based on the amount of vegetation that would be impacted, the collocation of the pipeline, and National Fuel's implementation of its proposed construction methods and impact minimization measures, we have determined that installing and operating the pipeline would not significantly affect vegetation.

3.2 Wildlife

3.2.1 Terrestrial Animals

The aforementioned vegetation and other natural features that would be crossed by the pipeline including wetlands, rock outcroppings, drainages, unvegetated lands, and disturbed areas provide habitat for a variety of wildlife species. Wildlife species known to occur or that potentially occur within these habitats include common wildlife accustomed to human presence.

Migratory birds are addressed specifically in section B.3.2.3 and protected species including state- and federally-listed threatened and endangered species, and RFSS and ANF Species with Viability Concerns are addressed later in section B.3.2.4. As stated previously, RFSS and other USDA-FS species of concern are also addressed in the BE.

The loss of woody vegetation would reduce the amount of habitat available to wildlife and would result in the relocation of wildlife and forested edges. The relocation of wildlife to neighboring habitats would put additional pressure on the resources within those habitats. For species that require very specialized habitats (e.g. RFSS wetland and riparian dependent species), the loss of some habitat could result in a decrease in fitness for, or even mortality to, these individuals. The magnitude in which populations would be affected would depend on the size of the population and the amount of suitable habitat present.

The general use of construction equipment (physical disturbance and noise) could alter wildlife behavior, resulting in avoidance and/or displacement. Affected wildlife could experience increased rates of stress, injury, and mortality. Once installation of the pipeline is complete, National Fuel would revegetate affected lands in accordance with the measures identified in its ESCAMP and would periodically maintain vegetation occurring on the permanent easement. Operating the pipeline would involve periodic vegetation maintenance within the permanent easement. These activities could affect wildlife in a manner similar to that described for the construction activities and would result in the permanent conversion of forested vegetation to herbaceous and upland shrub vegetation. However, these impacts would be both infrequent and short term.

To avoid and minimize impacts on wildlife, National Fuel would comply with any relevant aspects of the ANF Forest Plan and would implement numerous measures as described in its ESCAMP, Invasive Species Control Plan, other project-specific plans, and the USDA-FS' Guide to Noxious Weed Prevention Practices.

Based on National Fuel's proposed construction procedures, the collocation of the pipelines, the characteristics of the wildlife affected, the presence of similar habitats nearby, and National Fuel's commitment to restore and revegetate affected lands, we conclude that potential impacts on wildlife would not be significant.

3.2.2 Fisheries

As described previously, installing the pipelines (and use of access roads) would require 18 waterbody crossings. Warmwater, coldwater, high-quality coldwater fisheries, and approved trout waters would all be crossed. Waterbodies containing RFSS would also be crossed. RFSS fish species are addressed in the BE. No other specially managed or exceptional value waterbodies (and fisheries) would be affected by the Project. Fish known to occur in the waterbodies that would be crossed or that potentially occur in these waterbodies include black crappie (*Pomoxis nigromaculatus*), chain pickerel (*Esox niger*), common carp (*Cyprinus carpio*), northern hog sucker (*Hypentelium nigricans*), northern pike (*Esox lucius*), pumpkin seed (*Lepmois gibbosus*), rock bass (*Ambloplites rupestris*), small mouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*), yellow perch (*Perca flavescens*), a variety of minnows (*Cyprinidae sp.*), sunfish (*Centrarchidae sp.*), darters (*Percidae sp*.), suckers (*Catostomidae sp.*), and catfish (*Ictaluridae sp.*). Additionally, East Hickory and Queen Creeks are approved trout waters that are stocked with brook (*Salvelinus fontinalis*), brown (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*).

With the exceptions of East Hickory and Queen Creeks which would be crossed via HDD, National Fuel would cross waterbodies using open cut, and dam and pump or flume construction methods. The open cut crossing of the Allegheny River would be completed in compliance with the PFBC's prohibition of instream work between April 1 and August 15. Dale Run, Dunn Run, E. Br. Hickory Creek, Queen Creek, and their tributaries are all

wild trout streams. Instream construction would be avoided in these streams between September 30 and December 31 to avoid impacts to spawning trout. With the exception of approved trout waters and wild trout streams, no other timing prohibitions apply to waterbody crossings.

Installing the pipeline using dam and pump or flume construction methods would result in the loss of aquatic habitat and would temporarily increase turbidity and sedimentation. The general disturbance caused by the use of construction equipment resulting in fish avoidance and alteration of behavior combined with the loss of aquatic habitat, sedimentation, and the effect on water quality resulting from increased turbidity (or an inadvertent release of equipment fluid) would temporarily increase the rates of stress, injury, and/or mortality experienced by fish.

The use of an HDD significantly reduces potential impacts on fish. However, an inadvertent release of bentonite drilling fluid into either East Hickory or Queen Creeks would temporarily affect water quality and could increase the rates of stress, injury, and/or mortality experienced by fish. Should an inadvertent return occur, National Fuel would contain and clean up the release in accordance with its HDD Inadvertent Return Contingency Plan. We have reviewed this plan and find it acceptable.

The open cut crossing of the Allegheny River (including the instream use of equipment and spoil storage) would result in the loss of aquatic habitat and the temporary increase of turbidity and sedimentation as demonstrated by National Fuel's modeling (see Surface Waters discussion, section B.2.2). Additionally, the loss of aquatic habitat would result in decreased foraging, resting, breeding, and shelter opportunities and would likely affect predation rates. General disturbance and the resulting increase in turbidity may cause fish avoidance, behavior alteration, increased predation, and gill agitation. Downstream sedimentation (deposition [see section B.2.2]) could alter aquatic habitat characteristics and affect fish use of this habitat. All of aforementioned activities could increase rates of stress (including susceptibility to disease), injury, and/or mortality experienced by fish. No contaminated sediments were identified in the Allegheny River Project area and we have concluded that construction would not expose fish to additional mercury.

The withdrawal of water from the Allegheny River or any other waterbody for the purposes of hydrostatic testing could also affect fish. Withdrawal equipment could result in the impingement and entrainment of fish. However, National Fuel would screen intakes and maintain flow rates to minimize these impacts. Withdrawals could also affect flow and cause a disturbance that could alter fish movement and behavior, resulting in increased rates of stress, injury, and/or mortality.

The measures National Fuel would implement to minimize impacts on surface waters as described in its ESCAMP, Spill Prevention and Response Procedures, HDD Inadvertent Return Contingency Plan and other Project-specific plans would also minimize

impacts on fish. Additionally, National Fuel would comply with all applicable waterbody crossing restrictions and agency permits and any relevant aspects of the ANF Forest Plan.

Because specific species tolerances for increased turbidity are not known, it is difficult to fully anticipate impacts on fish. In general, fish species that occupy the streams in the Project area are acclimated to short-duration increases in turbidity due to storms or high flow events. Therefore, based on the characteristics of the fish potentially affected including their mobility, the temporary nature of the impacts, and National Fuel's implementation of impact minimization measures, we have determined that installing and operating the Project would not significantly impact fisheries.

3.2.3 Migratory Birds

Migratory birds are protected by the Migratory Bird Treaty Act (16 U.S. Code 703-711). This act governs and prohibits take and certain other impacts on migratory birds and their nests. Executive Order (EO) 13186 was issued, in part, to ensure that environmental analyses of federal actions assess the impacts on migratory birds. EO 13186 states that emphasis should be placed on species of concern, priority habitats, and key risk factors; and prohibits the take of any migratory bird without authorization from the USFWS. The Commission and the USFWS have entered into a Memorandum of Understanding (MOU) that focuses on avoiding or minimizing adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the Commission and the USFWS by identifying areas of cooperation. This voluntary MOU does not waive legal requirements under any other statutes and does not authorize the take of migratory birds.

A variety of migratory birds including forest-interior birds, birds of conservation concern, and waterfowl use or could use the habitats affected by the Project. These birds use these habitats for foraging, resting (stopover), sheltering, breeding, and nesting. These habitats and the impacts on them resulting from constructing and operating the pipeline were addressed previously.

Consistent with EO 13186 which emphasizes a focus on species of concern and priority habitats, the Project would be located within the North American Bird Conservation Initiative - Bird Conservation Region (BCR) 28. The Project would also be located near BCR 13. Within BCR 28, 25 birds of conservation concern as identified in the USFWS publication Birds of Conservation Concern 2008 occur or potentially occur. These birds are: bald eagle; peregrine falcon; upland sandpiper; Northern saw-whet owl (S. Appalachian breeding pop.); whip-poor-will; red-headed woodpecker; yellow-bellied sapsucker (S. Appalachian breeding pop.); olive-sided flycatcher; loggerhead shrike black-capped chickadee (S. Appalachian pop.); Bewick's wren (bewickii ssp.); sedge wren; wood thrush; blue-winged warbler; golden-winged warbler; prairie warbler; Cerulean warbler; worm-eating warbler; Swainson's warbler; Louisiana waterthrush; Kentucky warbler;

Canada warbler; Henslow's sparrow; rusty blackbird; and red crossbill (S. Appalachian pop.).

The temporary and permanent loss of wildlife habitat and the general disruption to wildlife behavior created by the use of construction-related equipment could result in the displacement of migratory birds. Displacement and avoidance could impact bird migration, nesting, foraging, and mating behaviors. Behavior changes including nest abandonment combined with the loss and/or conversion of wildlife habitats as well as direct impacts from construction could increase the amount of stress, injury, and mortality experienced by migratory birds.

As described previously, to avoid and minimize impacts on the environment, National Fuel proposes a route adjacent to an existing pipeline easement. National Fuel would also comply with any relevant aspects of the ANF Forest Plan and would implement numerous measures described in its ESCAMP that would further minimize impacts. Additionally, only limited tree clearing would be necessary to complete construction activities and National Fuel states that it would attempt to clear trees outside of the primary nesting season. However, to ensure impacts on migratory birds are minimized, the USDA-FS has indicated it will require National Fuel to conduct tree clearing between August 1st and March 31st, unless pre-disturbance surveys by a USDA-FS biologist (or a biologist deemed qualified by the USDA-FS) concludes that no nesting birds will be affected (to a level of nest failure) as a result of construction activities.

Based on the scope of the Project, the characteristics and habitat requirements of the birds of conservation concern and migratory birds occurring or potentially occurring in the Project area, the collocation of the pipelines, the presence of similar habitats adjacent to and in the vicinity of the Project, the anticipated timing of construction, and the relatively short duration of construction activities (75 days), we have determined that installing and operating the pipeline would not result in population-level impacts or significant measureable negative impacts on birds of conservation concern or migratory birds.

3.2.4 Special Status Species

Special status species are those species for which federal or state agencies provide an additional level of protection by law, regulation, or policy. Included in this category are federally-listed threatened and endangered species that are protected under the ESA, species that are listed as threatened or endangered by the Commonwealth of Pennsylvania, and RFSS and other USDA-FS species of concern.

Regional Forester Sensitive Species

Based on information provided to National Fuel by the USDA-FS, there are 80 RFSS within the ANF. The sweet-scented Indian-plantain (*Hasteola suaveolens*) occupies habitat within the Project area and suitable habitat is present for 26 other species. The

sweet-scented Indian-plantain is discussed below and in the BE (appendix H). Species with suitable habitat in the project area are also addressed in the BE.

In addition to discussing species occupying or having suitable habitat within the Project area, the BE addresses species with viability concerns and non-native invasive plants. Based on habitat surveys of affected lands and its analysis of RFSS, National Fuel concluded that the Project may impact individuals, but is not likely to cause a trend toward federal listing or a loss of viability. We concur. Additionally, National Fuel has committed to following the relevant guidance and criteria of the ANF Forest Plan, concluding that any potential minor impacts to species with suitable and occupied habitat should be mitigated.

Sweet-scented Indian-plantain

This species typically grows along the banks of rivers that are subject to scour and flooding events. It is believed that this species prefers dry to moist ground within floodplains, is relatively tolerant of light shade, and its seed germination may depend on frequent flooding. Two occurrences (totaling 13 individual plants) were documented within a PEM wetland along the Allegheny River. Consistent with a USDA-FS request, National Fuel would dig up by hand or heavy equipment the area where the plants are found with sufficient soil and maintain the plants in a moist condition so they can be replaced intact during restoration of the area. Based on National Fuel's adherence to site-specific mitigation measures requested by the USDA-FS, it concluded that the Project may impact individuals, but is not likely to cause a trend toward federal listing or a loss of viability. We concur.

Federally-listed Species

The FERC is required by Section 7 of the ESA to ensure that any action taken by the Commission would not jeopardize the continued existence of a federally-listed threatened or endangered species, or result in the destruction or adverse modification of the designated critical habitat of a federally-listed species. Based on our findings and determinations as described below, we request that the USFWS consider this analysis along with the Biological Assessment provided under separate cover on April 28, 2017 as our compliance with ESA consultation requirements for this Project and enter into Formal Consultation.

According to the USFWS' Pennsylvania Field Office (USFWS PFO) in an October 30, 2015 letter to a National Fuel representative, the Allegheny River is inhabited by threatened and endangered mussels. These mussels are:

- Northern rifffleshell (*Epioblasma torulosa rangiana*);
- Clubshell (*Pleurobema clava*);
- Rayed bean (*Villosa fabalis*);

- Snuffbox (*Epioblasma triquetra*);
- Sheepnose (*Plethobasus cyphus*); and
- Rabbitsfoot (*Quadrula cylindrical cylindrical*).

The pipeline would also be located within the range of the threatened northern long-eared bat (*Myotis septentrionalis*). In electronic correspondence dated October 12, 2015 between the USFWS PFO and a National Fuel representative, the USFWS PFO indicated that the Project would not be located within 5 miles of known northern long-eared bat (NLEB) hibernacula or maternity roost trees. Although no known hibernacula or maternity roost trees are located within the immediate vicinity of the Project, it is possible that NLEB are present or could forage on potentially affected lands and as such project-related activities (tree clearing and equipment use) could affect this species. Additionally, the USDA-FS has expressed concerns about this species and potential incidental take. Therefore, we have determined that installing and operating the pipeline may affect, but is not likely to adversely affect the NLEB. Based on our determination and in consultation with the USFWS, we submitted under separate cover a streamlined consultation form for the NLEB.

Mussels

Surveys of the Allegheny River conducted by National Fuel in 2015 and 2016 confirmed the presence of clubshell, northern riffleshell, and rayed bean. Four species of mussels having special status in Pennsylvania were also observed during these surveys. These species are addressed separately. Although not observed during the 2015/2016 surveys, snuffbox, sheepnose, and rabbitsfoot have all been reported within the Allegheny River in the vicinity of the Project. In total, over 17 mussel species and 4,000 individual mussels were recorded throughout the potentially affected segment of the Allegheny River.

Northern riffleshell

The endangered northern riffleshell is a small to medium-size mussel (up to three inches long). Its exterior is brownish-yellow to yellowish-green with fine green rays and its interior is typically white. The species is sexually dimorphic; male shells are irregular ovate in outline, with a wide shallow sulcus just anterior to the posterior ridge. Female shells are obovate in outline, and greatly expanded post-ventrally. The northern riffleshell is a long-term breeder with fertilization occurring in the late summer and embryos (glochidia) released the following spring or summer (Ortmann 1919). Northern riffleshell glochidia are obligate parasites on fish. Several fish species have been identified as hosts and it is believed that additional species may be utilized. It is believed that this is a relatively short-lived species that experiences very low juvenile survival.

The northern riffleshell occurs in clean, packed, coarse sand and gravel in riffles and runs (Stansbery et al. 1982, Watters 1990). The species buries itself to the posterior margin

of the shell, although females may be more exposed especially during the breeding season (U.S. Fish and Wildlife Service 1994).

Clubshell

The endangered clubshell is a small to medium-size mussel (up to three inches long). Its exterior is yellow to brown with bright green blotchy rays and its interior is white. The shell is wedge-shaped and solid with a pointed and fairly high umbo. The clubshell is a short-term breeder with fertilization occurring in mid-spring and glochidia released in mid-summer (Ortmann 1919). Like the northern riffleshell and other mussels, clubshell glochidia are obligate parasites on fish. Several fish species have been identified as hosts and it is believed that additional species may be utilized. The clubshell is known to be a long-lived species that experiences low juvenile survival rates.

The clubshell is typically associated with clean, stable, coarse sand and gravel runs, often just downstream of riffles (Stansbery et al. 1982). The clubshell typically burrows completely beneath the substrate two to four inches, relying on water to percolate between the sediment particles (Watters 1990).

Rayed bean

The endangered rayed bean is a small mussel (less than 1.5 inches long). Its exterior is green, yellowish-green or brown with numerous, wavy, dark, green rays. The shell is elongate or ovate in males and elliptical in females. The rayed bean is believed to be a long-term breeder with fertilization occurring in late-spring and glochidia released in fall. The Tippecanoe darter (*Etheostama Tippecanoe*) has been identified as a host and it is believed that additional fish species may be utilized.

The rayed bean has been observed in or near shoals or riffles, occupying gravels and sands. The rayed bean has also been reported buried among the roots of aquatic vegetation.

Snuffbox

The endangered snuffbox has been described as a small to medium size mussel (ranging from 1.8 to 2.8 inches long). Its exterior is yellowish or yellowish-green, becoming darker with age. The shell is somewhat triangular, oblong or ovate. The snuffbox is believed to be a long-term breeder with fertilization occurring in fall and glochidia released in the following spring. The snuffbox has been observed in swift currents of riffles and shoals, occupying gravels, cobbles, and sands.

Sheepnose

The endangered sheepnose is a medium size mussel (up to 5.5 inches long). Its exterior is yellow to dull yellowish brown without rays and is smooth and shiny, and its interior is typically white, but may be pinkish to cream colored. The shell is oblong,

moderately inflated, with thick, solid valves. The sheepnose's life history is not well documented. The sheepnose is known to occur in shallow shoal habitats with moderate to swift currents over sand and gravel.

Rabbitsfoot

The threatened rabbitsfoot is a medium to large size mussel (up to six inches long). Its exterior is generally smooth and yellowish, greenish or olive in color becoming darker and yellowish-brown with age and usually covered with dark green or nearly black chevrons and triangles. The shell is elongate, rectangular, and moderately inflated. The rabbitsfoot is a short-term breeder with fertilization occurring in spring and glochidia released in late-summer. The Rainbow darter (*Etheostama caeruleum*) has been identified as a host and it is believed that additional fish species may be utilized. The rabbitsfoot is known to occur in shallow areas along the bank and may occur in deep water runs over sands and gravels.

As described previously, National Fuel plans to cross the Allegheny River using open-cut methods (within a 48 hour timeframe) during low flow conditions. Prior to beginning instream work, National Fuel would salvage and relocate mussels as described in its (draft) Mussel Salvage and Relocation Plan (MSRP). National Fuel plans to conduct this effort which is estimated to occur over 4 weeks during low flow conditions prior to the pipeline crossing. Mussels would be relocated upstream and made available for reintroduction into other waterbodies. Following construction, National Fuel would monitor mussels and habitat restoration. Monitoring events would be undertaken immediately after construction, in 2018, and in 2020.

Mussels are sedentary filter-feeders and are vulnerable to substrate disturbance, sedimentation, scouring, water quality degradation, changes in channel morphology, and alterations of river hydrology. Salvaging and relocating mussels would require handling, storing, and moving mussels. These activities would result in the loss of mussels (approximately 1,000 federally-listed individuals) and would increase stress on mussels. Mussels could be mishandled during the salvage process and the stress resulting from relocating them would likely result in additional loss and lower mussel fitness. Crossing the Allegheny River would disturb the river bed, altering habitat; affect water flow, increasing turbidity which in turn would affect water quality; and would increase sedimentation resulting in the deposition of materials into gravels and sands (see section B.2.2). These effects would result in the loss and degradation of mussel habitat.

Furthermore, individuals that are not relocated could be lost due to exposure and smothering, based on the anticipated levels of downstream sedimentation (see section B.2.2). Lastly, these effects would also impact mussel behavior and surrounding environmental conditions, increasing the rates of stress and decreasing the rates of fitness experienced by downstream mussels (and associated host fish species).

To minimize effects on mussels, National Fuel would adhere to its site-specific Allegheny River Crossing Plan; implement erosion control devices and best management construction practices described in its ESCAMP and other Project-specific plans; salvage and relocate mussels in compliance with its MSRP; and monitor post-construction activities. The MSRP includes measures and protocols that address:

- identifying and marking the "Action Area" where mussels would be salvaged;
- ensuring relocation areas are sufficient to accommodate salvaged mussels;
- using measures that would maximize the probability of identifying mussels;
- counting, removing, tagging, handling and recording mussels;
- minimizing the spread of mussel diseases;
- transporting and relocating mussels;
- implementing salvage efforts under the appropriate water clarity and temperature conditions;
- using only qualified personnel (including professional macalogist[s]);
- monitoring instream work and sediment dispersal;
- implementing unintentional take and agency notification(s); and
- conducting post-construction monitoring and reporting.

Because the MSRP has not been finalized and the measures contained therein are necessary to minimize effects on mussels, **we recommend that:**

- **<u>At least 30 days prior to construction within the Allegheny River</u>, National Fuel should file with the Secretary of the Commission (Secretary) the final Mussel Salvage and Relocation Plan developed in consultation with the USFWS PFO and the USDA-FS.**

Based on the impacts of National Fuel's planned crossing of the Allegheny River as described in this and previous sections and the confirmed presence of federally-listed threatened and endangered species as well as the potential for other protected species to occupy this segment of the Allegheny River, we have determined that installing and operating the pipelines may affect and is likely to adversely affect the identified federally-listed threatened and endangered mussels.

Consultation with the USFWS under section 7 of the ESA is ongoing, therefore **we recommend that:**

- **National Fuel should <u>not begin</u> construction activities <u>until</u>:**

  a. the staff completes formal consultation with the USFWS; and

  b. National Fuel has received written notification from the Director of OEP that construction or use of mitigation may begin.

State-Listed Species

<u>Pennsylvania Protected Species</u>

A review of the Pennsylvania Natural Diversity Inventory (PNDI) identified protected (rare and endangered) freshwater mussels and fish that are known to occur or potentially occur in the Allegheny River segment that would be affected by installing the pipelines. The rare species are: rainbow mussel (*Villosa iris*), fragile papershell (*Leptodea fragilis*), round pigtoe (*Pleurobema sintoxia*) and wavy-rayed lampmussel (*Lampsilis fasciola*). The endangered species are: gravel chub (*Erimystax x-punctatus*), mountain madtom (*Noturus eleutherus*), northern madtom (*Noturus stigmosus*), clubshell (*Pleurobema clava*), northern riffleshell (*Epioblasma torulosa rangiana*), and rayed bean mussel (*Villosa fabalis*). The fragile papershell, round pigtoe, and rainbow mussel were identified during the 2015/2016 Allegheny River surveys. The clubshell, northern riffleshell, and rayed bean were addressed previously and are not discussed further.

The pipelines would affect Pennsylvania protected mussels and their habitat in the same manner as federally-listed threatened endangered mussels would be affected. . The MSRP previously described also addresses Pennsylvania protected mussels. Impacts on protected fish would be the same as those described previously for non-protected fish; however, the rates of stress, injury, and mortality experienced by protected fish may be greater given their sensitive states and greater susceptibility to environmental change. Based on these impacts and National Fuel's implementation of impact avoidance and minimization measures, we find that installing and operating the pipelines could impact protected freshwater mussels, fish, and their habitats. However, based on the scope of the project and the temporary nature of construction activities, we conclude that the impacts on mussels and fish would be temporary and relatively minor to overall populations.

4.0 Land Use, Recreation, and Visual Resources

4.1 Land Use

National Fuel's proposed Project would affect approximately 45.4 acres (temporary and permanent) of land during construction. There are no active (or inactive) agricultural

lands located within or adjacent to the proposed Project. The Project would cross land use categories comprised of forest, open land, developed and open water designations. Categories further refined within these land uses include upland forests; residential; and upland scrub-shrub and wetlands (including palustrine emergent or scrub-shrub areas) (open land). Open water and wetlands are discussed in section B.2. Although a majority of the Project disturbance would be within already managed grassland areas (existing pipeline right-of-way), the Project would result in 19.8 acres of direct conversion of natural vegetation to managed grassland. The remaining acreage would be returned to pre-construction uses or per landowner agreement.

Forest Land

About 5.2 acres of upland forest land would be affected by the Project. Following construction, 0.2 acre would be allowed to revert to pre-construction conditions and the remaining 5 acres would be converted to maintained right-of-way. Impacts on upland forest lands would be long-term, as it would take decades for mature trees to re-establish. However, the small amount of acreage cleared would not constitute a significant impact on forest land.

Open Land

Approximately 26 acres of open land would be affected by the Project during construction. Open land includes all non-forested lands, non-residential cleared lands, and existing rights-of-way. Following construction, approximately 13 acres would continue to be used as permanent rights-of-way. The remaining 13 acres would be restored and returned to pre-construction conditions and use.

Residential Land

National Fuel would attempt to ensure that construction activities minimize impacts to residences, residential areas, and commercial properties, and that final cleanup is completed expediently. There is one residence and one church located off of Main Street in Tidioute which are located next to the proposed access into staging area SA-1. There are numerous residential structures located within 50 feet of the proposed construction right-of-way between MP 2.92 and MP 3.39 and five residences located within 50 feet of the proposed construction right-of-way between MP 4.24 and MP 4.48. National Fuel has developed site-specific residential construction plans for these homes (see appendix D). These plans identify the mitigation measures to be implemented by National Fuel to further reduce impacts on residents during the construction period. Based on our review, we have found the site-specific plans and mitigation acceptable. However, **we encourage affected residents to review these plans and provide comments to us.**

In addition to the residence(s) noted above, there are additional structures or outbuildings that are also located within 50 feet of the proposed construction right-of-way

or extra work areas. National Fuel does not have plans to demolish or remove any of the existing residential structures or associated auxiliary buildings along the right-of-way. These nearby structures are not utilized as full-time residences and mostly consist of storage sheds, garages, barns, camping cabins, including:

- approximately 15 small cabins/hunting lodges some with associated out structures (outhouses, sheds, etc.) associated with an organized campground located within 50 feet of the construction right-of-way between approximately MP 2.92 and MP 3.39. Some of these structures appear to have been permanently abandoned and others are well maintained;

- a small storage shed located approximately 45 feet south of the proposed construction right-of-way at MP 3.47;

- a storage shed located approximately 36 feet northeast of the proposed construction right-of-way at MP 4.26; and

- a small storage shed located approximately 13 feet southwest of the proposed construction right-of-way at MP 4.43.

To avoid or minimize potential residential impacts, National Fuel would complete the construction in accordance with best management practices. In residential areas during construction, National Fuel would:

- provide notice to landowners regarding the construction schedule by phone or in person prior to the start of the construction on the landowner's property;

- maintain access and traffic flow (particularly for emergency vehicles);

- eliminate or reduce hazards associated with open ditches by erecting temporary barricades or fencing;

- minimize the length of trench remaining open during construction – including excavation, pipe placement and backfill during one day shift; and

- minimize fugitive dust emissions by the use of dust suppression techniques (e.g., water spray).

In addition, for residences within 50 feet of the construction work area to avoid or minimize impacts, National Fuel would employ some or all of the following mitigation measures, as appropriate:

- mature trees and landscaping would not be removed from within the edge of the construction work area to the extent practicable (e.g., necessary for the safe operation of construction equipment);

- immediately after backfilling the trench, all lawn areas and landscaping within the construction work area should be restored consistent with the ESCAMP; and

- homeowners would be notified in advance of any scheduled disruption of household utilities and the duration of the interruption would be kept as brief as possible. Representatives of the local utility companies would be on-site during construction when necessary.

To ensure that construction activities minimize impacts to residences, residential areas, and commercial properties, **we recommend that:**

- **Prior to construction, National Fuel shall file evidence of landowner concurrence for all locations where construction workspace or fencing will be located within 10 feet of a residence, and the church located at 218 Main Street, Tidioute, Pennsylvania.**

4.2 Public Land, Conservation Land, Recreation, and Special Interest Areas

Public or Conservation Land

National Fuel's proposed Project is located nearly entirely within the bounds of the ANF, which is administered by the USDA-FS. The ANF is Pennsylvania's only National Forest; the forest is approximately 513,175 acres and includes land in Elk, Forest, and McKean and Warren counties in the northwestern corner of the state. Approximately 461,000 acres are forested; 41,000 acres are non-forest; and 11,000 acres are covered by water (primarily the Allegheny Reservoir).

As previously described, only limited tree clearing would be necessary to complete construction activities, as new pipeline facilities would utilize existing maintained (cleared) right-of-way for the length of construction. National Fuel would seek approval for a Special Use Permit through the ANF from the USDA-FS. National Fuel would consult with the USDA-FS to identify and address any concerns regarding the Project crossing these public lands.

Natural, Recreational, or Scenic Areas

On NFS lands, there are no designated federal natural, recreation, or scenic areas and no recreation facilities such as campgrounds, picnic areas, trailheads, or overlooks within

the Project area, therefore, there would be no effect on these types of facilities. There are no known dispersed campsites within the Project area and people generally do not camp on powerlines, pipelines, and other transmission-type corridors. Dispersed use, such as hunting, fishing, bird-watching, and driving for pleasure may occur in and around the Project area, but these are transitory in nature. Some people may be displaced during the active construction phase of the Project, either because of construction closures or because what they are seeking, such as game or non-game species are also displaced. These effects are temporary and as the Project site naturalizes, use would generally return. Transmission lines lend themselves to illegal use by off-road vehicle users because of the ability to move across country on a wide corridor and the challenge of steep grades as these lines cut across hills and valleys. This leads to loss of vegetation, soil compaction, and erosion on steep slopes, introduction of invasive plants, and can be a safety hazard to these illegal users. It is possible that the integrity of the pipeline could be compromised if these physical effects occur. Sections of the existing pipeline may or may not be currently experiencing illegal off-road vehicle use. However, whenever a pipeline crosses a road, National Fuel intends to use fencing, boulders, or other blockading methods to prevent illegal use of the pipeline as a transportation corridor. The Recreation Opportunity Spectrum for the Project area is classified as Roaded Natural and because the Project is occurring on an existing transmission corridor, this is not expected to change.

The Allegheny River, which would be crossed by proposed project facilities, is a federally designated Wild and Scenic River (Public Law 102-271) with a "recreational" classification as established under the National Wild and Scenic Rivers Act. The Allegheny National Forest was appointed the managing agency for the Allegheny River upon its designation into the national wild and scenic rivers system on April 20, 1992. The Secretary of Agriculture has delegated the responsibility of making a Determination of Effects for projects on the designated portions of the Allegheny River to the Regional Forester of the Eastern Region of the Forest Service, located in Milwaukee, Wisconsin. This Determination of Effects cannot be made until the final project location and methods have been decided upon and an application for permit has been made to the USACE in Pittsburgh, Pennsylvania. The USACE is the regulatory agency for the Allegheny Wild and Scenic River because this river is a navigable waterway.

The Determination of Effects is based on an analysis of the Project's effects on the free flow, water quality, and Outstandingly Remarkable Values of the designated river. In the case of the Allegheny River, the Outstandingly Remarkable Values are scenic, heritage, natural, recreational, scientific, and ecological values. For the analysis under NEPA, recreational values are discussed in this section, scenic values are discussed in section B.4.4, and the other values are discussed in their respective sections of this document. This analysis is only for the NEPA document and does not constitute a Determination of Effects under the Wild and Scenic Rivers Act 7(a).

Recreation on the Allegheny River includes use by both motorized and non-motorized boating, fishing, camping on the river islands, and viewing scenery. Boating and fishing would be affected by a temporary closure of river traffic during the trenching operation. Non-motorized boaters would bear greater impact by not being able to use the river from Bonnie Brae to the Tidioute Borough Access, a distance of 2 miles, during the trenching operation. Bonnie Brae is the last public launch before the Project area. Motorized boaters would be able to use the river up to the Project boundary and would then have to motor back upstream to their take-out point. Non-motorized boaters putting in at the Tidioute Borough Access would not be affected by the project as far as put-in and take-out is concerned, whereas motorized boaters would not be able to go upstream, but going downstream from Tidioute Borough Access and returning would not be a problem. The river would need to be signed at all launches to warn boaters of the project underway and to indicate where to get off the river (for non-motorized boaters) or to turn around (for motorized boaters). Plans indicate that during the trenching operation, there would be spoil piles in the river as trenching removes the substrate of the riverbed. Following construction, the spoil piles would be completely removed to avoid creating a navigational hazard for boaters and to avoid changing the flow of the river.

Fishing upstream of the Project is not expected to be affected, but fishing downstream of the Project could be affected by increased sediment loads that would cause fish to avoid the area until sediment loads returned to normal.

The Project would affect camping along the river since Courson Island, the fourth island in the Allegheny Islands Wilderness, is situated between Bonnie Brae boat launch and the Project area. Motorized boaters would still be able to access Courson Island, but non-motorized boaters would find it difficult to paddle upstream to return to the Bonnie Brae. Campers would be subject to the noise of the trenching operation, decreasing the feeling of remoteness and solitude on the Wilderness Island. However, if the trenching portion of the Project occurs mid-week, there impact would be less than if it occurred on a weekend when camping use tends to be higher.

4.3 Visual Resources

The existing Line Q right-of-way is 35 feet wide, and would have to be expanded by 6.5 feet north of State Route 337 and 14.5 feet south of State Route 337 in order to provide proper space between lines. The existing Line Q and the proposed Line QP permanent right-of-ways would total 41.5 feet (north of Route 337) and 49.5 feet (south of Route 337) on NFS lands. Temporary work areas that would provide for staging of equipment and materials would be approved by the permit administrator prior to construction and may exceed this width in a localized area.

Most visual and aesthetic impacts associated with the Project would be limited to the period of active construction, in which the landscape would be characterized by areas of

cleared or flattened vegetation, trench excavation and earthwork, grading, and spoil storage. Equipment and vehicles would move around the Project area and construction materials would be transported to the site. Significant tree-clearing activities are not anticipated in preparation of the installation of the new line. The contours and vegetation along the pipeline rights-of-way would be restored to near pre-construction conditions following backfilling. Aesthetic impacts may include temporary elevated noise or dust in areas proximate to use of construction equipment. The contours and vegetation along the pipeline right-of-ways would be restored to near pre-construction conditions following backfilling. The visual impacts of construction within the pre-existing maintained right-of-way would decrease over time as disturbed vegetation becomes reestablished. These construction-related visual and aesthetic impacts would be temporary and would decrease with distance from areas of active construction. The Project's only new aboveground facilities, a regulator station, would be located in sparsely populated areas set back from the road adjacent to an existing utility right-of-way and accordingly there would be not be significant visual impacts.

On the ANF, scenery would be managed through the guidance of the ANF's scenery implementation guide for pipeline rights-of-way. Scenic Integrity Level for the Project area is considered to be moderate to low. The area has several road and transmission corridors, residential areas and farms, and a history of vegetation management. While the new right-of-way would be wider than the existing, it is not significantly so in most areas. Feathering the edges of the line, avoiding a straight cut across the hillside by making some parts of the right-of-way wider and some narrower depending on which tress along the edge are cut, would make it even less so.

Due to the colocation of Line QP with an existing utility right-of-way, permanent significant visual impacts to the Allegheny River are not anticipated. The widening of the right-of-way as seen from the river would not be a noticeable change to river users. Where the pipeline emerges from underground is in the town of Tidioute and is surrounded by yards, trees, and buildings. The structures do not affect the river scenery in a negative manner at the present time and are not expected to do so when the Project is complete. These were an accepted part of river scenery at the time of designation. Temporary visual impacts are limited to the compressed timeframe associated with this crossing construction and consist of personnel, equipment, materials, and spoil piles within the river corridor and along the banks. No other known visually-sensitive or designated vistas or scenic resource areas would be affected by the Project.

The majority of visual impacts associated with the Project would be limited to the period of active construction, resulting from the presence of construction equipment and personnel at Project sites, with minimal permanent impacts. We conclude that the Project would not have a significant impact on visual resources.

4.4 Hazardous Waste Sites

In order to identify any landfills, spills or hazardous waste sites in the Project area, National Fuel reviewed publicly-available databases maintained by the PADEP and various other federal databases (maintained with environmental site records). The review was conducted to identify any sites within 0.5 miles of the pipeline construction work areas. A review of the database information did not indicate any sites or facilities within 0.5 miles of the proposed pipeline.

If unexpected contaminated media is encountered, National Fuel would address the contamination using best management practices developed in coordination with the PADEP. At a minimum, waste would be collected and removed from the work site promptly and would be disposed in a proper manner or recycled, as appropriate. We conclude these measures are appropriate.

5.0 Cultural Resources

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

The area of potential effect is comprised of new pipeline rights-of-way, staging areas and an access road. The project is located on private and public lands. Pan-American Consultants, contractor for National Fuel, coordinated with the USDA-FS in order to obtain an Archaeological Resource Protection Act permit to conduct archaeological survey on federal land. The project number assigned to this project by the USDA-FS is R2015091903059. The project number assigned by Pennsylvania State Historic Preservation Office (SHPO) is ER2015-1639-042-E. During survey, one isolated find (36WA/017) was identified on public land, and one multi-component archaeological site was identified on private land (36WA0618). A Project modification necessitated additional survey in April 2016.

Pan American Consultants provided Project information to the SHPO and USDA-FS, and stated the proposed work within the delineated boundaries of site 36WA0618 would not require soil stripping or placement of gravel, and therefore, would have no effect to the site. In letters dated March 24, 2016 and May 5, 2016, the SHPO concurred with the no effect recommendation for 36WA/017. The SHPO concurred that the proposed work would have no effect to site 36WA0618, as long as there was no ground disturbance beyond the depth of cultural resource survey shovel testing. The USDA-FS concurred that

site 36WA/017 was not NRHP eligible on March 11, 2016 and June 27, 2016. We also concur.

National Fuel provided a plan to address the unanticipated discovery of historic properties and human remains during construction. The plan provides for the notification of interested parties, including Native American Tribes, in the event of any discovery. We find this plan acceptable.

National Fuel contacted nine federally recognized tribes on December 15, 2015 to request their comments on the project: Absentee Shawnee Tribe, Delaware Nation, Delaware Tribe of Indians, Eastern Shawnee Tribe of Oklahoma, Oneida Nation, Seneca Nation, Seneca-Cayuga Tribe of Oklahoma, Shawnee Tribe, and Tonawanda Band of Seneca Indians. As a result of this correspondence, the Delaware Nation requested the Stockbridge-Munsee Nation also be contacted. National Fuel provided project information to the Stockbridge-Munsee Nation on June 29, 2016. We sent our NOI to all ten Tribes, along with a follow-up letter, on February 19, 2016 (initial nine Tribes) and July 18, 2016 (Stockbridge-Munsee Nation). The Stockbridge-Munsee Nation responded and requested a copy of the cultural survey report. The report was sent to the Stockbridge-Munsee Nation on May 4, 2017. The USDA-FS consulted with the original ten tribes and an additional five federally recognized Tribes: the Cayuga Nation, Oneida Nation of Wisconsin, Onondaga Nation, St. Regis Mohawk Tribe, and Tuscarora Nation on March 20, 2017. To date, no comments have been received from Forest Service consultation efforts.

Therefore, we have determined, based on the information filed by National Fuel and consultations with the SHPO, USDA-FS and Tribes, that the Project as proposed would have no effect on any properties listed in or eligible for listing the NRHP provided that there was no ground disturbance beyond the depth of cultural resource survey shovel testing at site 36WA0618.

6.0 Air Quality and Noise

6.1 Air Quality

Federal and state air quality standards are designed to protect human health. The USEPA has developed National Ambient Air Quality Standards (NAAQS) for criteria air pollutants such as oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), and inhalable particulate matter ($PM_{2.5}$ and PM_{10}). $PM_{2.5}$ includes particles with an aerodynamic diameter less than or equal to 2.5 micrometers and PM_{10} includes particles with an aerodynamic diameter less than or equal to 10 micrometers. The NAAQS were set at levels the EPA believes are necessary to protect human health and welfare. Volatile organic compounds (VOC) and hazardous air pollutants (HAPs) are also emitted during fossil fuel combustion.

Greenhouse Gases (GHGs) produced by fossil-fuel combustion are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). GHGs status as a pollutant is not related to toxicity. GHGs are non-toxic and non-hazardous at normal ambient concentrations, and there are no applicable ambient standards or emission limits for GHGs under the Clean Air Act. GHGs emissions due to human activity are the primary cause of increased levels of all GHGs since the industrial age. These elevated levels of GHGs are a cause of warming of the climate system since the 1950s. These existing and future emissions of GHGs, unless curtailed, may cause further warming and changes to the local, regional and global climate systems. During construction and operation of the Project, these GHGs would be emitted from construction equipment and line heaters. Emissions of GHGs are typically expressed in terms of CO_2 equivalents (CO_{2e}).

If measured ambient air pollutant concentrations for a subject area remain below the NAAQS criteria, the area is considered to be in attainment with the NAAQS. The Project areas are in attainment for all NAAQS.

The Clean Air Act is the basic federal statute governing air pollution in the United States. We have reviewed the following federal requirements and determined that they are not applicable to the proposed Project:

- New Source Review;
- Title V;
- National Emissions Standards for Hazardous Air Pollutants;
- New Source Performance Standards;
- Greenhouse Gas Reporting Rule; and
- General Conformity of Federal Actions.

Construction Impacts

During construction, a temporary reduction in ambient air quality may result from criteria pollutant emissions and fugitive dust generated by construction equipment. The quantity of fugitive dust emissions would depend on the moisture content and texture of the soils that would be disturbed. Fugitive dust and other emissions due to construction activities generally do not pose a significant increase in regional pollutant levels; however, local pollutant levels could increase. Dust suppression techniques, such as watering the right-of-way may be used as necessary in construction zones near residential and commercial areas to minimize the impacts of fugitive dust on sensitive areas. The Project construction emissions are presented in table 9.

Table 9
Construction Emissions
(tons/year)

Source	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	GHG (as CO_{2e})	Total HAPS
Line Q Replacement and Abandonment	0.5	0.1	<0.1	0.1	<0.1	<0.1	20.0	<0.1
Proposed Line QP	6.9	1.4	0.5	1.5	8.6	1.1	306.0	<0.1
Proposed Regulator Station at Limestone Township, PA	0.1	<0.1	<0.1	<0.1	0.1	<0.1	3.1	<0.1
Existing Regulator Station at Tidioute Borough, PA	0.1	<0.1	<0.1	<0.1	0.1	<0.1	3.1	<0.1

These emissions represent the combined emissions of construction equipment combustion, on-road vehicle travel, off-road vehicle travel, and earthmoving fugitive dust. Construction related emission estimates were based on a typical construction equipment list, hours of operation, and vehicle miles traveled by the construction equipment and supporting vehicles for each area of the Project. Emission factors for construction were based on Tier 2 diesel engine standards. Ultra-low sulfur diesel use was assumed for both the non-road and on-road diesel vehicles.

Operational Impacts

The proposed regulator station, located in Limestone Township and the existing Tidioute South Station located in Tidioute Borough are both in Warren County, Pennsylvania; and would consist of valves, compressors, pump seals, connectors, flanges, and open ended lines. Emissions from the regulator stations are shown below in table 10.

Table 9 Operation Emissions (tons/year)								
Source	**NO_x**	**CO**	**VOCs**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**GHG (as CO_{2e})**	**Total HAPs**
Proposed Regulator Station at Limestone Township, PA	0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
Existing Regulator Station at Tidioute Borough, PA	0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1

These emissions would not have a significant impact on ambient air quality and would not contribute to an exceedance of an air quality standard. We also do not anticipate any changes in emissions form the Project facilities that is being abandoned by sale.

Conclusion

Given the implementation of construction work practices, the short duration of the construction activities, a review of the estimated emissions from construction and operation, we find there would be no regionally significant impacts on air quality.

6.2 Noise

The noise environment can be affected both during construction and operation of pipeline projects. The magnitude and frequency of environmental noise may vary considerably over the course of the day, throughout the week, and across seasons, in part due to changing weather conditions and the effects of seasonal vegetative cover. Two measures to relate the time-varying quality of environmental noise to its known effect on people are the 24-hour equivalent sound level (Leq) and day-night sound level (Ldn). The Leq is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The Ldn is the Leq plus 10 decibels on the A-weighted scale (dBA) added to account for people's greater sensitivity to nighttime sound levels (between the hours of 10 p.m. and 7 a.m.). The A-weighted scale is used because human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered to be 3 dBA; 5 dBA is clearly noticeable to the human ear, and 10 dBA is perceived as a doubling of noise.

Construction Noise

Construction noise is highly variable. Many construction machines operate intermittently, and the types of machines in use at a construction site change with the construction phase. The sound level impacts on residences along the pipeline right-of-way due the construction activities would depend on the type of equipment used, the duration of use for each piece of equipment, the number of construction vehicles and machines used simultaneously, and the distance between the sound source and receptor. Nighttime noise due to construction would be limited since construction generally occurs during daylight hours, Monday through Saturday.

HDD Construction

National Fuel has identified five sites where they would use HDD activities to install the pipeline; two road crossings and three waterbody crossings. These locations are identified in section A.7.2 and appendix E of the EA. National Fuel has committed to not using HDD during nighttime hours. National Fuel would attempt to meet the FERC's 55 dBA Ldn criteria at the closest NSAs using mitigation measures and construction procedures such as:

- temporary noise barriers surrounding workspace;
- exhaust silencers on equipment engines and low-noise generators; and
- partial noise barrier or other enclosure around hydraulic power unit, engine driven pumps, engine coolers, and mixing/cleaning systems.

In the event that FERC's noise criterion is exceeded, National Fuel would work with specific landowners at NSAs to address concerns on a case by case basis. There are NSAs located within 0.5 mile of the HDD entry and exit sites at every HDD operation. National Fuel conducted an acoustical analysis to estimate the noise levels attributable to each HDD and the total noise level at each NSA. Table 11 below summarizes the estimated sound levels of HDD operations at the nearest NSAs.

Table 10
Estimated Sound Contribution of Daytime HDD Operations at NSAs

HDD No.	HDD Segment	Entry Exit Point	Distance & Direction of Closest NSA	HDD Noise Levels L_{eq} (without noise control measures) (dBA)	HDD Noise Levels L_{eq} (with noise control measures) (dBA)	Ambient L_{dn} (dBA)	Total L_{dn} of HDD + Ambient L_{dn} (dBA)	Increase Above Ambient L_{dn} (dBA)
HDD #1	Route 62	Entry	550 ft. S-SW	35.9	33.9	46.0	46.3	0.3
		Exit	750 ft. S-SW	24.6	22.6	46.0	46.0	0.0
HDD #2	Bimber Run Road	Entry	300 ft. NW	46.2	44.2	46.0	48.2	2.2
		Exit	250 ft. NW	36.7	34.7	46.0	46.3	0.3
HDD #3	Kelly Hill Road	Entry	100 ft. S	56.2	54.2	43.9	54.6	10.7
		Exit	100 ft. SW	48.3	46.3	43.9	48.3	4.4
HDD #4	East Hickory Creek	Entry	50 ft. S	62.4	60.4	43.9	60.5	16.6
		Exit	150 ft. SW	48.3	46.3	43.9	48.3	4.4
HDD #5	Queen Creek	Entry	50 ft. S	62.4	60.4	43.9	60.5	16.6
		Exit	300 ft. NW	38.2	36.2	43.9	44.6	0.7

As illustrated in table 11, some NSAs were above 55 dBA or had a significant noise increases. To ensure that the noise would not have a significant impact on local residents, **we recommending that**:

- **Prior to initiating HDD operations at the Kelly Hill Road, East Hickory Creek, and Queen Creek crossings**, **National Fuel should file with the Secretary, for the review and written approval by the Director of OEP, an HDD noise mitigation plan to reduce the projected noise level attributable to the proposed drilling operations at NSAs with predicted noise levels above 55 dBA. During drilling operations, National Fuel should implement the approved plan, monitor noise levels, and make all reasonable efforts to restrict the noise attributable to the drilling operations to no more than 55 dBA L_{dn} at the NSAs.**

Operational Noise

The Project would have no significant impact from operational noise. The Project would not add to or modify the amount of compression at any compressor stations. Operational noise from the Project would occur at the proposed Limestone Township Regulator Station and Tidioute Borough Regulator Station. Noise at the regulator stations would be audible, but minor and intermittent in nature.

Conclusion

Given the temporary nature of construction activities, our HDD noise condition, and the minor incremental noise impacts from operations, we conclude construction and operation noise impacts would not be significant.

7.0 Reliability and Safety

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

Methane has an auto-ignition temperature of 1,000 degrees Fahrenheit and is flammable at concentrations between 5.0 percent and 15.0 percent in air. An unconfined mixture of methane and air is not explosive; however, it may ignite if there is an ignition source. A flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

Safety Standards

The USDOT is mandated to provide pipeline safety under Title 49 USC Chapter 601. The USDOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards which set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level.

The USDOT provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards. A state may also act as USDOT's agent to inspect interstate facilities within its boundaries; however, the USDOT is responsible for enforcement actions. The USDOT pipeline standards are published in Title 49 CFR Parts 190-199. Part 192 specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993, between the USDOT and the FERC, the USDOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify that it would design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection. Alternatively, an applicant must certify that it has been granted a waiver of the requirements of the safety standards by the USDOT in accordance with Section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards other than the USDOT standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert the USDOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

The FERC also participates as a member of the USDOT's Technical Pipeline Safety Standards Committee which determines if proposed safety regulations are reasonable, feasible, and practicable.

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

Conclusion

National Fuel's construction and operation of the Project would represent a minimum increase in risk to the nearby public and we are confident that with implementation of the standard safety design criteria, that the Project would be constructed and operated safely.

8.0 Cumulative Impacts

The proposed Project lies in the Appalachian Plateau. It is an area that is 86% forested and is punctuated by high hills and low mountains. This forested landscape supports the major economic activities of forestry and recreation. Prior to 1890, these forests contained hemlock and American beech on wet plateaus and stream valleys and oak-chestnut on dry ridges and outcrops. In the late nineteenth century, the Allegheny Plateau was nearly completely clear-cut, leaving a ravaged landscape. Logging between 1890 and 1930 resulted in the predominance of the Allegheny hardwood forest type, including black cherry, red and sugar maples, and yellow birch. This area is also at the northern fringe of the Appalachian coal belt and includes substantial portions of Pennsylvania's oil and gas production. This area has historically provided an accessible, rural recreation oasis for generations of residents of nearby New York and Philadelphia.

In accordance with NEPA, we identified other actions located in the vicinity of the Project facilities and evaluated the potential for a cumulative impact on the environment. As defined by CEQ, a cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. CEQ guidance states that an adequate cumulative effects analysis may be conducted by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions. In this analysis, we consider the impacts of past projects within the region as part of the affected environment (environmental baseline) which was described and evaluated in the preceding environmental analysis. However, present effects of past actions that are relevant and useful are also considered.

Consistent with CEQ guidance and to determine cumulative impacts, we expanded the geographic boundaries of our review into geographic scopes as described below. Actions located outside the geographic scope are generally not evaluated because their potential to contribute to a cumulative impact diminishes with increasing distance from the Project.

As described in the environmental analysis section of this is EA, constructing and operating the Project would temporarily and permanently impact the environment. The Project would affect geology, soils, water resources, vegetation, wetlands, wildlife, cultural resources, visual resources, air quality, noise, and some land uses. However, we conclude that these impacts would not be significant. We also conclude that many of the Project-related impacts would be contained within or adjacent to the temporary construction right-of-way and ATWS. For example, erosion control measures included in the National Fuel's construction and restoration plans, would keep disturbed soils within work areas. For other resources, the contribution to regional cumulative impacts is lessened by the expected recovery of ecosystem function. This is in contrast with other large-scale development projects in which wetlands are permanently converted to uplands. Similarly, vegetative communities would be cleared, but revegetation would proceed immediately following construction in all temporary work areas. Additionally, we determined that visual impacts would be minimal at any discrete location along the proposed pipeline route.

Based on these conclusions and determinations, the collocation of the Project pipelines with existing rights-of-way, National Fuel's implementation of impact avoidance, minimization, and mitigation measures as described in their construction and restoration plans, and their adherence to our recommendations, we find that most of the impacts of the Project would be largely limited to the 5-mile-long corridor followed by the pipeline. Furthermore, because the impacts of the Project would generally be localized, they would only contribute incrementally to a cumulative impact in the Project impact zone. As a result, we have calibrated the scope of our analysis to the magnitude of the aforementioned environmental impacts. It is estimated that Project completion would occur within less than 1 year.

Based on the impacts of the Project as identified and described in this EA and consistent with CEQ guidance, we have determined that the following resource-specific project impact zones, described in table 12, are appropriate to assess cumulative impacts:

- Impacts on geology and soils would be largely contained within the proposed Project workspaces, and therefore we evaluated other projects/actions within the same construction footprint as the proposed Project.

- Impacts on water resources (primarily increased turbidity) could extend outside of the workspaces, but would also be contained to a relatively small area. Furthermore, impacts on water resources are traditionally assessed on a watershed level. Therefore, for these resources we evaluated other projects/actions within the Hydrologic Unit Code (HUC) 12 subwatersheds crossed by the Project.

- Impacts on wetlands, vegetation, and wildlife could extend outside of the workspaces but would generally be contained to a relatively small area within or adjacent to proposed Project workspaces. We believe the watershed scale is most appropriate to evaluate impacts as it provides a natural boundary to accommodate general wildlife habitat and ecology characteristics in the Project area. Therefore, we evaluated projects within the HUC-12 subwatersheds crossed by the Project.

- Impacts on cultural resources would also be largely contained within or adjacent to proposed Project workspaces. Therefore, we evaluated other projects/actions that overlapped with known cultural features potentially within the Area of Potential Effects (APE).

- Impacts on land use, recreation, and visual resources would be restricted to the construction workspaces and the immediate surrounding vicinity. However, in recognition of the scenic attributes of the project area, the geographic scope for land use, recreation, and visual resources is 1 mile.

- Temporary impacts on air quality, including fugitive dust, would be largely limited to areas within 0.25 mile of active construction.

- Long-term impacts on NSAs were evaluated by identifying other stationary source projects with the potential to result in significant noise that would affect the same NSAs within 0.5 mile of the Project. None were identified; therefore, we do not consider long-term cumulative noise impacts further in this analysis. However, we did consider areas where the temporary noise from construction of the Project would overlap with noise from other construction projects, which would be limited to areas within 0.25 mile of Project construction.

Table 11 Geographic Scope for Cumulative Impact Analysis	
Environmental Resource	**Area of Impact**
Soils and Geology	Construction workspaces
Groundwater, Wetlands, Vegetation, Wildlife	HUC 12 Watershed
Surface Water Resources	HUC 12 Watershed. For direct in-water work (e.g. dredging) include potential overlapping impacts from sedimentation, turbidity, and water quality
Cultural Resources	Overlapping impacts within the Area of Potential Effects
Land Use, Recreation, and Visual	1 mile from the centerline and existing visual access points (e.g., road crossings)
Noise - Construction	0.25 mile from pipeline
Air Quality – Construction	0.25 mile from pipeline

Other Projects Considered

Information regarding present and future planned developments was obtained through National Fuel's research as well as our own. National Fuel consulted sources including federal, state, and local agency and municipality websites; reports and direct communications; permit applications with various agencies; and paid and free-access database searches.

Potential cumulative impacts associated with current, proposed, or reasonably foreseeable projects or activities in the project geographic scope were identified and are listed in appendix F. Past projects are considered in the baseline environmental analysis; therefore, this cumulative analysis is focused on the projects listed. For this analysis we included publicly known or recorded current or reasonably foreseeable future projects.

We examined approved or pending FERC projects during the similar timeframe and adjacent or similar geographies as the Line Q, QP, and Queen Storage Facility Project (Warren and Forest Counties, Pennsylvania). No current, approved, or reasonably foreseeable FERC projects in Warren and Forest Counties, Pennsylvania were identified. EmKey's gathering line installation, the USDA-FS Izenbrown Corners, Coalbed Run, and Emerald Ash Borer Remediation Projects have been included as a reasonably foreseeable projects.

Mining site locations and oil and gas resource permit databases for projects in Warren and Forest Counties, Pennsylvania were reviewed using Pennsylvania Department of Environmental Protection (PADEP) mineral resources. There are minimal resource explorations or mining in the vicinity of the Project, limited generally to surface mining operations for sand and gravel. The closest mining operation to the project facilities is a sand and gravel pit approximately 0.5 miles southwest of the Project in Limestone Township, Pennsylvania. There were 712 oil and gas well permits issued in Warren and Forest Counties, Pennsylvania from January 1, 2016 through December 31, 2016. None of these permits were specifically for locations in Tidioute Borough, Limestone Township or Hickory Township.

Natural gas production from shale resources in the area involves the drilling and completion of wells and construction of gathering systems and consequent rights-of-way. Production and gathering activities, and the pipelines and facilities used for these activities, are not regulated by FERC but are overseen by the affected region's state and local agencies with jurisdiction over the management and extraction of the shale gas resources.

A well site is specifically designed for the function and the existing physical conditions present at the well location. Consequently, the footprint of construction is variable. If an average footprint is assumed, then some imprecision is introduced. However, the resources that lie within the footprint are not readily available for inclusion in a cumulative impacts analysis. Thus, gas production in the region could potentially add to a cumulative effect. We do not know how many acres of land affected by gas production facilities consisted, or currently consist, of industrial, forest, agriculture, or wetland. As a result, it is only possible to speak in general terms about the cumulative effects on specific resources.

Natural gas production from shale resources involves improvement or construction of roads, preparation of a well pad, drilling and completion of wells, and construction of gathering systems and consequent rights-of-way. It is likely that development activities would continue through the construction of the proposed Project, but the exact extent of such drilling is unknown. Whether or not these facilities contribute cumulative impacts to those of the Project depends on proximity and the level of stabilization of the impact area. The latter characteristic is likely a function of time and the level of stabilization administered following construction. This impact information is not readily available for consideration here. However, if it were available, there would still not be specific resource impact information to consider cumulatively with the resource impacts of the Project. We assume that resource impacts caused by these facilities are similar to those described for the

Project and therefore are also largely temporary and localized. Consequently, they would contribute minor cumulative impacts.

The USDA-FS has three projects in the geographic scope that were considered for cumulative impacts. These projects involve ecosystem and habitat improvement actions. One project, Izenbrown Corners, consists of 9,474 acres of NFS lands and 11,327 acres of private land for a total project area of 20,801 acres. This project intends to restore and regenerate oak habitat while limiting the spread of nonnative invasive plant species. Another project, Coalbed Run, consists of 17,900 acres and provides long-term maintenance of oak-forest community and retain native vegetative diversity. Lastly, the Emerald Ash Borer Remediation Project consists of 102,832 acres and intends to remediate the effects of non-native insects and disease. While the project areas are relatively large in each of the USDA-FS project, the actions being performed are generally beneficial for the resources in our geographic scope.

Major highway or bridge projects currently underway, recently completed or planned within Warren County and Forest County were reviewed using Pennsylvania Department of Transportation (PennDOT) project databases and transportation program plan documents. Although no major highway and bridge projects were located within the municipalities crossed by the Project, the Hunter Station Bridge Replacement project in Tionesta Township, Forest County, Pennsylvania was included due to impacts to the Allegheny River. A table with the recently completed, current, and planned projects in the vicinity is included in appendix F.

The Pennsylvania Bulletin and the Pennsylvania eFACTs website were reviewed from January 2014 to November 2016, focusing on major projects within Warren and Forest Counties for Marcellus related activities and other projects. Several actions (air permitting, NPDES applications, and renewals) were reviewed, though no actions within the corresponding geographic scope were identified for inclusion in the cumulative impact summary.

Resources Eliminated from Further Consideration

Several resource areas were considered and it was determined that no cumulative impacts are expected to occur on them. Cumulative impacts are not expected to occur to geological resources because no mineral resources would be affected by the Project. Given the relative distance to active mining or mineral resource exploration, no anticipated cumulative impacts to geologic resources are expected.

Potential cumulative impacts associated with soil resources may include loss of agricultural land use at a regional level or diminished fertility of soils directly affected by projects. No active agricultural lands would be affected by the Project. National Fuel would implement construction techniques and measures in accordance with the Project ESCAMP to protect soil conditions within the construction work areas, ensure soil conditions remain stable, and provide for successful restoration. The likelihood of cumulative impacts on soils is minimal and would be limited to development or construction activities from other projects directly adjacent to the right-of-way that could increase the erosion potential or affect soils in agricultural or residential areas. We identified no recently-completed, current, and proposed projects adjacent to the Project and, therefore, cumulative impacts are not expected to occur.

Construction activities for the Project would not require the withdrawal or use of groundwater; therefore, we do not anticipate Project construction or operations would affect groundwater quality or supply. Localized impacts may occur due to trenching and dewatering; however, these impacts would be short-term during construction only and minimized through the use of best management practices. Given this, we do not expect the Project's minor additive impacts on groundwater would contribute to any cumulative impacts associated with groundwater quality, or withdrawal and depletion.

The Project could contribute to cumulative noise impacts through construction. However, the impact of noise is highly localized and attenuates quickly as the distance from the noise source increases. Therefore, cumulative impacts are unlikely unless one or more of the local projects is constructed at the same time in the same location. Therefore, we conclude that cumulative noise impacts would not be significant.

The following discussion describes the resources for which we conclude that a cumulative impact could result from construction and/or operation of the Project.

8.1 Surface Water and Wetlands

The region of influence considered for cumulative impacts on groundwater, surface water, and wetlands are the watershed for the Project. The Project is located within the East Hickory Creek watershed (HUC 050100030104) and the Perry Magee Run-Allegheny River watershed (HUC 050100030103).

USDA-FS vegetation management and non-native invasive plant treatments, as well as private activities, were analyzed in the East Hickory and Perry-Magee watersheds in the Coalbed EA, Emerald Ash Borer Remediation EA, and Izenbrown EAs and were found to have minimal effect on water quality and water quantity. Associated with these projects,

the ANF has proposed to construct 0.8 miles of new road in the East Hickory watershed, but this proposal is located at least 3 miles away from this pipeline project. The USDA-FS would implement buffers from streams and wetlands as well as other Forest Plan Standards and Guidelines during implementation to reduce erosion and sedimentation (USDA-FS 2007a).

Surface Water

Construction of the Project would result in temporary impacts on the Allegheny River. Potential increases of sedimentation and turbidity during construction are possible; however, National Fuel has designed site-specific plans and measures to minimize potential impacts on waterbodies in proximity to the Project and at the crossing. The various gas production, EmKey's Forest Extension, the Izenbrown Corners, Coalbed Run, and Emerald Ash Borer Remediation projects are within the same watersheds. Potential impacts associated with these projects are expected to be temporary in nature and mitigated through measures such as erosion control devices. The sediment deposition thickness generated by construction of the Project is predicted to drop below 0.25 cm within 50 feet from the crossing. Additionally, there would be a temporary turbidity plume during excavation extending up to 1,200 feet downstream of the excavation, but would settle out within 6.5 hours of completion. For turbidity impacts to be cumulative, a plume from one of the other projects would need to overlap the same river stretch during that 6.5 hour period. Although we do not have turbidity or sedimentation estimates from the other projects considered in this analysis, given the distance between the activities, we conclude that cumulative turbidity and sedimentation would be minimal and the Project's additive impacts on waterbodies would not contribute to significant cumulative impacts on water resources within the affected watersheds.

Wetlands

Construction of the Project would result in temporary impacts on 0.86 acre of wetlands. The Project would not contribute to a permanent loss of any wetlands. The only other proposed projects in the watersheds are oil and gas production projects, EmKey's Forest Extension, the Izenbrown Corners, Coalbed Run, and Emerald Ash Borer Remediation projects. Those projects would be required to apply for permits with the USACE if wetlands would be affected. Wetland impact data for the other projects is not readily available for consideration here. However, National Fuel estimates that in the affected subwatersheds, there are 16.4 acres of freshwater emergent wetland, 392 acres of freshwater forested/shrub wetland, and 15 acres of ponds. Therefore, we conclude that the

Project's minor impacts on wetlands would not contribute to significant cumulative impacts on wetlands.

8.2 Vegetation, Wildlife, and Threatened, Endangered, and Special Status Species

Vegetation

The geographic scope for cumulative impacts on vegetation was considered to be the subwatersheds in which the proposed Project would occur. For each of the projects considered, construction would increase habitat fragmentation, and would lengthen the recovery time for affected vegetation communities. Long-term impacts would occur due to the removal of forested vegetation and replacement by herbaceous vegetation. Approximately 5 acres of forested land would be permanently affected due to the Project. While the proposed Forest Extension Pipeline, the Izenbrown Corners, Coalbed Run, and Emerald Ash Borer Remediation projects would have impacts on vegetation within the same geographic scope, the region has abundant forest resources. Further, some of the other projects are designed to restore and regenerate desired forest types and associated plant and animal communities. While these activities affect vegetation, they would have long-term benefits rather than impacts. Based on the minimal impact of the Project and its co-location with an existing right-of-way, we conclude that when temporary and permanent vegetation impacts from the Project are combined with temporary and permanent vegetation impacts from the other projects, the cumulative impact would not be significant.

Wildlife

The geographic scope for cumulative impacts on wildlife was considered to be the watersheds in which the proposed Project would occur. Construction of the Project and other current, proposed, or reasonably foreseeable future projects could cause a cumulative impact on wildlife. Impacts on wildlife resources as a result of the other projects would be similar to those associated with the Project, including temporary displacement and stress on individuals during construction and long-term impacts as a result of the permanent alteration of the landscape, and available habitat, and edge effects. The other projects that cross through the same subwatersheds are expected to have similar short-term disturbances on aquatic wildlife, and similar short- and long-term impacts on terrestrial wildlife. Potential impacts by other projects on migratory birds would be similar to those described for the Project. Impacts would include the temporary loss of habitat during initial clearing, prolonged loss of habitat due to the long recovery time for trees to become reestablished in disturbed areas, and the long-term loss of habitat. These cumulative impacts would be most significant if the projects were constructed at or near the same time (including the timeframe for habitat restoration) and within proximity to one another. Cumulative impact

on wildlife and vegetation relative to habitat fragmentation caused by the Project is avoided or minimal due to the utilization of a previously disturbed right-of-way and only minor increases in right-of-way width. We conclude that when impacts on wildlife from the Project are considered with impacts from the other projects, the cumulative impact would not be significant.

Threatened, Endangered, and Special Status Species

Cumulative impacts on federally and state listed threatened and endangered species, Regional Forester Sensitive Species and ANF species of viability concern could occur if other projects were to affect the same habitats as the Project. However, the ESA consultation process includes a consideration of the current status of affected species and cumulative impacts would be minimized and mitigated. National Fuel would adhere to conservation measures to avoid, minimize, and mitigate impacts on any listed species affected by the Project. Similar mitigation may be required for future projects and it is likely that similar conservation measures would be required by the jurisdictional agencies as well. These conservation measures would reduce impacts such that the projects cumulatively would not adversely affect special status species or jeopardize the continued existence of any species or cause adverse modification of critical habitat. With mitigation measures for RFSS plant species with occupied habitat, there are no cumulative impacts anticipated. Surveys for RFSS plants have or would occur for the other Forest Service activities identified within the geographic scope. If plants are found, appropriate mitigations would be applied by USDA-FS. We conclude that the cumulative impacts on federally and state listed threatened and endangered species, RFSS, and USDA-FS species with viability concerns, would not be significant based on the addition of the Project's impacts on these resources.

8.3 Land Use, Recreation, and Visual Resources

The geographic scope that was identified for cumulative impacts on land use, recreation, and visual resources is within a 1-mile radius of the Project. Based on the spatial magnitude of the Project and use of lands generally previously disturbed for construction and operation of natural gas facilities, impacts to land use would not be significant, and the cumulative effects of the Project would be negligible. The construction and operation of the pipeline facilities would have minor, temporary effects on existing and future land use. Travel corridors on the right-of-way would be blocked to prevent off road vehicle use. On the ANF, scenery would be managed through the guidance of the ANF's scenery implementation guide for pipeline rights-of-way. Temporary workspace areas would be restored to prior use in accordance with National Fuel's ESCAMP as well as individual landowner agreements.

Projects with permanent aboveground components, such as buildings and roads would generally have greater impacts on land use than the operational impacts of a pipeline (including gathering lines for gas development) which would be buried and thus allow for most uses of the land following construction. Therefore, with the exception of the permanent right-of-way (including a permanent conversion of forested land to herbaceous cover), pipeline projects typically only have temporary impacts on land use. The majority of long-term or permanent impacts on land use are associated with vegetation clearing and maintenance of the pipeline right-of-way.

The visual qualities of the Project landscape are influenced by existing linear installations such as roadways, pipelines, and electrical transmission and distribution lines. Within this context, the other projects listed in appendix F would have the greatest cumulative impact on visual resources in the proposed Project area. The Project would add incrementally to this impact, but the overall contribution would be relatively minor. The impact of oil and gas development activities on land use, recreation, special interest areas, and visual resources would vary widely depending on the location of specific facilities.

Given the proposed Projects' contribution to cumulative impacts on land use, recreation, and visual resources would mostly be limited to the construction phase and would be temporary and minor, we conclude that cumulative impacts on these resources would not be significant.

8.4 Cultural Resources

The geographic scope for cultural resources is the APE for both direct and indirect effects. The APE is comprised of new pipeline rights-of-way, staging areas and an access road, and is located on private and public lands. National Fuel coordinated with the USDA-FS in order to obtain an Archaeological Resource Protection Act permit to conduct archaeological survey on federal land. During the survey, one isolated find (36WA/017) was identified on public land, and one multi-component archaeological site was identified on private land (36WA0618). We have determined, through consultation with the Pennsylvania SHPO, that National Fuel's Project would have no effect on the two sites. Therefore, there is no potential for cumulative effects on historic properties.

8.5 Air Quality and Noise

National Fuel would not install new air emission sources for this Project. There would be no increase in operational emissions resulting from this Project. The potential cumulative impacts resulting from short-term construction activities would be limited due to the short term nature of the pipeline and regulator station construction activity.

Although the Project is expected to slightly increase GHG emissions, the Project would not have a discernible influence on regional climate change. The combined effect of multiple construction projects occurring in the same airshed and timeframe could temporarily add to the ongoing air quality effects of existing activities. Typically, smaller local projects have varying construction schedules and would take place over a relatively large geographic area. We conclude that the Project would not have a significant long-term adverse impact on air quality and would not add significantly to the long term cumulative impact of the area.

8.6 Conclusion on Cumulative Impacts

Construction of the Project, in addition to other projects within the same watersheds crossed by the pipeline, would have cumulative impacts on a range of environmental resources, as discussed above. We provided information about Project-related impacts and mitigation measures for specific environmental resources where available, and were able to make some general assumptions about other projects identified in appendix F. For the federal projects, there are laws and regulations in place that protect waterbodies and wetlands, threatened and endangered species, and historic properties, and limit impacts from air and noise pollution. Federal land-managing agencies, such as the USDA-FS, have requirements to protect resources on their lands. We only have limited information about potential or foreseeable private projects in the region. For some resources, there are also state laws and regulations that apply to private projects as listed on appendix F. Given the small scope and short duration of the Project, we conclude that when added to other past, present, and reasonably foreseeable future actions, the Project would not have significant adverse cumulative impacts on environmental resources.

9.0 Alternatives

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

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

The purpose of the Project is to sell natural gas storage capacity to reduce operation and maintenance costs while maintaining uninterrupted natural gas service to National Fuel's customers. The alternatives were reviewed against the evaluation criteria in the

sequence presented above and if the alternative would not meet the Project's objective or is not feasible, it was not brought forward to the next level of review.

The first consideration for including an alternative in our analysis is whether or not it could satisfy the stated purpose of the project. An alternative that cannot achieve the purpose for the project cannot be considered as an acceptable replacement for the project. All of the alternatives considered here are able to meet the project purpose stated in section A.2. of this EA.

Some alternatives are technically and economically feasible. Technically practical alternatives, with exceptions, would generally require the use of common construction methods. An alternative that would require the use of a new, unique or experimental construction method may not be technically practical because the required technology is not available or unproven. Economically practical alternatives would result in an action that generally maintains the economic viability of the proposed action. Generally, we do not consider the cost of an alternative as a critical factor unless the added cost to design, permit, and construct the alternative would render the project economically impractical.

Determining if an alternative provides a significant environmental advantage requires a comparison of the impacts on each resource as well as an analysis of impacts on resources that are not common to the alternatives being considered. The determination must then balance the overall impacts and all other relevant considerations. In comparing the impact between resources, we also considered the degree of impact anticipated on each resource. Ultimately, an alternative that results in equal or minor advantages in terms of environmental impact would not compel us to shift the impacts from the current set of landowners to a new set of landowners.

One of the goals of an alternatives analysis is to identify alternatives that avoid significant impacts. In this EA, we evaluated each environmental resource potentially affected by the Project and concluded that constructing and operating it would not significantly impact these resources. Consistent with our conclusions, the value gained by further reducing the (not significant) impacts of the Project when considered against the cost of relocating the route/facility to a new set of landowners was also factored into our evaluation.

Based on the analysis presented in this EA, we identified two resources that warranted additional consideration of alternatives that would avoid or minimize impacts. First, the designated "Wild and Scenic" Allegheny River is a major waterbody (at the point of crossing the Allegheny River is approximately 590 feet wide) which contains federally and state-listed threatened and endangered species. Consequently, we consider alternative

crossing locations and alternative crossing techniques that would minimize impacts on the Allegheny River.

It is important to note, however, that to maintain navigation safety, National Fuel proposes to remove portions of the existing 6-inch-diameter Line Q pipe that are exposed due to scour within the river. Consequently, in-stream work at the existing crossing location would occur under any alternative considered. Therefore, no alternative would completely avoid impacts at the location of the proposed facilities.

The other resource for which we considered impact avoidance and minimization was USDA-FS lands. Because of the location of the Queen Storage Field and the existing infrastructure, USDA-FS lands cannot be avoided. However, in evaluating alternative locations for crossing the Allegheny River, the resultant impact on USDA-FS land was a primary consideration.

The Project does not propose to increase the existing capacity of natural gas delivery, and no new customers are planned; therefore system alternatives are not viable options, and were not evaluated further.

During the USDA-FS scoping period, a comment was received from the USEPA that requested "the evaluation of alternative pipeline and service/access road alignments [that] avoid and minimize impacts to resources of concern, such as major wetland complexes." Section B.9.3 of this EA considers alternative routes and river crossing techniques/strategies.

No comments were received during the FERC scoping which requested that we consider alternatives to the proposed route, route variations, or construction alternatives for the Project. Our review of the proposed Project found no significant environmental impacts that would drive an evaluation of additional alternatives. However, recognizing the impacts on the Allegheny River and the habitat it provides for state and federally listed species, we did analyze alternative location siting and alternative construction methods, as discussed below.

9.1 No-Action Alternative

The No-Action Alternative would consist of not abandoning and construct the facilities as described. The No-Action Alternative would leave compromised (exposed) operating natural gas pipeline within the Allegheny River streambed. The abandonment and replacement activities need to occur to maintain system integrity. The No-Action Alternative would not meet the Project's stated object. Further, as previously stated,

removal of Line Q is necessary for safety considerations. Therefore, the no-action alternative was not pursued further**.**

9.2 Alternatives Removed from Consideration for Not Meeting Initial Evaluation Criteria

Several Alternatives were considered and then dismissed due to the fact that they would not meet the Project's stated objective or they are not technically or economically feasibility. These alternatives would not be able to be pursued due to limiting circumstances.

Aboveground River Crossing Alternative

We considered an aboveground alternative crossing of the Allegheny River by utilizing the existing Buckingham Street Bridge to avoid impacts on mussels. The Buckingham Street Bridge is a through-truss bridge that was originally constructed in 1933. Records indicate deck rehabilitation was completed in 2001. National Fuel assessed the feasibility of attaching the 12-inch-diameter steel high pressure Line Q replacement pipe inside a 16-inch-diamter steel casing and the 4-inch-diameter plastic high pressure Line QP inside a 6-inch-diameter steel casing, both attached to the Buckingham Street Bridge.

In order to plan for all expected conditions, National Fuel evaluated the scenario of a half-inch ice condition at the bridge. Assuming a half inch of ice cover, the weight of these pipes would be over 127 pounds per foot (lbs/ft), not including the additional weight of hangers and brackets to attach the pipes to the bridge. This would add over 32 tons of weight to the bridge structure. According to PennDOT Design Manual Part 5 Utility Relocation (DM5), National Fuel would not meet recommendations used to apply for Bridge Occupancy Permit from PennDOT. Due to the fact that it would not be technically feasible to construct the above ground alternative, it was dismissed from consideration.

Conventional Bore River Crossing

The subsurface geology in the area is problematic for a conventional bore crossing. The amounts of large rock and cobble in the area would make this type of crossing extremely difficult and unlikely to succeed. Since the spoil is removed through the casing with an auger, any materials encountered must be able to fit between the auger flights in order to be carried out. Due to the fact that it would not be technically feasible to perform a conventional bore, it was dismissed from consideration.

Direct Pipe River Crossing

The Direct Pipe Method is a relatively new form of trenchless technology, and requires the pipe to be welded into a continuous straight string behind the entry pit. This

would not be feasible for this crossing due to the close proximity of structures and roads to the location of where the entry pit would be needed for the crossing. A level area would be required between the homes and river, and duration for installation would be in excess of 7 weeks, causing major disruptions and noise in the community. The topography on the other side of the river would prohibit entry on the other side. Due to the fact that it would not be technically feasible to perform the Direct Pipe method it was dismissed from consideration.

Horizontal Directional Drill River Crossing

The option for completing the Line Q replacement and Line QP crossing using the HDD method was also assessed. National Fuel first assessed a short HDD crossing, approximately 1,012 feet in length, spanning from the existing station on the north side of the Allegheny River to the top of the bank, on the north side of SR 62, on the south side of the Allegheny River. This was infeasible due to very limited access for equipment and pullback on the south side of the Allegheny River, specifically the area between the Allegheny River and SR 62. There would be no access for a drill rig and or workspace for a pullback string and associated equipment on the south side of the drill. This area also has a highway retaining wall that would impede access for drilling operations and pullback. Additionally, pullback to the north would be infeasible due to houses, businesses, and other streets located on the north side of the Allegheny River.

National Fuel then assessed the feasibility of a longer HDD crossing, approximately 1,904 feet in length. For such a crossing, the drill side would be on the south side of the Allegheny River, with about a 260-foot head differential between the entry and exit points. An elevation difference of 260 feet between the two sides of an HDD presents another major risk factor for HDD feasibility. When there are elevation differences of more than 50 feet, portions of the borehole/annulus would be dry and have no drilling mud. This makes the borehole susceptible to cave-in and impedes necessary lubrication during pullback of the product pipe, causing damage that may lead to future corrosion of that pipe. The crossing would have required pullback along the south side of the Allegheny River as well.

In addition, the pullback would require a substantial amount of temporary pullback workspace (approximately 1,900 feet in length and 40 feet wide), as the existing right-of-way layout has several bends which impedes the ability to use it for the pullback pipe.

Geotechnical results demonstrate that an HDD would pose unacceptable risks. National Fuel performed a geotechnical boring for subsurface information, which demonstrated that this area has sand and gravel deposits to a depth of 45 feet. This geology is not conducive for HDD construction and presents a high likelihood of inadvertent returns due to the gravel and cobble nature of the strata. The rock that was observed from 45 to 80 feet was highly weathered silt stone and shale, with rock quality designation (RQD) never

exceeding 23 percent. For HDD, RQD above 75 percent (high quality rock) is preferred. While drilling, these thinly bedded seams would be conduits for drilling mud and an expectation of heavy inadvertent returns is high.

Due to the likelihood of potential cave-in, inadvertent return, and lack of pullback space, it would not be technically feasible to perform an HDD crossing and this crossing method was dismissed from consideration.

9.3 Technically Feasible Alternatives Considered

9.3.1 Alternative River Crossing Locations

We reviewed technically feasible alternative river crossing locations to determine if another location would have less environmental impact on the river. Topographic maps of the area and identified two locations that were plausible for an alternate location to cross the Allegheny River. These locations were approximately 3,000 feet downstream of the current crossing location (Site 1) and approximately 9,100 feet upstream of the current crossing location (Site 2). Due to the topography of the region and the occurrence of steep slopes down to the river's edge on one or both sides of the river, these were the closest locations to the current crossing location with any feasibility.

Whether National Fuel crosses the Allegheny River at the proposed crossing or at either alternative site, the two existing exposed lines at the current Project crossing location still require construction activities to occur in order to remove the pipelines, as they currently pose a potential navigational hazard. Consequently, the choice of an alternative crossing cannot eliminate, only reduce, impacts at the proposed crossing location.

At both Site 1 and Site 2, crossing via trenchless construction is not feasible. Boring logs obtained by National Fuel indicate subsurface conditions are very consistent along the Allegheny River in this region and are not conducive to trenchless construction. In addition to the subsurface conditions, the surface conditions at these two locations are also not practical for a trenchless construction method.

Also, the proposed crossing location and both alternative sites cannot be differentiated based on mussel habitat. Information obtained from PennDOT, *The Transportation Project Development Process, Threatened and Endangered Species Desk Reference Publication No. 546* (2013) states that this reach of the Allegheny River, from about 30 miles upstream to about 55 miles downstream, represents some of the highest quality tributaries in Pennsylvania. Numerous mussel surveys have been completed in this area and, based on a compilation of available surveys, the average listed mussel species

population density is the highest in the Ohio River basin system in Pennsylvania. Projects located in this reach have the greatest mussel population densities.

Table 13 summarizes the factors and data used to compare the three alternative crossing locations.

Table 12,
Alternative Crossing Location Comparison

Location	Crossing Impact Length (feet)	Acres of Impact Associated with the Crossing	Additional Right-of-way within ANF (feet)	Mussel Habitat
Site 1	1,100	4.5	2,900	Yes
Site 2	560	17	9,800	Yes
Proposed Location	494	0.5	0	Yes

Site 1 Crossing Location

Site 1 is approximately 1,100 feet wide. The current proposed crossing location at McGuire Run is approximately 630 feet wide, but only approximately 494 feet actually are within the normal stream bed due to the presence of the gravel bar at the mouth of McGuire Run. The Site 1 alternative is about 2.1 times as wide as the proposed crossing location. Using the Site 1 crossing would disturb a greater amount of mussel habitat and would likely increase the direct impact on federal and state listed species. In addition, in order to lay pipe to Site 1 approximately 4,900 feet of new right-of-way would need to be acquired and cleared, including approximately 2,900 feet of additional right-of-way within the ANF, in order to get the proposed pipelines back to the existing Line Q right-of-way. Based on these factors, we conclude that Alternative 1 would not provide a significant environmental advantage compared to the proposed crossing location.

Site 2 Crossing Location

Site 2 is a slightly longer river impact than the proposed crossing location at approximately 560 feet, and is located in close proximity to an existing Pennsylvania Fish and Boat Commission Boat Launch. This boat launch is a high traffic area for recreational users of the Allegheny River during the proposed construction window which was chosen to protect fish species and to comply with Pennsylvania requirements. Crossing at this location would likely include temporarily closing the boat launch, a higher impact to recreational use of the river. Also, an additional 9,100 feet of new greenfield pipeline

would need to be constructed in order to get from the existing Line Q right-of-way to the Site 2 crossing location. Once across the river, approximately 9,800 feet of right-of-way would need to be acquired and cleared within the Allegheny National Forest to get the proposed pipelines back to the existing Line Q right-of-way.

Alternative 2 affects slightly more mussel habitat and potentially more of the mussels that are not discovered and salvaged in the translocation process. Additionally, the greenfield construction affecting an additional 17 acres in total, and 9 acres within the ANF represents a large increase in the overall project footprint. Based on these factors, we conclude that Alternative 2 would not provide an environmental advantage when compared with the proposed crossing location.

9.3.2 Construction Alternatives for River Crossing

Dry Open Cut

We considered a dry open cut alternative in order to minimize impacts on the Allegheny River. The porosity and permeability of the river bottom sediments would allow for subterranean flow under traditional dam methods utilizing plastic sheeting and steel support structures and would ultimately result in the breaching and/or failure of these dam systems. This would create a significant safety threat to all workers performing tasks within the river.

A two-step sheet pile cofferdam system would take approximately eight to ten weeks of total construction time within the river and the additional disturbed area for work space, spoil storage and equipment is anticipated to be 50 feet wide and extend into the river approximately 375 feet. Also, blocking and redirecting half the river flow during each step would increase water depth and flow velocity on the open side thus creating the potential for scour at the upstream piling corner area of the river and other soft areas including the opposite side river bank. Any scouring created on the open side would complicate cofferdam installation when the cofferdam is moved to that side during the second step. Additionally, once the cofferdam is positioned on the other side of the river during the second step, the newly installed pipeline installed during the first step has the potential to be exposed or its cover reduced due to scour. Lastly, the additional bed disturbance due to the cofferdam installation, larger workspace area within the river, and dry conditions for an extended length of time lead to a larger impact on threatened and endangered species and critical habitat within the Allegheny River. Therefore, we conclude that the dry open cut crossing alternative would not provide a significant environmental advantage over the proposed crossing.

Wet Open Cut Alternatives

To minimize impacts on aquatic biota in the Allegheny River, the proposed Project would complete the crossing using a wet open cut method in a single trench perpendicular to the river to minimize environmental impacts. National Fuel proposes to attach the 6-inch steel casing pipe for Line QP to the 12-inch Line Q pipe and install both lines in a single trench within the Allegheny River. Once installed, the 4-inch plastic Line QP pipe would be fed into the new 6-inch steel casing. National Fuel proposes to remove only the exposed portions of the inactive and active 6-inch Line Q pipes within the river and cap the remaining pipe just below river bed with the remaining buried pipes being abandoned in place. National Fuel would complete the wet open cut, single trench for both Line Q and Line QP and the removal of the exposed existing pipes within 48 hours per FERC Plan and Procedures for such crossings. The work area within the river would be 40 feet by 494 feet. National Fuel would complete the Allegheny River crossing during low flow conditions within agency approved timeframes. National Fuel would monitor daily published discharge flow rates from the Kinzua Dam, USGS Allegheny River Gauge at Warren, Pennsylvania, and weather precipitation forecasts prior to contractor moving on site.

In summary, we have determined that the proposed Project, as modified by our recommended mitigation measures, is the preferred alternative than can meet the Project objectives.

C. CONCLUSIONS AND RECOMMENDATIONS

We conclude that approval of the Line QP, Line Q, and Queen Storage Project would not constitute a major federal action significantly affecting the quality of the human environment. This finding is based on the above environmental analysis, National Fuel's application and supplements, implementation of National Fuel's ESCAMP and other plans, and our recommended mitigation measures. We recommend that the Commission Order contain a finding of no significant impact and that the following mitigation measures be included as conditions of any authorization the Commission may issue.

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

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

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

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

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

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

    a. the modification of conditions of the Order; and

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

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

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

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

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

   This requirement does not apply to extra workspace allowed by the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan*, and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;

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

   c. recommendations by state regulatory authorities; and

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

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

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

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

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

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

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

    f. the company personnel and specific portion of National Fuel's organization having responsibility for compliance;

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

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

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

        (2) the environmental compliance training of onsite personnel;

(3) the start of construction; and

(4) the start and completion of restoration.

7. National Fuel shall employ at least one EI per construction spread. The EIs shall be:

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

    b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;

    c. empowered to order the correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

    d. responsible for documenting compliance with the environmental conditions of that Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and

    e. responsible for maintaining status reports.

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

    a. an update on National Fuel's efforts to obtain the necessary federal authorizations;

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

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

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

e. the effectiveness of all corrective actions implemented;

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

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

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

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

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

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

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

12. **At least 30 days prior to any construction activity within the Allegheny River**, National Fuel shall file with the Secretary, the final Mussel Salvage and Relocation Plan developed in consultation with the USFWS PFO and the USDA-FS.

13. National Fuel shall not begin construction activities **until**:

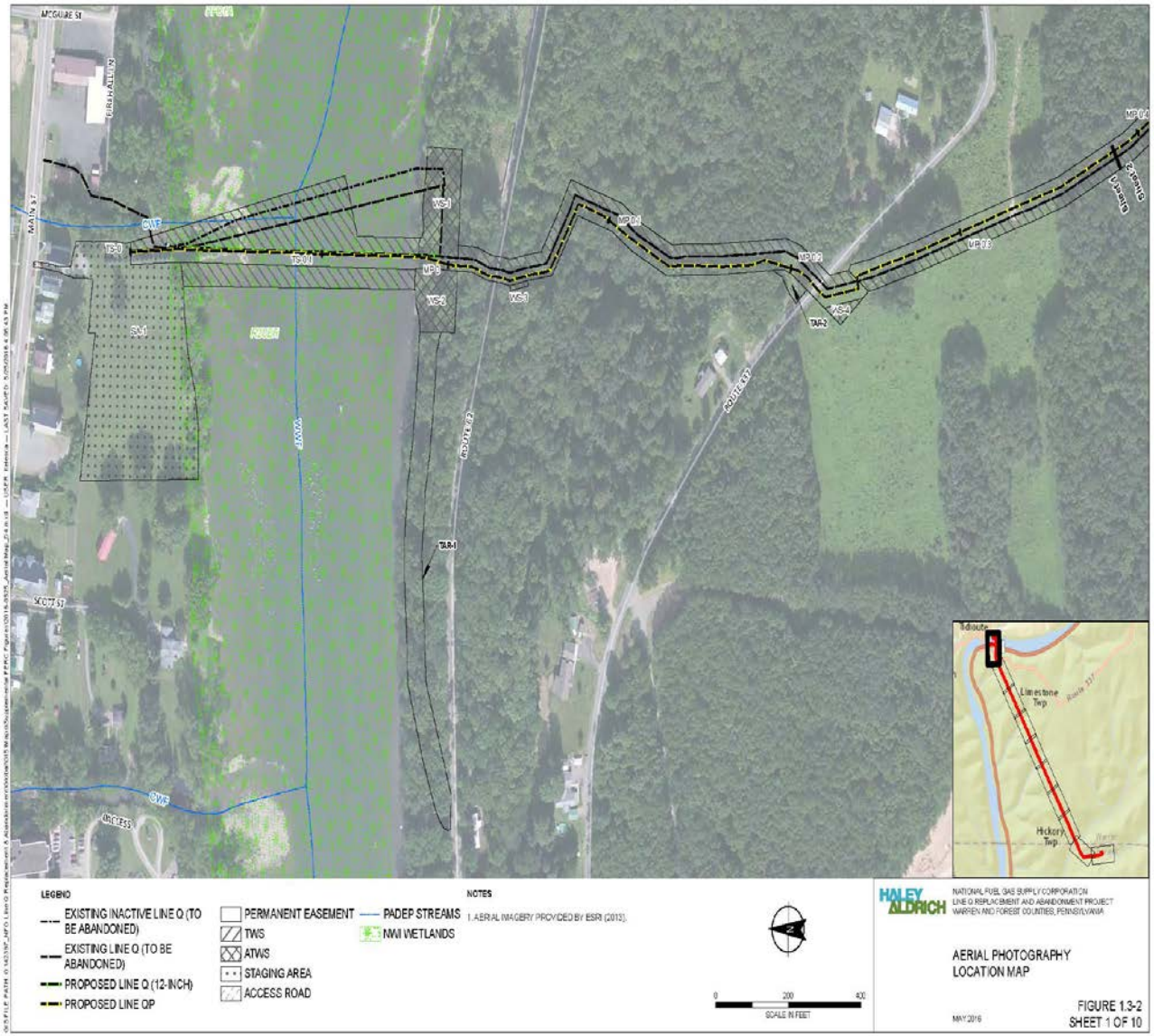
a. the staff completes formal consultation with the USFWS; and

b. National Fuel has received written notification from the Director of OEP that construction or use of mitigation may begin.

14. **Prior to construction**, National Fuel shall file evidence of landowner concurrence for all locations where construction workspace or fencing will be located within 10 feet of a residence, and the church at 218 Main Street, Tidioute, Pennsylvania.

15. **Prior to initiating HDD operations at the Kelly Hill Road, East Hickory Creek and Queen Creek crossings,** National Fuel shall file with the Secretary, for the review and written approval by the Director of OEP, a HDD noise mitigation plan to reduce the projected noise level attributable to the proposed drilling operations at NSAs with predicted noise levels above 55 dBA. During drilling operations, National Fuel shall implement the approved plan, monitor noise levels, and make all reasonable efforts to restrict the noise attributable to the drilling operations to no more than 55 dBA L_{dn} at the NSAs.

Appendix A
Maps of the Pipeline Route and Facilities for the Line QP, Line Q and Queen Storage Project


MCGUIRE ST
MAIN ST
SCOTT ST
ACCESS
TS-1
TS-2
TS-3
VS-1
VS-2
VS-3
VS-4
MP 01
MP 02
MP 03
MP 04
TAR-1
TAR-2
Limestone Twp.
Hickory Twp.
LEGEND
EXISTING INACTIVE LINE Q (TO BE ABANDONED)
EXISTING LINE Q (TO BE ABANDONED)
PROPOSED LINE Q (12-INCH)
PROPOSED LINE QP
PERMANENT EASEMENT
TWS
ATWS
STAGING AREA
ACCESS ROAD
PADEP STREAMS
NWI WETLANDS
NOTES
1. AERIAL IMAGERY PROVIDED BY ESRI (2013).
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200
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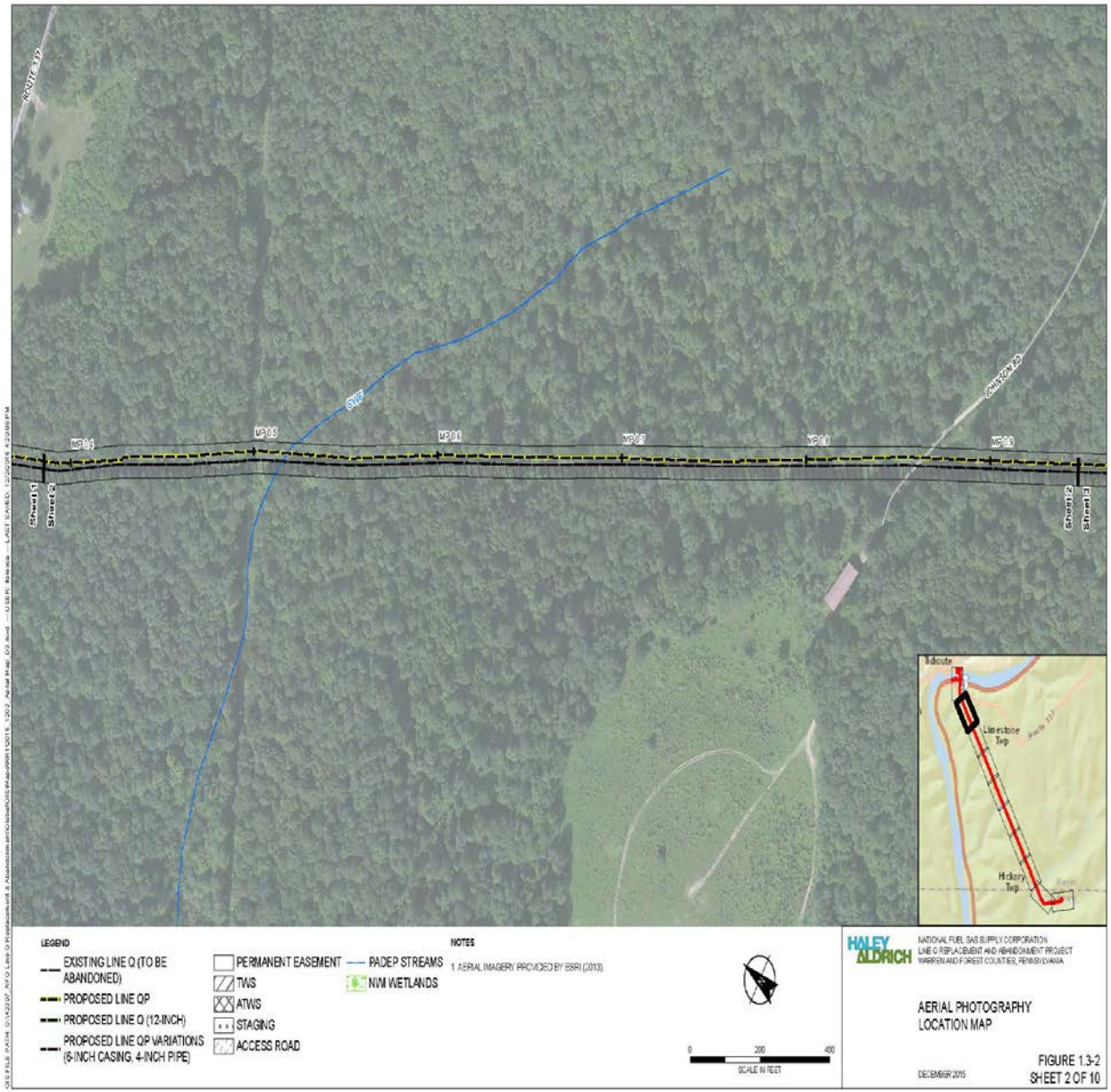
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT AND ABANDONMENT PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
AERIAL PHOTOGRAPHY
LOCATION MAP
MAY 2016
FIGURE 1.3-2
SHEET 1 OF 10


ROUTE 337
MP 0.4
MP 0.5
MP 0.6
MP 0.7
MP 0.8
MP 0.9
Sheet 1
Sheet 2
Sheet 2
Sheet 3
CWP
DAWSON RD
Limestone Twp.
Hickory Twp.
LEGEND
EXISTING LINE Q (TO BE ABANDONED)
PROPOSED LINE QP
PROPOSED LINE Q (12-INCH)
PROPOSED LINE QP VARIATIONS (6-INCH CASING, 4-INCH PIPE)
PERMANENT EASEMENT
TWS
ATWS
STAGING
ACCESS ROAD
PADEP STREAMS
NWI WETLANDS
NOTES
1. AERIAL IMAGERY PROVIDED BY ESRI (2013).
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SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT AND ABANDONMENT PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
AERIAL PHOTOGRAPHY
LOCATION MAP
DECEMBER 2015
FIGURE 1.3-2
SHEET 2 OF 10

LEGEND
EXISTING LINE O (TO BE ABANDONED)
PROPOSED LINE OP
PROPOSED LINE O (12-INCH)
PROPOSED LINE OP (VARIATIONS (8-INCH CASING, 4-INCH PIPE)
PERMANENT EASEMENT
TWS
ATWS
STAGING
ACCESS ROAD
PADEP STREAMS
NWI WETLANDS
NOTES
1. AERIAL IMAGERY PROVIDED BY ESRI (2013).
SCALE IN FEET
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200
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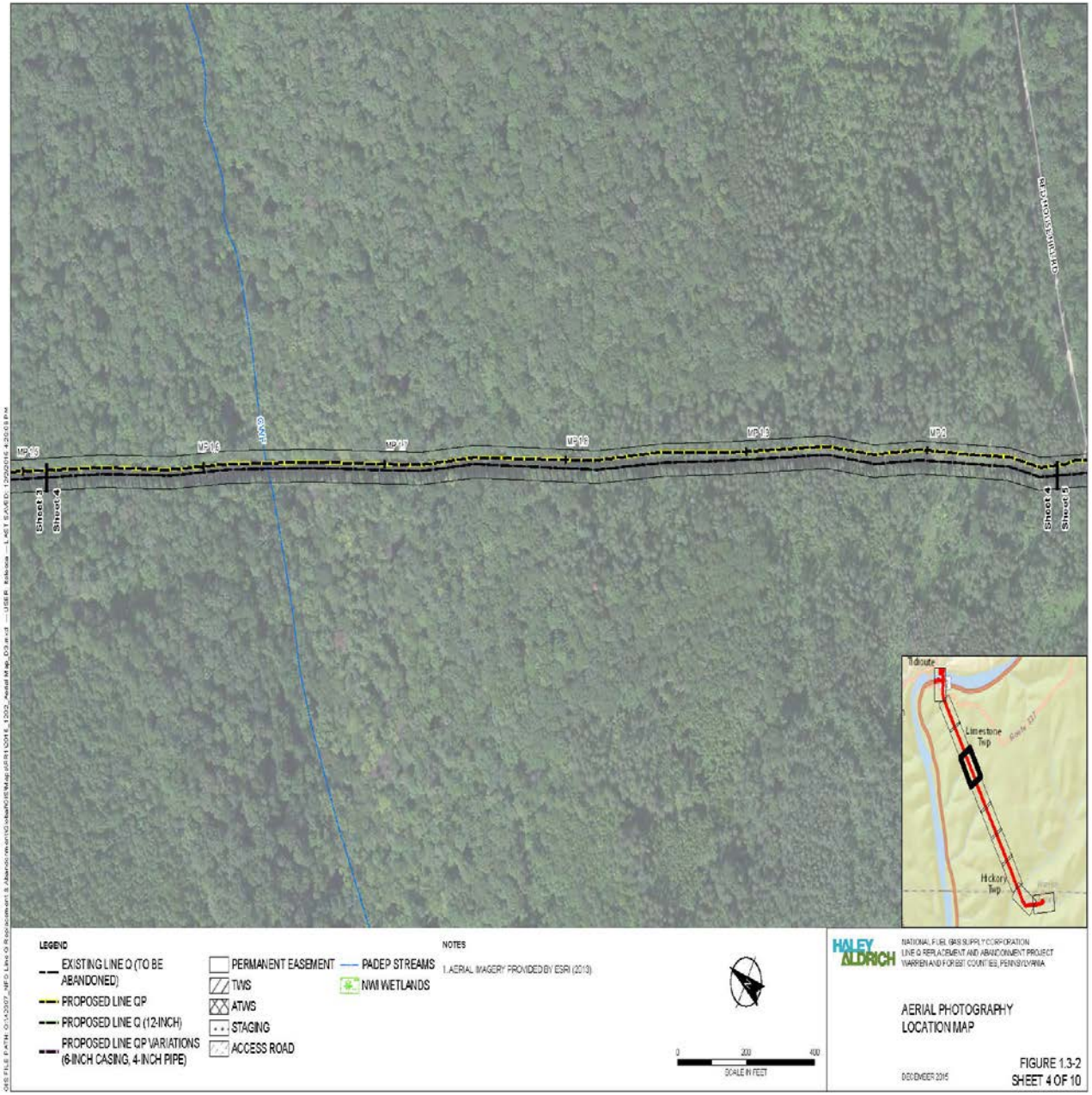
Sheet 2
Sheet 3
Sheet 3
Sheet 4
JOHNSON RD
HALEY & ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE O REPLACEMENT AND ABANDONMENT PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
AERIAL PHOTOGRAPHY
LOCATION MAP
FIGURE 1-3-2
SHEET 3 OF 10


MP 15
MP 16
MP 17
MP 18
MP 19
MP 20
Sheet 3
Sheet 4
Sheet 4
Sheet 5
Tidioute
Limestone Twp.
Hickory Twp.
LEGEND
EXISTING LINE Q (TO BE ABANDONED)
PROPOSED LINE QP
PROPOSED LINE Q (12-INCH)
PROPOSED LINE QP VARIATIONS (6-INCH CASING, 4-INCH PIPE)
PERMANENT EASEMENT
TWS
ATWS
STAGING
ACCESS ROAD
PADEP STREAMS
NWI WETLANDS
NOTES
1. AERIAL IMAGERY PROVIDED BY ESRI (2013)
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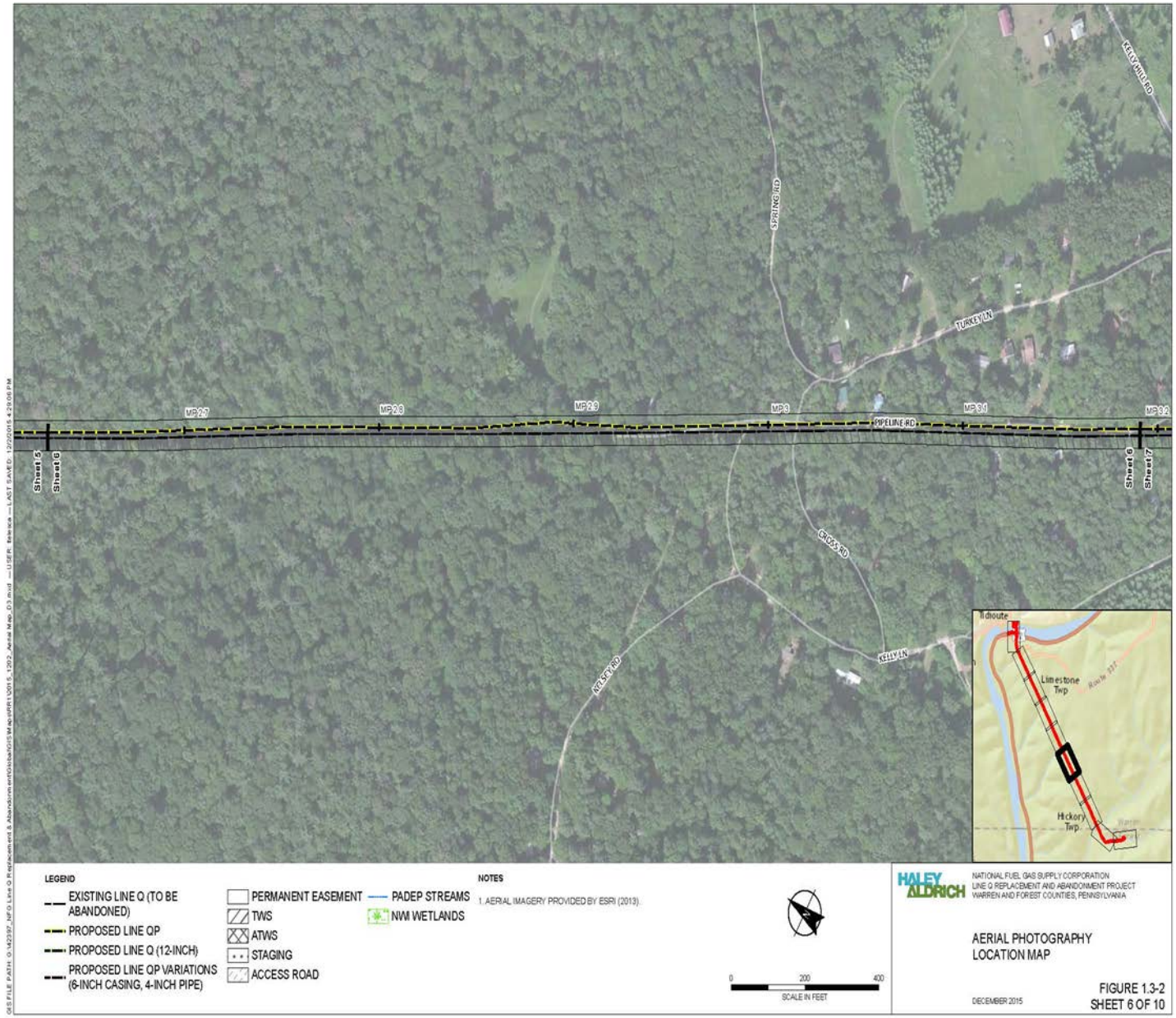
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT AND ABANDONMENT PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
AERIAL PHOTOGRAPHY
LOCATION MAP
DECEMBER 2015
FIGURE 1.3-2
SHEET 4 OF 10


SPRING HD
KELLY HILL RD
TURKEY LN
MP 2.7
MP 2.8
MP 2.9
MP 3
MP 3.1
MP 3.2
PIPELINE RD
Sheet 5
Sheet 6
Sheet 6
Sheet 7
CROSS RD
KELLY LN
KELSEY RD
Tidioute
Limestone Twp
Hickory Twp
LEGEND
EXISTING LINE Q (TO BE ABANDONED)
PROPOSED LINE QP
PROPOSED LINE Q (12-INCH)
PROPOSED LINE QP VARIATIONS (6-INCH CASING, 4-INCH PIPE)
PERMANENT EASEMENT
TWS
ATWS
STAGING
ACCESS ROAD
PADEP STREAMS
NWI WETLANDS
NOTES
1. AERIAL IMAGERY PROVIDED BY ESRI (2013).
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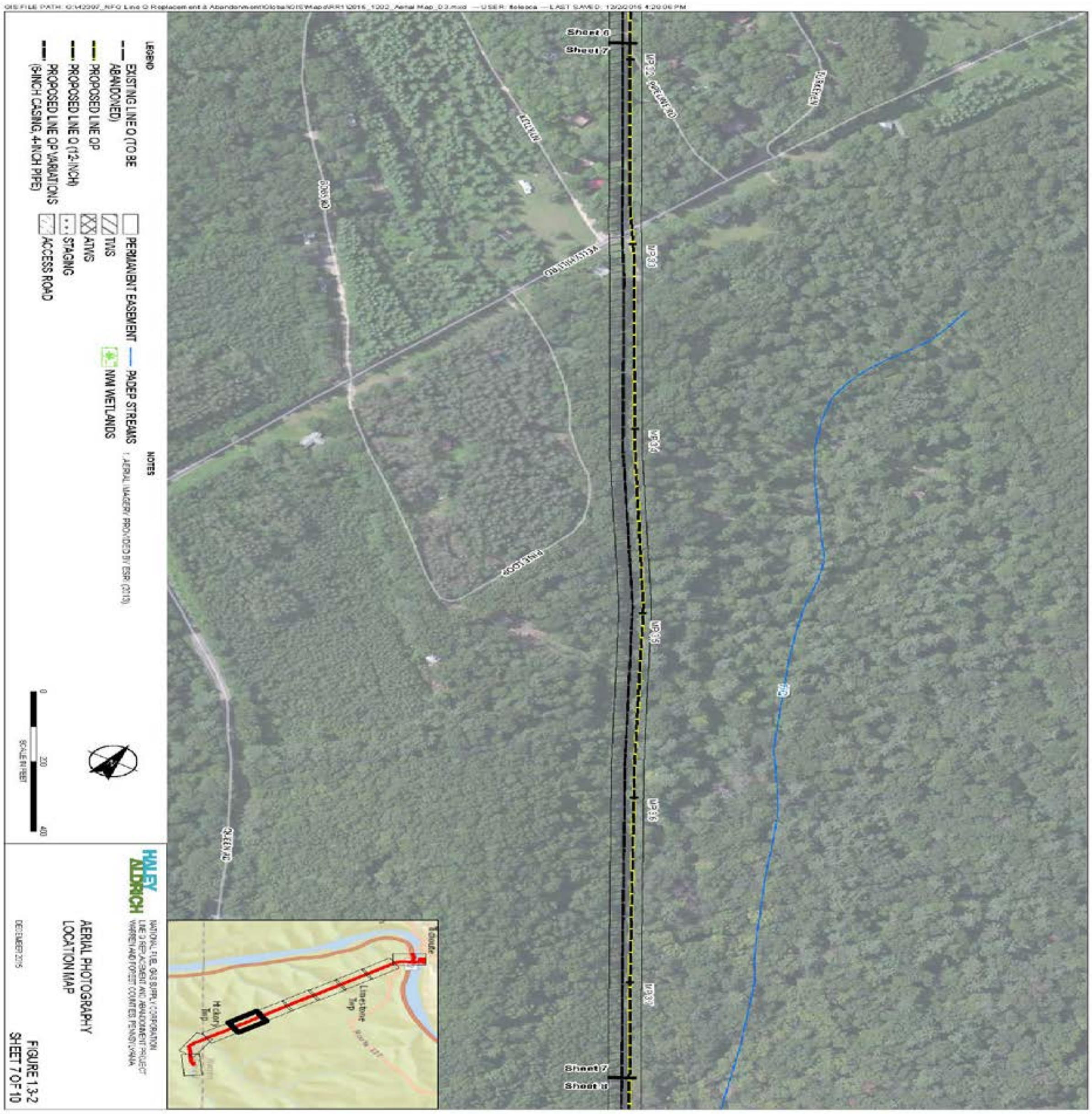
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT AND ABANDONMENT PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
AERIAL PHOTOGRAPHY LOCATION MAP
DECEMBER 2015
FIGURE 1.3-2
SHEET 6 OF 10


LEGEND
EXISTING LINE Q (TO BE ABANDONED)
PROPOSED LINE QP
PROPOSED LINE Q (12-INCH)
PROPOSED LINE QP VARIATIONS (6-INCH CASING, 4-INCH PIPE)
PERMANENT EASEMENT
TWS
ATWS
STAGING
ACCESS ROAD
PADEP STREAMS
NWI WETLANDS
NOTES
1. AERIAL IMAGERY PROVIDED BY ESRI (2013)
SCALE IN FEET
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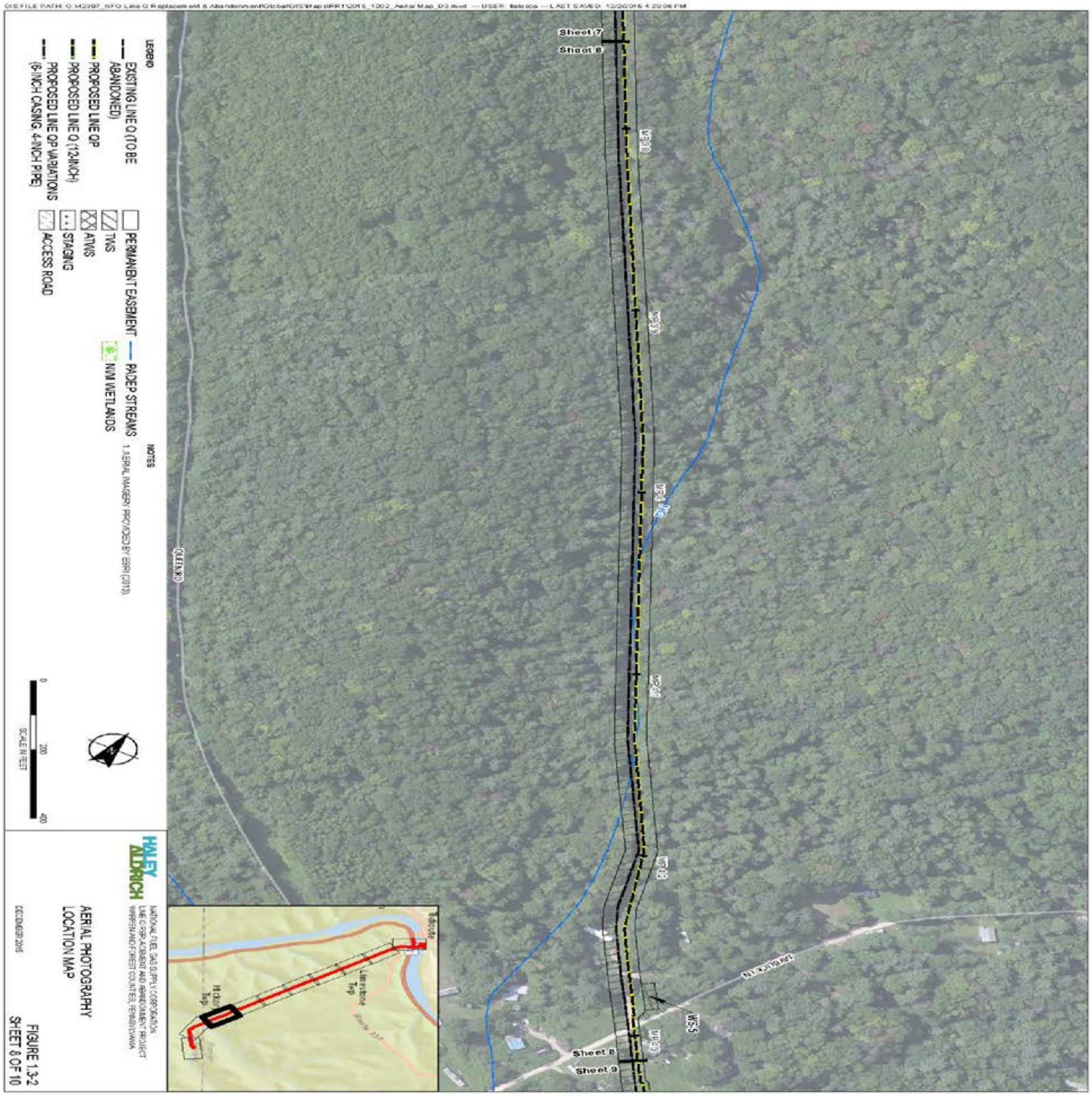
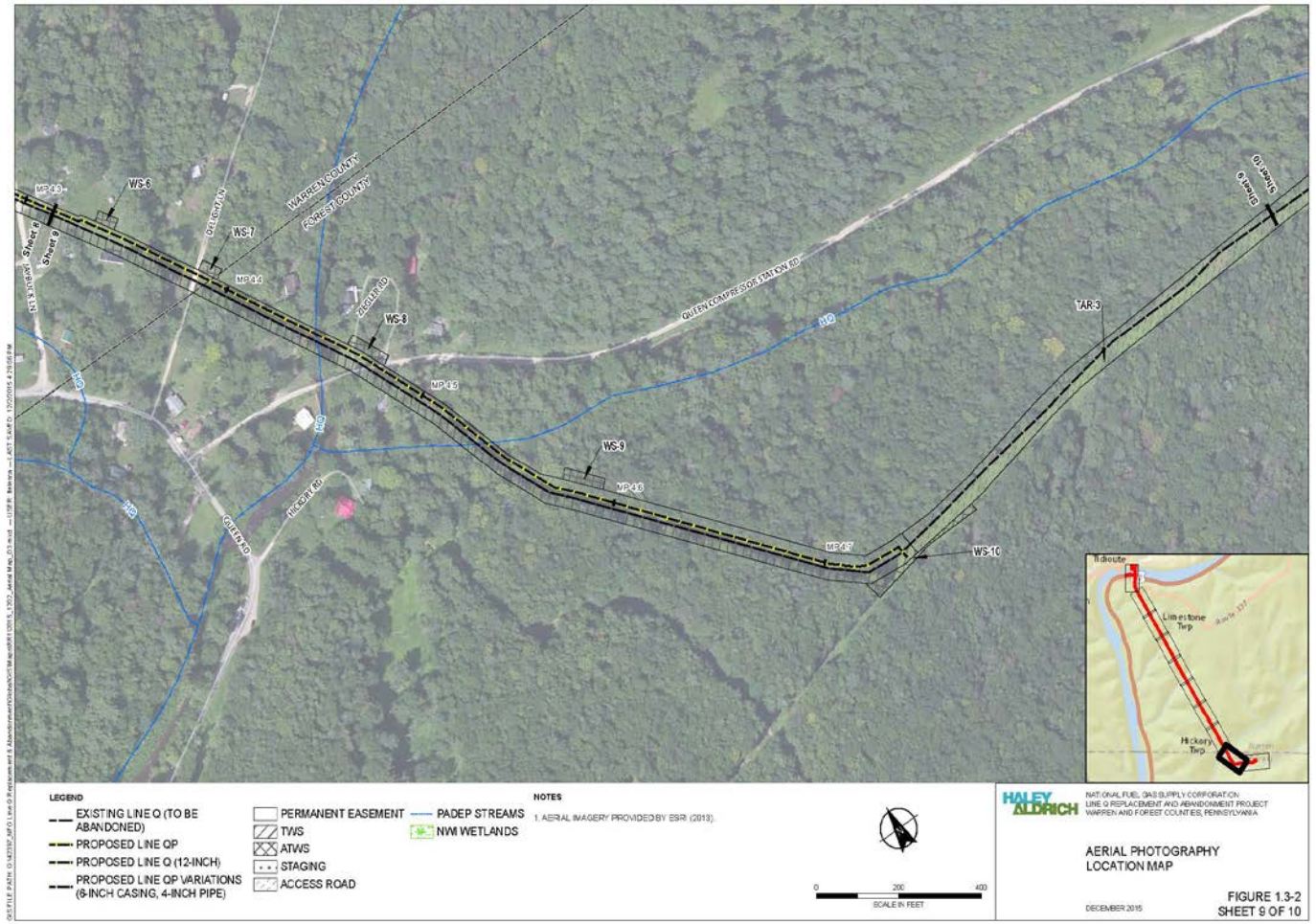
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT AND ABANDONMENT PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
AERIAL PHOTOGRAPHY
LOCATION MAP
DECEMBER 2015
FIGURE 1.3-2
SHEET 7 OF 10
Sheet 6
Sheet 7
Sheet 7
Sheet 8
Limestone Twp
Hickory Twp


LEGEND
EXISTING LINE Q (TO BE ABANDONED)
PROPOSED LINE QP
PROPOSED LINE Q (12-INCH)
PROPOSED LINE QP VARIATIONS (6-INCH CASING 4-INCH PIPE)
PERMANENT EASEMENT
TWS
ATWS
STAGING
ACCESS ROAD
PADEP STREAMS
NWI WETLANDS
NOTES
1. AERIAL IMAGERY PROVIDED BY ESRI (2013)
SCALE IN FEET
HALEY ALDRICH
AERIAL PHOTOGRAPHY LOCATION MAP
FIGURE 1.3-2
SHEET 8 OF 10
Sheet 7
Sheet 8
Sheet 9


MP 4.3
WS-6
Sheet 8
Sheet 9
WARREN COUNTY
FOREST COUNTY
WS-7
MP 4.4
ZIEGLER RD
WS-8
MP 4.5
WS-9
MP 4.6
MP 4.7
WS-10
QUEEN COMPRESSOR STATION RD
TAR-3
Sheet 9
Sheet 10
HICKORY RD
QUEEN RD
Tidioute
Limestone Twp
Hickory Twp
LEGEND
EXISTING LINE Q (TO BE ABANDONED)
PROPOSED LINE QP
PROPOSED LINE Q (12-INCH)
PROPOSED LINE QP VARIATIONS (6-INCH CASING, 4-INCH PIPE)
PERMANENT EASEMENT
TWS
ATWS
STAGING
ACCESS ROAD
PADEP STREAMS
NWI WETLANDS
NOTES
1. AERIAL IMAGERY PROVIDED BY ESRI (2013).
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SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT AND ABANDONMENT PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
AERIAL PHOTOGRAPHY
LOCATION MAP
DECEMBER 2015
FIGURE 1.3-2
SHEET 9 OF 10


ULTEN COMPRESSOR STATION RD
SA-2
TAR-3
Sheet 9
Sheet 10
Tidioute
Limestone Twp.
Hickory Twp.
LEGEND
EXISTING LINE Q (TO BE ABANDONED)
PROPOSED LINE QP
PROPOSED LINE Q (12-INCH)
PROPOSED LINE QP VARIATIONS (6-INCH CASING, 4-INCH PIPE)
PERMANENT EASEMENT
TWS
ATWS
STAGING
ACCESS ROAD
PADEP STREAMS
NWI WETLANDS
NOTES
1. AERIAL IMAGERY PROVIDED BY ESRI (2013).
0
200
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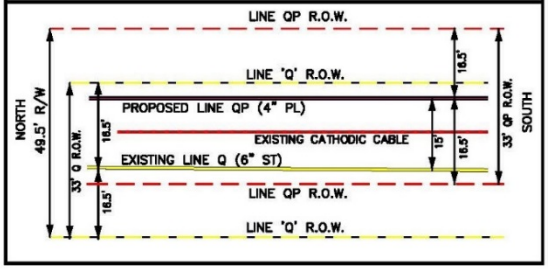
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT AND ABANDONMENT PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
AERIAL PHOTOGRAPHY
LOCATION MAP
DECEMBER 2015
FIGURE 1.3-2
SHEET 10 OF 10

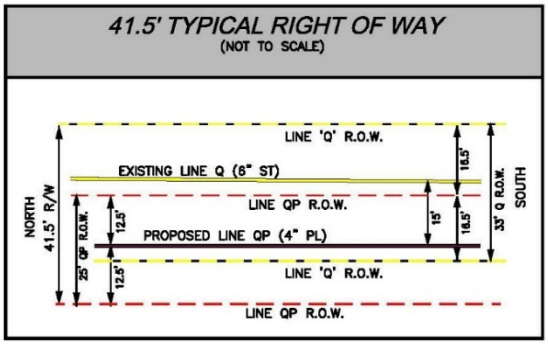
LINE Q and QP PERMANENT R.O.W.S ON THE ANF

49.5' TYPICAL RIGHT OF WAY
(NOT TO SCALE)



SOUTH OF ROUTE 337

41.5' TYPICAL RIGHT OF WAY
(NOT TO SCALE)

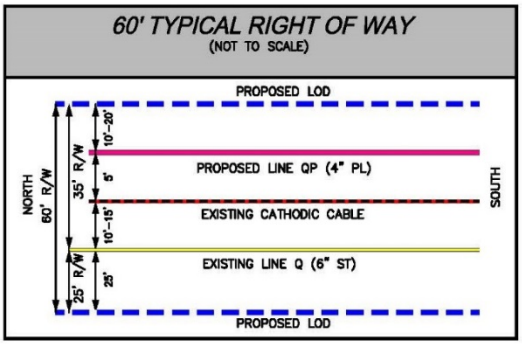


NORTH OF ROUTE 337

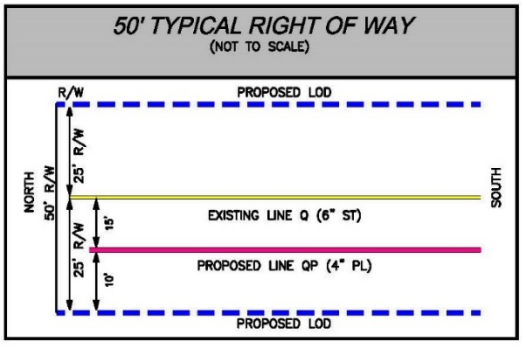
(NOT TO SCALE)

National Fuel Gas Supply Corporation
Line "Q" and Line "QP"
March 31, 2017
20170331 QP TYPICALS.DWG

LINE QP CONSTRUCTION R.O.W. ON THE ANF



SOUTH OF ROUTE 337



NORTH OF ROUTE 337

(NOT TO SCALE)

National Fuel Gas Supply Corporation
Line "QP"
March 31, 2017
20170331 QP TYPICALS.DWG

Appendix B
Table of Characteristics of Soils Crossed by the Project

Characteristics of Soils Crossed by the Project

Soil Series	Erosion Hazard	Poor Revegetation Potential [a]	Compaction Potential [b]	Drainage	Shallow Rock (Y/N) [c]	Hydric (Y/N) [c]	Prime Farmland (Y/N) [c]	Vulnerable Soils		
								V/E [d] (Y/N) [c]	V/W [e] (Y/N) [c]	V/B [f] (Y/N) [c]
Warren and Forest Counties, Pennsylvania (PA609)										
Brinkerton soils, 3 to 8 percent slopes (BkB)	Slight	Severe	Severe	Poorly Drained	N	Y	N	N	Y	N
Cavode silt loam, 0 to 8 percent slopes (CdB)	Slight	Severe	Severe	Somewhat Poorly Drained	Y	Y	N	N	Y	Y
Cavode silt loam, 8 to 15 percent slopes (CdC)	Moderate	Severe	Severe	Somewhat Poorly Drained	Y	Y	N	Y	Y	Y
Cavode silt loam, 15 to 25 percent slopes (CdD)	Moderate	Severe	Severe	Somewhat Poorly Drained	Y	N	N	Y	Y	Y
Cavode silt loam, 0 to 25 percent slopes, extremely stony (CeC)	Moderate	Severe	Severe	Somewhat Poorly Drained	Y	Y	N	Y	Y	Y
Chenango gravelly silt loam, 3 to 8 percent slopes (ChB)	Slight	Slight	Moderate	Well Drained	N	Y	Y	N	N	N
Chenango gravelly silt loam, 8 to 15 percent slopes (ChC)	Slight	Slight	Moderate	Well Drained	N	Y	N	N	N	N
Ernest silt loam, 3 to 8 percent slopes (EsB)	Slight	Severe	Severe	Moderately Well Drained	N	Y	N	N	Y	N
Ernest silt loam, 8 to 15 percent slopes (EsC)	Moderate	Slight	Severe	Moderately Well Drained	N	Y	N	Y	Y	N
Ernest silt loam, 0 to 25 percent slopes, extremely stony (EvD)	Slight	Slight	Severe	Moderately Well Drained	N	N	N	N	Y	N
Gilpin channery silt loam, 3 to 8 percent slopes (GnB)	Slight	Slight	Severe	Well Drained	Y	N	Y	N	N	Y
Gilpin channery silt loam, 8 to 15 percent slopes (GnC)	Slight	Slight	Severe	Well Drained	Y	N	N	N	N	Y

Soil Series	Erosion Hazard	Poor Revegetation Potential [a]	Compaction Potential [b]	Drainage	Shallow Rock (Y/N) [c]	Hydric (Y/N) [c]	Prime Farmland (Y/N) [c]	Vulnerable Soils		
								V/E [d] (Y/N) [c]	V/W [e] (Y/N) [c]	V/B [f] (Y/N) [c]
Gilpin channery silt loam, 15 to 25 percent slopes (GnD)	Moderate	Moderate	Severe	Well Drained	Y	N	N	Y	N	Y
Gilpin soils, 25 to 60 percent slopes (GpF)	Severe	Slight	Severe	Well Drained	Y	N	N	Y	N	Y
Hazleton channery sandy loam, 25 to 80 percent slopes, extremely stony (HvF)	Very Severe	Slight	Severe	Well Drained	Y	N	N	Y	N	Y
Pope loam (Po)	Slight	Slight	Moderate	Well Drained	N	Y	Y	N	Y	N
Wayland silt loam (Wa)	Slight	Severe	Severe	Poorly Drained	N	Y	N	N	Y	N
Wharton silt loam, 3 to 8 percent slopes (WhB)	Slight	Slight	Severe	Moderately Well Drained	Y	Y	Y	N	Y	Y
Wharton silt loam, 8 to 15 percent slopes (WhC)	Moderate	Slight	Severe	Moderately Well Drained	Y	Y	N	Y	Y	Y

a Poor revegetation potential represents the degree that the soil affects the expected mortality of planted seedlings when plant competition is not a limiting factor. The ratings are for seedlings from a good planting stock that are properly planted during a period of sufficient rainfall. A rating of slight indicates that the expected mortality of the planted seedlings is less than 25 percent; moderate, 25 to 50 percent; and severe, more than 50 percent.

b Compaction potential based on shallow excavation rating class and limiting soil characteristic features, including properties that influence the ease of digging and the resistance to sloughing.Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing. A rating of "slight" indicates that the soil has features that are very favorable for excavations/compaction. Good performance and very low maintenance can be expected. "Moderate" indicates that the soil has features that are moderately favorable. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Severe" indicates that the soil has one or more features that are unfavorable for excavations and compaction.

c Y/N = Yes or No

d V/E - designates the general area of vulnerability of erosion due to slope and/or the texture of exposed soil.

e V/W - designates the general area of vulnerability to soil horizon wetness.

f V/B - designates the general area of vulnerability due to shallow depth to bedrock.

Appendix C
Crossing Plan for the Allegheny River

Allegheny River Site Specific Crossing Plan

Allegheny River crossing construction procedures will occur as follows:

1. Plastic and steel pipe will first be laid out in staging area SA-1. Plastic pipe will be fused, inspected, and pressure tested, while steel pipe will be welded, inspected, x-rayed, coated, and pressure tested prior to any in-stream work for the crossing of the Allegheny River. The 6-inch steel casing pipe for Line QP will be attached to the 12-inch steel Line Q pipe prior to installation in the river.

2. Concurrently with, or prior to, pipe work in upland areas, mitigation procedures for threatened and endangered species within the Project areas of the Allegheny River crossing will be conducted in accordance with a Project-specific plan to be developed and approved in consultation with USFWS and PFBC.

3. Any navigational aids or other procedures developed per the Project Aids to Navigation Plan (to be developed in consultation with PFBC) will be installed or carried out prior to start of work in the Allegheny River.

4. After the new 12-inch and 6-inch steel casing pipe are ready for installation, trenching across the Allegheny River can begin. To minimize the amount of disturbance time within the river in-stream construction of the Allegheny River will be limited to a single 48-hour period.

5. The pipelines will be installed with a minimum of 5 feet of cover below the bottom of the riverbed. Once the Line Q and Line QP trench is dug by an excavator and experienced operator, the new 12-inch concrete coated steel pipe and 6-inch steel casing pipe will be carried in, lowered into the trench with adequate support to ensure the pipelines rests at the bottom of the trench, and then backfilled.

6. Removal of the exposed sections of the existing active and inactive 6-inch pipes will be completed within the same 48-hour period. The exposed portions of the two pipes will be cut and removed from the river by an excavator and properly disposed offsite. Remaining portions of the abandoned pipes will be capped and left in place.

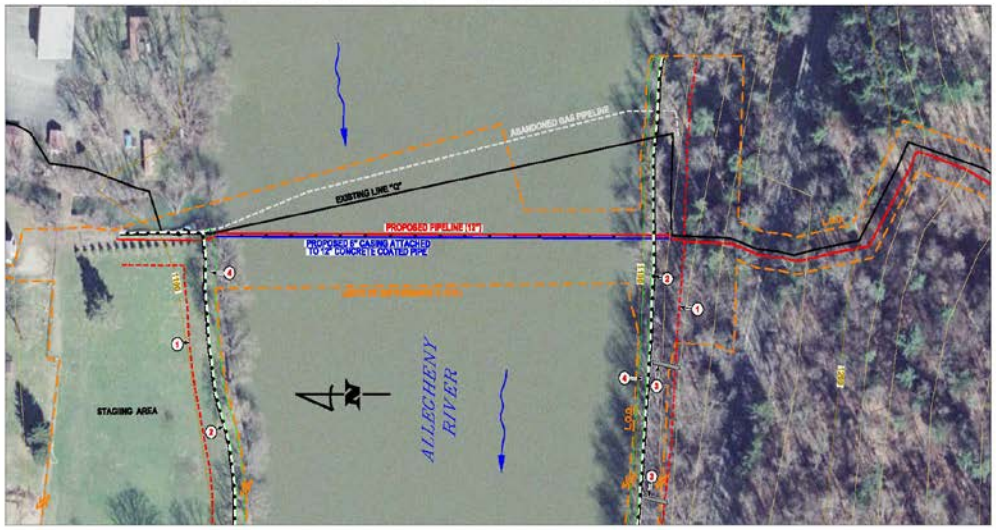
7. After backfill, the 12-inch pipeline will be pressure tested with water to substantiate the design MAOP of 1,440 psig. The installation procedures for the cofferdam would be as follows:

8. The plastic Line QP line can also then be inserted into the 6-inch steel casing. A steel cable will then be inserted in the 6-inch steel casing pipe from the south side

of the river and attached to the 4-inch plastic pipe. The plastic pipe will then be pulled through the casing pipe across the river.

9. The final connections (tie-ins) on either end of the crossing can be completed and x-rayed as appropriate.

6" and 12" CROSSING - PHASE 1 - CLEARING AND GRADING



(1) STREAM – BUFFER AREA
Stream buffer areas must be maintained at all times. The buffer area is that area 50 feet from the top of banks on both sides of stream. Activities such as stacking cut logs, burning cleared brush, discharging water from trenches, refueling and maintaining equipment should be done outside of buffer areas. These areas should also be seeded and mulched immediately after pipeline installation.

(2) Temporary Erosion and Sediment Control
Install filter fence across the right-of-way just outside the natural vegetative strip prior to construction. (See Typical Drawing No. 5 for proper fence installation)
Make any repairs to fence as necessary after each working day.

(3) Install temporary slope breakers above the disturbed work areas, to avoid excessive erosion. Temporary slope breakers must be installed on slopes greater than 5 percent where the base of the slope is less than 50 feet from waterbody, wetland or road crossings.
(See BMP Drawing No. 5)

(4) CONSTRUCTION
Leave at least 10 feet of ground on both banks undisturbed as a natural, vegetative strip (except for the equipment crossings). Trees greater than 4 inches in diameter may be removed from the vegetative strip at the time of initial clearing.

Note: Environmental Inspection
At least one Environmental inspector having knowledge of the waterbody conditions in the project area is required for each construction spread.
Environmental inspectors shall have the authority to stop activities that violate the environmental conditions of the FERC certificate or other authorizations and order corrective action.

DATE OF SURVEYS

LEGEND

(4) VEGETATIVE STRIP
(1) STREAM BUFFER BOUNDARY
(2) FILTER FENCE
(3) SLOPE BREAKER

NO.	DATE	DESCRIPTION	BY
1			

National Fuel
SUPPLY CORPORATION

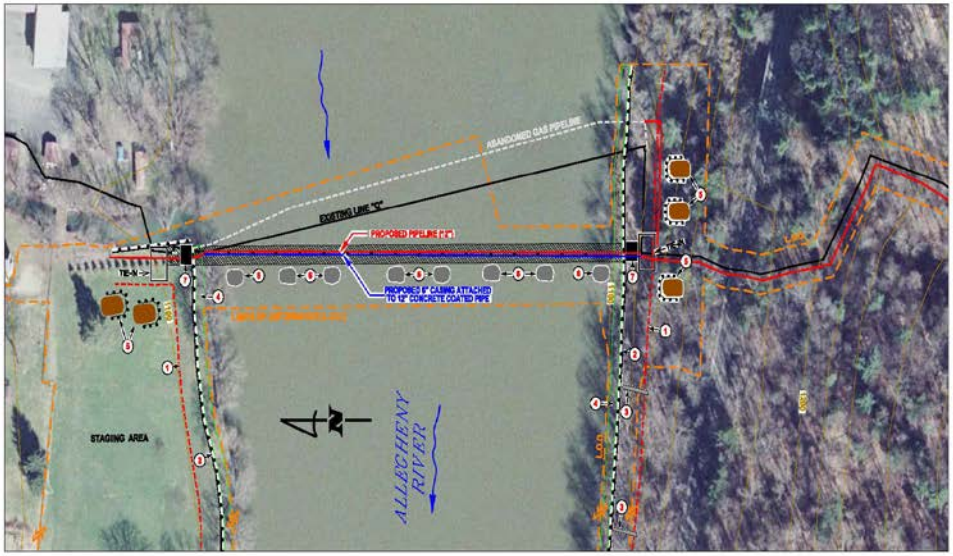
ENGINEERING DEPARTMENT
GEOMATICS SECTION
1100 STATE STREET
ERIE, PENNSYLVANIA 16501

MAJOR WATERBODY CONSTRUCTION
EROSION CONTROL - SITE SPECIFIC PLAN
LINE "Q" CROSSING THE ALLEGHENY RIVER
BOROUGH OF TIDIOUTE and
LIMESTONE TWP.,WARREN COUNTY, PA

DATE:	DRAWN BY:	APPROVED BY:
2/15/2016	TFD	G. M. MC CREA
SCALE: NOT TO SCALE	FILENAME: 20160215 LINE Q 6 IN and 12 IN RIVER XING PHASE 1.DWG	

SHEET NO.: 1 OF 4

6" and 12" CROSSING - PHASE 2 - TRENCHING AND LOWERING IN



Spoil Pile Placement and Control

(5) Stream bank spoil will be stored at least 10 feet beyond stream banks.

All upland spoil from major waterbody crossings, must be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas.

CONSTRUCTION

(6) Pile spoil on down stream side of trench. Pile spoil at edge of stream and continue toward the center of stream. Do not pile spoil across the entire length of stream.

(7) Remove earth plugs just prior to carrying pipeline across stream.

LEGEND

- (5) UPLAND AND BANK SPOIL
- TIE-IN BELL HOLE
- (4) VEGETATIVE STRIP
- (6) STREAM BED SPOIL
- (1) STREAM BUFFER BOUNDARY
- (7) EARTH PLUG
- (2) FILTER FENCE
- OPEN TRENCH
- PIPELINE

DATE OF SURVEYS

NO.	DATE	DESCRIPTION	BY

National Fuel SUPPLY CORPORATION

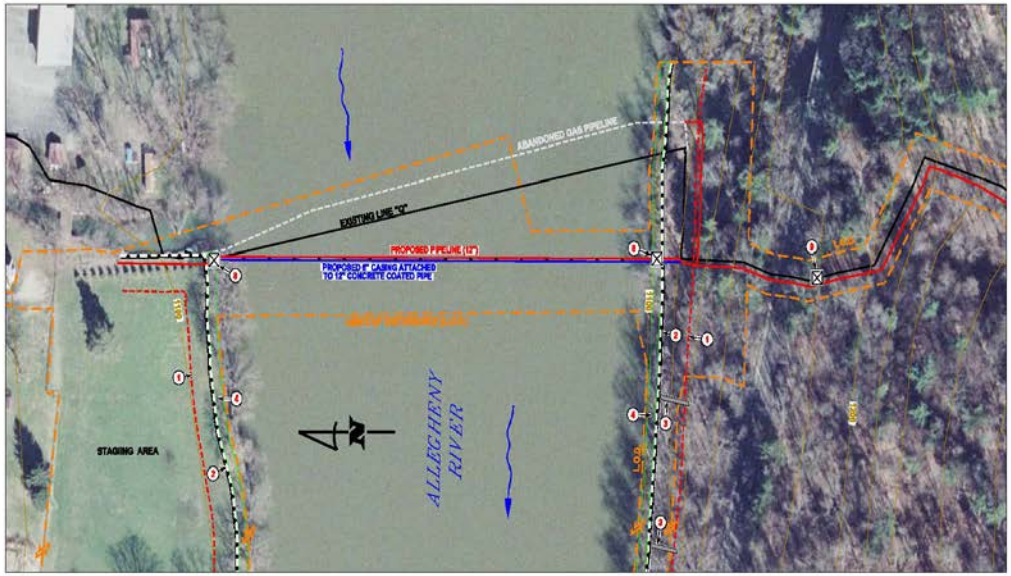
ENGINEERING DEPARTMENT
GEOMATICS SECTION
1100 STATE STREET
ERIE, PENNSYLVANIA 16501

MAJOR WATERBODY CONSTRUCTION
EROSION CONTROL - SITE SPECIFIC PLAN
LINE "Q" CROSSING THE ALLEGHENY RIVER
BOROUGH OF TIDIOUTE and
LIMESTONE TWP., WARREN COUNTY, PA

DATE: 2/15/2016 | DRAWN BY: TFD | APPROVED BY: G. M. MC CREA
SCALE: NOT TO SCALE | FILENAME: 20160215 LINE Q 6 AND 12 IN RIVER XING PHASE 2.DWG

SHEET NO.: 2 OF 4

6" and 12" CROSSING - PHASE 3 - PERMANENT EROSION CONTROLS



CONSTRUCTION

(8)→ Install trench breakers at the edges of stream as per Typical Drawing No. 6.

(9)→ Restore erosion controls, install trench breakers at the base of slopes adjacent to waterbody.

REVEGETATION

Soil Additives

Fertilize and add soil pH modifiers in accordance with written recommendations. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as possible after construction.

Seeding Requirements

Prepare a seedbed in disturbed areas to a depth of 3 to 4 inches using appropriate equipment to provide a firm seedbed. If hydroseeding, scarify the seedbed to facilitate lodging and germination of seed.

Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures and perform seeding of permanent vegetation at the beginning of the next recommended seeding season.

Seed slopes steeper than 30% immediately after final grading, weather permitting.

DATE OF SURVEYS

LEGEND

(3) SLOPE BREAKER

(2) FILTER FENCE

(8)(9) ☒ TRENCH BREAKER

(4) VEGETATIVE STRIP

NO.	DATE	DESCRIPTION	BY

National Fuel
SUPPLY CORPORATION

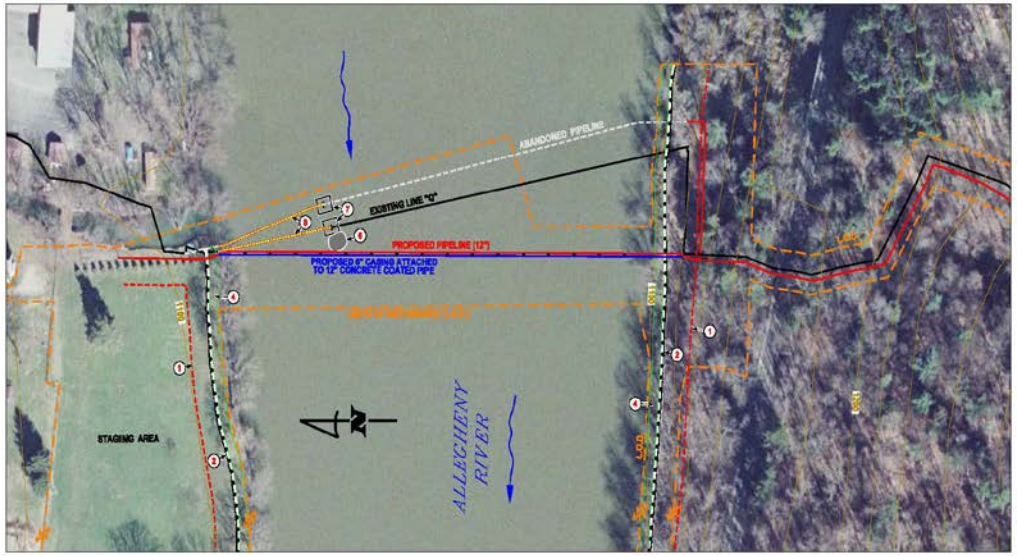
ENGINEERING DEPARTMENT
GEOMATICS SECTION
1100 STATE STREET
ERIE, PENNSYLVANIA 16501

MAJOR WATERBODY CONSTRUCTION
EROSION CONTROL - SITE SPECIFIC PLAN
LINE "Q" CROSSING THE ALLEGHENY RIVER
BOROUGH OF TIDIOUTE and
LIMESTONE TWP., WARREN COUNTY, PA

DATE:	DRAWN BY:	APPROVED BY:
2/15/2016	TFD	G. M. MC CREA
SCALE: NOT TO SCALE	FILENAME: 20160215 LINE Q 6 AND 12 IN RIVER XING PHASE 3.DWG	

SHEET NO.: 3 OF 4

CAP EXISTING PIPELINES AND ABANDON IN PLACE



(8)→ Pile spoil on down stream side of bell holes.

(7)→ Cap pipe ends of existing buried pipeline sections.

(8)→ Remove exposed pipeline sections from river (no disturbance).

LEGEND

(1) STREAM BUFFER BOUNDARY
(2) FILTER FENCE
(4) VEGETATIVE STRIP
(6) STREAM BED SPOIL
(7) BELL HOLE
(8) EXPOSED PIPE

DATE OF SURVEYS

National Fuel SUPPLY CORPORATION

MAJOR WATERBODY CONSTRUCTION
EROSION CONTROL - SITE SPECIFIC PLAN
LINE "Q" CROSSING THE ALLEGHENY RIVER
BOROUGH OF TIDIOUTE and
LIMESTONE TWP.,WARREN COUNTY, PA

SHEET NO.: 4 OF 4

ENGINEERING DEPARTMENT
GEOMATICS SECTION
1100 STATE STREET
ERIE, PENNSYLVANIA 16501

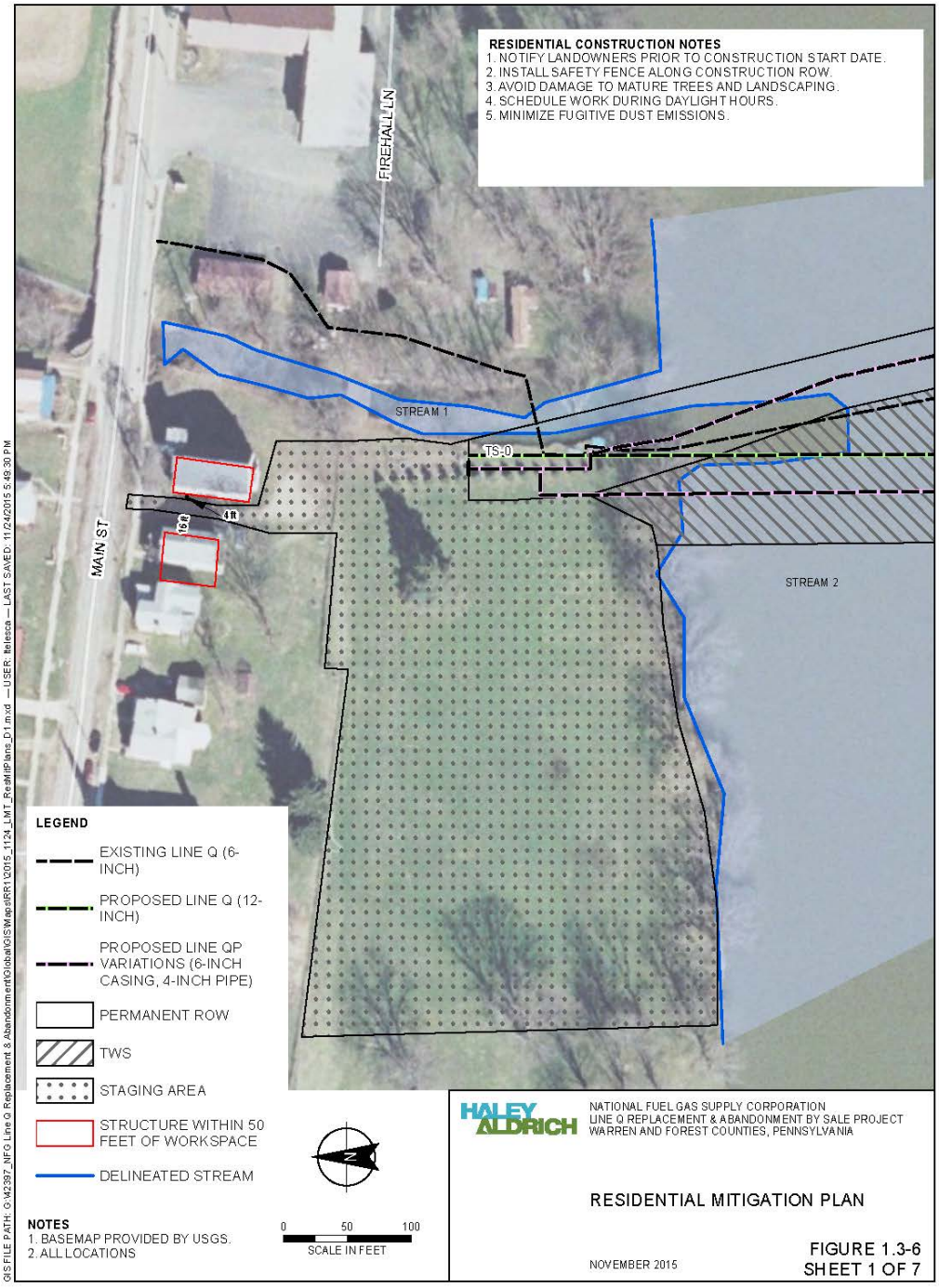
DATE: 2/15/2016 | DRAWN BY: TFD | APPROVED BY: G. M. MC CREA
SCALE: NOT TO SCALE | FILENAME: 20160215 LINE Q CAP AND ABANDON.DWG

NO.	DATE	DESCRIPTION	BY

Appendix D
Site-specific Residential Construction Plans

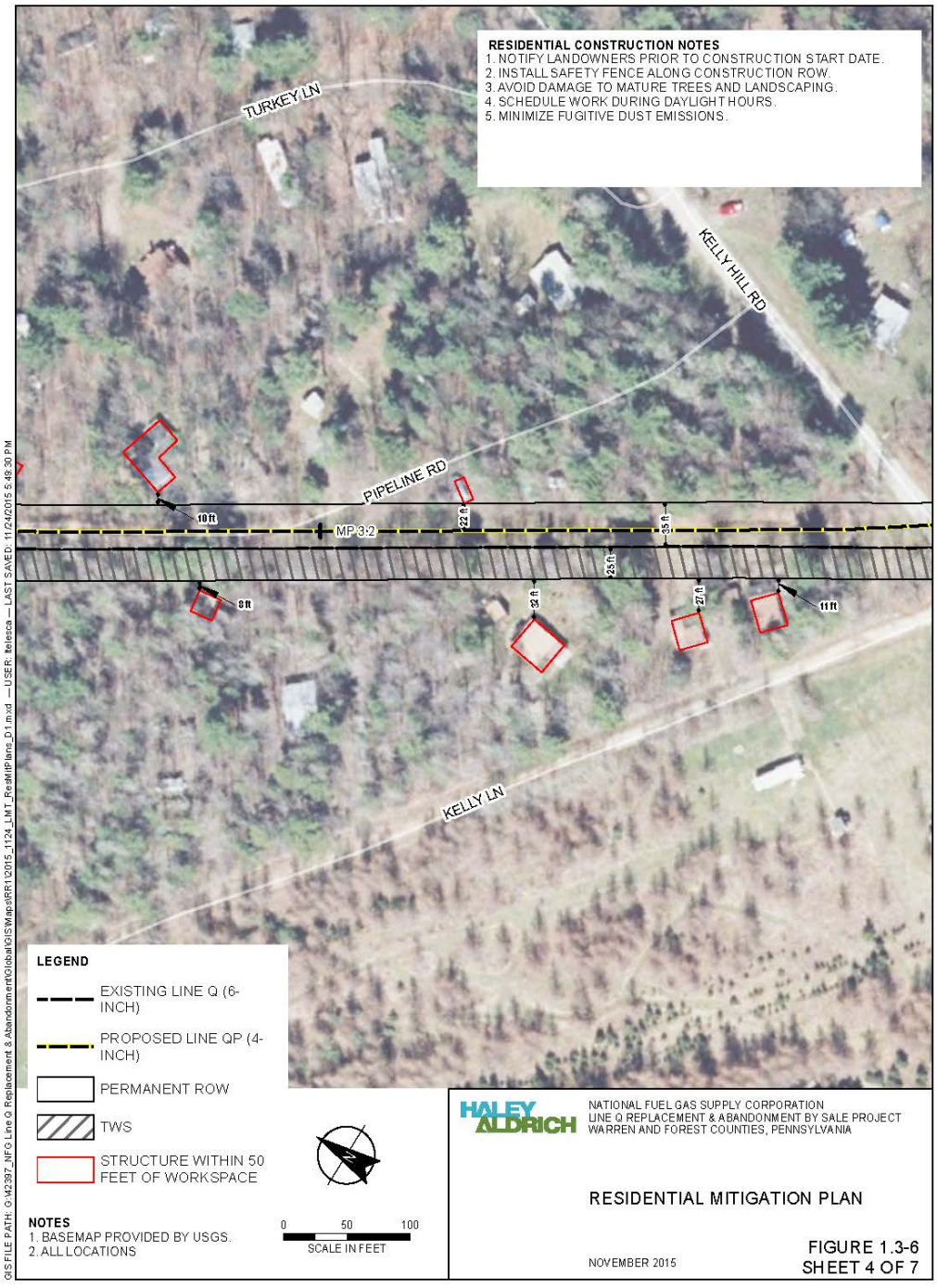
Existing Residences Within 50 Feet of Construction Work Space and Proposed Mitigation							
Facility	**County, State**	**MP**	**Description of Structure(s)**	**Distance from Construction Work Area (feet)**	**Distance from Pipeline Centerline (feet)**	**Direction from Pipeline Centerline**	**Proposed Mitigation**
Staging Area SA-1	Warren, PA	N/A	Residential Dwelling	16	N/A	N/A	Site Specific
	Warren, PA	N/A	Church	4	N/A	N/A	Site Specific
Proposed Line QP (4-inch Plastic)	Warren, PA	2.92	Abandoned Residential Cabin	17	54	West	N/A
	Warren, PA	2.93	Residential Cabin	12	35	East	Site Specific
	Warren, PA	2.95	Residential Cabin	21	58	West	Site Specific
	Warren, PA	2.95	Residential Cabin	11	34	East	Site Specific
	Warren, PA	3.03	Residential Cabin	39	60	East	BMP
	Warren, PA	3.04	Residential Cabin	9	30	East	Site Specific
	Warren, PA	3.11	Residential Cabin	15	55	West	Site Specific
	Warren, PA	3.14	Residential Cabin	3	42	West	Site Specific
	Warren, PA	3.14	Residential Cabin	20	41	East	Site Specific
	Warren, PA	3.16	Residential Dwelling	10	31	East	Site Specific
	Warren, PA	3.18	Residential Cabin	8	44	West	Site Specific
	Warren, PA	3.22	Camper	0	22	East	N/A
	Warren, PA	3.22	Residential Dwelling	32	70	West	BMP
	Warren, PA	3.25	Residential Dwelling	27	65	West	BMP

Existing Residences Within 50 Feet of Construction Work Space and Proposed Mitigation							
Facility	**County, State**	**MP**	**Description of Structure(s)**	**Distance from Construction Work Area (feet)**	**Distance from Pipeline Centerline (feet)**	**Direction from Pipeline Centerline**	**Proposed Mitigation**
	Warren, PA	3.26	Residential Dwelling	11	50	West	Site Specific
	Warren, PA	3.31	Residential Dwelling	0	41	West	Site Specific
	Warren, PA	3.35	Residential Cabin	10	55	West	Site Specific
	Warren, PA	3.39	Residential Cabin	19	65	West	Site Specific
	Warren, PA	4.24	Residential Trailer	0	21	West	Site Specific
	Warren, PA	4.30	Camper	0	8	West	N/A
	Warren, PA	4.30	Residential Dwelling	0	11	East	Site Specific
	Warren, PA	4.36	Residential Dwelling	0	37	West	Site Specific
	Forest, PA	4.45	Residential Dwelling	44	54	East	BMP
	Forest, PA	4.48	Residential Dwelling	46	86	West	BMP

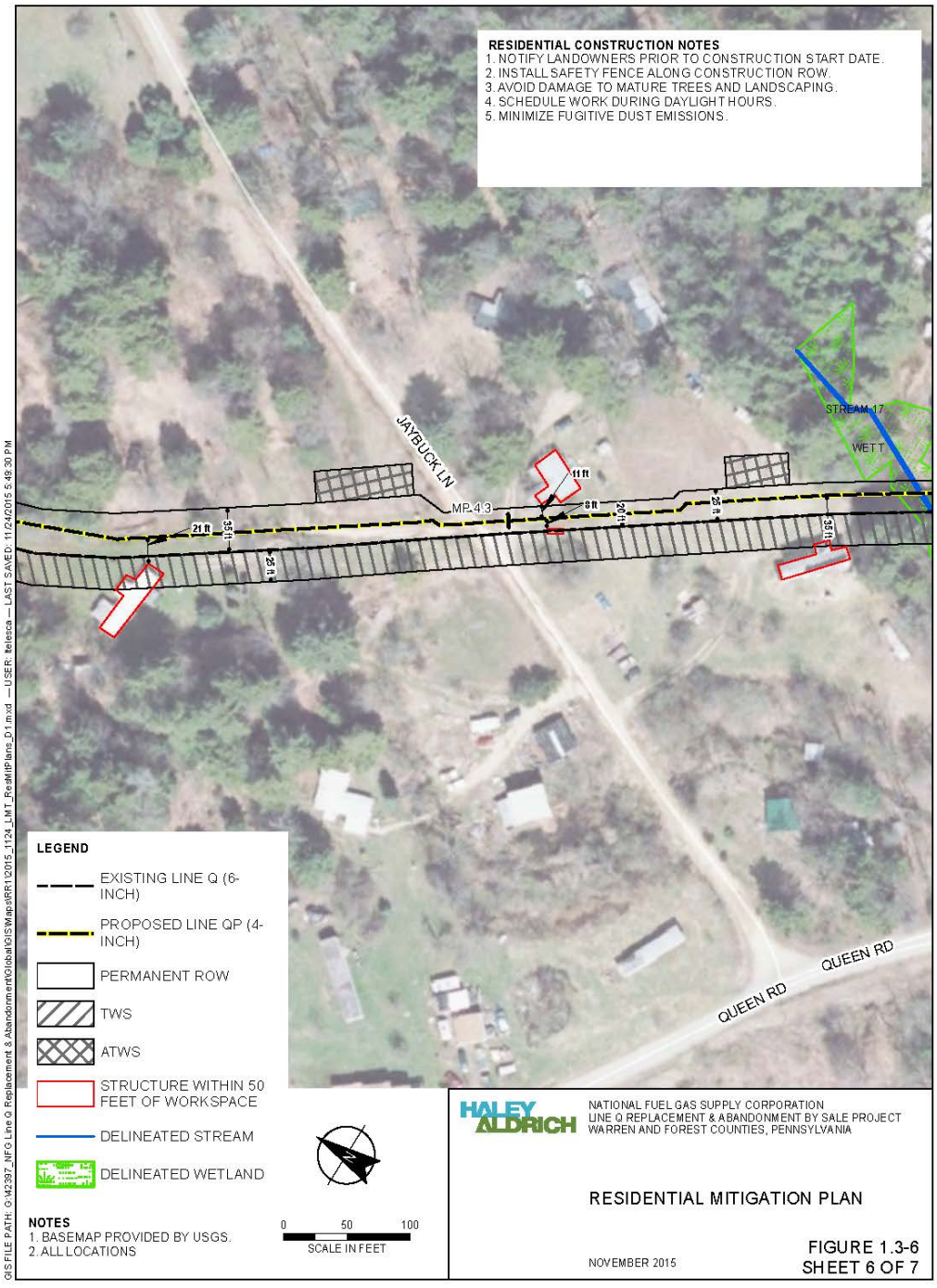

RESIDENTIAL CONSTRUCTION NOTES
1. NOTIFY LANDOWNERS PRIOR TO CONSTRUCTION START DATE.
2. INSTALL SAFETY FENCE ALONG CONSTRUCTION ROW.
3. AVOID DAMAGE TO MATURE TREES AND LANDSCAPING.
4. SCHEDULE WORK DURING DAYLIGHT HOURS.
5. MINIMIZE FUGITIVE DUST EMISSIONS.
FIREHALL LN
STREAM 1
TS-0
MAIN ST
16 ft
4 ft
STREAM 2
LEGEND
EXISTING LINE Q (6-INCH)
PROPOSED LINE Q (12-INCH)
PROPOSED LINE QP VARIATIONS (6-INCH CASING, 4-INCH PIPE)
PERMANENT ROW
TWS
STAGING AREA
STRUCTURE WITHIN 50 FEET OF WORKSPACE
DELINEATED STREAM
N
NOTES
1. BASEMAP PROVIDED BY USGS.
2. ALL LOCATIONS
0 50 100
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT & ABANDONMENT BY SALE PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
RESIDENTIAL MITIGATION PLAN
NOVEMBER 2015
FIGURE 1.3-6
SHEET 1 OF 7
GIS FILE PATH: G:\42397_NFG Line Q Replacement & Abandonment\Global\GIS\Maps\RR1\2015_1124_LMT_ReMitPlans_D1.mxd — USER: htelesca — LAST SAVED: 11/24/2015 5:49:30 PM

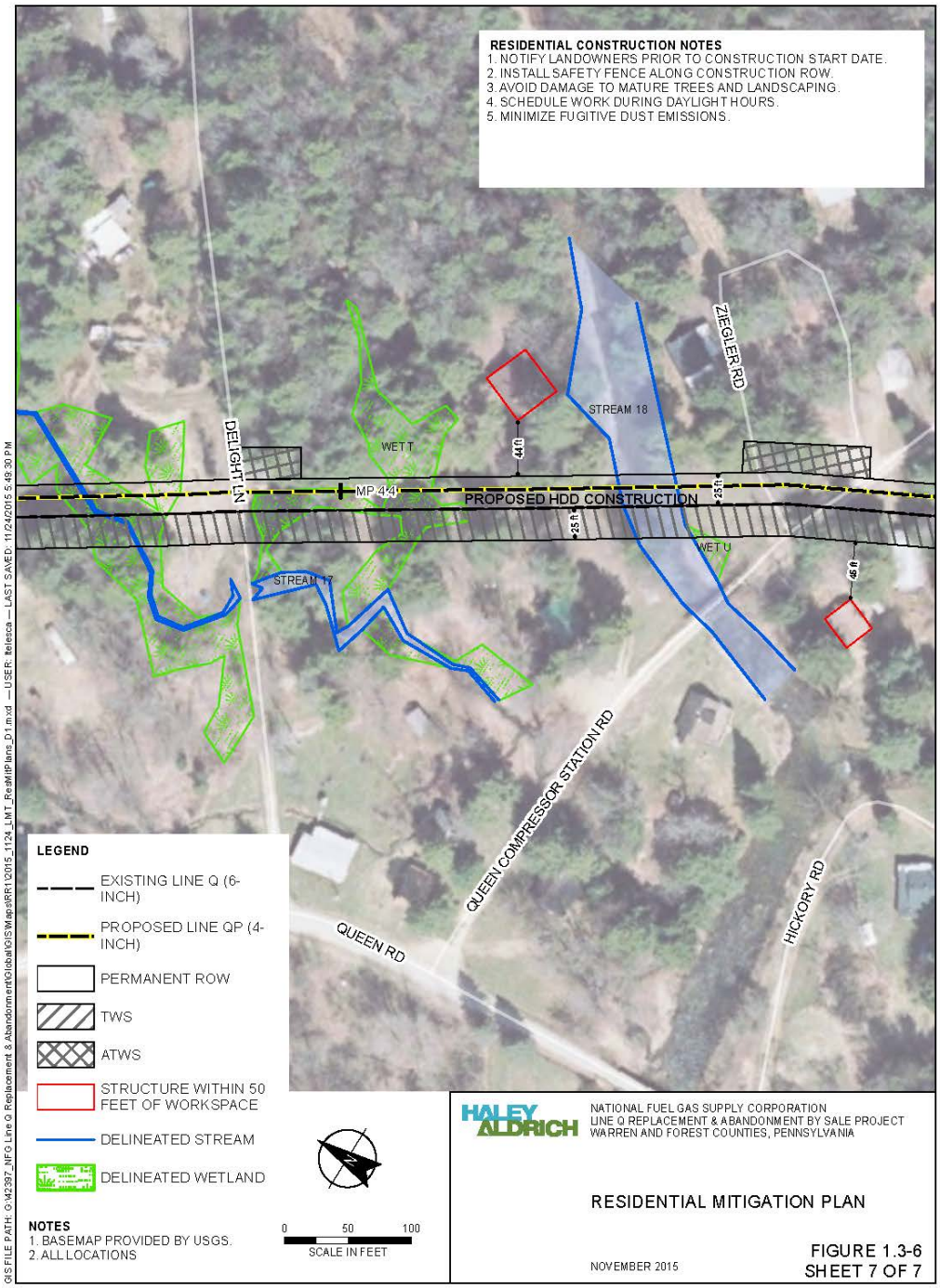

RESIDENTIAL CONSTRUCTION NOTES
1. NOTIFY LANDOWNERS PRIOR TO CONSTRUCTION START DATE.
2. INSTALL SAFETY FENCE ALONG CONSTRUCTION ROW.
3. AVOID DAMAGE TO MATURE TREES AND LANDSCAPING.
4. SCHEDULE WORK DURING DAYLIGHT HOURS.
5. MINIMIZE FUGITIVE DUST EMISSIONS.
SPRING RD
TURKEY LN
PIPELINE RD
MP 8
CROSS RD
KELLY LN
KELSEY RD
12 ft
11 ft
35 ft
25 ft
17 ft
21 ft
30 ft
LEGEND
EXISTING LINE Q (6-INCH)
PROPOSED LINE QP (4-INCH)
PERMANENT ROW
TWS
STRUCTURE WITHIN 50 FEET OF WORKSPACE
NOTES
1. BASEMAP PROVIDED BY USGS.
2. ALL LOCATIONS
0 50 100
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT & ABANDONMENT BY SALE PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
RESIDENTIAL MITIGATION PLAN
NOVEMBER 2015
FIGURE 1.3-6
SHEET 2 OF 7
GIS FILE PATH: G:\42397_NFG Line Q Replacement & Abandonment\Global\GIS\Maps\RR12015_1124_LMT_ResMitPlans_D1.mxd — USER: ttelesca — LAST SAVED: 11/24/2015 5:48:30 PM


RESIDENTIAL CONSTRUCTION NOTES
1. NOTIFY LANDOWNERS PRIOR TO CONSTRUCTION START DATE.
2. INSTALL SAFETY FENCE ALONG CONSTRUCTION ROW.
3. AVOID DAMAGE TO MATURE TREES AND LANDSCAPING.
4. SCHEDULE WORK DURING DAYLIGHT HOURS.
5. MINIMIZE FUGITIVE DUST EMISSIONS.
TURKEY LN
MP 3-1
PIPELINE RD
KELLY LN
39 ft
9 ft
35 ft
25 ft
20 ft
15 ft
3 ft
LEGEND
EXISTING LINE Q (6-INCH)
PROPOSED LINE QP (4-INCH)
PERMANENT ROW
TWS
STRUCTURE WITHIN 50 FEET OF WORKSPACE
NOTES
1. BASEMAP PROVIDED BY USGS.
2. ALL LOCATIONS
0 50 100
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT & ABANDONMENT BY SALE PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
RESIDENTIAL MITIGATION PLAN
NOVEMBER 2015
FIGURE 1.3-6
SHEET 3 OF 7
GIS FILE PATH: G:\42397_NFG Line Q Replacement & Abandonment\Global\GIS\Maps\RR12015_1124_LMT_ResMitPlans_D1.mxd — USER: ttelesca — LAST SAVED: 11/24/2015 5:49:30 PM


RESIDENTIAL CONSTRUCTION NOTES
1. NOTIFY LANDOWNERS PRIOR TO CONSTRUCTION START DATE.
2. INSTALL SAFETY FENCE ALONG CONSTRUCTION ROW.
3. AVOID DAMAGE TO MATURE TREES AND LANDSCAPING.
4. SCHEDULE WORK DURING DAYLIGHT HOURS.
5. MINIMIZE FUGITIVE DUST EMISSIONS.
TURKEY LN
KELLY HILL RD
PIPELINE RD
MP 8.2
10 ft
23 ft
25 ft
25 ft
8 ft
32 ft
27 ft
11 ft
KELLY LN
LEGEND
EXISTING LINE Q (6-INCH)
PROPOSED LINE QP (4-INCH)
PERMANENT ROW
TWS
STRUCTURE WITHIN 50 FEET OF WORKSPACE
NOTES
1. BASEMAP PROVIDED BY USGS.
2. ALL LOCATIONS
0
50
100
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT & ABANDONMENT BY SALE PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
RESIDENTIAL MITIGATION PLAN
NOVEMBER 2015
FIGURE 1.3-6
SHEET 4 OF 7
GIS FILE PATH: G:\42397_NFG Line Q Replacement & Abandonment\Global\GIS\Maps\RR12015_1124_LMT_ResMitPlans_D1.mxd — USER: ttelesca — LAST SAVED: 11/24/2015 5:49:30 PM


RESIDENTIAL CONSTRUCTION NOTES
1. NOTIFY LANDOWNERS PRIOR TO CONSTRUCTION START DATE.
2. INSTALL SAFETY FENCE ALONG CONSTRUCTION ROW.
3. AVOID DAMAGE TO MATURE TREES AND LANDSCAPING.
4. SCHEDULE WORK DURING DAYLIGHT HOURS.
5. MINIMIZE FUGITIVE DUST EMISSIONS.
MP 33
MP 34
41 ft
35 ft
25 ft
10 ft
19 ft
KELLY LN
KELLY HILL RD
PINE LOOP
LEGEND
EXISTING LINE Q (6-INCH)
PROPOSED LINE QP (4-INCH)
PERMANENT ROW
TWS
STRUCTURE WITHIN 50 FEET OF WORKSPACE
NOTES
1. BASEMAP PROVIDED BY USGS.
2. ALL LOCATIONS
0
50
100
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT & ABANDONMENT BY SALE PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
RESIDENTIAL MITIGATION PLAN
NOVEMBER 2015
FIGURE 1.3-6
SHEET 5 OF 7
GIS FILE PATH: G:\42397_NFG Line Q Replacement & Abandonment\Global\GIS\Maps\RR12015_1124_LMT_ResMitPlans_D1.mxd — USER: ttelesca — LAST SAVED: 11/24/2015 5:48:30 PM


RESIDENTIAL CONSTRUCTION NOTES
1. NOTIFY LANDOWNERS PRIOR TO CONSTRUCTION START DATE.
2. INSTALL SAFETY FENCE ALONG CONSTRUCTION ROW.
3. AVOID DAMAGE TO MATURE TREES AND LANDSCAPING.
4. SCHEDULE WORK DURING DAYLIGHT HOURS.
5. MINIMIZE FUGITIVE DUST EMISSIONS.
JAYBUCK LN
MP 413
STREAM 17
WETT
QUEEN RD
QUEEN RD
11 ft
8 ft
20 ft
21 ft
35 ft
25 ft
LEGEND
EXISTING LINE Q (6-INCH)
PROPOSED LINE QP (4-INCH)
PERMANENT ROW
TWS
ATWS
STRUCTURE WITHIN 50 FEET OF WORKSPACE
DELINEATED STREAM
DELINEATED WETLAND
NOTES
1. BASEMAP PROVIDED BY USGS.
2. ALL LOCATIONS
0
50
100
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT & ABANDONMENT BY SALE PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
RESIDENTIAL MITIGATION PLAN
NOVEMBER 2015
FIGURE 1.3-6
SHEET 6 OF 7
GIS FILE PATH: O:\42397_NFG Line Q Replacement & Abandonment\Global\GIS\Maps\RR112015_1124_LMT_ResMitPlans_D1.mxd — USER: ttelesca — LAST SAVED: 11/24/2015 5:48:30 PM


RESIDENTIAL CONSTRUCTION NOTES
1. NOTIFY LANDOWNERS PRIOR TO CONSTRUCTION START DATE.
2. INSTALL SAFETY FENCE ALONG CONSTRUCTION ROW.
3. AVOID DAMAGE TO MATURE TREES AND LANDSCAPING.
4. SCHEDULE WORK DURING DAYLIGHT HOURS.
5. MINIMIZE FUGITIVE DUST EMISSIONS.
ZIEGLER RD
STREAM 18
WET T
DELIGHT LN
MP 44
PROPOSED HDD CONSTRUCTION
WET U
STREAM 17
QUEEN COMPRESSOR STATION RD
QUEEN RD
HICKORY RD
LEGEND
EXISTING LINE Q (6-INCH)
PROPOSED LINE QP (4-INCH)
PERMANENT ROW
TWS
ATWS
STRUCTURE WITHIN 50 FEET OF WORKSPACE
DELINEATED STREAM
DELINEATED WETLAND
NOTES
1. BASEMAP PROVIDED BY USGS.
2. ALL LOCATIONS
0
50
100
SCALE IN FEET
HALEY ALDRICH
NATIONAL FUEL GAS SUPPLY CORPORATION
LINE Q REPLACEMENT & ABANDONMENT BY SALE PROJECT
WARREN AND FOREST COUNTIES, PENNSYLVANIA
RESIDENTIAL MITIGATION PLAN
NOVEMBER 2015
FIGURE 1.3-6
SHEET 7 OF 7
GIS FILE PATH: G:\42397_NFG Line Q Replacement & Abandonment\Global\GIS\Maps\RR12015_1124_LMT_ResMitPlans_D1.mxd — USER: ttelesca — LAST SAVED: 11/24/2015 5:49:30 PM

Appendix E
Summary of Waterbodies Crossed

Summary of Waterbodies Crossed by the Project

MP[a]	Stream Crossing ID	Waterbody Name	Waterbody Class[b]	Waterbody Type[c]	Crossing Width (feet)	Crossing Method Proposed[d]
Proposed Line QP (4-inch Plastic), Warren and Forest Counties, Pennsylvania						
TS-0.05	2	Allegheny River	Major	Perennial	590	Existing Pipe /
0.07	5	Unnamed Tributary of Allegheny River	Minor	Ephemeral	8	Open Cut, D&P or
0.52	6	Myers	Intermediate	Perennial	24	D&P or FP
1.63	7	Dale Run	Intermediate	Perennial	14	D&P or FP
2.32	8	Unnamed Tributary of Dunn Run	Minor	Perennial	5	D&P or FP
2.52	9	Dunn	Intermediate	Perennial	50	D&P or FP
2.59	10	Unnamed Tributary of Dunn Run	Minor	Perennial	20	D&P or FP
2.63	11	Unnamed Tributary of Dunn Run	Minor	Perennial	9	D&P or FP
2.68	12	Unnamed Tributary of Dunn Run	Minor	Perennial	13	D&P or FP
2.69	12	Unnamed Tributary of Allegheny River	Minor	Perennial	65	D&P or FP
2.83	13	Unnamed Tributary of Allegheny River	Minor	Perennial	5	D&P or FP
2.84	14	Unnamed Tributary of Allegheny River	Minor	Perennial	5	D&P or FP
4.08	16	Unnamed Tributary of East Hickory	Intermediate	Perennial	23	D&P or FP
4.10	16	Unnamed Tributary of East Hickory	Intermediate	Perennial	11	D&P or FP
4.36	17	Unnamed Tributary of East Hickory	Minor	Perennial	3	D&P or FP
4.44	18	East Hickory Creek	Intermediate	Perennial	45	HDD
4.52	19	(Unnamed Tributary of East Hickory	Minor	Intermittent	4	HDD
4.55	20	Queen	Intermediate	Perennial	65	HDD
TAR-1	3	Unnamed Tributary of Allegheny River	Minor	Ephemeral	3	Timber Mats/Culvert
TAR-1	4	Unnamed Tributary of Allegheny River	Minor	Intermittent	3	Timber Mats/Culvert
TAR-3	21	Unnamed Tributary of Queen Creek	Minor	Ephemeral	3	Timber Mats/Culvert
TS-0.05	2	Allegheny River	Major	Perennial	494	Open Cut

a Locations provided by approximate milepost (MP).

b "Minor Waterbody" includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing; "Intermediate Waterbody" includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of crossing; and "Major Waterbody" includes all waterbodies greater than 100 feet wide at the water's edge at the time of crossing.

c Waterbody type includes perennial, intermittent and ephemeral. A perennial stream has flowing water year-round during a typical year. Perennial streams are identified as solid blue lines on the USGS Topographic maps. An intermittent stream has flowing water during certain times of the year when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Intermittent streams are identified as dashed blue lines on the USGS Topographic maps. An ephemeral drainage feature has flowing water only during and for a short duration after, precipitation events in a typical year. Ephemeral drainage features are not identified on the USGS Topographic map.

d Crossing methods "D&P" = Dam and Pump, "FP" = Flume Pipe and "HDD" = Horizontal Directional Drilling. Final crossing method would be made based on current weather conditions and forecasts during construction.

Appendix F

Past, Present, and Reasonably Foreseeable Projects within the Geographic Scopes of the Line Q Replacement and Abandonment by Sale Project

Past, Present, and Reasonably Foreseeable Projects within the Geographic Scopes of the Line Q Replacement and Abandonment by Sale Project

Activity/Project, Sponsor/Proponent and Location[1]	Distance and Direction from the Project	Project Description, Approximate Layout and Type	Permits/ Authorizations	Potential Resource Impacts	Status and Schedule
Recently Completed Projects or Activities					
None Identified	N/A	N/A		N/A	N/A
Present Projects or Activities					
Hunter Station Bridge Replacement PennDOT Tionesta Township, Forest County, Pennsylvania	Approximately 15 miles South	As part of PennDOT's Twelve Year Transportation Plan, the Hunter Station Bridge (US Route 62) over the Allegheny River in Tionesta Township, Forest County will be replaced. Project bridge and highway work associated with this project corridor is approximately 0.8 miles in length.	Federal Highway Administration/ PennDOT Environmental Assessment USACE and PADEP Section 404/401/Section 10 Permitting USFWS Incidental Take Permit Section 4(f)/Section 2002 Review	Surface Water, Wildlife	Bridge construction expected to be undertaken from 2017 through 2018.
Various Companies Natural Gas Production and Exploration Warren and Forest Counties, PA	Varies, greater than 1 mile	Ongoing Marcellus Shale production in Warren and Forest Counties, (and regionally) Pennsylvania. Well drilling and completions, construction and operation of gathering pipelines, gas treatment and compression facilities (as needed to support new production). Potential environmental impacts are assumed based on the nature of the actions and regional location(s) of activity	USACE Section 404/10 PADEP Section 401 Chapter 105 Permitting PADEP Chapter 102 Permitting Endangered Species Act Consultation National Historic Preservation Act Section 106 Consultation	Groundwater, Soils, Geology	On-going construction

Activity/Project, Sponsor/Proponent and Location[1]	Distance and Direction from the Project	Project Description, Approximate Layout and Type	Permits/ Authorizations	Potential Resource Impacts	Status and Schedule
Reasonably Foreseeable Future Projects					
Forest Extension Pipeline EmKey Gathering Inc. Crawford and Warren Counties, PA	Partially adjacent workspace (at Tidioute Station)	Installation of approximately 14 miles of new gathering pipeline to connect EmKey' s existing gathering system in Rome Township, Crawford County, PA to Line Q (in Tidioute Borough, Warren County, PA) being sold by National Fuel as part of this application. Typical pipeline right-of-ways range from 50 to 100 feet wide.	USACE Section 404/10 PADEP Section 401 Chapter 105 Permitting PADEP Chapter 102 Permitting Endangered Species Act Consultation National Historic Preservation Act Section 106 Consultation	Vegetation, Soils, Land Use, noise (construction), air quality (construction)	Proposed 2017 Construction
USDA-FS Izenbrown Corners Project	Partially adjacent	Proposed management activities within the Perry Magee and East Hickory watersheds include vegetation management on 6,332 acres, non-native invasive plant species treatments on 315 stand acres, 11 miles of road management activities, all over the next 20 years.	USACE Section 404/10 PADEP Section 401 Chapter 105 Permitting PADEP Chapter 102 Permitting Endangered Species Act Consultation National Historic Preservation Act Section 106 Consultation	Vegetation, Wildlife, Soils, Land Use, noise (construction), air quality (construction)	Currently under analysis, 2017

Activity/Project, Sponsor/Proponent and Location[1]	Distance and Direction from the Project	Project Description, Approximate Layout and Type	Permits/ Authorizations	Potential Resource Impacts	Status and Schedule
Reasonably Foreseeable Future Projects					
USDA-FS Coalbed Run Project	Within HUC 12 Watershed analysis boundary	Proposed management activities within the East Hickory Creek Watershed include: vegetation management on 2,208 acres, non-native invasive plant treatment 359 stand acres, and 55 miles of road management activities all over the next 20 years.	USACE Section 404/10 PADEP Section 401 Chapter 105 Permitting PADEP Chapter 102 Permitting Endangered Species Act Consultation National Historic Preservation Act Section 106 Consultation	Vegetation, Wildlife, Soils, Land Use, noise (construction), air quality (construction)	Started February 24, 2012
USDA-FS Emerald Ash Borer Remediation Project	Within HUC 12 Watershed analysis boundary	Proposed management activities within the East Hickory Creek Watershed include: vegetation management on 817 acres, non-native invasive plant treatment 670 stand acres, and 17 miles of road management activities all over the next 20 years.	USACE Section 404/10 PADEP Section 401 Chapter 105 Permitting PADEP Chapter 102 Permitting Endangered Species Act Consultation National Historic Preservation Act Section 106 Consultation	Vegetation, Wildlife, Soils, Land Use, noise (construction), air quality (construction)	Pending 2017

Notes: 1. Publicly available information was reviewed to identify recently completed, present and reasonably foreseeable future projects. National Fuel's proposed Project is located within the Borough of Tidioute and Limestone Township in Warren County, PA and Hickory Township in Forest County, PA. The Project is located within two HUC 12 Watersheds: East Hickory Creek (050100030104) and Perry Magee Run-Allegheny River (050100030103). The Hunter Station Bridge project is not within these HUC resources.

Appendix G
Impact of Proposed Excavation on River Sedimentation

Flow Science Incorporated
48 S. Chester Avenue, Ste. 200
Pasadena, CA 91106
(626) 304-1134 • Fax (626) 304-9427

Allegheny River: Impact of proposed Excavation on river Sedimentation

Prepared for

Haley & Aldrich Inc.

On behalf of

National Fuel Gas Supply Corporation

Prepared By
Li Ding, Ph.D., P.E. (VA)

Reviewed By
E. John List, Ph.D., P.E. (CA)

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SUMMARY

National Fuel Gas Supply Corporation (NFG) is in the planning process of laying a new pipeline across the Allegheny River near Tidioute, Pennsylvania. A four-foot wide and seven-foot deep trench is proposed to be excavated across the whole width of the river bottom for the new pipeline. NFG is concerned about the potential increase of turbidity and sedimentation in the river as a result of the trench excavation and would like to quantify sedimentation patterns in the river that include information on the distribution of particle deposition thickness at the river bottom and Total Suspended Solids (TSS) concentrations in the water body.

Flow Science Incorporated (Flow Science) has computed flow patterns in the vicinity of and downstream of the proposed excavation site using Computational Fluid Dynamics (CFD) modeling. A particle tracking method was then used to follow the path of particles using the computed flow patterns and determine the location of particle deposition, TSS concentrations, and sediment deposition thickness.

A total of three simulations have been conducted in this study: Base Case, High Flow Case and High Flow - High Fines Case. Base Case simulated expected conditions during the excavation for the river flow rate, water surface elevation (WSEL) as well as the expected particle distribution in the excavated soil. The High Flow Case simulated a condition with a higher river flow rate and a slightly higher WSEL compared to the Base Case. The same expected particle distribution was assumed for the excavated soil in the High Flow Case. The High Flow - High Fines Case simulated the same WSEL and flow rates as the High Flow Case. However, it assumed a biased particle distribution in the excavated soil with a higher percent of fine particles with low settling velocity compared to the expected particle distribution used in the Base Case and High Flow Case. The biased particle distribution included a weighted average of soil grain size based on nearby geotechnical data. Both the High Flow Case and High Flow - High Fines Case were intended to provide a sensitivity test on the effects of different river flow rates/water surface elevation (WSEL) and particle distribution of the excavated soil on the modeling results.

Based on the flow and particle tracking modeling results for the proposed excavation across the Allegheny River near Tidioute, Pennsylvania, the following main conclusions can be drawn:

- The flow seems to be relatively uniform in most of the river channel except nearing the sandbar and the area downstream of the D-D' section.

- The sandbar extending from the bank distorts the flow, and creates high velocities at the tip of the sandbar and low velocities at the upstream and downstream faces of the sandbar.

- The river widens downstream of the D-D' section and the flow slows from 2 ft/s to about 1.5 ft/s due to the widening of the river channel.

- Snapshots of simulated TSS concentrations at T = 2 and 6.5 hours after the start of excavation for all three simulations show that only particle plumes from the current excavation sections are visible and that most of the particle plumes from previous excavation sections have settled out of the water column.

- For the Base Case, the majority of particles released by the excavation settle within 500 ft downstream of the excavation site. The simulated maximum TSS concentrations drop below 100 mg/L within 500 ft from the site, below 50 mg/L within 1,000 ft from the site, and below 20 mg/L within 1,200 ft from the site.

- For the Base Case, the sediment deposition thickness is predicted to be less than 0.25 cm in the majority of the river channel, except in the immediate area of the proposed excavation site. The highest predicted deposition thickness is approximately 11 cm and occurs near the south end of the proposed site. The sediment deposition thickness is predicted to drop below 2 cm within 20 ft from the site, below 0.5 cm within 40 ft from the site, and below 0.25 cm within 50 ft from the site.

- The simulated flow patterns for the High Flow Case are similar to those from the Base Case. The simulated TSS distribution patterns are also similar to those from the Base Case, except that the simulated high TSS concentrations appear to spread out further downstream for the High Flow Case due to its higher river flow velocities. The simulated maximum TSS concentrations are below 100 mg/L at 510 ft from the site, below 30 mg/L at 1,130 ft from the site, and below 20 mg/L within 1,300 ft from the site.

- The simulated flow patterns for the High Flow - High Fines Case are the same as those from the High Flow Case. The simulated TSS concentrations from the High Flow - High Fines Case are higher than those from the Base Case and High Flow Case due to higher content of fine particles (*e.g.*, silt) with lower settling velocity and, thus a larger number of particles presenting in the water column. The simulated maximum TSS concentrations are below 100 mg/L at 1,130 ft from the site, below 50 mg/L at 1,520 ft from the site, and below 20 mg/L within 2,700 ft from the site.

- The predicted sediment deposition thickness drops below 0.5 cm within 50 ft from the excavation site for all three simulations.

INTRODUCTION

National Fuel Gas Supply Corporation (NFG) is in the planning process of laying a new pipeline across the Allegheny River near Tidioute, Pennsylvania. A four-foot wide and seven-foot deep trench is proposed to be excavated across the whole width of the river bottom for the new pipeline. NFG is concerned about the potential increase of turbidity and sedimentation in the river as a result of the trench excavation and would like to quantify sedimentation patterns in the river, which includes information on the distribution of particle deposition thickness at the river bottom and Total Suspended Solids (TSS) concentrations in the water body.

Flow Science Incorporated (Flow Science) has computed flow patterns in the vicinity of and downstream of the proposed excavation site for the expected river condition using Computational Fluid Dynamics (CFD) modeling. A particle tracking method was then used to follow the path of particles using the computed flow patterns and determine the location of particle deposition, TSS concentrations, and sediment deposition thickness. Additional simulations have been conducted to provide a sensitivity test on the effects of different river flow rates/water surface elevation (WSEL) and particle distribution of the excavated soil on the modeling results.

This document includes a general discussion of CFD modeling and the particle tracking method used in the analysis. The results from the model simulations are then presented and discussed. This work has been performed by Flow Science Incorporated of Pasadena, California, under contract with Haley & Aldrich, Inc.

METHOD OF ANALYSIS

CFD MODELING

In this report, the flow within the section of the Allegheny River near the proposed excavation site is modeled using computational fluid dynamics (CFD). CFD modeling provides a rigorous three-dimensional hydrodynamic model for simulating mixing and hydrodynamic flow patterns. A CFD model explicitly considers the generally accepted basic equations governing the turbulent motion of water (*i.e.*, time-averaged Navier-Stokes Equations). The resulting model is reasonably accurate, robust, and can be readily applied to a variety water body configurations, characteristics, and hydraulic conditions including segments of rivers, storage reservoirs, clearwells, etc.

Flow Science employs its own CFD program, FLOWMOD, to evaluate mixing in non-density stratified environments. FLOWMOD has been validated in several similar

applications in which Flow Science used the program to predict flow patterns in rivers. For example, FLOWMOD was used to predict dilution of a treated wastewater discharge to the Sacramento River under various effluent and river conditions and the results compared very favorably to field dye dilution studies. The use of a fully three-dimensional hydrodynamic model enabled the non-uniformity of the river flow distribution to be factored into the mixing analysis. The results of that work were included in an Environmental Impact Statement and were subject to evaluation by an EPA-convened Peer Review Committee who approved of the model use and its results. FLOWMOD has also been validated in various other applications including distribution reservoirs, clearwells, and basins. A discussion of the model's underlying theory and method of solution is provided in Hannoun and Boulos (1998).

The basic concepts underlying CFD consist of a set of conservation equations (mass, momentum, and energy) that are solved using the numerical method of finite differences. The computational domain, *i.e.*, a section of the river, is subdivided into small computational elements over which the conservation equations are solved. Typically, 25,000 to 300,000 computational elements are used. In general, a smaller grid size provides more accurate results, but with commensurately longer execution times for the simulation. Inputs to the model consist of a geometrical description of the river section and a set of initial and boundary conditions (*e.g.*, river flow rates and geometry). The model output produces spatial and temporal solutions for the variables (pressure, velocity, and temperature) that can be presented in graphical and tabular form.

In the present application, a steady-state solution for the velocity field under isothermal conditions (no temperature effects) is obtained through iteration for a constant river flow scenario. The velocity field was then used in a particle tracking model to evaluate the transport and settling of particles that are released due to the excavation.

PARTICLE TRACKING

In this study, a Lagrangian particle tracking model was used to simulate movement and settling of multiple sediment types in a flow field predicted by the aforementioned CFD modeling. This particle tracking model follows the same approach adopted by the well-known Particle Tracking Model (PTM) developed by the Engineering Research and Development Center of the Army Corp of Engineers (MacDonald *et al*., 2006). The PTM model was designed specifically to understand and predict the fate of material suspended during dredging and construction operations. It considers the sediment processes such as erosion, transport, settling, deposition, and resuspension. The particle tracking model used in this study considers the processes of transport, settling and deposition.

Sediment being modeled is discretized into a finite-number of particles as the model tracks them through the flow field. The particle movement is a function of both the

velocity components of the flow (including turbulence) and particle settling velocities. The particle release schedule and characteristics of released particles such as settling velocities, groups, sizes, and density were provided by Haley & Aldrich and are discussed in detail in **Attachment A**. Sufficient particles were released and modeled during the whole extraction process so that transport patterns are representative of all particles moving from the excavation source.

MODEL SETUP AND SCENARIORS

BATHYMETRY AND MODEL GRID

The Allegheny River flows from east to west in the section of interest (**Figure 1**). At the direction of Haley & Aldrich, Flow Science used simulated water surface elevations (WSEL) ranging from 1,092.4 to 1,092.7 ft and flow rates ranging from 1,600 to 2,000 cubic feet per second (cfs) for the river in all the simulations. Haley & Aldrich provided the satellite image in **Figure 1** of the river channel on July 28, 2015 when the river flow was about 2,870 cfs, similar to the range of the modeled flow rates. Haley & Aldrich also provided a river bottom profile at one cross section near the proposed excavation site. Based on the information provided, the river is fairly shallow even at the highest simulated WSEL, and the water depth at the deepest part of the river channel for the given river bottom profile is less than 3.2 ft. In addition, the satellite image in **Figure 1** shows that there are several exposed sandbars in this section of the river at the selected WSEL.

Under guidance from Haley & Aldrich, Flow Science developed the three-dimensional bathymetry for the river section of interest (**Figure 2**) using the information available. The modeling domain extends from 1,000 ft upstream to 3,000 ft downstream of the proposed excavation site. The shape and width of the river as well as the shape of the sandbars were derived from the satellite image in **Figure 1**. The small north branch (the shaded area in **Figure 1**) just upstream from the excavation site was considered to be very shallow with small flow comparing to the main channel and, thus, was not included in the current model. Given that the river bottom profile is only available at one location, the river bottom everywhere is assumed to be the same as the provided river bottom cross-sectional profile. If the river is wider than the provided profile, the river profile was extended by assuming a flat bottom in the areas beyond the provided profile; if the river is narrower than the provided profile, the river profile was shrunk by cutting off the portion beyond the river width equally from both the north and south banks.

The finite-difference grid used to simulate the flow in the river consists of 120 × 400 grid cells in the horizontal x- and z-directions (10-ft × 10-ft resolution), respectively, and 10 cells in the vertical y-direction (0.29 - 0.32 ft resolution).

PARTICLE MODELING PARAMETERS

A total of eight groups of particles with various sizes, density and settling velocities were considered in the study. Haley & Aldrich provided the information on the particles as well as the construction schedule and particle release patterns (**Attachment A**). It is assumed that the trench excavation will take place utilizing two excavators, each working from one side of the river and moving towards the center. It takes approximately 15 minutes for each excavator to excavate a 10-ft section of trench, before moving onto the next section. The total time to excavate the trench across the river is approximately 6.5 hours (the width of the river from water edge to water edge is about 510 ft at the proposed excavation site based on WSEL). Our simulation covers an eight-hour period that starts from the beginning of the excavation and ends at 1.5 hours after the completion of the excavation. Throughout the whole simulation period, a total of 15 million particles have been released and modeled, and less than 0.001% particles flowed out of the modeling domain. By the end of the simulation period, all particles released have either settled to the river bottom or flowed out of the modeling domain. These results indicate that both the size of the modeling domain and the duration of the modeling period are sufficient to capture the movement of all particles released.

MODELING SCENARIOS

A total of three simulations have been conducted in this study: Base Case, High Flow Case and High Flow - High Fines Case. Base Case used a simulated WSEL of 1,092.4 ft and a flow rate of 1,600 cfs for the river. The Base Case also assumed an expected particle distribution (see **Attachment A**) for the excavated soil in the particle tracking model. Both the simulated river WSEL/flow rate and particle distribution from the Base Case reflect the expected conditions during the excavation.

The High Flow Case simulated a condition with a higher river flow rate (2,000 cfs) and a slightly higher WSEL (1,092.7 ft) compared to the Base Case. Similar to the Base Case, the expected particle distribution (see **Attachment A** for the distribution) was assumed for the excavated soil in the High Flow Case. The High Flow Case was intended to evaluate the effects of the higher river flow rate/WSEL on the modeling results by comparing its results against those from the Base Case.

The High Flow - High Fines Case simulated the same WSEL and flow rates as the High Flow Case. However, it assumed a biased particle distribution (see **Attachment A** for the distribution) for the excavated soil in which, compared to the expected particle distribution used in the Base Case and High Flow Case, a higher percent of particles was considered as fine particles (e.g., silt) with low settling velocity. The biased particle distribution included a weighted average of soil grain size based on nearby geotechnical

data. The High Flow - High Fines Case was intended to simulate alternate conditions that may be encountered during the excavation by combining high river flow rate and high content of fine particles in the excavated soil.

A summary of major parameters used in all three simulations is presented in **Table 1**. Base Case represents the expected condition during the excavations, while the High Flow Case and High Flow - High Fines Case provides a sensitivity test on the effects of higher river flow rate and a biased particle distribution for the excavated soil on the modeling results.

TABLE 1: SUMMARY OF MAJOR PARAMETERS FOR MODELING SCENARIOS

Scenario	Flow Rate (cfs)	WSEL (ft)	Particle Distribution
Base Case	1,600	1092.4	Expected
High Flow Case	2,000	1092.7	Expected
High Flow - High Fines Case	2,000	1092.7	Biased

ANALYSIS AND RESULTS

BASE CASE

River Flow Patterns

The flow patterns in the Allegheny River in the section of interest for the Base Case were simulated using FLOWMOD. The model results presented include particle paths (*i.e.*, streamlines), velocity vectors, and contours of velocity magnitudes.

Figure 3 shows the computed fluid particle paths or streamlines near the surface of the river and on multiple selected sections. The location of the proposed excavation is noted in the figure for reference. These streamlines represent trajectories of massless particles injected into the river at various points. These particle paths illustrate only the velocities in the selected plane; velocities that are perpendicular to the selected plane are not shown or taken into account in this representation. As a result, some of these particle paths may appear to hit the riverbanks or sandbars. In reality, however, the particles approaching the boundaries will be transported vertically alongside the boundary. As shown in **Figure 3**, the streamlines appear to be uniform in the middle of river channel and the sandbar extending from the north bank near the C-C' section causes the streamlines to bend towards the center of the river. The streamlines also diverge downstream of the D-D' section due to the widening of the river channel.

Figure 4 shows the computed velocity vectors near the surface and on the same selected sections in the river. As shown, the sandbar that was shown to impact the streamlines in **Figure 3** results in a corresponding increase in velocities in this region since the river flow is forced to pass through a smaller cross-sectional area.

Figure 5 presents color contours of velocity magnitudes near the surface and on the selected sections. It is evident that the geometric constrictions in the river due to the sandbar result in higher velocity. The figure also shows that low velocity exists at the downstream face of the sandbar near the B-B' section, and upstream and downstream faces of the sandbar near the C-C' section. Water velocities are also reduced in the widening section of the river channel downstream from the D-D' section.

Sediment Settling

Figure 6 and 7 present the contours of simulated TSS concentrations for the Base Case at T = 2 and 6.5 hours after starting the excavation, respectively. The contours in the plan view on the top panel in both figures show the maximum simulated TSS concentrations in the water column at every horizontal location and enable visualization of particle plumes. At T = 2 hours, only two particle plumes from the current excavation sections are visible and most of the particles from previous excavation sections have settled out of the water column. In the two particle plumes shown, the simulated TSS concentrations are below 75 mg/L at a distance of 300 ft from the proposed excavation site, and below 25 mg/L at a distance of 700 ft from the proposed excavation site (*i.e.*, near the C-C' section). The results at T = 6.5 hours are similar to those at T = 2 hours, except only one particle plume is visible since there is only one working section at that time. An animation of simulation results for the Base Case over the whole simulation period is included in **Attachment B**.

Figures 8 and **9** present the maximum simulated TSS concentrations occurring during the eight-hour simulation period at each location for the Base Case. The top panel in **Figure 8** shows the maximum concentrations at the surface while the top panel in **Figure 9** shows the maximum concentrations in the water column. As shown, the majority of particles released by the excavation settle within 500 ft from the proposed site. The simulated maximum TSS concentrations are below 100 mg/L at a distance of 500 ft from the site, below 50 mg/L at a distance of 1,000 ft from the site, and below 20 mg/L at a distance of 1,200 ft from the site. The highest simulated TSS concentration reached is slightly above 4,000 mg/L and occurs near the south end of the proposed excavation site.

Figure 10 presents the thickness of sediment deposition for the Base Case calculated based on the simulated mass of settled particles. The relationship between mass of settled particles and deposition thickness was provided by Haley & Aldrich (see **Attachment A**). **Figure 11** shows a close examination of **Figure 10** in the area near the proposed excavation site. The sediment deposition thickness is predicted to be less than

0.25 cm in the majority of the river channel, except in the area in the vicinity of the proposed excavation site. The greatest predicted thickness is approximately 11 cm and occurs near the south end of the proposed site. The sediment deposition thickness is predicted to drop below 2 cm within 20 ft from the site, below 0.5 cm within 40 ft from the site, and below 0.25 cm within 50 ft from the site.

HIGH FLOW CASE

River Flow Patterns

The simulated flow patterns for the High Flow Case are presented in **Figures 12 - 14**. The model results presented include streamlines (**Figure 12**), velocity vectors (**Figure 13**), and contours of velocity magnitudes (**Figure 14**). Both simulated streamlines and velocity vectors from the High Flow Case are similar to those from the Base Case. The simulated velocity magnitudes from the High Flow Case are higher compared to the Base Case because of the higher river flow rate (2,000 cfs for the High Flow Case vs. 1,600 cfs for the Base Case).

Sediment Settling

Figures 15 - 18 present the results of simulated TSS concentrations for the High Flow Case. An animation of TSS concentration simulation results for the High Flow Case is included in **Attachment B**. The results shown are similar to those from the Base Case except that the simulated high TSS concentrations appear to spread out further downstream for the High Flow Case. The simulated maximum TSS concentrations at various distances from the excavation site are listed for the Base Case and High Flow Case in **Table 2**. As shown, the simulated maximum TSS concentrations from the High Flow Case are much lower than those from the Base Case in the vicinity of the excavation site (*e.g.*, at 10 ft from the excavation site), but slightly higher than those from the Base Case in the areas further downstream from the site. This pattern can be reasonably explained by the fact that the higher flow velocity from the High Flow Case can carry the particles much further downstream before they settle out of the water column. This pattern can also be observed in the simulated sediment deposition thickness shown in **Figures 17** and **18** as well as the values listed in **Table 3**. Both figures and table show higher simulated deposition thickness in the areas further downstream from the excavation site for the High Flow Case than those for the Base Case.

TABLE 2: SUMMARY OF SIMULATED MAXIMUM TSS CONCENTRATIONS OCCURRED THROUGHOUT THE SIMULATION FOR ALL MODELING SCENARIOS

Distance from the Excavation Site	Maximum Simulated TSS Concentration (mg/L)		
	Base Case	High Flow Case	High Flow - High Fines Case
10 ft	2,548	1,213	2,980
100 ft	275	303	970
200 ft	222	225	721
500 ft	77	107	343
1,000 ft	27	32	103
2,000 ft	9	11	34
3,000 ft	3	3	9

TABLE 3: SUMMARY OF SIMULATED MAXIMUM SEDIMENT DEPOSITION THICKNESS FOR ALL MODELING SCENARIOS

Distance from the Excavation Site	Maximum Simulated Sediment Deposition Thickness (cm)		
	Base Case	High Flow Case	High Flow - High Fines Case
0 ft	11	11	13
10 ft	2.5	2.6	4.7
20 ft	1.5	1.4	2.7
50 ft	0.21	0.24	0.42
100 ft	0.06	0.10	0.14
200 ft	0.02	0.02	0.07
500 ft	0.01	0.01	0.03
1,000 ft	0.00	0.01	0.01
2,000 ft	0.00	0.00	0.00
3,000 ft	0.00	0.00	0.00

HIGH FLOW - HIGH FINES CASE

The simulated flow patterns for the High Flow - High Fines Case are the same as those for the High Flow Case. The results of simulated TSS concentrations for the High Flow - High Fines Case are presented in **Figures 21 – 26**. As expected, the simulated TSS concentrations from the High Flow - High Fines Case are higher than those from the Base Case and High Flow Case due to a higher content of fine particles (*e.g.*, silt) with lower settling velocity and thus a larger number of particles presenting in the water column. The simulated TSS concentrations and sediment deposition thickness from all three simulations are compared in **Tables 2** and **3** respectively at several distances from the excavation site. The variation patterns observed from both tables are consistent with those shown in the figures: both the simulated TSS concentrations and deposition thickness are higher for the High Flow - High Fines Case than those for the Base Case and High Flow Case.

CONCLUSIONS

Based on the flow and particle tracking modeling results for the proposed excavation across the Allegheny River near Tidioute, Pennsylvania, the following main conclusions can be drawn:

- The flow seems to be relatively uniform in most of the river channel except nearing the sandbar and the area downstream of the D-D' section (see **Figures 3** and **12**).

- The sandbar extending from the bank distorts the flow, and creates high velocities at the tip of the sandbar and low velocities at the upstream and downstream faces of the sandbar.

- The river widens downstream of the D-D' section and the flow slows from 2 ft/s to about 1.5 ft/s due to the widening of the river channel.

- Snapshots of simulated TSS concentrations at T = 2 and 6.5 hours after the start of excavation for all three simulations show that only particle plumes from the current excavation sections are visible and that most of the particle plumes from previous excavation sections have settled out of the water column.

- For the Base Case, the majority of particles released by the excavation settle within 500 ft downstream of the excavation site. The simulated maximum TSS concentrations drop below 100 mg/L within 500 ft from

the site, below 50 mg/L within 1,000 ft from the site, and below 20 mg/L within 1,200 ft from the site.

- For the Base Case, the sediment deposition thickness is predicted to be less than 0.25 cm in the majority of the river channel, except in the immediate area of the proposed excavation site. The highest predicted deposition thickness is approximately 11 cm and occurs near the south end of the proposed site. The sediment deposition thickness is predicted to drop below 2 cm within 20 ft from the site, below 0.5 cm within 40 ft from the site, and below 0.25 cm within 50 ft from the site.

- The simulated flow patterns for the High Flow Case are similar to those from the Base Case. The simulated TSS distribution patterns are also similar to those from the Base Case, except that the simulated high TSS concentrations appear to spread out further downstream for the High Flow Case due to its higher river flow velocities. The simulated maximum TSS concentrations are below 100 mg/L at 510 ft from the site, below 30 mg/L at 1,130 ft from the site, and below 20 mg/L within 1,300 ft from the site.

- The simulated flow patterns for the High Flow - High Fines Case are the same as those from the High Flow Case. The simulated TSS concentrations from the High Flow - High Fines Case are higher than those from the Base Case and High Flow Case due to higher content of fine particles (*e.g.*, silt) with lower settling velocity and, thus a larger number of particles presenting in the water column. The simulated maximum TSS concentrations are below 100 mg/L at 1,130 ft from the site, below 50 mg/L at 1,520 ft from the site, and below 20 mg/L within 2,700 ft from the site.

- The predicted sediment deposition thickness drops below 0.5 cm within 50 ft from the excavation site for all three simulations.

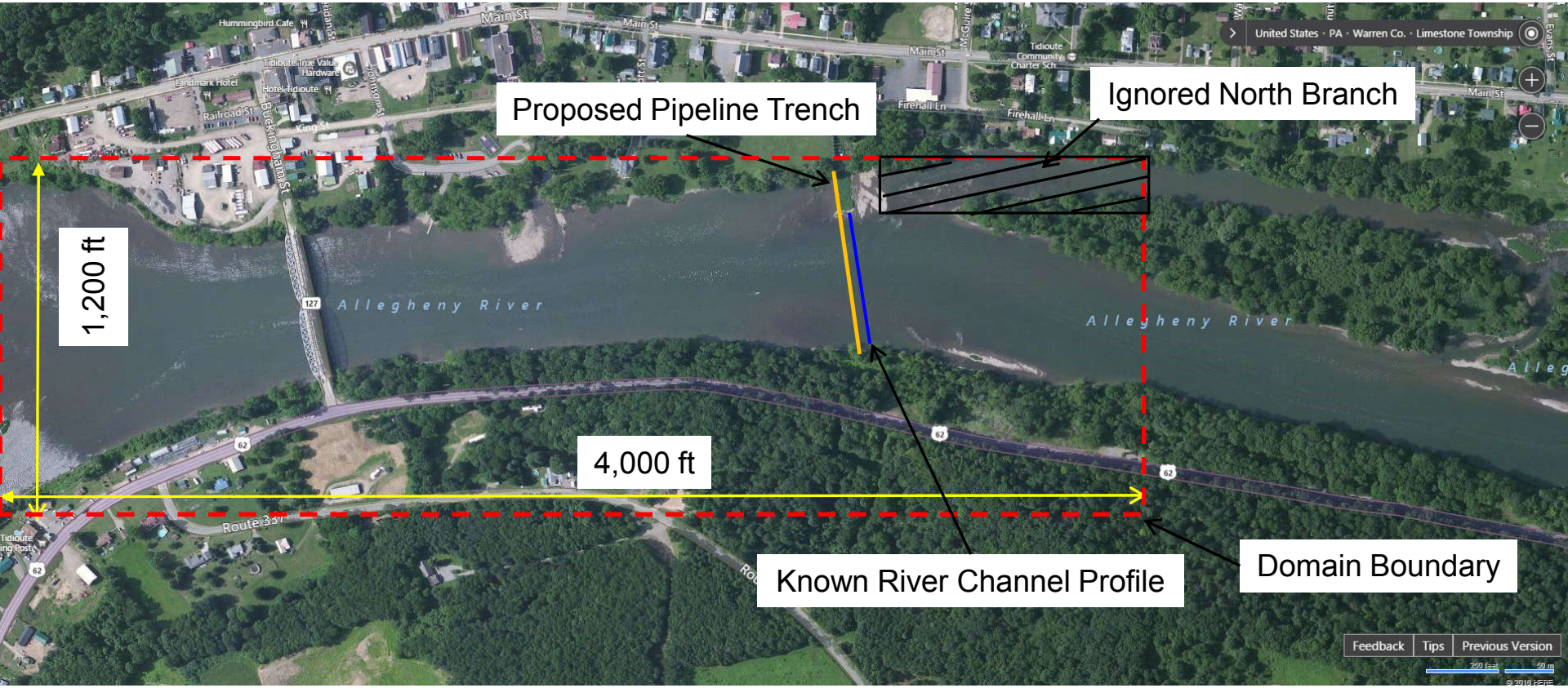
REFERENCES

Hannoun, I.A. and P. Boulos. Using Hydraulic Modeling to Optimize Contact Time, *Journal AWWA,* **90**, August 1998.

MacDonald, N.J., M.H. Davies, A.K., Zundel, J.D. Howlett, Z. Demirbilet, J.Z. Gailani, T.C., Lacky, and J. Smith. PTM: Particle Tracking Model, U.S. Army Corp of Engineers Engineer Research and Development Center Report, ERDC/CHL TR-06-20, September 2006.

FIGURES

Allegheny River Modeling Domain



Notes: This image was provided by Haley & Aldrich Inc.. It was taken on 7/28/2015 with a stream gauge flow of 2,870 cfs, similar to the modeled flow rate range of 1,600 to 2,000 cfs.

Allegheny River Modeling Bathymetry

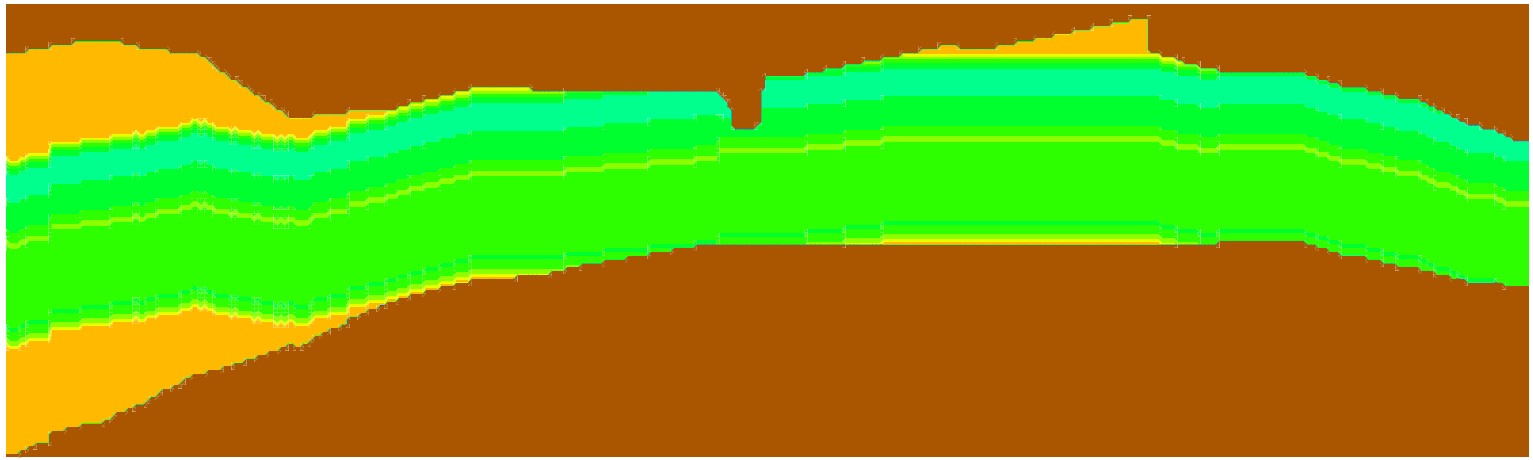
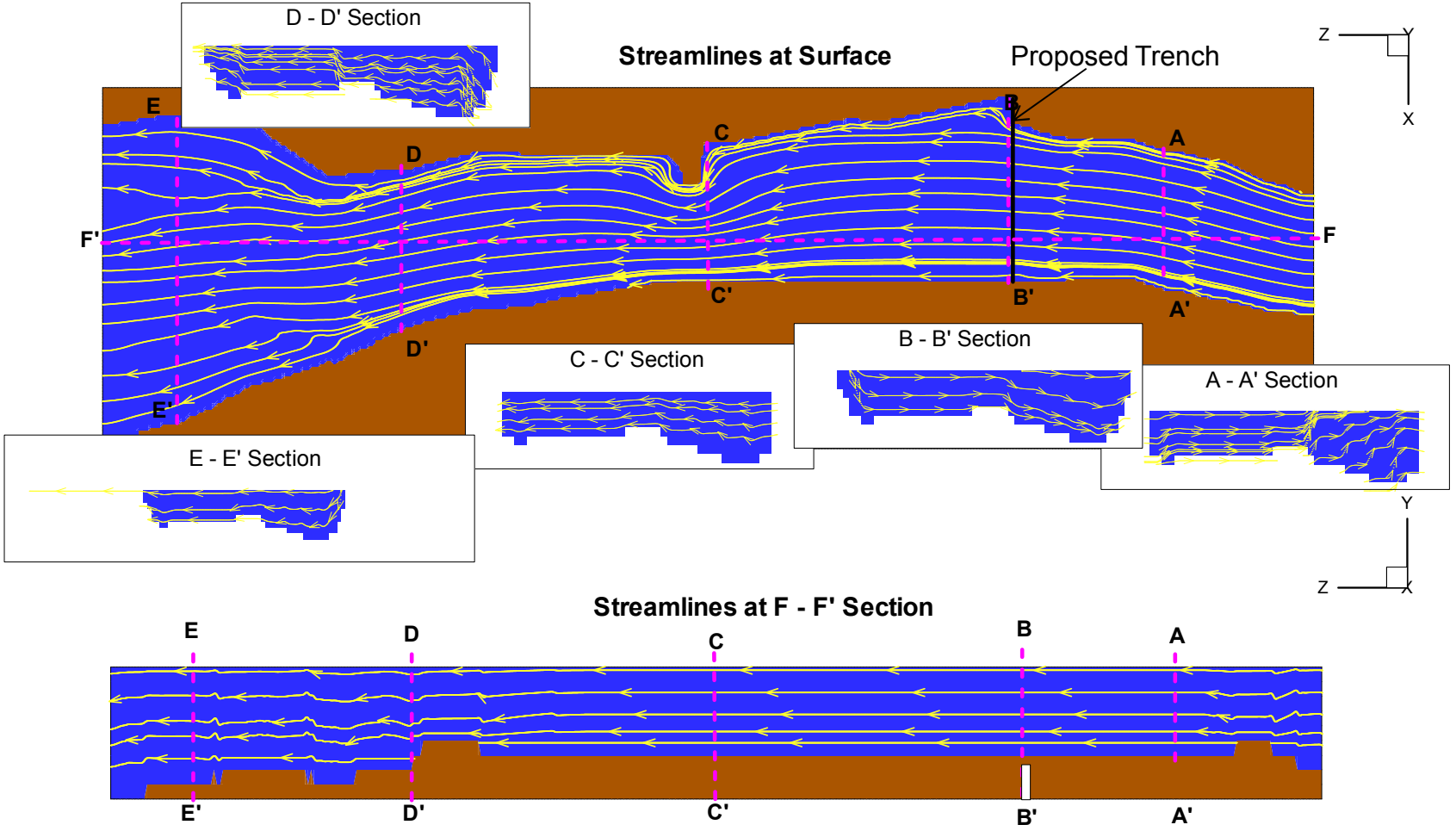
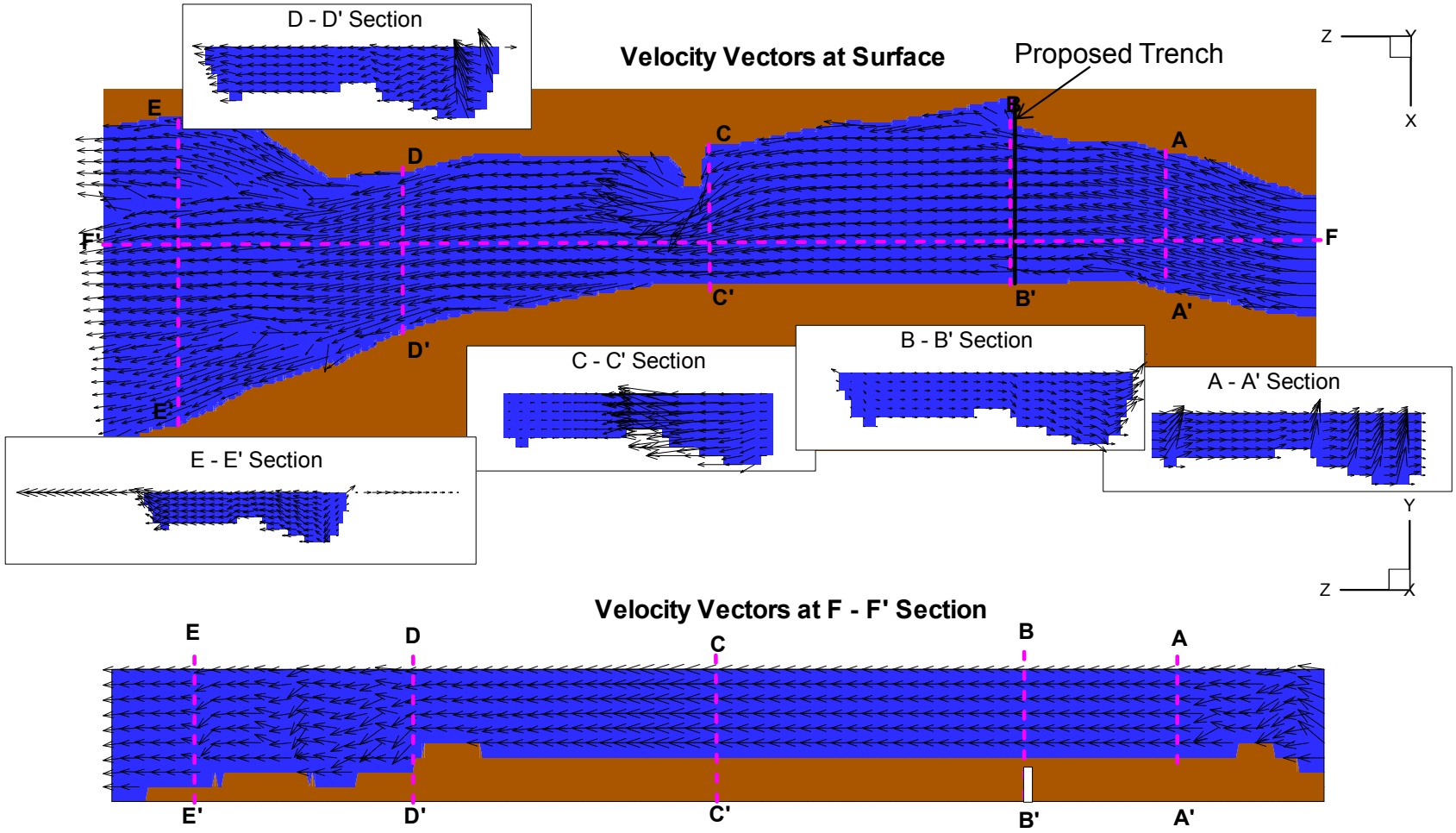


Figure 2

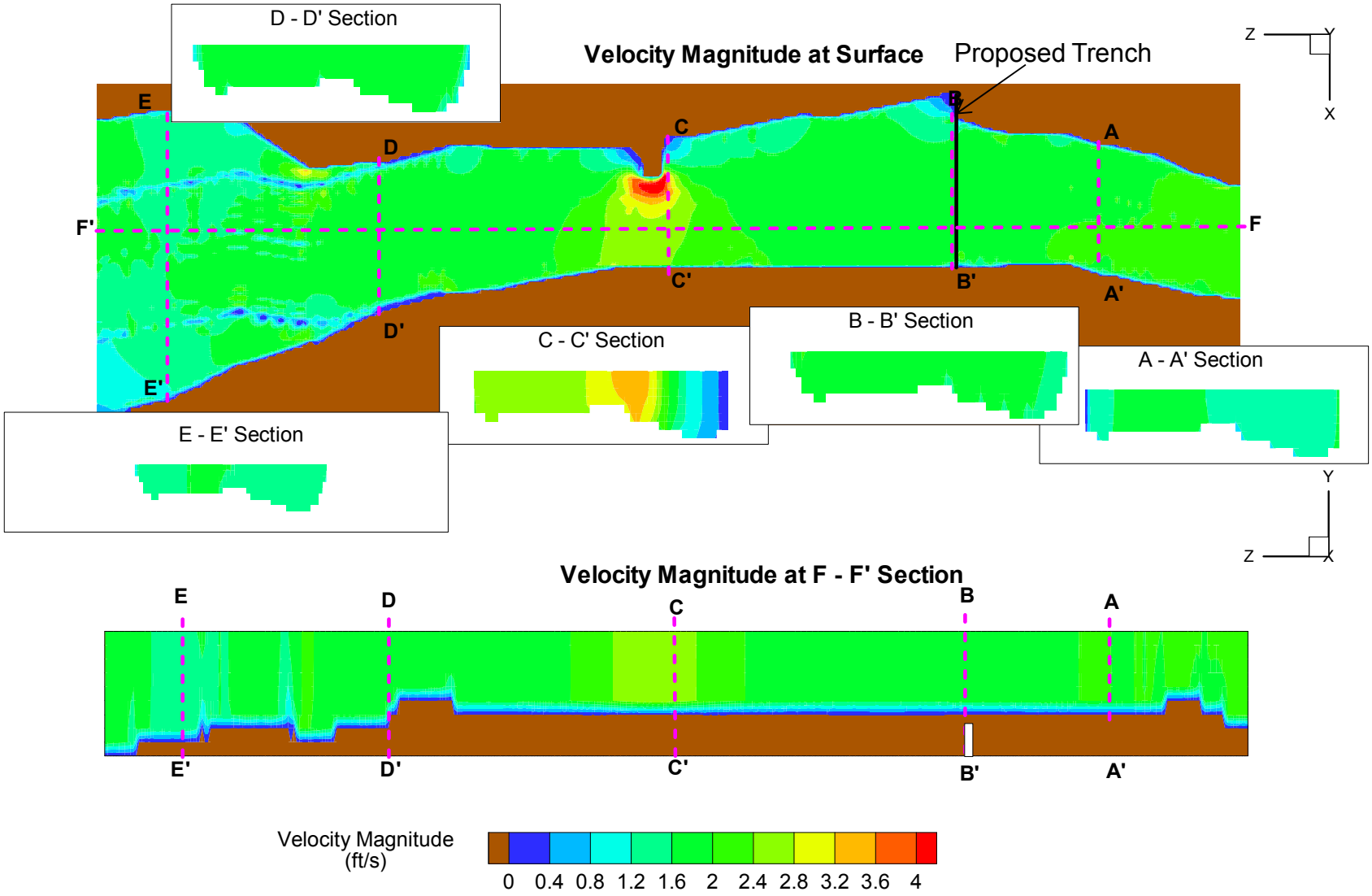
Base Case - Streamlines



Base Case – Velocity Vectors

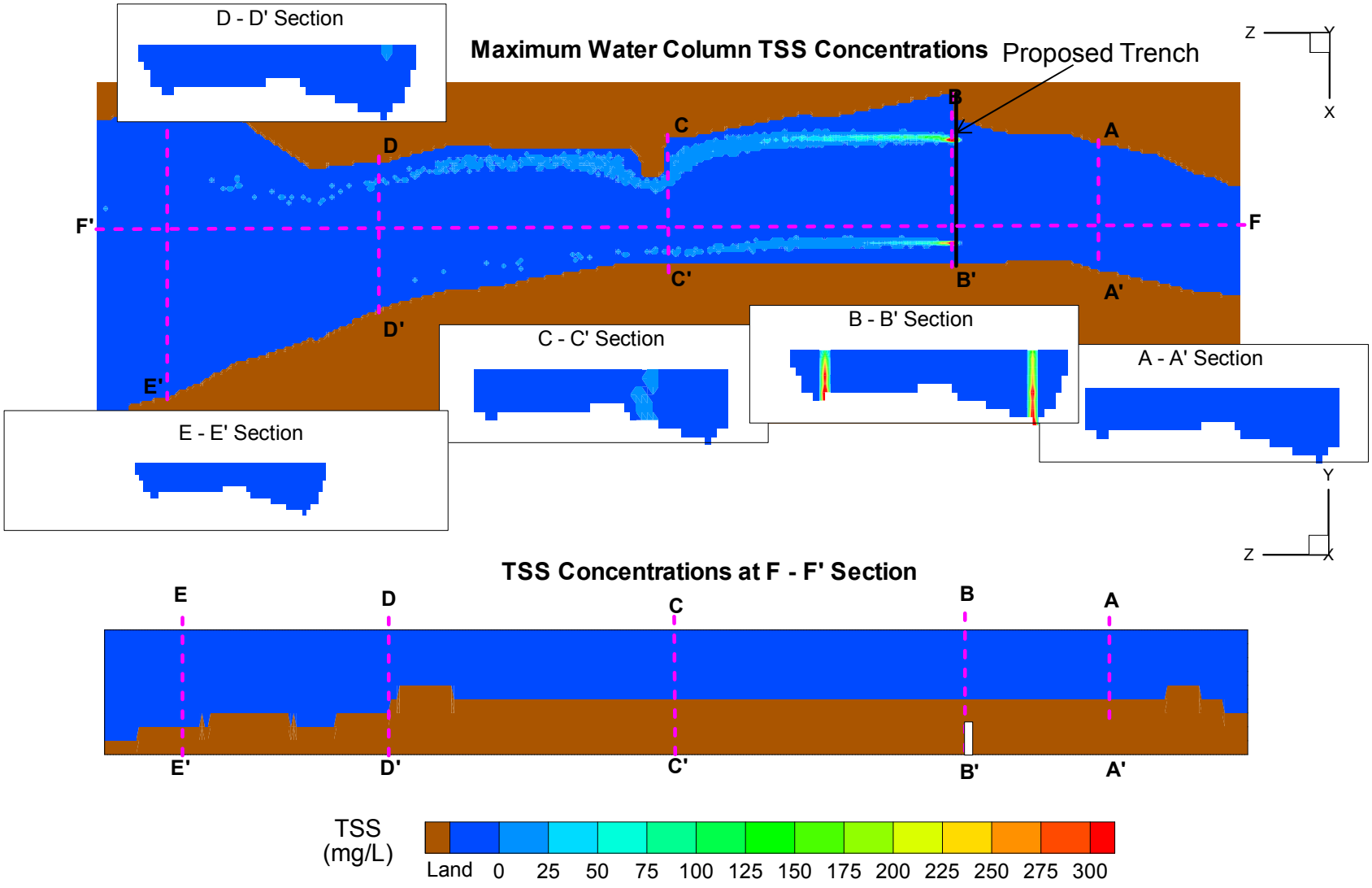


Base Case – Velocity Magnitude



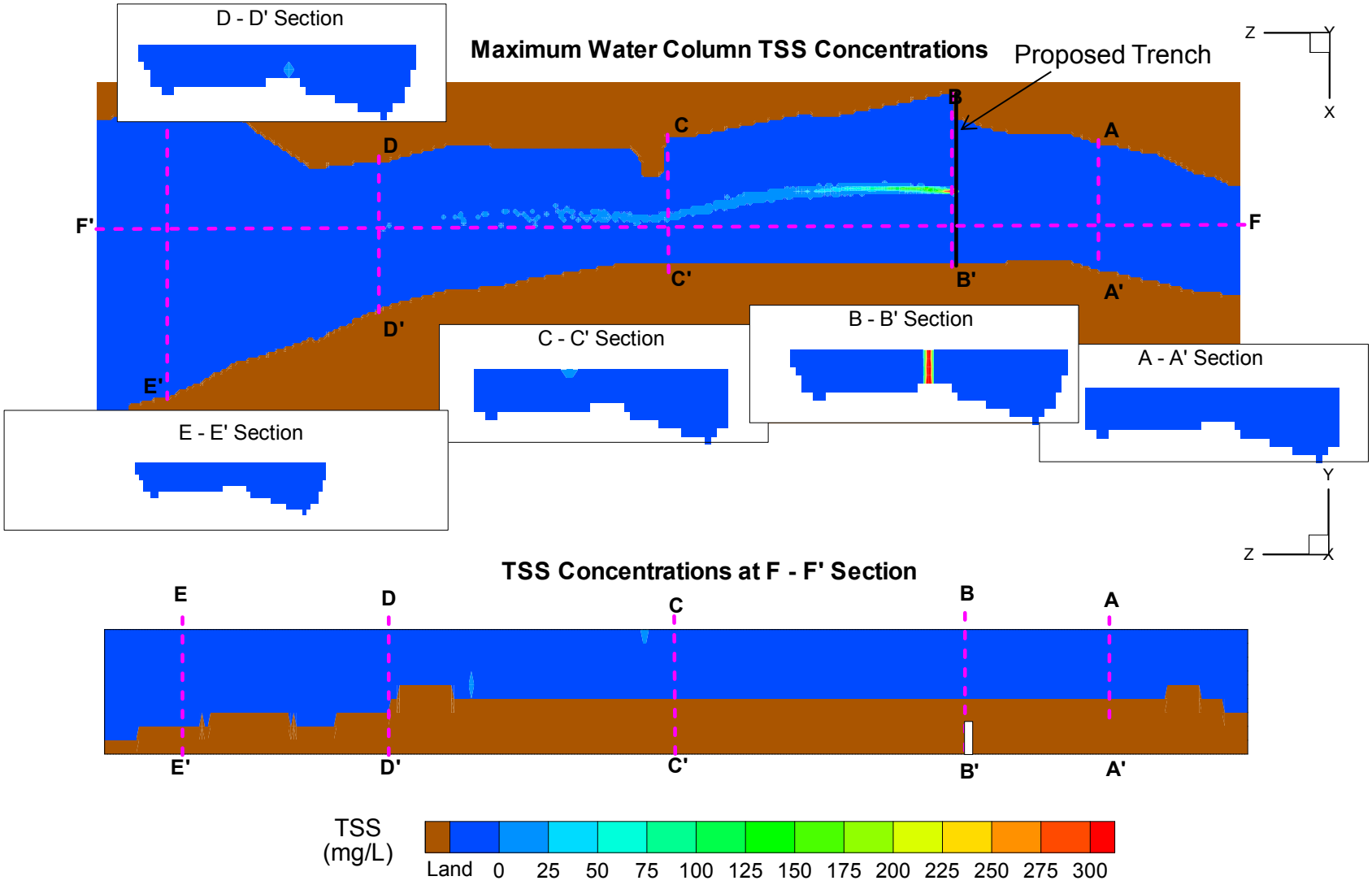
Base Case

TSS Concentrations at Time = 2 hours After Starting Excavation



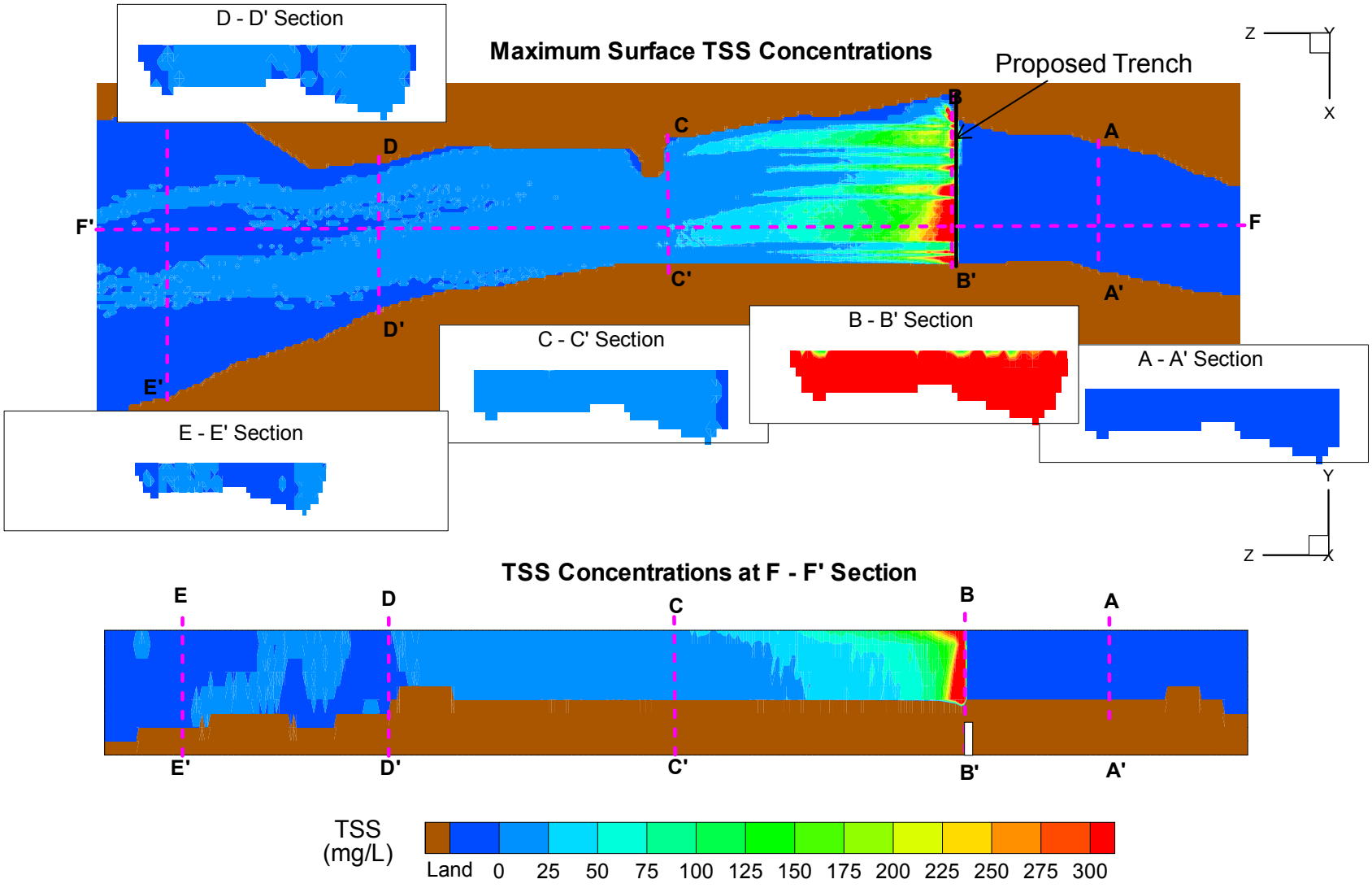
Base Case

TSS Concentrations at Time = 6.5 hours After Starting Excavation



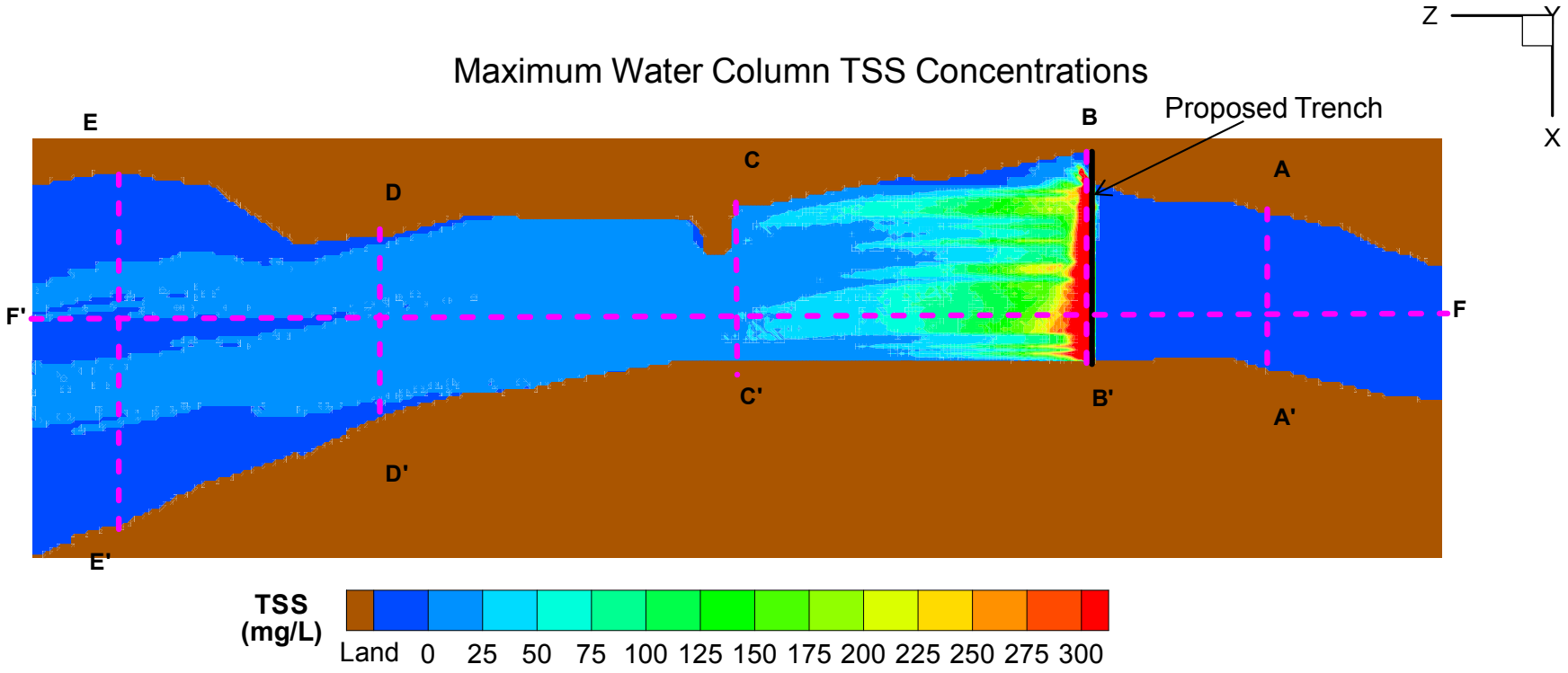
Base Case

Maximum TSS Concentrations Occurring in the 8-hour Simulation Period



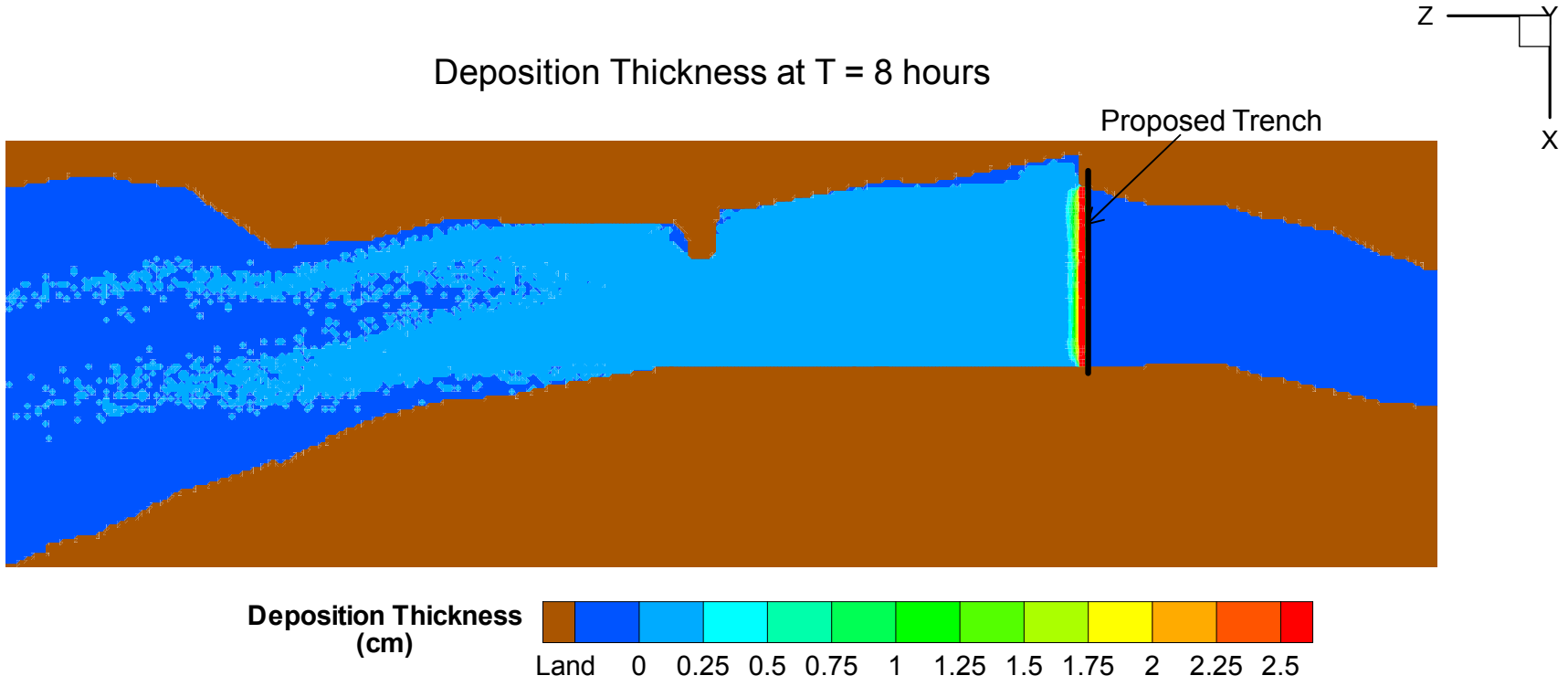
Base Case

Maximum TSS Concentrations Occurring in the 8-hour Simulation Period



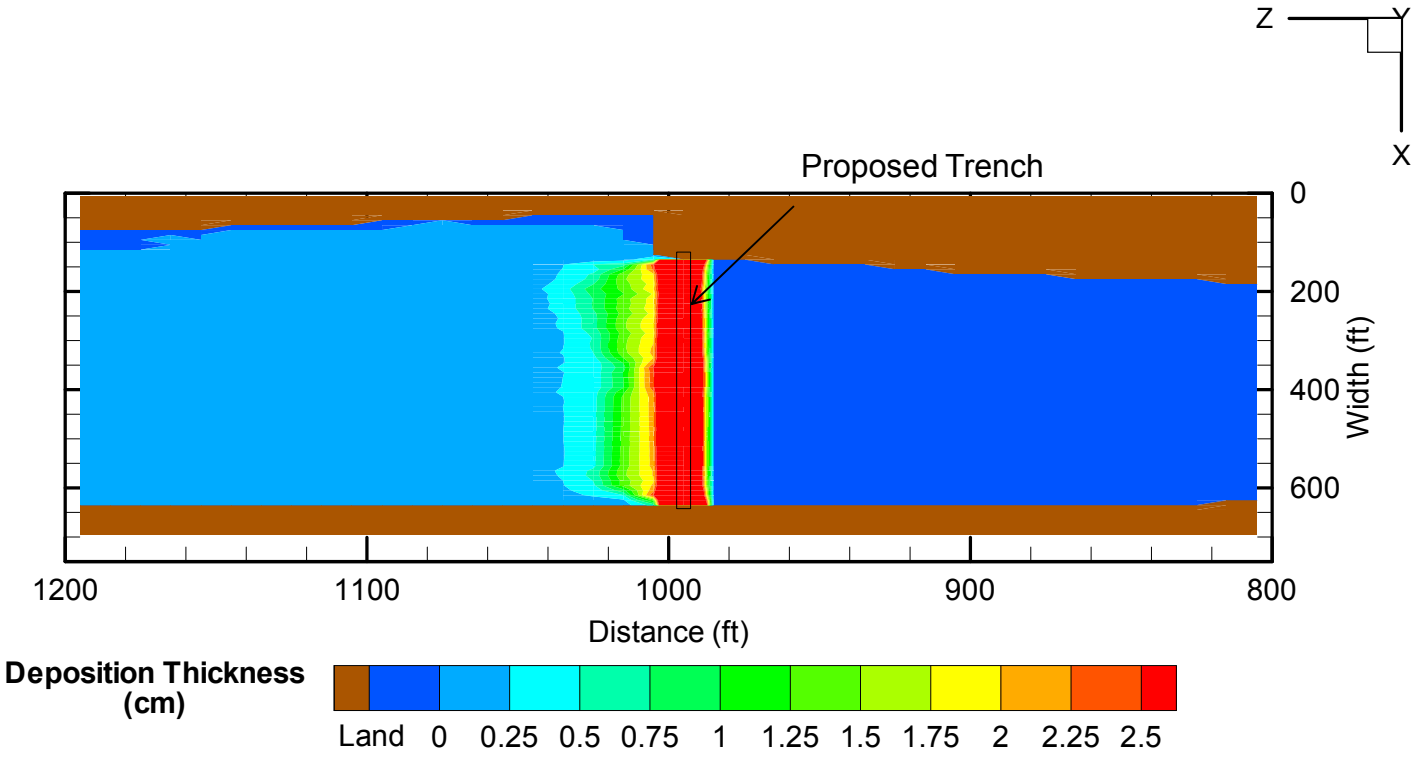
Base Case

Deposition Thickness at the End of the 8-hour Simulation Period

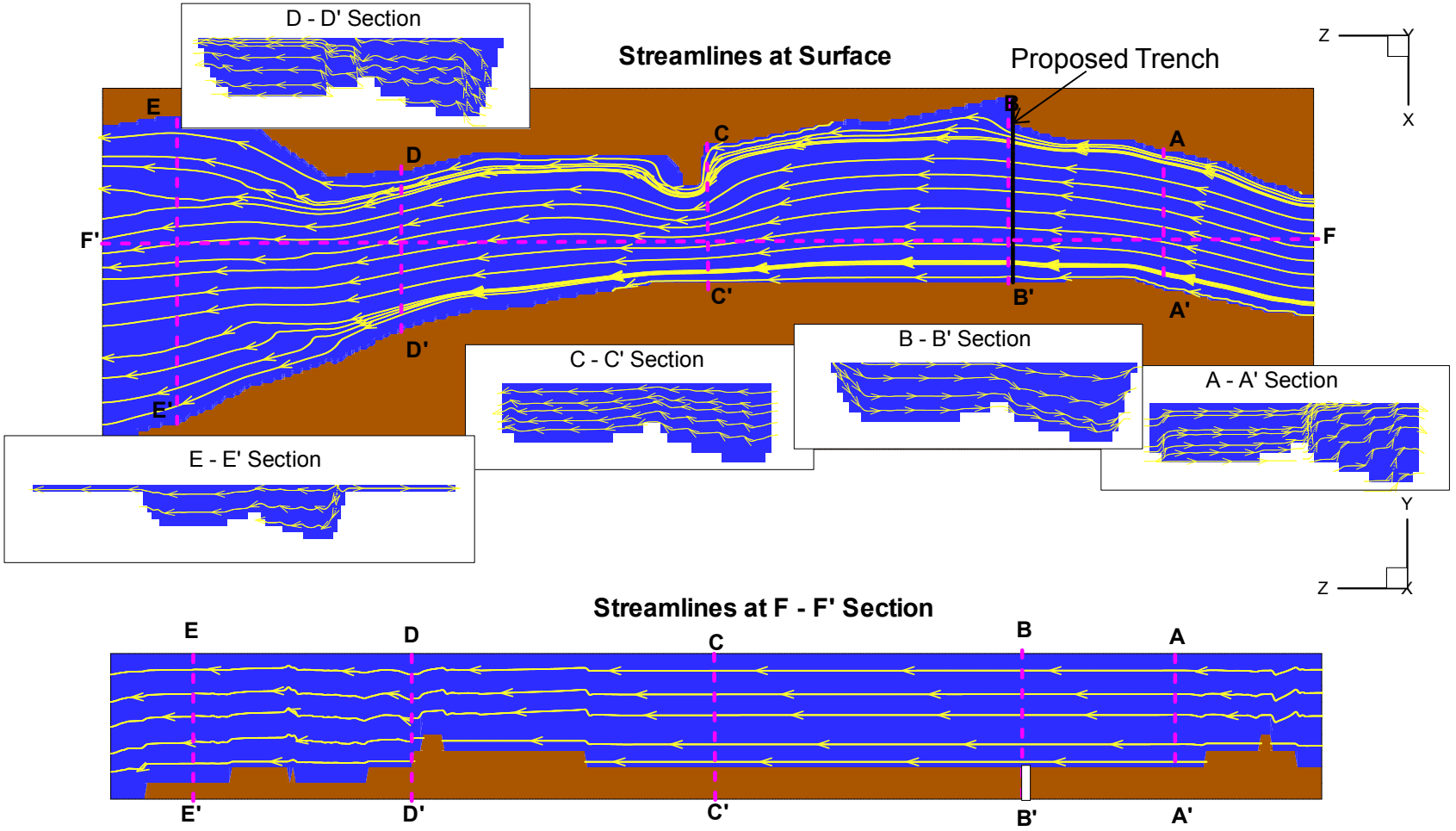


Base Case

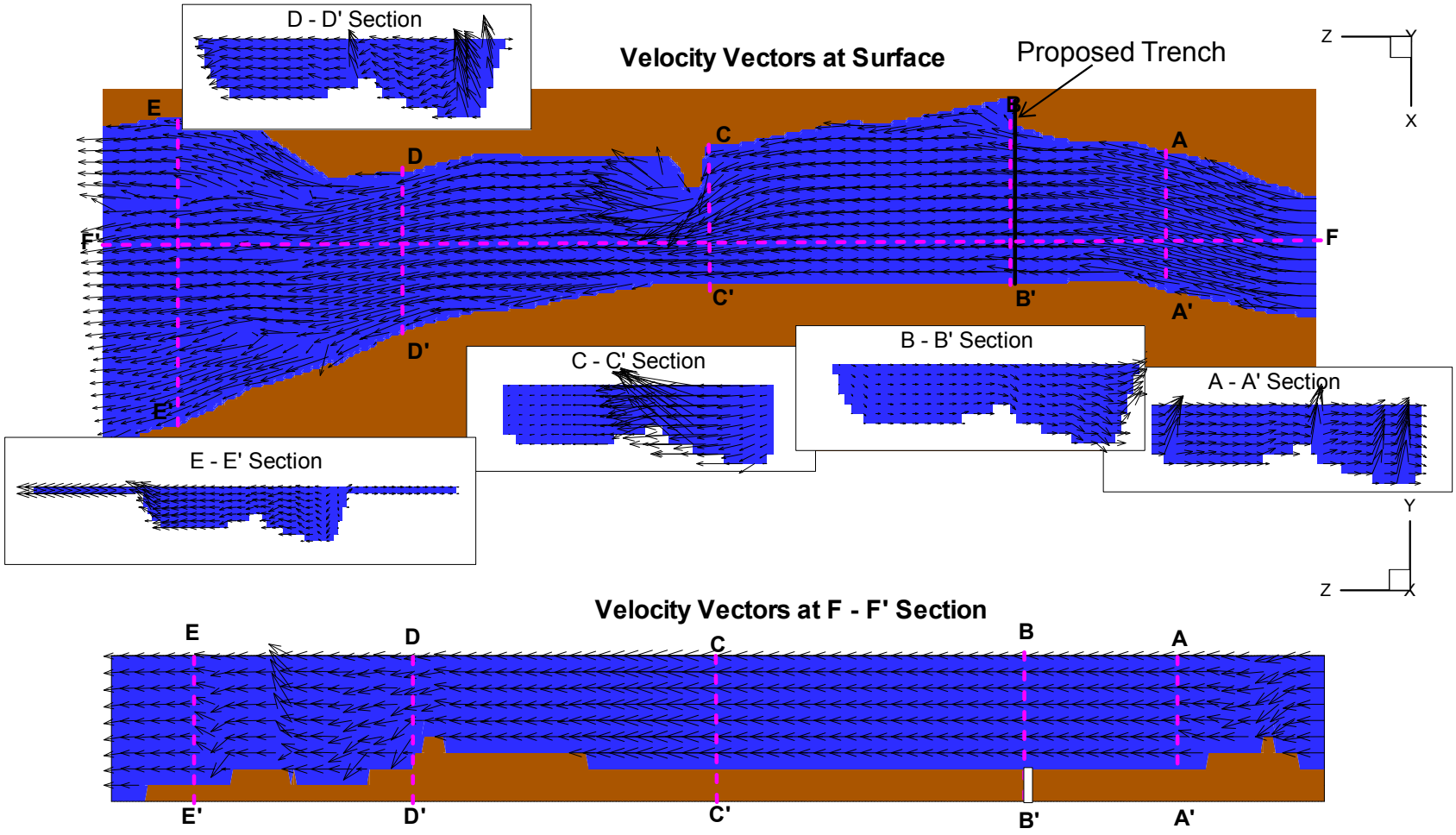
A Close Look of Deposition Thickness at the End of the 8-hour Simulation Period



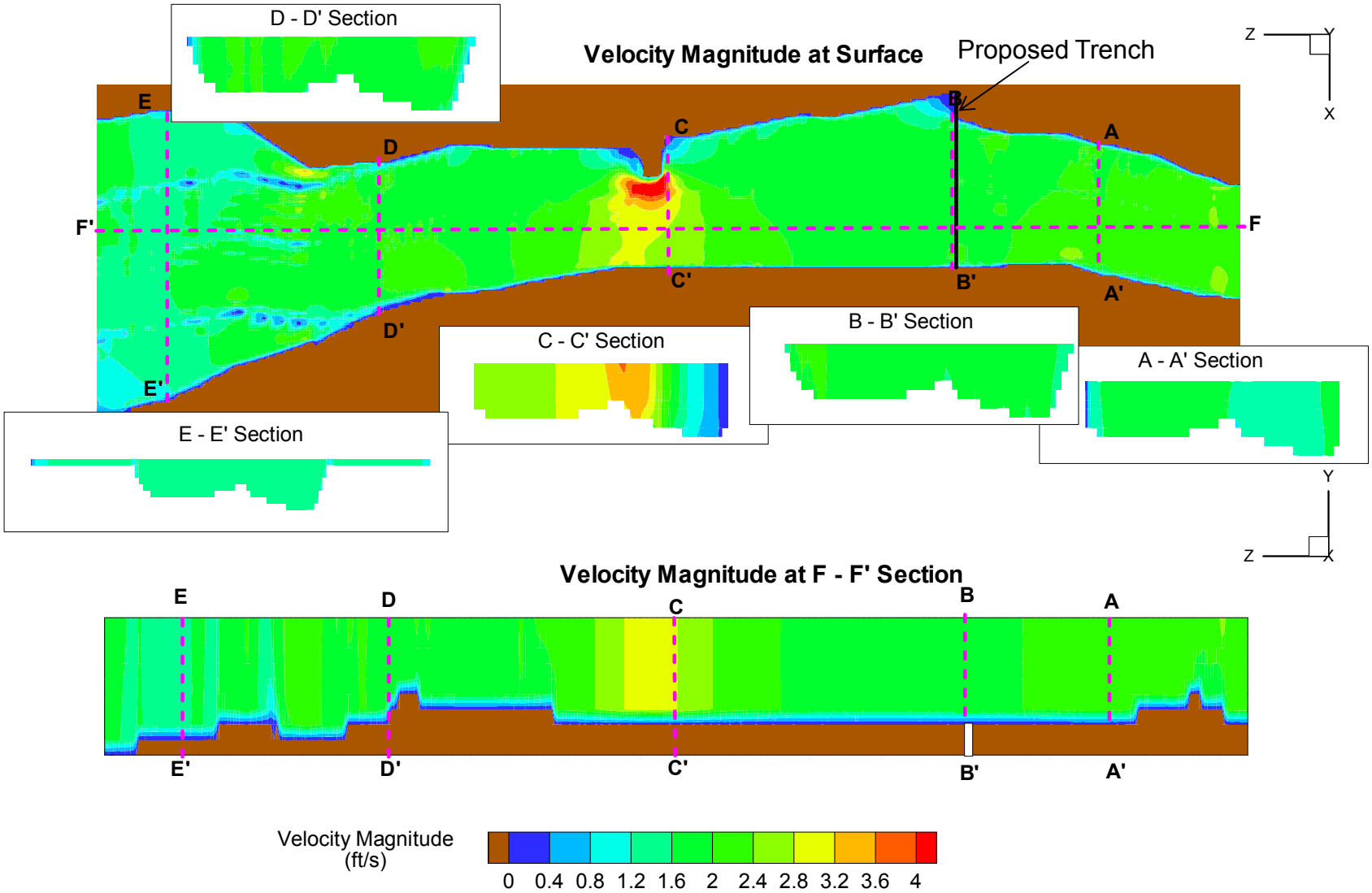
High Flow Case - Streamlines



High Flow Case – Velocity Vectors

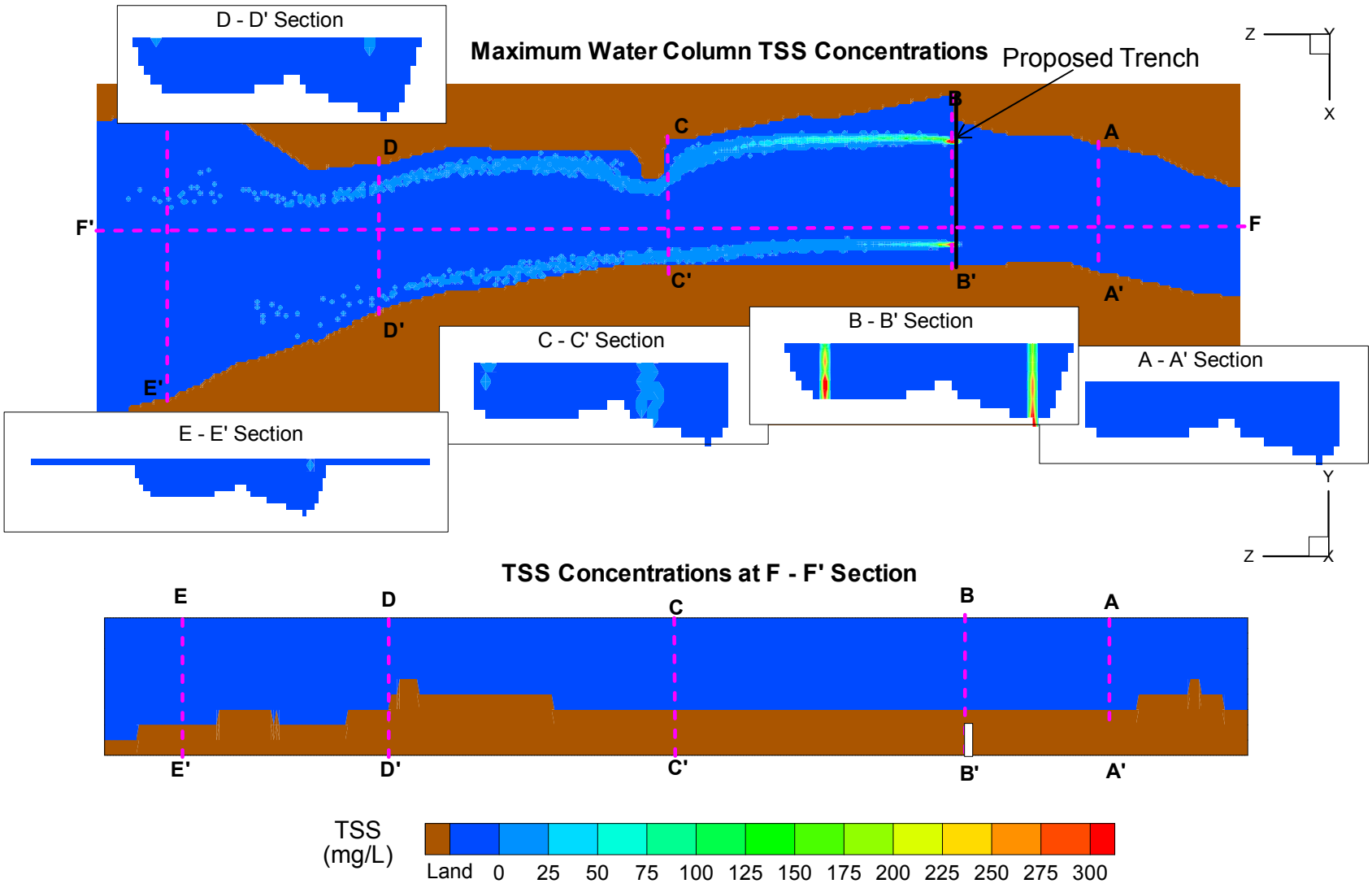


High Flow Case – Velocity Magnitude



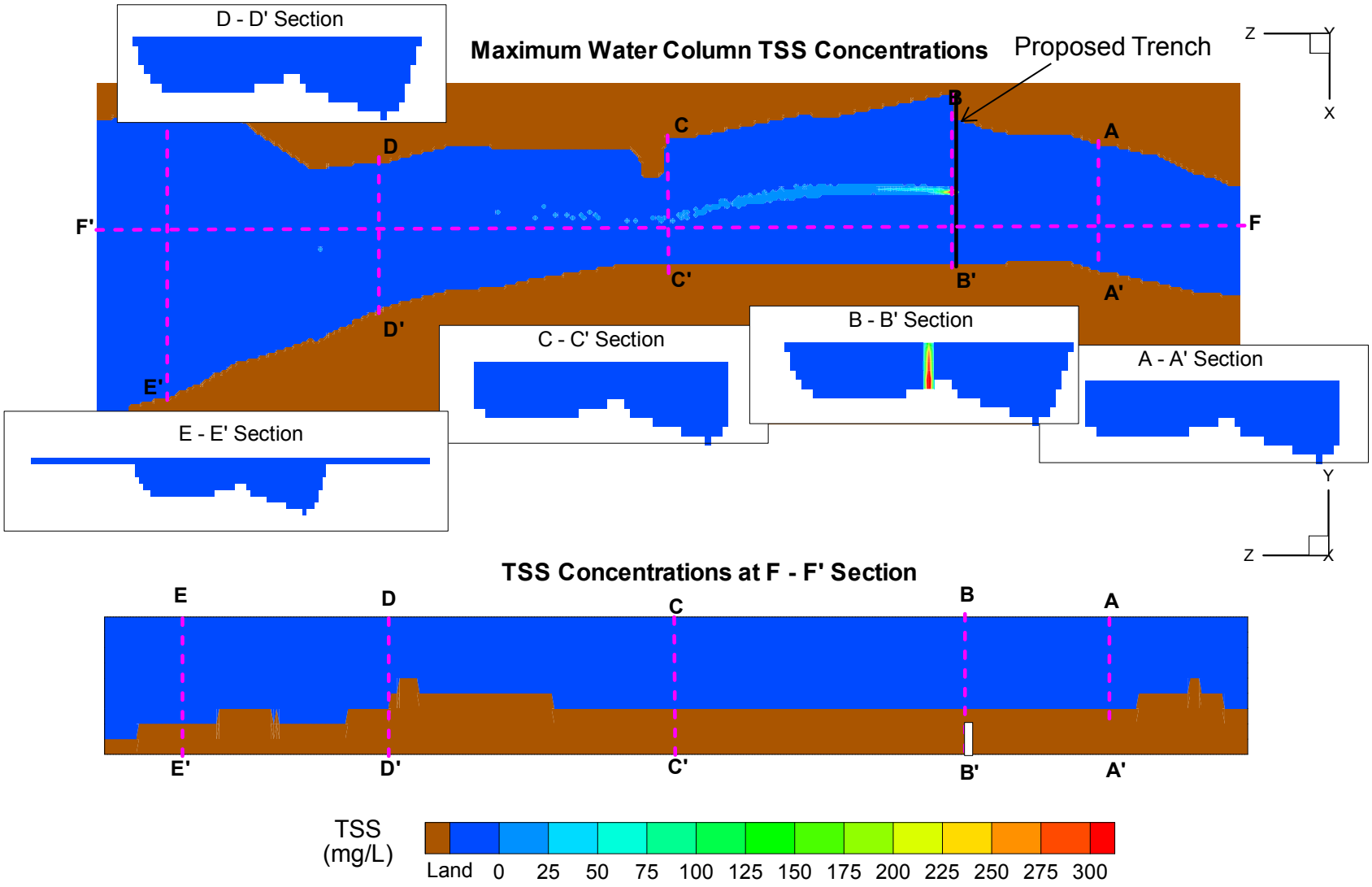
High Flow Case

TSS Concentrations at Time = 2 hours After Starting Excavation



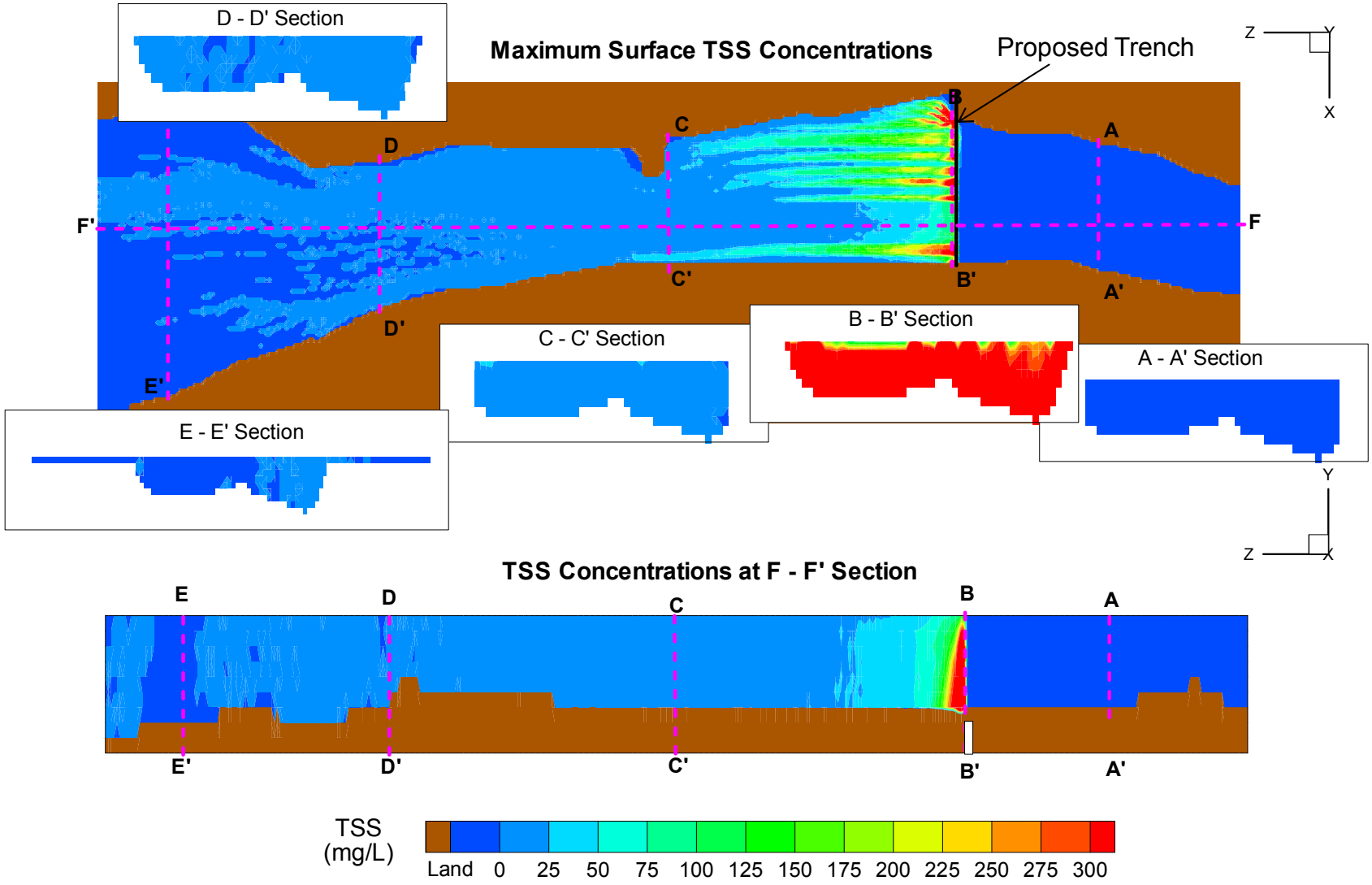
High Flow Case

TSS Concentrations at Time = 6.5 hours After Starting Excavation



High Flow Case

Maximum TSS Concentrations Occurring in the 8-hour Simulation Period



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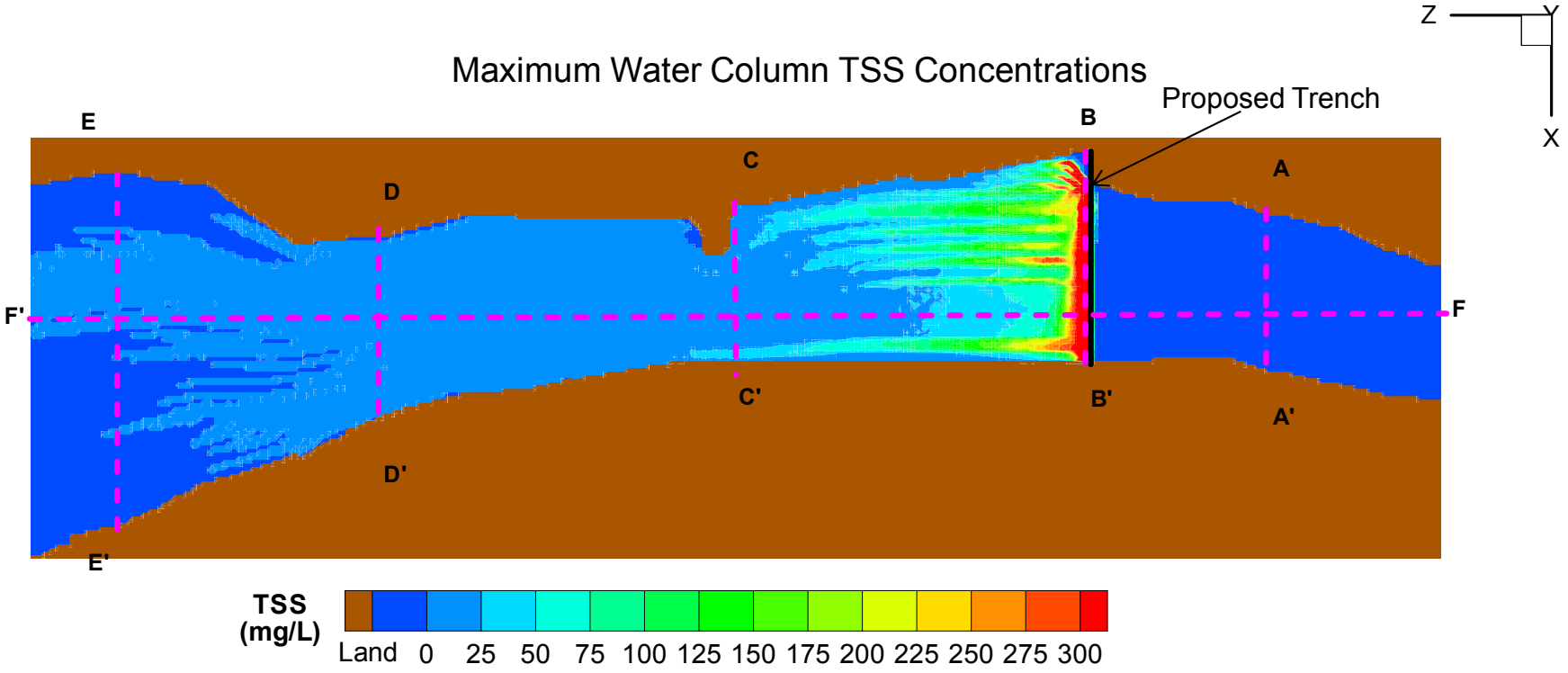
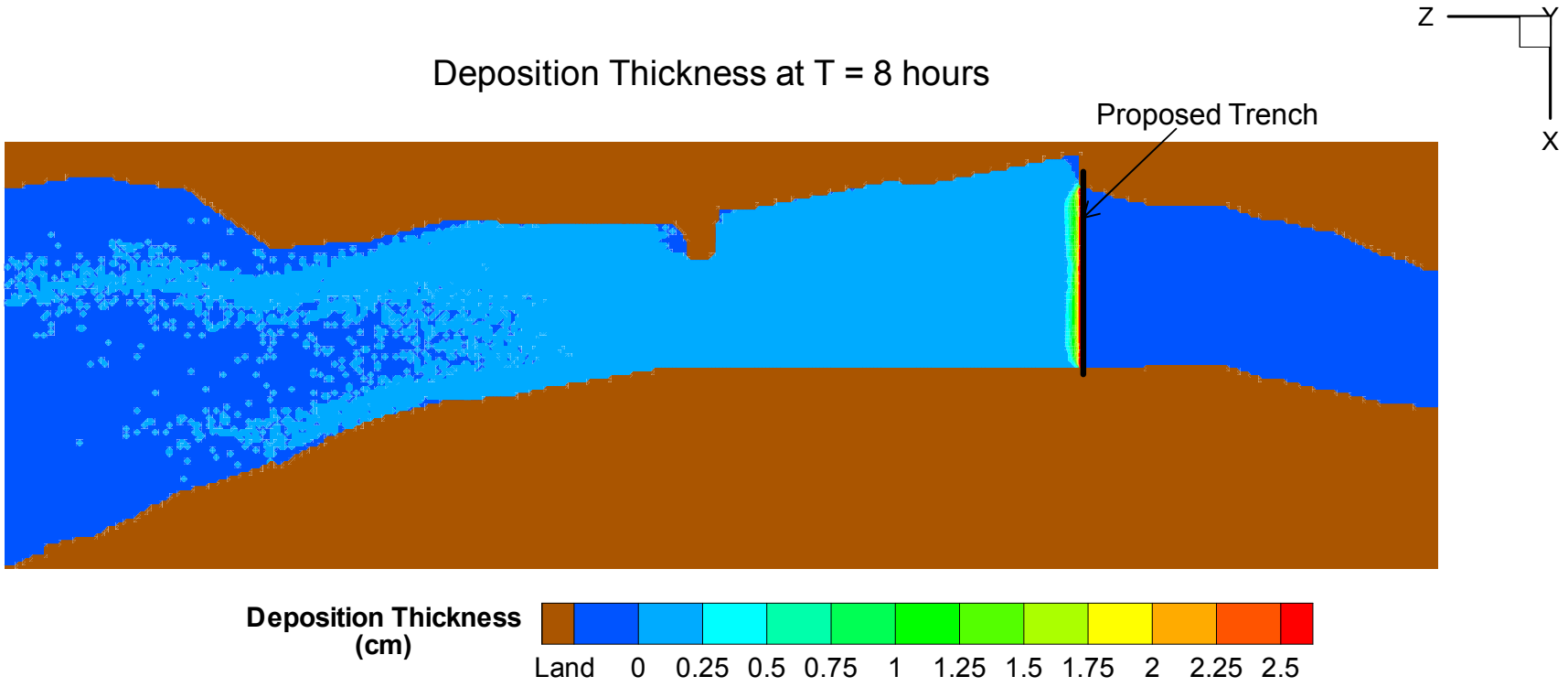
Maximum TSS Concentrations Occurring in the 8-hour Simulation Period



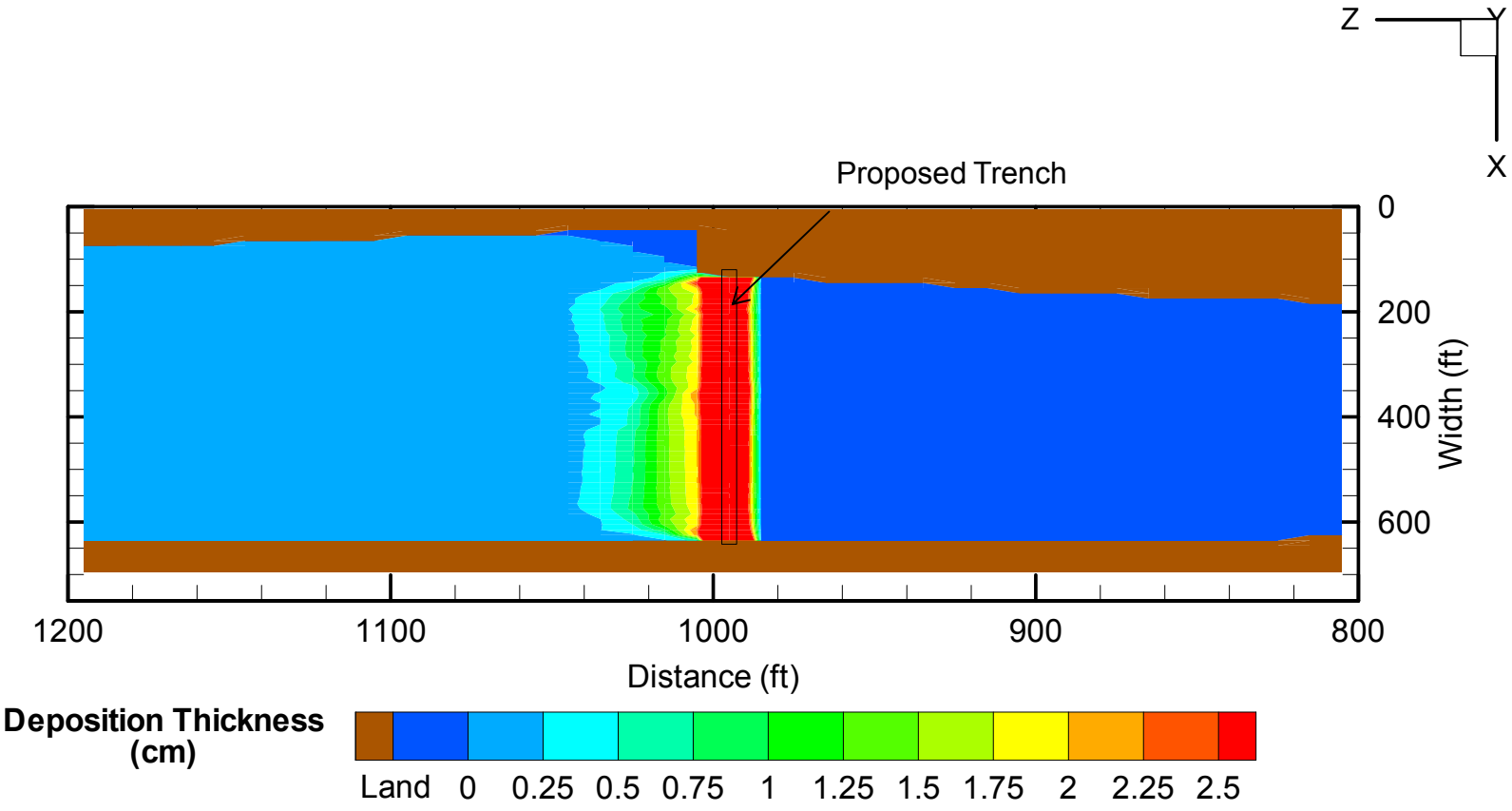
High Flow Case

Deposition Thickness at the End of the 8-hour Simulation Period



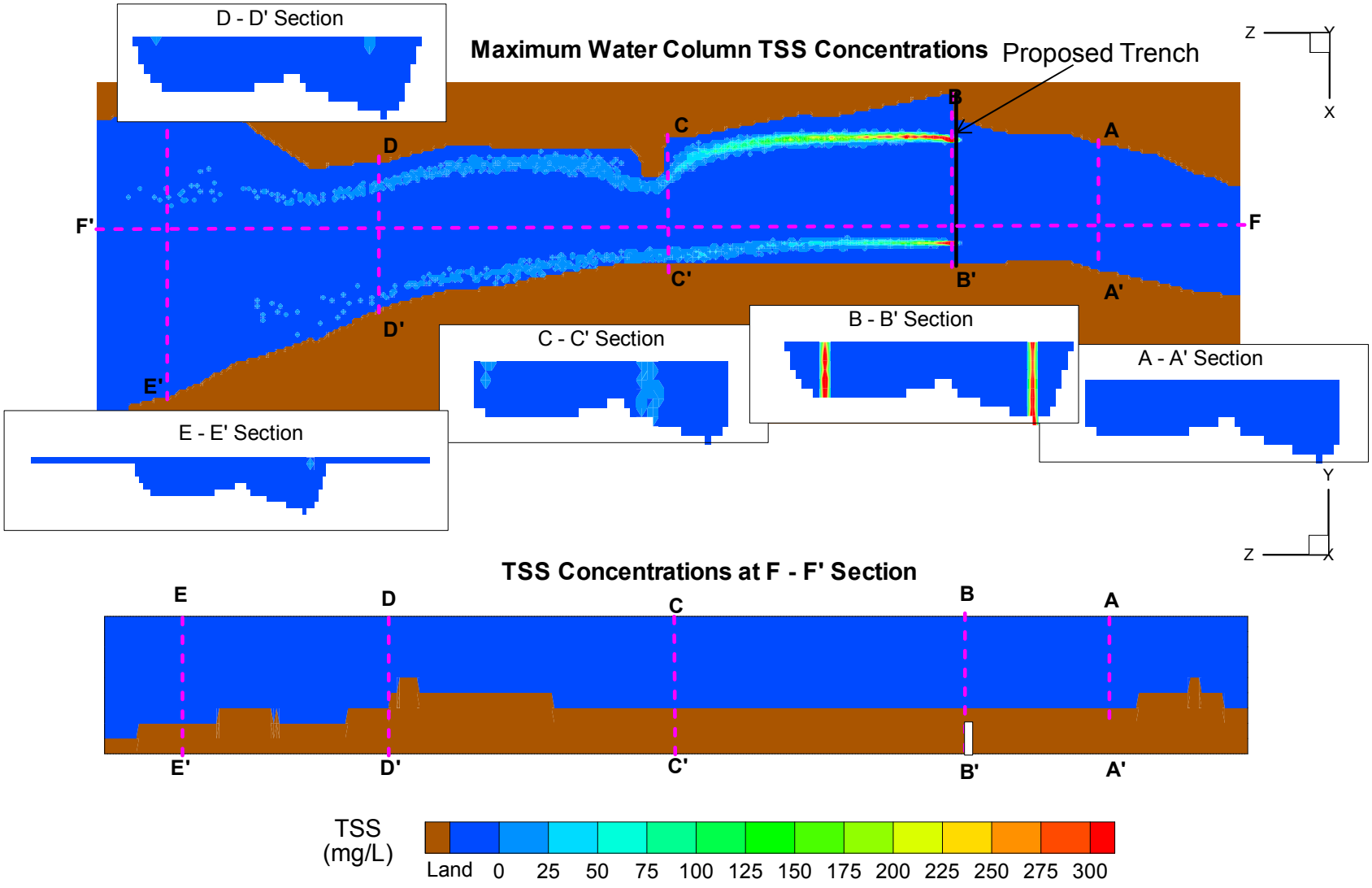
High Flow Case

A Close Look of Deposition Thickness at the End of the 8-hour Simulation Period



High Flow – High Fines Case

TSS Concentrations at Time = 2 hours After Starting Excavation



High Flow – High Fines Case

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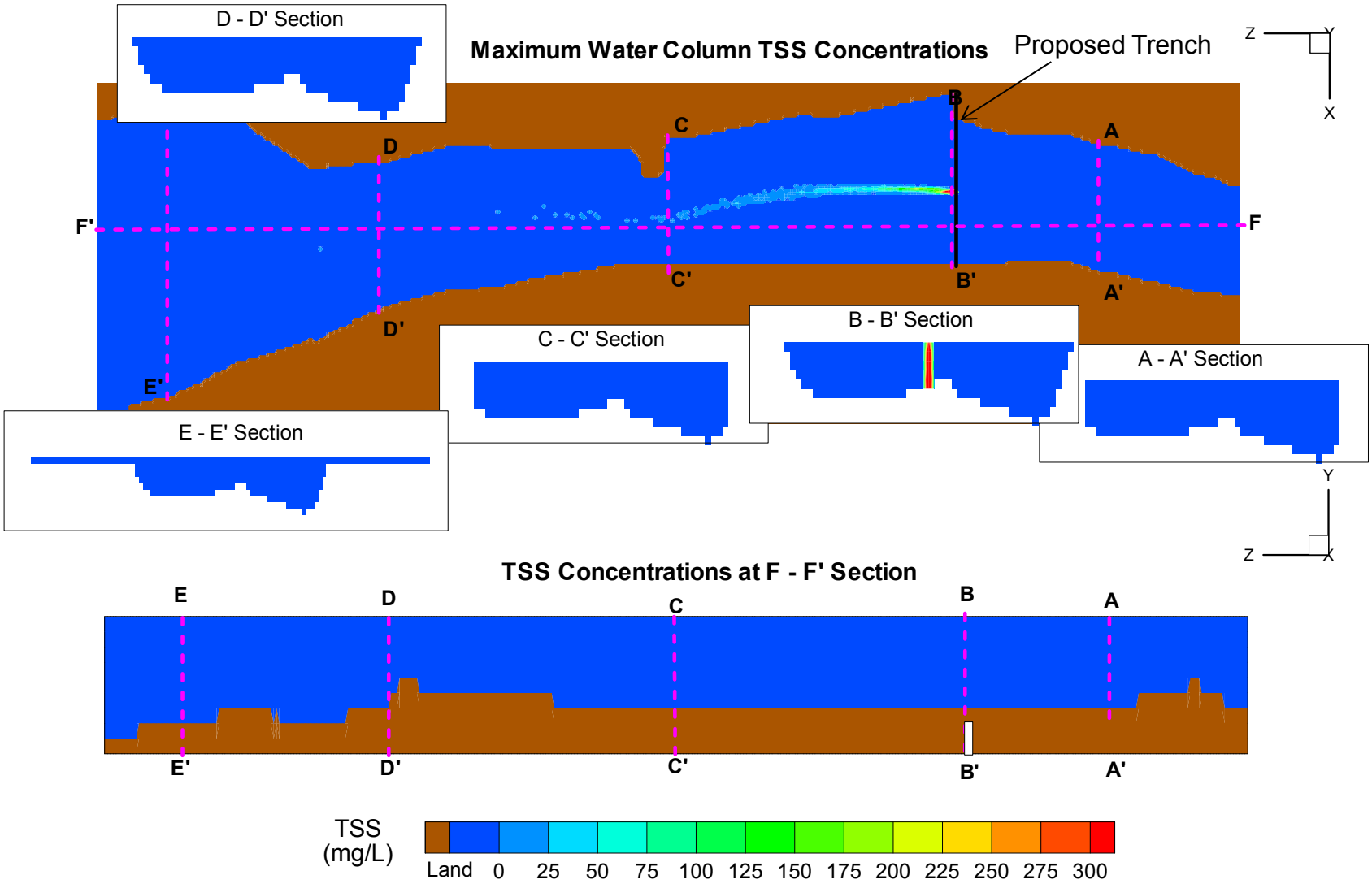
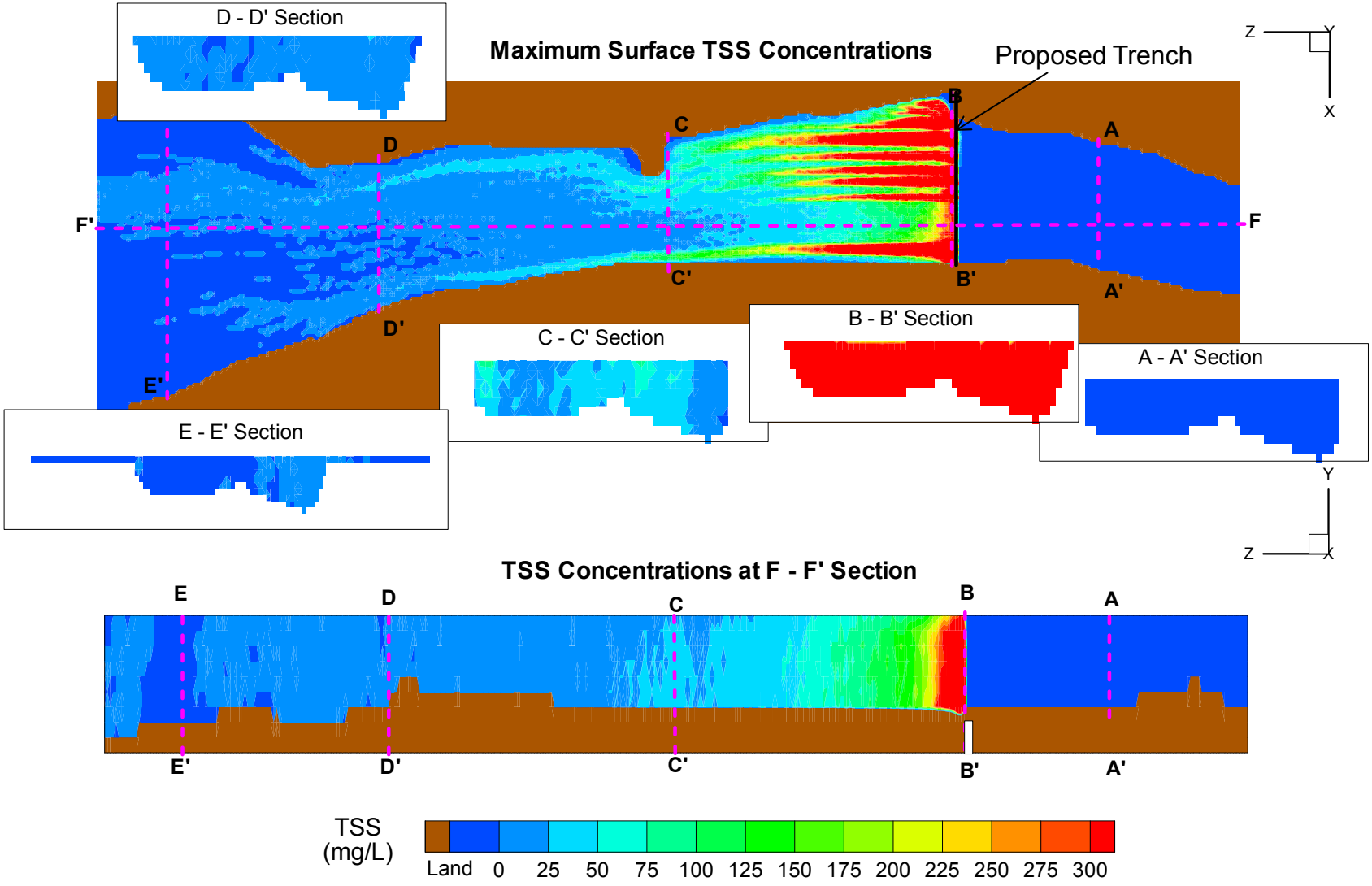


High Flow – High Fines Case

Maximum TSS Concentrations Occurring in the 8-hour Simulation Period



High Flow – High Fines Case

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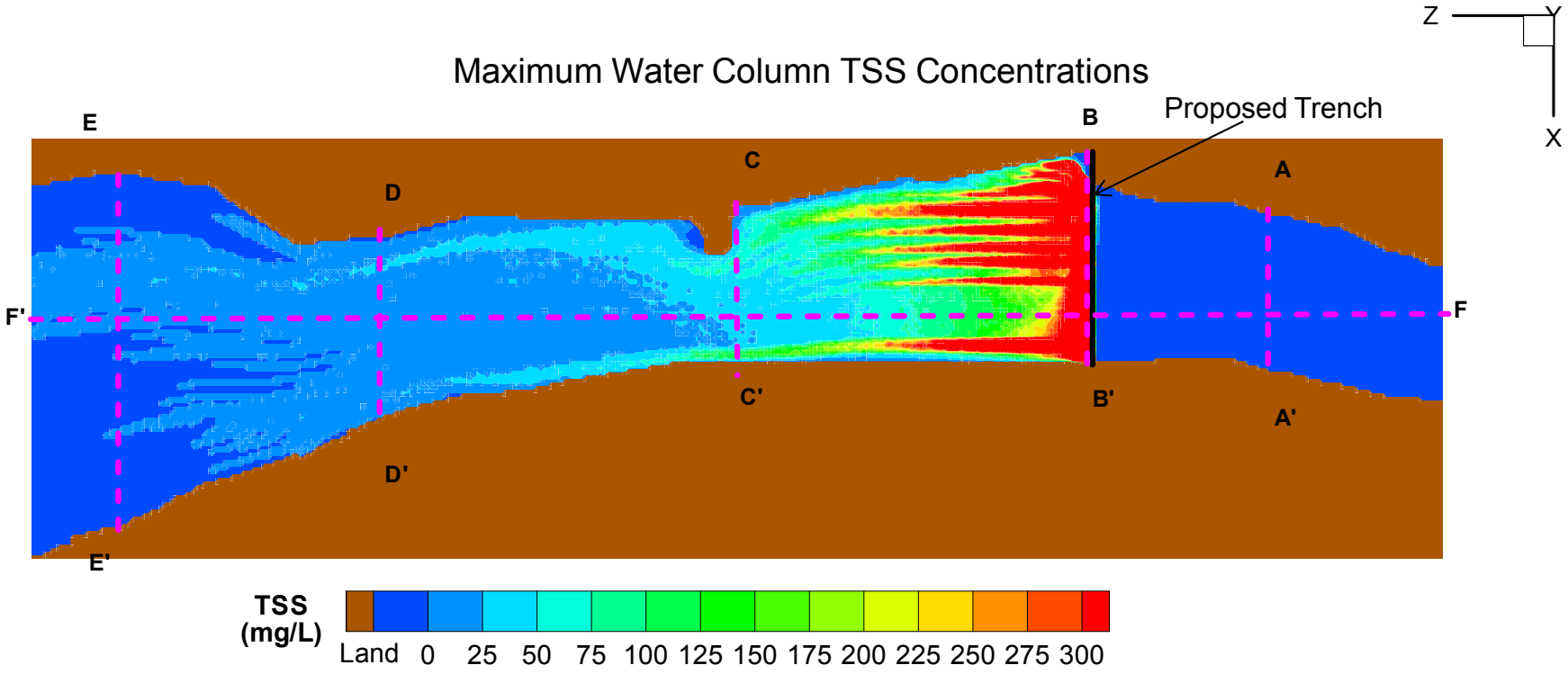
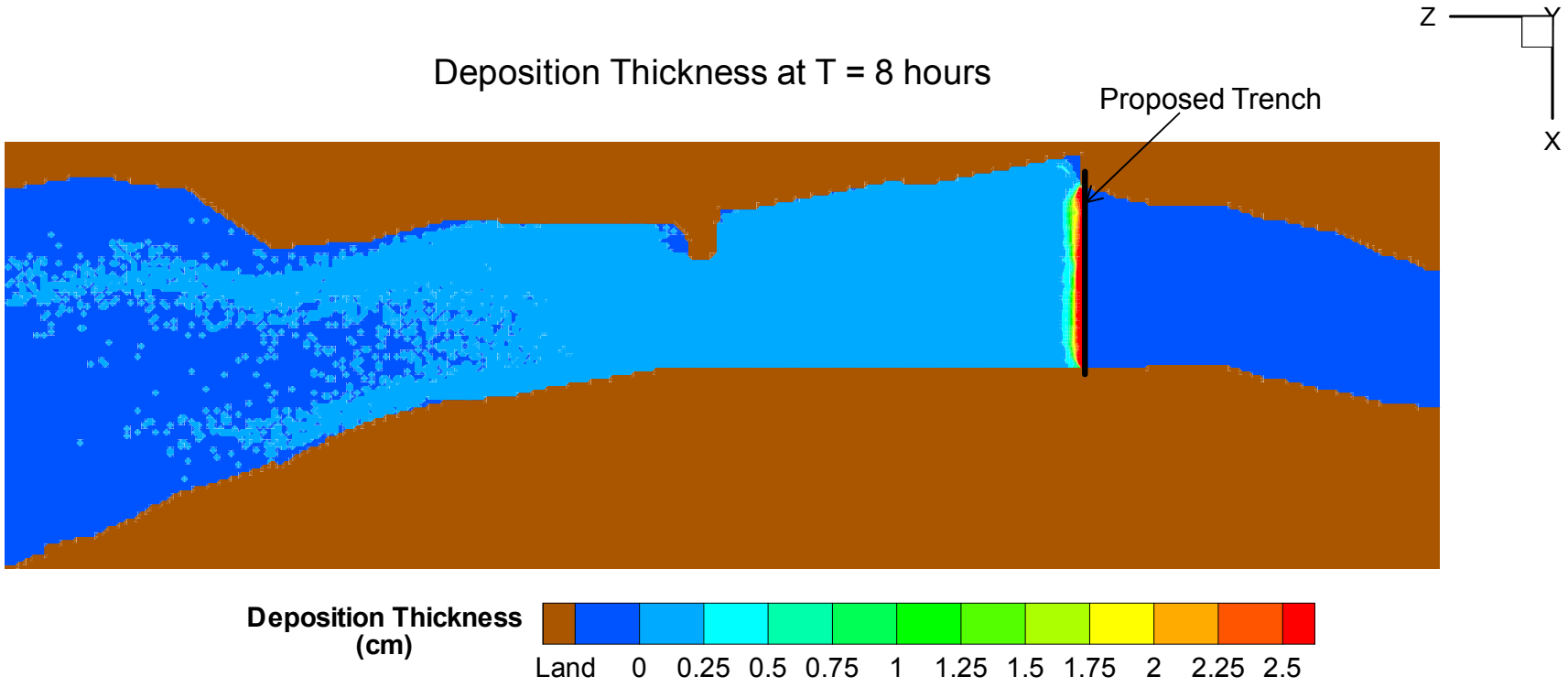


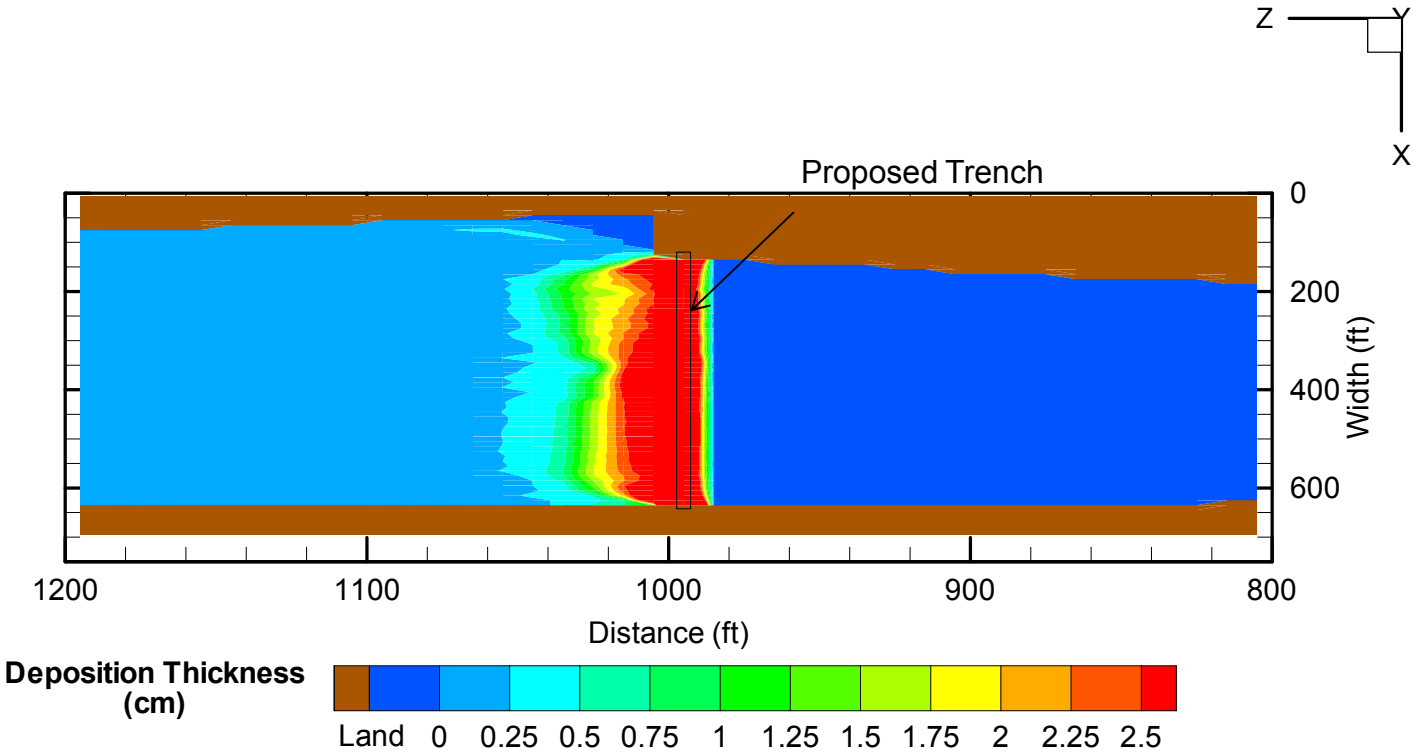
High Flow – High Fines Case

Deposition Thickness at the End of the 8-hour Simulation Period



High Flow – High Fines Case

A Close Look of Deposition Thickness at the End of the 8-hour Simulation Period



ATTACHMENT A

HALEY & ALDRICH, INC.
200 Town Centre Drive
Suite 2
Rochester, NY 14623
585.359.9000

MEMORANDUM

26 September 2016
File No. 42397-007

TO: Flow Science Incorporated
Li Ding, Ph.D., P.E. (VA)

FROM: Haley & Aldrich, Inc.
Lisa M. Telesca, Ryan J. Scott

SUBJECT: Allegheny River CFD Model Assumptions

The following basis was used to determine assumptions for the river bathymetry, flow conditions, and sediment characteristics previously provided to Flow Science Incorporated (FlowScience) to use for modeling the Allegheny River flow patterns, in order to predict increase of turbidity and sedimentation for National Fuel Gas Supply Corporation's (National Fuel) proposed Project, which includes excavation of a trench perpendicular to the river channel for installation of new natural gas pipelines. We have reviewed many of our assumptions herein with observations by Project personnel on a similar open cut crossing of the Allegheny River approximately completed by National Fuel in 2006.

FlowScience conducted three simulations, Base Case, High Flow Case, and High Flow – High Fines Case. This correlates to assumptions regarding flow conditions and sediment characteristics, which are further expounded upon below.

Bathymetry

We reviewed publicly available data and confirmed that there are no existing sources of general bathymetry for this reach of the Allegheny River. However, on behalf of National Fuel, Onyx Services Inc. conducted a hydrographic survey on December 20, 2013 along National Fuel's two existing (one active, one inactive) 6-inch pipelines within the river. We have assumed that the profile of the pipeline closest to the proposed Project crossing location is a best representation of the river bathymetry in this area. Since the pipelines surveyed are at an angle to the river flow, we scaled the profile horizontally to approximate a perpendicular cross-section of the river. Additionally, as the main river channel is generally uniform in width in the vicinity of the project, the river profile was used to approximate bathymetry for the entire stretch of river being modeled. Approximately 300 feet north of the Project location, an island bisects a portion of the river flow, however we have ignored this side channel as this is only a minor portion of the overall river flow. Bathymetry was kept constant for all three simulations run by FlowScience.

Flow Conditions and Water Depth

National Fuel has committed to completing construction of the Allegheny River crossing during low flow conditions of 2,000 cubic feet per second (cfs) or less. As this is the maximum flow at which National Fuel will construct, we used 2,000 cfs as the maximum flow rate for modeling. We used historical river gage data to review the range of flows during the construction window and determined the flow rate within the river will likely be closer to 1,600 cfs during construction. Therefore 1,600 cfs was used for the Base Case and 2,000 cfs was used for both the High Flow Case and High Flow – High Fines Case.

We used historical river gage data to determine the appropriate water elevation corresponding to a flow of 2,000 cfs and 1,600 cfs. The closest U.S. Geological Survey (USGS) river monitoring locations to the Project crossing location are Station 03015310 Allegheny River bl Conewango Creek at Warren, PA and Station 03016000 Allegheny River at West Hickory, PA. These stations are approximately 21.6 miles upstream and 8.3 miles downstream from the Project crossing, respectively. Historical data provides water depth (in feet) and discharge rate (in cubic feet per second) at each location. There are no large confluences between these two stations; therefore we assumed a proportional change in flow based on the distance between the stations and the Project crossing. Historical data from the two USGS stations indicate that flow rate at the Project crossing on the date of hydrographic survey (December 20, 2013) was approximately 3,930 cfs. Water elevation on that date was measured at 1,093.45 feet above sea level. At each of the two USGS stations, the change in flow rate correlated to a proportional change in water elevation. Based on the similar river width in these two areas with the location of the Project crossing, we assumed a similar proportional change in water elevation based on flow rates. Therefore, water elevation for a flow rate of 2,000 cfs at the Project location was estimated at 1,092.7 feet above sea level and water elevation for a flow rate of 1,600 cfs was estimated at 1,092.4. This represents an average water depth of approximately 2.1 feet and 1.9 feet respectively, which corresponds to field observations made during mussel species surveys in 2015 and 2016 by EnviroScience, Inc.

During trenching and backfill activities, spoil piles of material excavated from the trench will be placed temporarily within the river channel. These spoil piles will be spaced with approximately 20 feet between each pile. Although some localized changes to water flow and velocity are expected to occur directly at each pile location, we assume these will not have a significant effect on the velocity, flow direction, or water elevation.

Sediment Material

National Fuel completed a geotechnical analysis near the river bank at the Project crossing location in June 2012. Subsurface explorations included one test boring advanced to a depth of approximately 80 feet below ground surface and laboratory analysis was conducted on two samples to determine particle size distribution. Material from 15 feet to 30 feet was classified as GW-GM, Brown Gravel and coarse to find sand with trace silt. Material from 30 feet to 45 feet was classified as GP-GM, Grades to Gravel and coarse to fine sand, little silt, trace cobbles. The boring also encountered a 5 foot layer of gray clay and slit with trace sand from 10 to 15 feet below ground surface.

We assumed for the Base Case and High Flow Case that material to be excavated in the river would be similar in particle size distribution to the GW-GM and GP-GM samples collected with a slightly higher percentage of cobbles and gravel at the river bottom surface. Field visits in 2015 and 2016 confirm mostly gravel and sand river bottom conditions, with the presence of some large cobbles and boulders and some silt. Additionally, geotechnical data appeared to correspond with the National Cooperative Soil Survey soil classification (Pope loam).

Due to the layer of clay and silt in the geotech boring, we also looked at the High Flow – High Fines Case which incorporated this layer of clay and silt. Based on the surface elevation in the subsurface log (elevation 1102+/-), the clay and silt layer would be at approximately El. 1092 to El. 1087. Based on the water elevation and site bathymetry, the river bottom is at an average of El. 1090. We also assumed due to the velocity of the river and observations of existing near-surface sediment conditions from the mussel surveys, that fine particles within the top foot of the river bottom surface are scoured away leaving an armoring of larger grain size distribution, therefore, we were left with a 2 foot layer of high fines from El. 1089 to El 1087.

Distribution of particle sizes for both cases is presented in Table 1 below.

Material Volume and Mass

We assumed the trench excavated will be an average of 5 feet wide, accounting for side slopes, and 7 feet deep across the entire length of the river. Of this entire trench volume, we assumed a 10 percent material loss would contribute to turbidity and sedimentation downstream of the Project. Additionally, we assumed the smallest particles (i.e. silt) of exposed sediment material in the trench and of the temporary spoil piles in the river would be susceptible to scour due to the disturbance from the excavator and water movement around the piles, and therefore this nominal percentage of additional silt particles would also contribute to turbidity and sedimentation within the river. This 10 percent material loss and loss due to scour are assumed to be the total loss during both excavation and backfill activities.

FlowScience's model utilizes dry mass of material instead of volume. Therefore, in order to calculate the dry mass of material loss contributing to the total suspended solids and material deposition being modeled, we used literature values for specific gravity and void ratios based on the sediment material characteristics to calculate a dry unit weight to convert volume to mass. Mass of material lost for each particle classification is presented in Table 1 below.

Settling Velocities

Settling velocities were estimated based on the average particle size of each particle classification. It is noted that settling velocities are complicated by water properties such a viscosity and temperature, flow dynamics, particle roughness, and particle coagulation. We assumed the settling velocities would approximate Gibbs 1971 formula for quartz spheres in water at 20 degrees Celsius. We utilized an infographic created by the U.S. Geological Survey correlating several relationships for sediment

particles, including settling velocities based on Gibbs 1971 formula, to determine approximate settling velocities for the model (see Table 1).

However, research by T. Neville Burt suggests that high concentrations of cohesive particles (silts and clays) in an estuary environment interact in such a way as to dramatically change the settling velocity of those particles. Burt's general equation shows that the concentration of the cohesive particles dominates the settling velocity, not the particle size, for fine cohesive sediments. We anticipate that the silt material from the excavator bucket will have a higher settling velocity than the Gibbs 1971 formula predicts due to the high concentration of material slough. Therefore, we calculated the settling velocity for silts lost as part of the bucket excavation based on Burt's equation and assumed that silts exposed to scour would generally behave less cohesively and therefore Gibbs settling velocity was used (see Table 1).

Deposition Thickness

As FlowScience's model outputs mass of material deposited instead of volume, we assumed total thickness of material could be calculated using the dry unit weight of material, using the following formula:

Thickness = Mass/Dry Unit Weight/Area

As particles will settle in layers based on particle size, void ratios for the material will be different than those assumed for the material being excavated. We assumed a representative void ratio, and therefore dry unit weight, for each particle size such that the total mass was preserved. The conversion from mass to thickness per particle size is provided in the table below.

The table below presents the Particle Size Distribution, mass of material contributing to turbidity and sedimentation per 10 foot section of trench, and settling velocity.

Model Dosing Scheme

We assumed trench excavation will take place utilizing two excavators, each working from one side of the river moving towards the center. For simplicity of the model, we assumed each excavator will take approximately 15 minutes to excavate a 10-foot section of trench, before moving onto the next section. We assume the model would run for the total time to excavate the trench, approximately 6.5 hours.

We have assumed that as the excavator bucket moves into the water, removes material, and places that material in a pile next to the trench, that there is a continual release of material, evenly distributed vertically in the water column along the trench. As previously mentioned, we assumed material loss from the excavator bucket and additional loss of silt material exposed within the trench and spoil piles. For simplicity of the model, we've assumed losses for both excavation and backfill of the trench at once, and losses due to scour will be minimal once the excavator has moved to the next section of the trench.

Table 1. Model Inputs

Size Classification	Average Particle Size (mm)	Base Case, High Flow Case		High Flow-High Fines Case					Settling Velocity (cm/sec)	Conversion Mass to Thickness deposited per 100 sq ft (lb/cm)
		Particle Distribution (0-7' depth) El. 1090-1083	Mass of Material Lost per 10 foot Section of Trench (lbs)	Particle Distribution (0-1' depth) El. 1090-1089	Particle Distribution (1-3' depth) El. 1089-1087	Particle Distribution (3-7' depth) El. 1087-1083	Weighted Average Particle Distribution	Mass of Material Lost per 10 foot Section of Trench (lbs)		
Excavation and Backfill Loss										
Cobbles	100	**1%**	32.15	10%	0%	1%	**2%**	64.31	100	360.89
Coarse Gravel	34	**10%**	321.53	16%	0%	10%	**8%**	257.23	100	354.33
Fine Gravel	3	**37%**	1189.67	29%	0%	37%	**25%**	803.83	40	344.49
Coarse Sand	1.25	**12%**	385.84	12%	0%	12%	**9%**	289.38	20	295.28
Medium Sand	0.375	**18%**	578.76	18%	0%	18%	**13%**	417.99	5	291.99
Fine Sand	0.155	**12%**	385.84	10%	10%	12%	**11%**	353.69	1.5	282.15
Silt	0.032	**10%**	321.53	5%	90%	10%	**32%**	1028.91	3.62	180.45
Scour Loss in Trench and Spoil Piles										
Silt	0.032	**10%**	192.92	5%	90%	10%	**32%**	617.34	0.085	180.84

References

1. Coduto, Donald P., *Foundation Design: Principles and Practices*, Englewood Cliffs, N.J, Prentice Hall, 1994.

2. Dente Engineering, P.C., "Geotechnical Data Report: National Fuel Gas Supply Corporation, Line Q Crossing of the Allegheny River, Tidioute Borough, Warren County, Pennsylvania," June 2012.

3. Geotechdata.info, Soil void ratio, http://geotechdata.info/parameter/soil-void-ratio.html (as of November 16, 2013).

4. Naval Facilities Engineering Command, *Soil Mechanics Design Manual 7.01*, NAVFAC DM 7.01, September 1986.

5. Poppe, L.J., et. al, "Grain-Size Analysis of Marine Sediments: Methodology and Data Processing," *USGS East-Coast Sediment Analysis: Procedures, Database, and Georeferenced Displays*, USGS Open File Report 00-358, January 2003.

6. T. Neville Burt, "Field Settling Velocities of Estuary Muds," *Estuarine Cohesive Sediment Dynamics, Lecture Notes on Coastal and Estuarine Studies*, Vol. 14, 1986, pp 126-150.

Appendix H
Biological Evaluation

HALEY ALDRICH

www.haleyaldrich.com

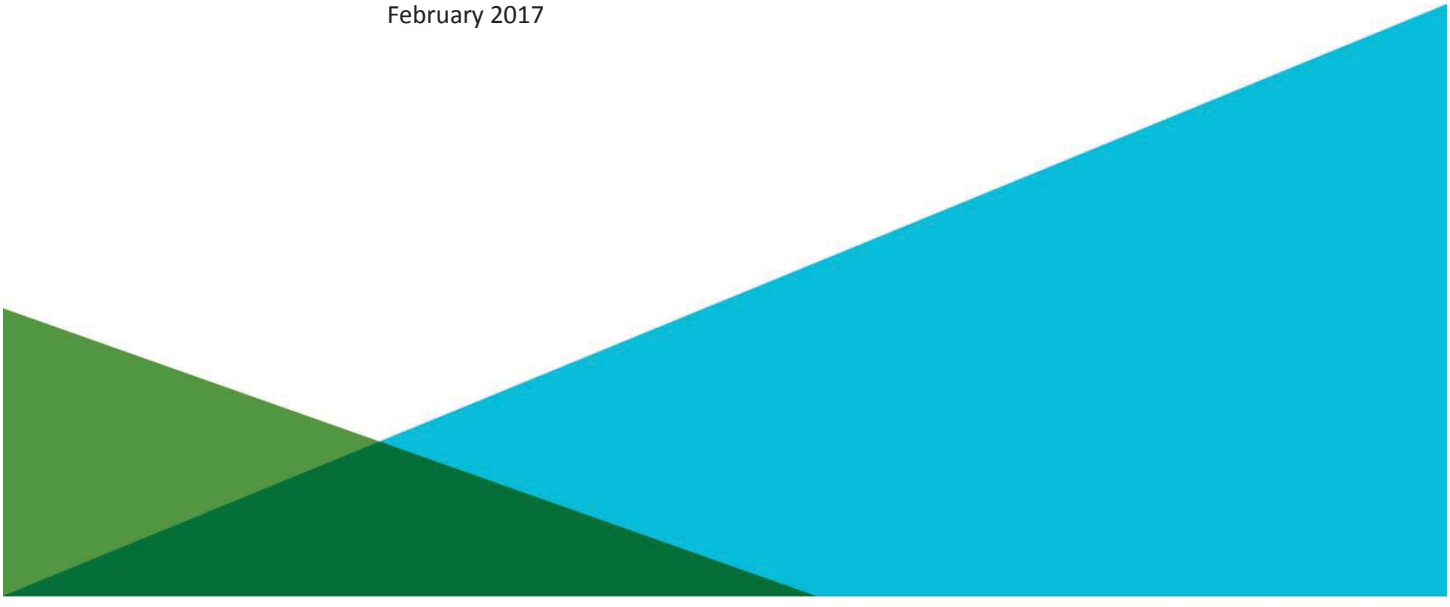
REPORT ON

U.S. FOREST SERVICE LANDS BIOLOGICAL EVALUATION LINE Q REPLACEMENT AND ABANDONMENT BY SALE PROJECT WARREN AND FOREST COUNTIES, PENNSYLVANIA

by Haley & Aldrich, Inc.
Rochester, New York

for National Fuel Gas Supply Corporation
Erie, Pennsylvania

File No. 42397-008
February 2017



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1. Introduction

1.1 PROPOSED ACTION

National Fuel's proposed Line Q Replacement and Abandonment by Sale Project is located in Warren and Forest Counties, Pennsylvania, wholly within the bounds of the Allegheny National Forest, which is managed by the United States Department of Agriculture Forest Service (USDA FS) and consists of both public and privately owned land. The Project will begin in Tidioute Borough, Warren County, Pennsylvania, traverse through Limestone Township (also located within Warren County, Pennsylvania) and terminate at National Fuel's existing Queen Storage Facilities in Hickory Township, Forest County, Pennsylvania; approximately 4.95 miles in total length.

The proposed Project will include the sale of National Fuel's existing Queen Storage Facilities and a portion of their existing 6-inch Line Q pipeline, construction of a new 4-inch plastic Line QP pipeline, and construction of a new regulator station. Line QP will be designed for a maximum allowable operating pressure (MAOP) of 124 psig from the tie-in to the remaining Line Q at Tidioute South Station to the new regulator station in Limestone Township, Warren County and a MAOP of 60 psig from the new regulator station south to the tie-in with existing National Fuel distribution mains approximately 2,000 feet west of the Queen Compressor Station. The regulator station will be used to adjust operating pressure within the pipe. The proposed regulator station will be approximately 25-feet by 25-feet along the pipeline permanent ROW. The proposed regulator station will be gravel-surfaced, accessible to work crews, and surrounded by fencing to provide security and safety, and prevent uncontrolled entry. The regulator station will include valves, pipe, fittings, pressure control and over-pressure protection. No compression will be installed at the regulator station. Intermittent noise impacts may occur at the new regulator station from vents or blowdowns. A full analysis of anticipated noise impacts is provided in Resource Report 9 (Section 9.2 – Noise Impacts) of the Federal Energy Regulatory Commission (FERC) Environmental Report and the supplemental noise assessment submitted September 1, 2016 to FERC.

National Fuel is not proposing work at the Queen Storage Facilities, including the existing Queen Compressor Station. These facilities will be sold as-is to EmKey Gathering, LLC (EmKey). Prior to transferring ownership of facilities to EmKey, National Fuel is proposing to replace the active Line Q crossing of the Allegheny River with a new 12-inch steel pipe as a non-jurisdictional activity. This activity will alleviate safety risk to human health and the environment due to compromised structural integrity of the active pipe and has been conditioned as part of the sale to EmKey. The proposed new Line QP pipeline will be installed concurrently with the replacement Line Q pipeline within the Allegheny River, utilizing a single trench to minimize impacts to the river.

Although a significant portion of the Project disturbance will be within already managed grassland areas (existing pipeline ROW), the Project will result in the direct conversion of some natural vegetation to managed grassland. Clearing of upland forested and shrub land will be required in some areas along the proposed construction corridor to open the existing 50-foot ROW to a full construction ROW width and the proposed existing access roads to allow for construction vehicle traffic. Forest cover clearing is limited to approximately 10 feet of additional width in areas where construction ROW is 60 feet wide, and some additional temporary workspace (ATWS) locations, due to the existing 50-foot ROW currently maintained in an herbaceous state. The maximum amount of tree clearing anticipated on USDA FS land is 3.54 acres; however, National Fuel expects to limit tree clearing to only what is necessary to safely construct the Project. The construction ROW width varies between 50 and 60 feet along the proposed

construction corridor, which will be shared permanent ROW (25 to 35 feet owned by National Fuel and 25 feet owned by EmKey). Therefore, forested and shrub land clearing will be permanent for the National Fuel's permanent portion of the ROW, because scrub/shrub and forested cover will not be allowed to revert to their pre-construction state.

The shared permanent ROW width varying between 50 and 60 feet would be acquired including through wetlands areas; however, only a 10-foot wide strip would be mechanically maintained and selective clearing only conducted within 30 feet (as centered on National Fuel's pipeline) of the full 50 to 60-foot shared permanent ROW in wetland areas over National Fuel's Line QP pipe. National Fuel will minimize potential impacts to stream and wetland habitat areas through use of measures and controls identified the Project Erosion and Sedimentation Control and Agricultural Mitigation Plan (ESCAMP) and Best Management Practices (BMPs). Potential impacts to other perennial streams and intermittent waterbodies will be minimized using crossing techniques described in Resource Report 2 of the FERC Environmental Report and will be temporary. The pipeline ROW, including stream or wetland crossings, will be restored following construction and during operation will be maintained in an herbaceous state. Potential impacts on wildlife and habitat from Project operation will be negligible as habitats will be re-established following temporary disturbance during construction.

National Fuel has applied for a FERC for a Certificate of Public Convenience and Necessity under Section 7(c) and 7(b) of the Natural Gas Act as amended for construction, operation, maintenance, and abandonment of this Project. Additionally, as the Project right-of-way (ROW) crosses several parcels owned by the USDA FS, a special use permit is also required. As a cooperating agency with FERC, the USFS has requested National Fuel perform wildlife and plant surveys on USFS owned lands in order to complete their environmental analysis of the Project.

1.2 HABITAT SUMMARY

Reconnaissance-level habitat surveys were conducted in the Project Area on USFS owned lands on October 17 and 18, 2016. Habitat types documented included open/herbaceous, northern hardwood forest, mixed coniferous/hardwood forest, and hemlock forest (see Appendix A for Plant/Wildlife Field Reconnaissance Report forms). Allegheny National Forest plant survey forms are included in Appendix B and include geographic coordinates for documented plant species. The forested habitats documented are narrow (~10-foot wide) strips adjacent to the cleared ROW. The documented habitat types are described below.

Open/Herbaceous

The Project site is comprised primarily of an open pipeline ROW with an associated access road. The maintained ROW is generally 25-50 feet wide. Many areas are rocky and unvegetated. Common herbaceous species include goldenrod (*Solidago spp.*), asters (*Symphyotrichum spp.*), ferns, and various grasses. This ROW begins adjacent to the Allegheny River and crosses several small streams. Slopes are generally steep throughout the Project site. Several invasive species were documented and are discussed further in Section 5.

Northern Hardwood Forest

Common overstory species in these areas include American beech (*Fagus grandifolia*), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), and black cherry (*Prunus serotina*). Understory species include American beech, maples, and witchhazel (*Hamamelis virginiana*). Invasive plants were observed in these areas (see Section 5). Scattered rocks are present throughout these areas and dead snags are present, but rare.

Mixed Hardwood/Coniferous Forest

Common overstory species in these areas include American beech, red maple, red oak, yellow birch (*Betula alleghaniensis*), red pine (*Pinus resinosa*), white pine (*Pinus strobus*), and eastern hemlock (*Tsuga canadensis*). Understory species include serviceberry (*Amalanchier arborea*), American beech, and witchhazel. Invasive plants were documented in these areas. Steep slopes with mixed forests adjacent to the Allegheny River include large boulders and rock outcroppings.

Hemlock Forest

Areas of hemlock forest are located in steep valleys associated with small perennial streams. Common overstory species are eastern hemlock and American beech and the understory consists of American beech saplings. Invasive species were documented in these areas. Scattered rocks are present in these areas as well as scattered dead snags.

2. Endangered Species Act

2.1 LISTED SPECIES

National Fuel initiated Pennsylvania Natural Diversity Inventory (PNDI) screening in August 2015 to review Rare, Threatened and Endangered (RTE) species potentially occurring in the vicinity of the Line QP proposed construction. No further agency consultation with the Pennsylvania Game Commission (PGC) or Pennsylvania Department of Conservation and Natural Resources (PDCNR) was required based on this PNDI review. Additional information requests were sent to the U.S. Fish and Wildlife Service (USFWS) and Pennsylvania Fish and Boat Commission (PFBC) on August 5, 2015.

October 2015 correspondence with the USFWS indicates the project is within the range of the northern long-eared bat (*Myotis septentrionalis* – threatened). This correspondence noted that stream crossings within the Allegheny National Forest would be too small to support mussel habitat. Federal and state-listed mussel species found in the Allegheny River have been addressed separately in the *Biological Assessment and Pennsylvania Coordination Document for the Line Q Replacement Project Crossing the Allegheny River at Tidioute, Warren County, Pennsylvania*, or Biological Assessment (Environscience, 2016).

Table 1. Federally-listed Threatened or Endangered Species that May Occur in the Project Site.

Species	Status	Occupied Habitat	Suitable Habitat	No Suitable Habitat
northern long-eared bat (*Miotis septentrionalis*)	threatened		X[1]	

[1]Suitable foraging habitat

Correspondence with PFBC on September 21, 2015 via telephone conversation also indicated no RTE species concerns in stream crossings along the Line QP route, except for the Allegheny River. PFBC indicated formal written response to Line QP request (under SIR #44872) would likely occur at the same time as the Allegheny River determination under SIR #36445.

2.2 HABITAT STATUS

Northern Long-Eared Bat

As noted in USFWS correspondence, the Project is not located within 5 miles of a known hibernacula or known maternity roost trees. Edge habitat exists along the length of the ROW corridor and crosses several small streams. These areas may provide suitable foraging habitat for the northern long-eared bat. Field surveys of the ROW, and trees immediately adjacent to the ROW, on October 17 and 18, 2016 found few live or standing dead trees with cavities, crevices, or exfoliating bark suitable for providing potential roosts.

2.3 EFFECTS AND DETERMINATIONS

Table 2 provides a summary of potential effects and the resulting effects determination for the federally-listed species.

Table 2. Effect Determinations for Federally-listed Species.

Species	Effects	Determination
northern long-eared bat (*Miotis septentrionalis*)	Limited tree cutting in the immediate vicinity of the existing ROW. Temporary noise disturbance during construction.	'may affect, but follows 4(d) rule'

The Project will require limited tree clearing in edge habitat (within approximately 10 feet of the currently maintained ROW). The maximum amount of tree clearing anticipated on USFS land is 3.54 acres; however, National Fuel expects to limit tree clearing to only what is necessary to safely construct the Project. No hibernacula or known maternity roost trees are known within 5 miles of the Project. However, rigorous surveys to detect maternity roost trees have not occurred in this area and it cannot be assumed there would be no impacts if tree clearing occurred during the pup season (June 1 to July 31). Therefore, the tree clearing required for the Project will be conducted outside the pup season and the Project will not produce effects on northern long-eared bat beyond those described in the USFWS's *Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions*. An additional impact to bats includes displacement from noise. Specifically, noise from construction activities could displace bats roosting near the ROW during the period of active construction, causing these bats to find alternate roosting sites. Due to the number of roosting sites near the Project area, this would not impact populations. USFWS correspondence indicated no further consultation is required for northern long-eared bat.

3. Regional Forester Sensitive Species on the Allegheny National Forest

3.1 LISTED SPECIES

On September 29, 2016, the USFS provided a list of Region 9 Regional Forester Sensitive Species (RFSS) (Table 3) that have population that receive special management attention by the USFS. Table 3 provides the current RFSS and their status within the Project area.

Table 3. Regional Forester Sensitive Species on the Allegheny National Forest and Habitat Status.

Species	Occupied Habitat	Suitable Habitat	No Suitable Habitat
Mammals			
Little Brown myotis (*Myotis lucifugus*)		X	
Tri-colored bat (former E. pip)(*Perimyotis subflavus macrotis*)		X	
Northern Flying Squirrel (*Glaucomys sabrinus*)		X	
Birds			
Yellow-bellied flycatcher *(Empidonax flaviventris*)			X
Northern goshawk *(Accipter gentilis)*		X	
Swainson's thrush (Catharus ustulatus)		X	
Bald eagle (*Haliaeetus leucocephalus*)		X	
Reptiles and Amphibians			
Timber rattlesnake *(Crotalus horridus)*		X	
Wood turtle (*Glyptemys insculpta*)		X	
Four-toed salamander (*Hemidactylium scutatum*)			X
Hellbender (*Cryptobranchus alleganiensis*)			X
Plants			
Butternut (*Juglans cinerea*)			X
Creeping snowberry (*Gaultheria hispidula*)			X
Rough cotton-grass (*Eriophorum tenellum***)**			X
Thread rush (*Juncus filiformis*)			X
Hooker's orchid *(Platanthera hookeri)*		X	
Wild quinine *(Parthenium integrifolium)*			X
Bartram shadbush *(Amelanchier bartramiana)*		X	
Sweet-scented Indian-plantain (*Hasteola suaveolens*)	X		
Mountain woodfern (*Dryopteris campyloptera*)		X	
White fawnlily (*Erythronium albidum*)			X
American ginseng (*Panax quinquefolius*)			X
Checkered rattlesnake plantain (*Goodyera tesselata*)			X
Canada yew (*Taxus canadensis*)			X
Boreal bog sedge (*Carex magellanica spp.irrigua*)			X
Bristly black currant (*Ribes lacustre*)		X	
Swamp red currant (*Ribes triste*)			X
Stalked bulrush (*Scirpus pedicellatus*)		X	
Boreal starwort (*Stellaria borealis spp.borealis*)		X	

Species	Occupied Habitat	Suitable Habitat	No Suitable Habitat
Queen-of-the-prairie (*Filipendula rubra*)			X
Blue false indigo (*Baptisia australis* var. *australis*)		X	
Awned sedge (*Carex atherodes*)		X	
Tufted hairgrass (*Deschampsia caespitosa*)		X	
Philadelphia panicgrass (*Panicum philadelphicum*)		X	
Great-spurred violet (*Viola selkirkii*)			X
Mollusks			
Creek heelsplitter *(Lasmigona compressa)*		X	
Longsolid (*Fusconaia subrotunda*)		X	
Rainbow (*Villosa iris*)	X		
Round pigtoe *(Pleurobema sintoxia)*	X		
Threeridge (*Amblema plicata*)		X	
White heelsplitter (*Lasmigona complanata*)		X	
Wabash pigtoe (*Fusconaia flava)*		X	
Rabbitsfoot (*Quadrula cylindrica cylindrica*)		X	
Invertebrates			
Ocellated darner *(Boyeria grafiana)*		X	
Green-faced clubtail (G*omphus viridifrons*)		X	
Harpoon clubtail (*Gomphus descriptus*)		X	
Rapids clubtail (*Gomphus quadricolor*)		X	
Mustached clubtail (*Gomphus adelphus*)		X	
Midland clubtail (*Gomphus fraternus*)		X	
Ski-tipped emerald (*Somatochlora elongata*)		X	
Uhler's sundragon (*Helocordulia uhleri*)		X	
Maine snaketail (*Ophiogomphus mainensis*)		X	
Zebra clubtail (*Stylurus scudderi*)		X	
Black-tipped darner (*Aeshna tuberculifera*)		X	
Green-striped darner (*Aeshna verticalis*)		X	
Comet darner (*Anax longipes*)			X
American emerald (*Cordulia shurtleffi*)		X	
Northern bluet (damselfly)(*Enallagma annexum*)		X	
Boreal bluet (*Enallagma boreale*)		X	
Sable clubtail (*Gomphus rogersi*)		X	
Amber-winged spreadwing (*Lestes eurinus*)			X
Crimson-ringed whiteface (*Leucorrhinia glacialis*)			X
Riffle snaketail (*Ophiogomphus carolus*)		X	
Mocha emerald (*Somatochlora linearis*)		X	
Brush-tipped emerald (*Somatochlora walshii*)		X	
White-faced meadowhawk (*Sympetrum obtrusum*)		X	
Band-winged meadowhawk (*Symp. semicinctum*)			X
West Virginia white (*Pieris virginiensis*)			X
Eyed brown (*Lethe eurydice*)			X
Fishes			
Bluebreast darter (*Etheostoma camurum*)		X	

Species	Occupied Habitat	Suitable Habitat	No Suitable Habitat
Burbot (*Lota lota*)		X	
Mountain madtom *(Noturus eleutherus)*		X	
Northern madtom (*Noturus stigmosus*)		X	
Channel darter *(Percina copelandi)*		X	
Gilt darter (*Percina evides*)		X	
Longhead darter (*Percina macrocephala*)		X	
Mountain brook lamprey *(Ichthyomyzon greeleyi)*		X	
Ohio lamprey (*Ichthyomyzon bdellium)*		X	
Spotted darter (*Etheostoma maculatum*)		X	
Tippecanoe darter (*Etheostoma tippecanoe*)		X	

3.2 HABITAT STATUS

Reconnaissance-level habitat surveys were conducted in the Project Area on October 17 and 18, 2016. Habitats observed for Regional Forester Sensitive Species are discussed in the following sections.

3.2.1 Species with Occupied Habitat

Sweet-Scented Indian-Plantain

Two small occurrences (totaling 13 individual plants) were documented within the ROW adjacent to the Allegheny River. The emergent wetland where this species was documented is the only area of suitable habitat observed in the Project site. This species typically grows along the banks of dynamic riverine habitats that are subject to scour and flooding. Sweet-scented Indian plantain may depend upon the bare soil exposed by frequent flooding for seed germination.

3.2.1.1 Mollusks

During the spring of 2015, EnviroScience Inc. was contracted by NFG to conduct a freshwater mussel survey (Phase 1 and 2) at the site of the proposed pipeline crossing work in the Allegheny River at Tidioute, Pennsylvania. This survey was performed from May 11 to May 13, 2015. The results of this survey and the anticipated impacts of the Project on the identified species are included in the Biological Assessment. The Biological Assessment also includes conservation measures National Fuel will implement to benefit or promote the recovery of mollusk species. Of the Regional Forester Sensitive Species, two were identified in the Phase 1 and 2 surveys.

Rainbow

This species lives in riffles along the edges of emerging vegetation in gravel and sand in moderate to strong current. It becomes most numerous in clean, well-oxygenated stretches at shallow depths. It is most abundant in small to medium-sized rivers but can also be found in inland lakes. This species was detected during 2015 surveys of the Allegheny River. Therefore, occupied habitat is present.

Round pigtoe

This species is found in medium to large rivers in mixed mud, sand, and gravel. This species was detected during 2015 surveys of the Allegheny River. Therefore, occupied habitat is present.

3.2.2 Species with Suitable Habitat

3.2.2.1 Mammals

Little Brown Myotis

The ROW corridor crosses several small streams, which may provide suitable foraging habitat for the little brown myotis. Field surveys of the ROW, and trees immediately adjacent to the ROW, found few live or standing dead trees with cavities, crevices, or exfoliating bark suitable for providing potential roosts.

Tri-Colored Bat

The ROW corridor crosses several small streams, which may provide suitable foraging habitat for the tri-colored bat. Field surveys of the ROW, and trees immediately adjacent to the ROW, found few live or standing dead trees with cavities, crevices, or exfoliating bark suitable for providing potential roosts.

Northern Flying Squirrel

Mature coniferous forests were observed within and adjacent to the ROW during field surveys. No northern flying squirrels were observed but suitable habitat is present.

3.2.2.2 Birds

Northern Goshawk

Mature forest habitat with eastern hemlock and white pine stands/inclusions were observed adjacent to the Project site during field surveys. The cleared ROW may also provide areas for foraging.

Swainson's Thrush

The cleared ROW of the Project site passes through extensive mixed and coniferous forests suitable for Swainson's thrush. The cleared ROW may also provide areas for foraging.

Bald Eagle

The Project site is adjacent to the Allegheny River, which provides foraging habitat for bald eagles. Bald eagles may be active in the Project site while foraging, but no nests were observed during field surveys.

3.2.2.3 Reptiles and Amphibians

Timber Rattlesnake

Dry forested sites are present along the edge of the Project site. Rock outcroppings and boulders are present in the area, which may provide denning and basking sites. There are no known hibernacula within the Project site, but there have been timber rattlesnake observations approximately 1 mile from the Project site. No individuals were observed during field surveys, though many timber rattlesnakes were already at their hibernacula when the surveys occurred.

Wood Turtle

Wooded riparian habitat is present at the northern end of the Project site along the Allegheny River. This area may provide wood turtle habitat; however, no wood turtles were documented during field surveys.

3.2.2.4 Plants

Hooker's Orchid

Hooker's orchid is found in broad range of habitats from dry to moist. The species has a wide but sparse distribution. No occurrences were documented within the Project site during field surveys.

Bartram Shadbush

Bartram shadbush is found in swamps, sphagnum bogs, peaty thickets, moist woods, and stream banks. Potential habitat along the Allegheny River and smaller streams was observed during field surveys; however, no individuals were documented during field surveys.

Mountain Wood Fern

Mountain wood fern can be found in cool, moist woods usually on acidic soils. This species is tolerant to moderately tolerant of shade. The forested edge of the Project site may provide suitable habitat for this species; however, no individuals were documented during field surveys.

Bristly Black Currant

Bristly black currant is tolerant of semi-shade or no shade conditions and occurs in woods, forests, and shrublands. The forested edge of the Project side may provide suitable habitat for this species; however, no individuals were documented during field surveys.

Stalked Bulrush

Stalked bulrush is an obligate wetland species usually occurring in lowland marshes in stream valleys, edges of bogs, boggy meadows, wet shores, and ditches. Suitable habitat occurs within the Project site adjacent to the Allegheny River; however, no individuals were documented during field surveys.

Boreal Starwort

Boreal starwort occurs in springy wooded slopes, sphagnous swamps and stream banks. Suitable habitat is scattered throughout the Project site along small streambanks; however, no individuals were documented during field surveys.

Blue False Indigo

Blue false indigo occurs along the Allegheny River in rocky habitats, sometimes associated with large boulders. The northern end of the Project site is adjacent to the Allegheny River; however, no individuals were documented during field surveys.

Awned Sedge

Awned sedge occurs in marshes, shrub swamps, wet successional fields, pond and stream edges, ditches, and calcareous meadows, swales and shores. Small areas of suitable habitat are scattered in the Project site; however, no individuals were documented during field surveys.

Tufted Hairgrass

Tufted hairgrass occurs in serpentine barrens, riverbed scours, marshes, damp openings, and along streams. Scattered areas of suitable habitat occur along the Allegheny River and small streams in the Project site; however, no individuals were documented during field surveys.

Philadelphia Panicgrass

Philadelphia panicgrass is found on river shores, sandbars, fields, roadsides, ditches and open woodlands. Scattered areas of suitable habitat are found in the Project site; however, no individuals were documented during field surveys.

3.2.2.5 Mollusks

Creek heelsplitter

This species occurs principally in rivers and streams of various sizes, even in very small creeks and is rare in lakes. It is found on substrates of gravel, sand, or mud. Suitable habitat for this species may exist in the Allegheny River; however, no PNDI records were reported for the Project and the species was not detected during 2015 surveys of the Allegheny River.

Longsolid

This species is found in medium to large rivers in gravel with a strong current often in sand and gravel. Suitable habitat for this species may exist in the Allegheny River; however, no PNDI records were reported for the Project and the species was not detected during 2015 surveys of the Allegheny River.

Threeridge

This species can be found in a variety of habitats, ranging from small streams to big rivers, and from locations such as lakes, rivers, and streams with little or no current to areas of very swift current. It is found in a variety of substrates including clay, mud, sand, sand mixed with gravel, and gravel. Suitable habitat for this species may exist in the Allegheny River; however, no PNDI records were reported for the Project and the species was not detected during 2015 surveys of the Allegheny River.

White heelsplitter

This species may be found in a variety of habitats, from medium-sized rivers to permanent sloughs, backwater bays, lakes, and reservoirs. Suitable habitat for this species may exist in the Allegheny River; however, no PNDI records were reported for the Project and the species was not detected during 2015 surveys of the Allegheny River.

Wabash pigtoe

This species is found in medium to large rivers in gravel with a strong current often in sand and gravel. Suitable habitat for this species may exist in the Allegheny River; however, no PNDI records were reported for the Project and the species was not detected during 2015 surveys of the Allegheny River.

Rabbitsfoot

This species is found in medium to large rivers in sand and gravel. Suitable habitat for this species may exist in the Allegheny River; however, no PNDI records were reported for the Project and the species was not detected during 2015 surveys of the Allegheny River.

3.2.2.6 Invertebrates

Ocellated Darner

The ocellated darner is found in clear, shallow, rocky, swift flowing streams and large, rocky, poorly vegetated lakes. The streams found within the Project site may provide suitable habitat for this species; however, no specific invertebrate surveys were conducted for this project.

Green-faced Clubtail

The green-faced-clubtail is found in clean, small, rocky forest streams with gravel-sand and lightly silted rocks. The streams found within the Project site may provide suitable habitat for this species; however, no specific invertebrate surveys were conducted for this project.

Mustached Clubtail

The mustached clubtail is found in clear, small to medium swift moving streams and rivers. The streams found within the Project site may provide suitable habitat for this species; however, no specific invertebrate surveys were conducted for this project.

Midland Clubtail

The midland clubtail is found in small to large streams, rivers and wetlands. The streams found within the Project site may provide suitable habitat for this species; however, no specific invertebrate surveys were conducted for this project.

American Emerald

The American emerald is found in small to large streams, ponds, and wetlands. The streams found within the Project site may provide suitable habitat for this species; however, no specific invertebrate surveys were conducted for this project.

Mocha Emerald

The mocha emerald is found in small to large forested streams and rivers. The streams found within the Project site may provide suitable habitat for this species; however, no specific invertebrate surveys were conducted for this project.

Brush-tipped Emerald

The brush-tipped emerald is found in small streams and wetlands. The streams found within the Project site may provide suitable habitat for this species; however, no specific invertebrate surveys were conducted for this project.

White-faced Meadowhawk

The white-faced meadowhawk is found in small to large streams and wetlands. The streams found within the Project site may provide suitable habitat for this species; however, no specific invertebrate surveys were conducted for this project.

3.2.2.7 Fishes

Bluebreast darter

This species requires clean, medium to large size rivers with swift flow and high bottom velocities, and a bottom of large rocks, rubble and coarse to fine gravel. This species was listed in the PNDI review of the Project and the Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Burbot

Burbot prefer deep, cold waters of lakes and rivers. During late winter and early spring, after spawning, they often migrate from lakes to tributary rivers. The only Pennsylvania populations occur in Lake Erie and the Allegheny River headwaters. The Allegheny River population represents a relic/distribution. This species was listed in the PNDI review of the Project and the Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Mountain madtom

The mountain madtom requires clean, moderate- to swift-flowing large streams or rivers with a bottom of large stones, rubble, gravel and sand. It is usually found in deep, fast riffles, sometimes in dense vegetation attached to the bottom material. This species was listed in the PNDI review of the Project and the Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Northern madtom

The northern madtom is found in the same habitat as the mountain madtom, but prefers a bottom of shifting sand and mud in moderate current. Swifter portions are usually avoided, as are very silted areas. This species was listed in the PNDI review of the Project and the Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Channel darter

The channel darter inhabits large clean streams and rivers with moderate current and bottoms consisting of large rocks, fine gravel and sand. Riffle areas are utilized during spawning and summer feeding, and deeper, quiet backwaters during the winter. The Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Gilt darter

Gilt Darters require clean rivers, whether small or large, with moderate to fast current, flowing over gravel-rubble bottoms. It prefers the middle and lower parts of riffles and clean pools. This species was listed in the PNDI review of the Project and the Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Longhead darter

The longhead darter prefers clean, fast, rocky riffles, or clear pools. Medium sized, unpolluted streams with a moderate current are required. The Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Mountain brook lamprey

Mountain brook lamprey adults are found in medium to large rivers; they lay their eggs in nests constructed in gravel streambeds. The ammocoete larvae burrow into the muddy bottoms of tributary streams to feed by filtration. The Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Ohio lamprey

Ohio lamprey are found in some of the same waters as the mountain brook lamprey, but it is usually found farther downstream. This species was listed in the PNDI review of the Project and the Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Spotted darter

This species requires large unpolluted streams, spending most of its time in deep riffles, or pools just downstream, where a gravel-rubble bottom predominates, and bottom current velocity is low. This species was listed in the PNDI review of the Project and the Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

Tippecanoe darter

This species prefers riffle areas four to 20 inches deep, in clean rivers and large creeks with a bottom of pea-sized, clean gravel and a high bottom current velocity. This species was listed in the PNDI review of the Project and the Allegheny River may provide suitable habitat for this species. However, no specific fish surveys were conducted for this project.

3.3 EFFECTS AND DETERMINATIONS

The RFSS determined to have no suitable habitat have a 'no impact' determination. The action site does not provide suitable habitat for any of these species and no direct, indirect or cumulative impacts to any of these species are anticipated. Effect determinations for RFSS with occupied or suitable habitat are provided in Table 4. See the Biological Assessment for a discussion of effects on mussel species.

Table 4. Effect Determinations for Regional Forester Sensitive Species with Occupied or Suitable Habitat.

Species	Effects	Determination
Mammals		
Little Brown myotis (*Myotis lucifugus*)	Minor tree clearing in a narrow linear strip along ROW. Temporary noise disturbance during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Tri-colored bat (former *E. pip*)(*Perimyotis subflavus*)	Minor tree clearing in a narrow linear strip along ROW. Temporary noise disturbance during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Northern flying squirrel (*Glaucomys sabrinus macrotis*)	Minor tree clearing in a narrow linear strip along ROW. Temporary noise disturbance during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Birds		
Northern goshawk *(Accipter gentilis)*	Minor impacts to foraging individuals during construction; Minor tree clearing in a narrow linear strip along ROW.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'

Species	Effects	Determination
Swainson's thrush (*Catharus ustulatus*)	Minor impacts to foraging individuals during construction; Minor tree clearing in a narrow linear strip along ROW.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Bald eagle (*Haliaeetus leucocephalus*)	Minor impacts to foraging individuals during construction; Minor tree clearing in a narrow linear strip along ROW.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Reptiles and Amphibians		
Timber rattlesnake (*Crotalus horridus)*	Potential impacts to individuals, including injury or death, during construction from moving equipment and soils.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Wood turtle (*Glyptemys insculpta*)	Potential impacts to individuals, including injury or death, during construction from moving equipment and soils.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Plants		
Hooker's orchid (*Platanthera hookeri*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal alisting or a loss of viability'
Bartram shadbush (*Amelanchier bartramiana*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Sweet-scented Indian-plantain (*Hasteola suaveolens*)	Two small groups of plants have been documented on the site.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Mountain woodfern (*Dryopteris campyloptera*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Bristly black currant (*Ribes lacustre*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Stalked bulrush (*Scirpus pedicellatus*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'

Species	Effects	Determination
Boreal starwort (*Stellaria borealis spp. borealis*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Blue false indigo (*Baptisia australis* var. *australis*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Awned sedge (*Carex atherodes*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Tufted hairgrass (*Deschampsia caespitosa*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Philadelphia panicgrass (*Panicum philadelphicum*)	Suitable habitat exists on the site; no plants exist presently.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Mollusks		
See the Biological Assessment for a discussion of effects on mollusks.		
Invertebrates		
Ocellated darner *(Boyeria grafiana)*	Minor impacts to individuals from stream crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Green-faced clubtail (G*omphus viridifrons*)	Minor impacts to individuals from stream crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Harpoon clubtail (*Gomphus descriptus*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Rapids clubtail (*Gomphus quadricolor*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Mustached clubtail (*Gomphus adelphus*)	Minor impacts to individuals from stream crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'

Species	Effects	Determination
Midland clubtail (*Gomphus fraternus*)	Minor impacts to individuals from stream crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Ski-tipped clubtail (*Somatoghlora elongata*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Uhler's dragon (*Helocordulia uhleri*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Maine snaketail (*Ophiogomphus mainensis*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Zebra clubtail (*Stylurus scudderi*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Black-tipped darner (*Aeshna tuberculifera*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Green-striped darner (*Aeshna verticalis*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
American emerald (*Cordulia shurtleffi*)	Minor impacts to individuals from stream crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Northern bluet (damselfly)(*Enallagma annexum*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Boreal bluet (*Enallagma boreale*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Sable clubtail (*Gomphus rogersi*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'

Species	Effects	Determination
Riffle snaketail (*Ophiogomphus carolus*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Mocha emerald (*Somatochlora linearis*)	Minor impacts to individuals from stream crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Brush-tipped emerald (*Somatochlora walshii*)	Minor impacts to individuals from stream crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
White-faced meadowhawk (*Sympetrum obtrusum*)	Minor impacts to individuals from stream crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Fishes		
Bluebreast darter (*Etheostoma camurum*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Burbot (*Lota lota*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Mountain madtom (*Noturus eleutherus*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Northern madtom (*Noturus stigmosus*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Channel darter (*Percina copelandi*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Gilt darter (*Percina evides*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Longhead darter (*Percina macrocephala*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'

Species	Effects	Determination
Mountain brook lamprey (*Ichthyomyzon greeleyi*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Ohio lamprey (*Ichthyomyzon bdellium*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Spotted darter (*Etheostoma maculatum*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Tippecanoe darter (*Etheostoma tippecanoe*)	Minor impacts to individuals from Allegheny River crossing activities during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'

The rationales for Regional Forester Sensitive Species determinations with suitable or occupied habitat are provided below.

3.3.1 Mammals

Little Brown Myotis and Tri-Colored Bat

The Project will require limited tree clearing in edge habitat (within approximately 10 feet of the currently maintained ROW), which could result in disturbance to roosting bats. The maximum amount of tree clearing anticipated on USFS land is 3.54 acres; however, National Fuel expects to limit tree clearing to only what is necessary to safely construct the Project. Because tree clearing during the maternity season could result in mortality of pups, tree removal will occur outside of the pup season (June 1 to July 31) to the most practical extent. Tree removal may also result in a loss of potential roost sites. However, because of the large number of potential roost trees near the Project site, the limited tree removal required for the Project will not impact populations. Impacts to foraging are not anticipated because construction will occur during daylight hours. Foraging and roosting habitat are plentiful outside of the Project site. Any potential impacts will be temporary and minimal because of the narrow, linear nature of the project.

Northern Flying Squirrel

The Project will require limited tree clearing in edge habitat (within approximately 10 feet of the currently maintained ROW). The maximum amount of tree clearing anticipated on USFS land is 3.54 acres; however, National Fuel expects to limit tree clearing to only what is necessary to safely construct the Project. Tree clearing may result in a loss of northern flying squirrel nests and foraging area. To reduce the likelihood of disturbance to nesting northern flying squirrel, Forest Service Plan Standards and Guidelines would be implemented if northern flying squirrel is documented along the ROW (USDA-FS 2007, page 84). An additional impact to northern flying squirrels includes displacement and behavior

modification resulting from construction noise. Due to the substantial availability of habitat outside the Project area, this would not impact populations.

3.3.2 Birds

Northern Goshawk, Swainson's Thrush, and Bald Eagle

Minor impacts to foraging may occur if goshawks, Swainson's thrush, or bald eagles are present during construction. There are no known nesting goshawks or bald eagles in the area. Additional foraging habitat is readily available outside of the Project site. Tree removal may result in a loss of potential nesting sites. However, because of the large number of potential nesting trees near the Project site, the limited tree removal required for the Project will not impact populations. To reduce the likelihood of disturbance to nesting northern goshawks and bald eagles, as well as prevent the destruction of their active nests, Forest Service Plan Standards and Guidelines would be implemented if a bald eagle nest or active northern goshawk nest is found along the ROW (USDA-FS 2007, pages 82-83 and 84-85). Tree removal during the Swainson's thrush nesting season (April 1 to June 30) could result in the disturbance to nesting individuals and the destruction of their active nests. Timber removal activities that have the potential to disturb Swainson's thrushes during the nesting period, to the point of nest failures or result in the destruction of active nests, will be avoided to the greatest practical extent. Any potential impacts will be temporary and minimal because of the narrow, linear nature of the project.

3.3.3 Reptiles and Amphibians

Timber Rattlesnake

No winter den sites are known to occur in the immediate vicinity of the Project site. Rocky-outcrops were observed during field surveys. Individuals may be impacted during construction. Impacts may include injury or death during equipment or earth-moving activities, as well as behavioral changes and modification of habitat use, Behavioral modifications or changes in habitat use would be temporary, and none of the potential impacts will cause a trend toward federal listing or loss of viability. To reduce the likelihood of disturbance to timber rattlesnake, Forest Service Plan Standards and Guidelines would be implemented if timber rattlesnakes are documented along the ROW (USDA-FS 2007, page 87).

Wood Turtle

No nests have been documented in the Project site and no individuals were observed during field surveys. Individuals in areas of suitable habitat may be impacted during construction, but such impacts will be minor, temporary, and will not cause a trend toward federal listing or loss of viability. Because turtles may be impacted during implementation, the following conservation measure will apply for turtles: At the onset of project implementation between Route 62 and the river, a biologist will review the activity site for turtles and if turtles are found, they will be relocated to the river riparian corridor away from the action. Persons implementing the action, will avoid the turtles and report any sightings to a Forest Service, Bradford District biologist as soon as possible.

3.3.4 Plants

The Project will not impact individual plants of species with suitable habitat in the Project site (Hooker's orchid, bartram shadbush, mountain woodfern, bristly black currant, stalked bulrush, boreal starwort,

blue false indigo, awned sedge, tufted hairgrass, or Philadelphia panicgrass). No individual plants of these species were found during field surveys; however, suitable habitat may be altered by the Project.

Sweet-scented Indian-plantain was found in the Project site. Per USFS request, site-specific mitigation measures will be implemented to conserve these specific plants species observed. National Fuel will dig up by hand or heavy equipment the area where the plants are found with sufficient soil and maintain the plants in a moist condition so that it can be replaced in-tack during restoration of the area.

3.3.5 Mollusks

See the Biological Assessment for a discussion of effects on mollusks.

3.3.6 Invertebrates

The probability is low that local populations would be impacted by the construction of the Project. Suitable habitat is widespread outside of the Project site. Crossing methods and erosion and sediment control measures will ensure minimal impacts on water quality. While it is possible individuals could be impacted, these impacts will be minimal and temporary. The Project will not cause a trend toward federal listing of these species or a loss of viability.

3.3.7 Fishes

The probability is low that local populations would be impacted by the construction of the Project. Suitable habitat is widespread outside of the Project site. Crossing methods, on-shore erosion and sediment control measures, and limited in-stream construction time will ensure minimal impacts on water quality. While it is possible individuals could be impacted, these impacts will be minimal and temporary. Additionally, National Fuel has agreed to an in-stream construction restriction for the protection of state listed fish species, including the Gravel chub (*Erimystax x-punctatus*), Mountain madtom, and Northern madtom, during the spawning season of these species. The Project will not cause a trend toward federal listing of these species or a loss of viability.

4. Species with Viability Concerns

4.1 LISTED SPECIES

Habitat suitability for listed species with viability concerns is presented in Table 5 below.

Table 5. Species with Viability Concerns.

Species	Occupied Habitat	Suitable Habitat	No Suitable Habitat
Birds			
Black-throated Blue Warbler (*Setophaga caerulescens*)		X	
Henslow's Sparrow (*Ammodramus henslowii*)			X
Golden-winged Warbler (*Vermivora chrysoptera*)			X
Great Blue Heron (*Ardea herodias*)		X	
Red-shouldered Hawk (*Buteo lineatus*)		X	
Raven (*Corvus corax*)		X	
Swainson's Thrush (*Catharus ustulatus*)		X	
Osprey (*Pandion heliaetus*)		X	
Reptiles			
Eastern box turtle (*Terrapene carolina carolina*)		X	
Northern coal skink (*Plestiodon antracinus anthracinus*)		X	
Amphibians			
Jefferson salamander (*Ambystoma jeffersonianum*)		X	
Four-toed Salamander (*Hemidactylium scutatum*)		X	

4.2 HABITAT STATUS

Reconnaissance-level habitat surveys were conducted in the Project Area on October 17 and 18, 2016. Suitable habitats observed for species with viability concerns are discussed below. Henslow's sparrow and golden-winged warbler were determined to have no suitable habitat within the Project site and no impacts are anticipated to these species. Swainson's thrush is also listed as a RFSS and is discussed in Section 3.

4.2.1 Birds

Black-throated Blue Warbler

The black-throated blue warbler is found in contiguous tracts of relatively undisturbed hardwood and mixed deciduous-coniferous forests. This species prefers forests with a dense shrub layer for nesting and foraging. Suitable forested habitat occurs in and around the Project site.

Great Blue Heron

The great blue heron prefers undisturbed late-successional deciduous forest with large trees suitable for nesting. They commonly forage along streams and wetlands. Nesting habitat is not present in the Project site. However, foraging areas occur on the northern edge of the Project site along the Allegheny River and at other small streams located throughout.

Red-shouldered Hawk

The red-shouldered hawk nests in undisturbed, mature or late-successional, upland and riparian forests. This species forages in various habitats, including open, non-forested areas; large floodplains; wetlands; and savannas. Areas adjacent to the Project site may provide nesting habitat and the cleared ROW of the Project may provide a foraging area.

Raven

The raven nests in rocky outcroppings and occasionally in mature or late-successional conifers and hardwoods located on slopes of 30 percent or more. Areas of suitable raven habitat were observed near the Project site.

Osprey

Ospreys prefer lakes, ponds, rivers and marshes bordered by trees. They require open water containing adequate fishing opportunities. In recent years, ospreys have produced young near lakes and rivers across most of the state. Suitable osprey habitat was observed along the Allegheny River on the northern end of the Project site.

4.2.2 Reptiles

Eastern Box Turtle

The eastern box turtle is found in deciduous woodlands, old fields, pastures, and marshy areas. Suitable habitat for the eastern box turtle occurs in and around the Project site.

Northern Coal Skink

The northern coal skink is found in open habitat with rock or log cover, highway right-of-ways, and powerline clear-cuts. Suitable northern coal skink habitat is found throughout the Project site.

4.2.3 Amphibians

Jefferson Salamander

The Jefferson salamander is found in deciduous or mixed hardwood-coniferous forest with temporary or permanent ponds. Suitable habitat for the Jefferson salamander occurs in and around the Project site.

Four-toed Salamander

The four-toed salamander is found in mixed hardwood-confierous forest with bogs, marshes, woodland ponds, open meadows, or dry wooded hillsides. Suitable habitat for the Jefferson salamander occurs in and around the Project site.

4.3 EFFECTS AND DETERMINATIONS

The species with viability concerns determined to have no suitable habitat have a 'no impact' determination. The Project site does not provide suitable habitat for any of these species and no direct, indirect or cumulative impacts to any of these species are anticipated. Effect determinations for species with viability concerns with suitable habitat are provided in Table 6.

Table 6. Effect Determinations for Species with Viability Concerns.

Species	Effects	Determination
Birds		
Black-throated Blue Warbler (*Setophaga caerulescens*)	Minor impacts to foraging individuals during construction. Where tree removal occurs, there is the potential for loss of nesting sites. However, the potential loss of nesting trees would have negligible impacts to populations due to the amount of trees in the vicinity of the Project.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Great Blue Heron (*Ardea herodias*)	Minor impacts to foraging individuals during construction.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Red-shouldered Hawk (*Buteo lineatus*)	Minor impacts to foraging individuals during construction. Where tree removal occurs, there is the potential for loss of nesting sites. However, the potential loss of nesting trees would have negligible impacts to populations due to the amount of trees in the vicinity of the Project.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Raven (*Corvus corax*)	Minor impacts to foraging individuals during construction. Where tree removal occurs, there is the potential for loss of nesting sites. However, the potential loss of nesting trees would have negligible impacts to populations due to the	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'

Species	Effects	Determination
	amount of trees in the vicinity of the Project.	
Osprey (*Pandion heliaetus)*	Minor impacts to foraging individuals during construction. Where tree removal occurs, there is the potential for loss of nesting sites. However, the potential loss of nesting trees would have negligible impacts to populations due to the amount of trees in the vicinity of the Project.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Reptiles		
Eastern box turtle (*Terrapene carolina carolina*)	Potential impacts to individuals, including injury or death, during construction from moving equipment and soils.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Northern coal skink (*Plestiodon antracinus anthracinus*)	Potential impacts to individuals, including injury or death, during construction from moving equipment and soils.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Amphibians		
Jefferson salamander (*Ambystoma jeffersonianum*)	Potential impacts to individuals, including injury or death, during construction from moving equipment and soils.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'
Four-toed Salamander (*Hemidactylium scutatum*)	Potential impacts to individuals, including injury or death, during construction from moving equipment and soils.	'may impact individuals, but not likely to cause a trend toward federal listing or a loss of viability'

4.3.1 Birds

Activities (e.g., timber removal, construction, etc.) that have the potential to disturb nesting bird species with viability concerns to the point of nest failures, or result in the destruction of active nests, will occur outside of the common raven nesting period (April 1 – July 31) to the greatest extent practical.

To reduce the likelihood of disturbance to any identified bird species with viability concerns, Forest Service Plan Standards and Guidelines will be implemented (USDA-FS 2007, pages 55, 84-86).

4.3.2 Reptiles

Because turtles may be impacted during implementation, the following conservation measure will apply for turtles: At the onset of project implementation between Route 62 and the river, a biologist will review the activity site for turtles and if turtles are found, they will be relocated to the river riparian corridor away from the action. Persons implementing the action, will avoid the turtles and report any sightings to a Forest Service, Bradford District biologist as soon as possible.

To reduce the likelihood of disturbance to any other reptile species with viability concerns, Forest Service Plan Standards and Guidelines would be implemented if any of these species are found along the ROW (USDA-FS 2007, page 87).

4.3.3 Amphibians

To reduce the likelihood of disturbance to any other amphibian species with viability concerns, Forest Service Plan Standards and Guidelines would be implemented if any of these species are found along the ROW (USDA-FS 2007, page 87).

5. Non-Native Invasive Plants

5.1 IDENTIFIED NON-NATIVE INVASIVE PLANTS WITHIN PROJECT AREA

The Pennsylvania Department of Conservation and Natural Resources (DCNR) has prepared a list of invasive plants to guide management efforts, primarily of DCNR lands, but no regulations exist to control invasive plants. This list and the Allegheny National Forest Plant Survey Form provided by the USFS was used to determine the presence of common invasive plant species within the Project corridor. On October 17 and 18 a reconnaissance-level survey of non-native invasive plants was conducted in the Project site. This survey documented 11 different non-native invasive species within the action area. The species observed are listed in Table 7.

Table 7. Invasive Species Documented within the Project Area.

Species	Number of Occurrences
Multiflora rose (*Rosa multiflora*)	29
Tartarian honeysuckle (*Lonicera tatarica*)	12
Japanese stiltgrass (*Microstegium vimineum*)	11
Bristled knotweed (*Persicaria longiseta*)	9
Japanese barberry (*Berberis thunbergii*)	4
Garlic mustard (*Alliaria petiolata*)	1
Purple loosestrife (*Lythrum salicaria*)	1
Canada thistle (*Cirsium arvense*)	1
Common privet (*Ligustrum vulgare*)	1

5.2 CONTINGENCY PLAN FOR CONSTRUCTION

Potential construction impacts may include, but not be limited to, the movement or introduction of non-native invasive species into natural communities. Transport of invasive species can occur through the movement of heavy equipment and/or fill materials during the clearing, installation and restoration phases of the Project. As noted below and in the Invasive Species Control Plan (Appendix C) submitted to FERC, National Fuel is committed to 3 years of post-construction monitoring and no net increase in the areal coverage of invasive plant species during that time. As a result, no significant impacts to the species discussed in this report, or any other native species, are anticipated to result from the spread of invasive species. Controlling the spread of target invasive plant species will be accomplished by applying the following control measures:

1. Inspector training: At least one Environmental Inspector having knowledge of the wetland and stream conditions in the Project corridor is required throughout construction and restoration. The number and experience of Environmental Inspectors assigned to each construction spread will be appropriate for the length of the construction spread and the number/significance of resources affected. At least one inspector shall be trained on identifying the target invasive

plant species and site specific measures for preventing their possible transport onto or throughout the construction spread.

2. Equipment sanitation: The contractor(s) shall be instructed to bring in clean machinery and materials free of any visible soil, vegetation or debris prior to entering construction spreads. As necessary, cleaning will take place within an elevated wash rack station with clean water (no soaps). This wash water will be discharged and disposed appropriately. BMP for this wash station is incorporated into the Project ESCAMP.

3. Construction materials: Construction materials such as seed mixes, mulch material, gravel, and soil if being brought into the construction spread from an outside source shall be visually inspected or documented by vendors (as practicable) to be free of possible invasive plant material. During the monitoring phase, the contractor(s) shall avoid of mowing infested invasive areas into non-infested invasive areas.

4. Restoration: All wetlands and streams that are impacted by the construction activities will be restored to preconstruction conditions as soon as applicable. An appropriate seed or planting plan will be utilized based on the pre-existing conditions prior to disturbance. National Fuel will use their typical seed mixes appropriate for site restoration. If possible, seed mixes will be utilized from a local source.

5. Monitoring: Restoration monitoring, including invasive species assessment, will take place for 3 years (as required by the FERC) following the restoration phase of this Project by appropriately trained personnel. Inspection of the corridor will occur at least once a year during the growing season (April-November). A measurable increase in areal coverage of invasive plant species will be reported to FERC and copies will be sent to the Pennsylvania DCNR, United States Army Corps of Engineers (USACE), and US Forest Service (USFS). This plan will be considered successful if at the end of the monitoring period there is no net increase in the areal coverage. If there is an increase, then this plan will be reviewed with FERC with consultation from USFS, USACE and Pennsylvania DCNR to formulate new alternative control criteria. The new criteria will be used to develop a restoration plan.

6. Cumulative Impacts

Resource Report 1 – General Project Description of the FERC Environmental Report contains a review of approved or pending projects during the similar timeframe and adjacent or similar geographies as the proposed Project. No current, approved, or reasonably foreseeable projects in Warren and Forest Counties, Pennsylvania were identified within 150 feet of the Project ROW on USFS property. EmKey's gathering line installation was included as a reasonably foreseeable project as installation will be directly tied to the certification of this Project, however EmKey's gathering line will not affect USFS property. No other projects were identified on properties adjacent to the Project site.

Potential cumulative impacts associated with water resources may typically include degradation of water quality (both from non-point and point source pollution), sediment discharges from soil erosion, reduction of water source availability, deterioration of recreational water use, aquatic habitat loss or diminishment, and degradation due to irrigation or urban runoff.

Although Project construction could have a minor effect on surface water resources and wetlands, most potential impacts would be temporary and would not significantly affect these water and wetland resources due to the controls required for the Project. The impacts would be avoided or minimized by the use of both standard and specialized construction techniques, including those specified in National Fuel's Project-specific ESCAMP and Spill Prevention and Response Plan (SPRP), all of which confine impacts to controlled areas within construction limits, and restore construction areas so as to avoid and minimize possible ongoing impacts. As a result, both short and long term cumulative impacts would be avoided.

When projects are constructed in the same general location and time frame, they could have a cumulative impact on local vegetation and wildlife communities. ROW clearing and grading and other construction activities associated with the Project would result in the removal of vegetation; alteration of wildlife habitat; displacement of wildlife; and other potential secondary effects such as increased population stress, predation, and the establishment of invasive plant species.

Cumulative impact on wildlife and vegetation relative to habitat fragmentation caused by the Project is avoided or minimal due to the utilization of a previously disturbed ROW and only minor increases in ROW width. The majority of the disturbed areas would be returned to pre-existing conditions wherever possible. The geographic extent and duration of disturbances caused by construction of the Project, including cumulative impacts to juvenile and adult fish and disturbance of bottom sediments, would be minimal based on the proposed project activities and further minimized by the implementation of National Fuel's ESCAMP and the site-specific crossing plans prepared and measures employed based on consultation with the FERC and other permitting agencies.

Although the Project is anticipated to include a maximum of approximately 3.54 acres of forested edge clearing on USFS property, the Project is co-located with other existing ROWs and existing trails and access roads to the extent possible. Furthermore, as noted, this is a maximum amount of clearing and National Fuel expects to limit tree clearing to only what is necessary to safely construct the Project. As the Project does not include clearing of upland interior contiguous forestlands or development with significant impervious surfaces contiguous to Line Q Replacement and Abandonment by Sale Project and permanent wetland loss is not anticipated for the Project, significant cumulative impacts to wildlife and vegetation (including RTE species) are not anticipated.

7. Conservation Measures

In addition to the Forest Plan guidelines mentioned in previous sections of the report, Resource Report 2 of the FERC Environmental Report details the following conservation measures applicable to proposed stream work at the Allegheny River and protection of RFSS and species with viability concerns:

- Minimizing in-stream trench width and construction corridor.
- Salvage of mussel species within affected areas upstream, lateral, and downstream of the Project which will experience disturbances (Action Area) and relocation to suitable habitat upstream per an approved Relocation Plan by approved, qualified personnel.
- Minimize stream bank disturbances to approximately 15-feet wide corridor, and installation and maintenance of BMPs (e.g. silt barriers) for erosion and sedimentation control.
- Restoration of banks and riparian zone habitat to preconstruction conditions by following National Fuel's ESCAMP procedures for waterbody restoration.
- Utilizing native stream materials for in-stream fill and native and clean material for fill at the river banks.
- Ensuring all equipment used within the Allegheny River is clean and free of contamination and ensuring National Fuel's SPRP is followed at all times.
- A qualified monitor will be present at all times during river crossing construction.
- Sedimentation monitoring will be conducted upstream and downstream during construction per a USFWS-approved Turbidity Monitoring Plan.
- Post-construction monitoring will be completed.

National Fuel will also utilize a variety of mitigation measures to minimize potential adverse impacts to other waterbodies and wetlands as a result of the construction of the proposed facilities. BMPs will be implemented throughout construction to protect the environment and to minimize potential effects of the pipeline Project. Measures to avoid or minimize potential impacts to waterbodies may include:

- Expediting construction in the waterbody, reducing disturbance to the streambed and adjacent soils and the quantity of suspended sediments.
- During clearing operations (anticipated to be minimal), vegetative strips will be maintained along the bank of the waterbody. Trees will be cut flush with the surface, but removal of stumps or roots will be avoided or minimized to the extent feasible while allowing for safe working conditions.
- Construction of waterbody crossings will be conducted as perpendicular as possible to the axis of the channel when engineering and routing conditions allow.

- The length of actual, temporary, bank disturbance will be limited to the width of trench excavation necessary to place fabricated pipe in the crossing (typically less than 10 feet) plus the travel area which will be bridged across the stream.

- Waterbody crossings will be conducted during low flow conditions, to the maximum extent possible. Construction will be delayed if a storm/rain event is expected based on weather reports. Backup pumps will be available and used as necessary if unexpected high stream/water flow conditions are experienced during construction.

- Limit the amount of necessary construction equipment traffic (e.g., initially limit to that which is needed to clear and grade ROW and minimize overall equipment during construction).

- Construction equipment will not be parked, stored, or refueled within 100 feet of a stream.

- Equipment crossings subsequent to clearing will be performed utilizing travel mats elevated above the water level.

- Restoration of the waterbody to its original configuration and contour to the best extent possible. Permanent stabilization of the banks of the waterbody and adjacent areas using erosion control measures and vegetative cover as soon as possible after construction.

- Native stone will be used to the extent possible during stream bed restoration and stabilization.

- Removal of construction materials and related structures from each waterbody promptly after construction.

- Inspection of crossing points periodically during and after construction, and repairs to areas as needed.

Specific measures to avoid or minimize potential impacts in wetlands may include a combination of the following in accordance with the Project ESCAMP:

- Wetland boundaries and buffers will be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

- Sediment barriers (i.e., silt fence, silt logs, straw bales) will be installed across the construction right-of-way (ROW) immediately upslope of the wetland boundaries at all wetland crossings to prevent sediment flow into wetlands. Where wetlands are adjacent to the ROW and the ROW slopes towards the wetlands, sediment barriers will be installed along the edge of the ROW as is necessary to prevent sediment flow.

- Assembly of the pipeline will be conducted in upland areas unless the wetland is dry enough to adequately support skids and pipe.

- National Fuel will utilize “push-pull” or “float” techniques as necessary to place the pipe in the trench where water and other site conditions allow.

- Trenching of wetlands will not be conducted until the pipeline is assembled and ready for lowering in, minimizing the length of time that the trench is open.

- Trench dewatering will be limited or controlled to that which does not result in silt-laden water flowing into a wetland.

- Construction equipment will be limited to that which is needed to clear and grade the ROW, excavate the trench, install the pipeline, backfill the trench, and restore the construction ROW. Any additional equipment crossings will be limited to the wetland's travel-way.

- Construction equipment will not be parked, stored, or refueled within 100 feet of wetlands.

- Vegetation will be cut to just above ground level, leaving existing root systems in place. Cut vegetation will be removed from the wetland. Removal of tree stumps and in-ground root systems will be minimized unless the Chief Environmental Inspector determines safety related construction constraints require their removal.

- At a minimum, the top one foot of topsoil will be segregated within dry wetlands (no standing water or saturated soils at time of construction) from the areas disturbed for trenching. The segregated topsoil will be restored to its original location following the backfilling of the trench.

- The trench will be excavated by mechanical backhoe to a depth that provides at least three feet of cover on top of the pipe, except in bedrock areas, where a minimum of two feet will be provided.

- Low-ground pressure equipment (i.e. lighter weight, rubber tire, wider tracks) will be utilized if standing water or saturated soils are present in wetlands, or if normal construction equipment causes excessive ruts or mixing of the topsoil and subsoil in wetlands. Alternatively, or if such equipment is not available, normal equipment will be supported by approved travel mats.

- If a portion of the work or final cleanup is suspended over winter, a winter construction plan will be developed prior to winter work suspension, including details regarding removal, anchoring or maintaining mats and bridging, and applicable monitoring requirements.

- Removal of construction materials including work mats, temporary rip-rap, and other construction debris will be conducted after final grading of the ROW.

- Additionally, no blasting is proposed during construction of this Project.

In addition, the following conservation measures have been requested by the USFS on properties owned by the Forest Service:

- Tree clearing within the Limits of Disturbance will be limited to what is needed to safely construct the Project in order to protect shading and cover at streams and wetlands.

- Restoration of waterbodies channel, floodplain width and characteristics to the best extent possible. Particular caution will be used while restoring Streams 12 and 16, due to the length of parallel pipe being installed.

- National Fuel will work with USFS to designate trees to be placed within the stream and floodplain extents of Dunn and Dale Run to add roughness to these areas during restoration activities, provided placement does not hinder access to the pipeline for maintenance activities.

- National Fuel will use topsoil segregation for the pipeline trench.

- Soils disturbed by pipeline access and trench will be decompacted.

- Soil tests will be performed along the pipeline to determine soil additives necessary to foster healthier revegetation.

8. Summary

Reconnaissance-level surveys documented four broad habitat types within the Project site: open/herbaceous, northern hardwood forest, mixed hardwood/coniferous forest, and hemlock forest. Suitable foraging habitat is available for one federally-listed species (northern long-eared bat). Project construction may affect this species; however, construction activities will follow the 4(d) rule. Based on consultation with USFWS, no further consultation is required for northern long-eared bat. Other federally-listed species have been previously assessed under a separate cover (Enviroscience, 2016).

Three RFSS were documented within the Project site (sweet-scented Indian-plantain, rainbow, round pigtoe) and 55 species were found to have suitable habitat. Suitable habitat was also identified for nine species with viability concerns. The Project may impact individuals of these species, but is not likely to cause a trend toward federal listing or a loss of viability.

Sixty-nine individual occurrences of invasive species were recorded within the Project site. This included nine different species; however, most these occurrences were accounted for by three species (multiflora rose, Tartarian honeysuckle, and Japanese stiltgrass).

National Fuel has committed to following the relevant guidance and criteria of the Allegheny National Forest Land and Resource Management Plan (Forest Plan) and the Scenery Management Implementation Guide for the Allegheny National Forest, which should mitigation any potential minor impacts to species with suitable and occupied habitat.

References

1. Environscience, 2016. *Biological Assessment and Pennsylvania Coordination Document for the Line Q Replacement Project Crossing the Allegheny River at Tidioute, Warren County, Pennsylvania.* August, 2016 Revision. Prepared for National Fuel Gas Supply Corporation.

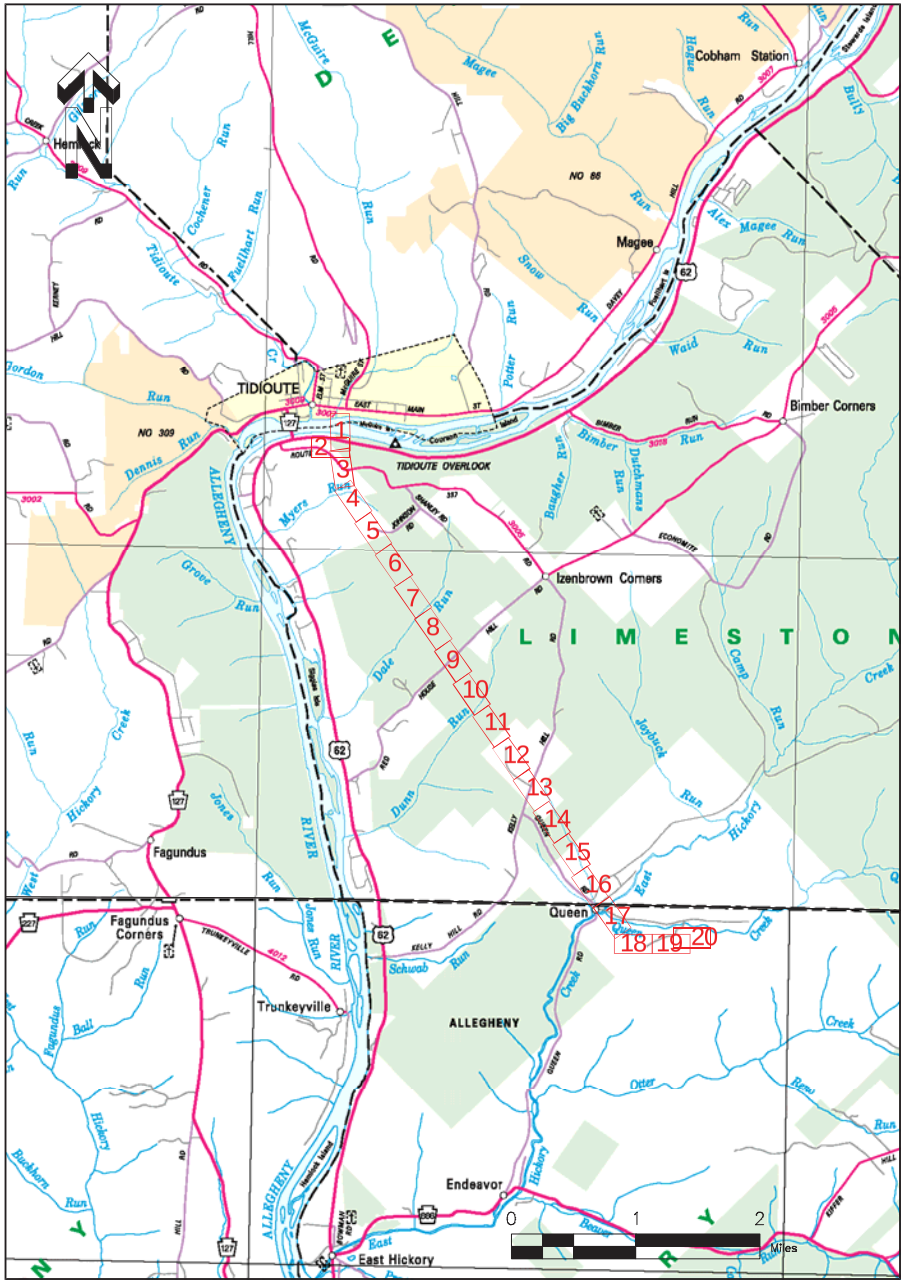
2. USDA-FS, 2007. *Allegheny National Forest Land and Resource Management Plan*. Allegheny National Forest. Warren PA.

3. National Fuel, 2015. Erosion and Sediment Control & Agricultural Mitigaiton Plan (ESCAMP). 18 November 2013, Revised 26 August 2014 (Appendices Updated January 2015).

4. FERC, 2013. Upland Erosion Control, Revegetation, and Maintenance Plan (Plan). May 2013.

5. FERC, 2013. Wetland and Waterbody Construction and Mitigation Procedures (Procedures). May 2013.

FIGURES



National Fuel
SUPPLY CORPORATION

1100 State St.
Erie, PA 16501
(814) 871-8000
www.nationalfuelgas.com

D.E.M. Surveying, P.C.
Professional Land Surveying

56 Industrial Park Road, Suite #1
Brookville, PA 15825
(814) 849-8230
www.demsurveying.com

INDEX MAP LEGEND

- Stream
- 4 — Construction Map Sheet
- State Route
- Township Road
- County Boundary
- Municipal Boundary

NOTES:

Property lines:
All property lines are approximate and are shown from available tax map record data only and not actual boundary retracement survey.

Survey Data:
Existing line Q and cathodic line located by NFG and surveyed by D.E.M. Surveying July 2015 in proposed project areas. All other feature data received from National Fuel in 2015.

Proposed Pipeline & Staging Area:
Proposed pipeline created by D.E.M. Surveying using survey data by D.E.M. Surveying and notes provided by NFG July 2015. Proposed staging area(s) according to data provided by NFG.

SOURCES:

Contours:
US Geodetic Survey 24K Topographical Map Contours (digital CAD Quads)

Aerial Photography:
PASDA Pennsylvania Spatial Data Access
The Penn State University 2006
http://maps.psiee.psu.edu/ImageryNavigator/

Index Mapping:
PennDOT PA Department of Transportation
Type 10 County Maps October 2014
http://www.dot.state.pa.us

CONSTRUCTION MAP LEGEND

- Even station (Ex. 2+00)
- Line Marker
- Gasline Test Station
- Cable Test Station
- Utility Pole
- Proposed Pipeline
- Road Centerline
- Access Road
- Dirt Road
- Treeline
- Existing Gas Pipeline
- Cathodic Cable
- 20' Elevation Contour
- Delineated Stream
- Delineated Wetland
- Limits of Disturbance
- Right of Way (existing Line Q) = 33 ft
- TEMPORARY WORK SPACE
- GATE
- EXISTING PIPELINE TO BE ABANDONED
- EXISTING PIPELINE
- EXISTING PROPERTY MARKER
- MAN HOLE
- SS — SANITARY SWER
- OHL — OVERHEAD UTILITIES
- PL — PROPERTY BOUNDARY LINE
- ENVIRONMENTAL CLEARING LIMITS
- PROPOSED 4" PL IN 6" ST CASING
- PROPOSED 12" ST (ATTACHED TO 6" ST)

- Open/Herbacious
- Northern Hardwood Forest
- Mixed Hardwood/Coniferous Forest
- Hemlock Forest
- PEM Wetland

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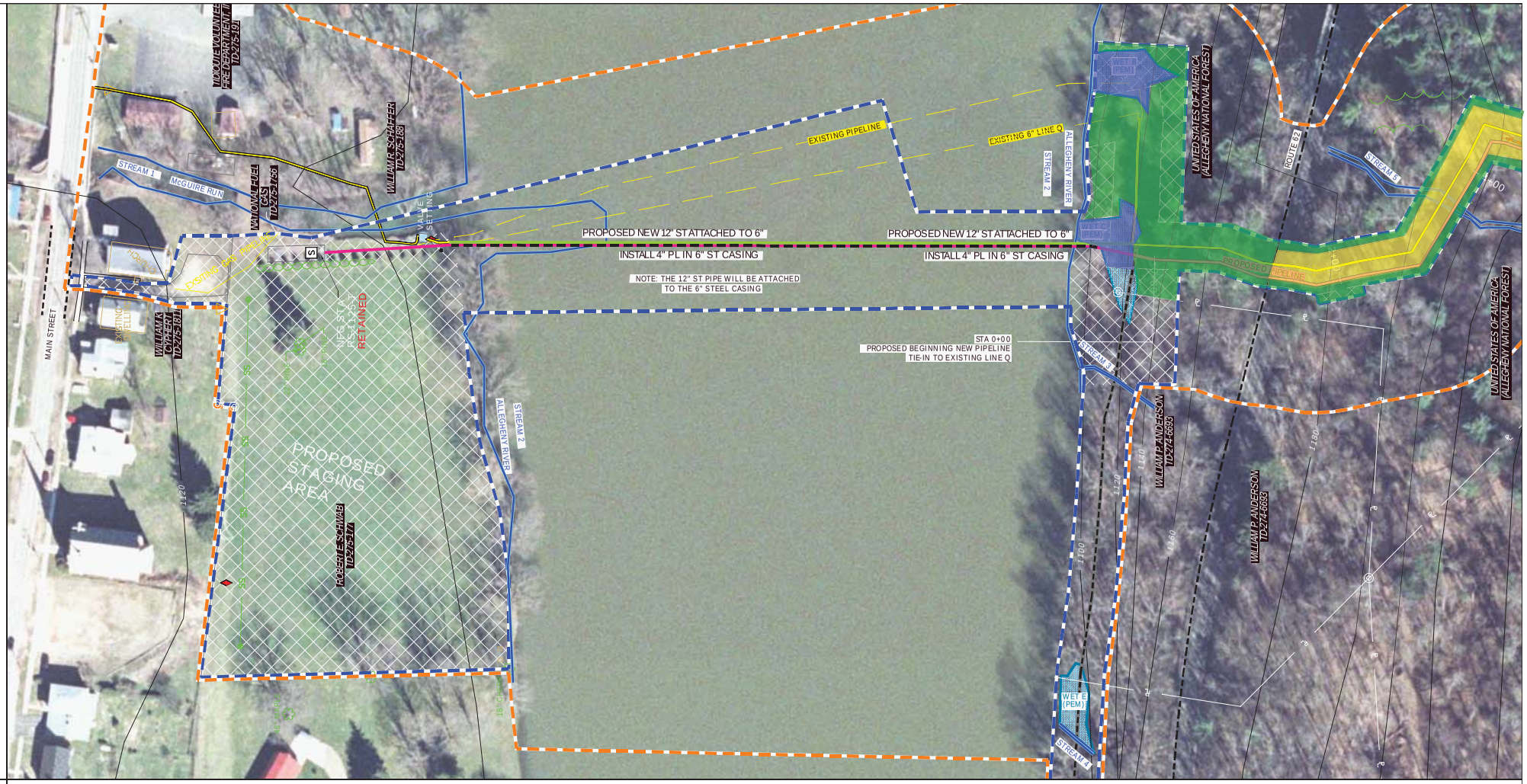
These maps have been provided as a tool to assist the contractor in building the pipeline. National Fuel has made reasonable efforts to provide this information and verify its accuracy; however, the contractor shall not rely solely on the informaton provided. national Fuel recommends that the contractor perform their own due diligence to determine the location of underground facilities, including the appropriate state One Call, communication with landowners, etc. national Fuel makes no warranty regarding the completeness or accuracy of the information provided.

National Fuel
SUPPLY CORPORATION
NFG Supply Corporation
LINE QP: TIDIOUTE TO QUEEN STORAGE

Drawn By: D.E.M. Surveying
Chkd By: D.E.M. Surveying
Scale: 1" = 2 miles
Date: February 2, 2016

REV
5

INDEX SHEET



FOOTAGE	
DIAMETER–WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

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ISSUED FOR REVIEW

0 100 200 Feet

National Fuel SUPPLY CORPORATION

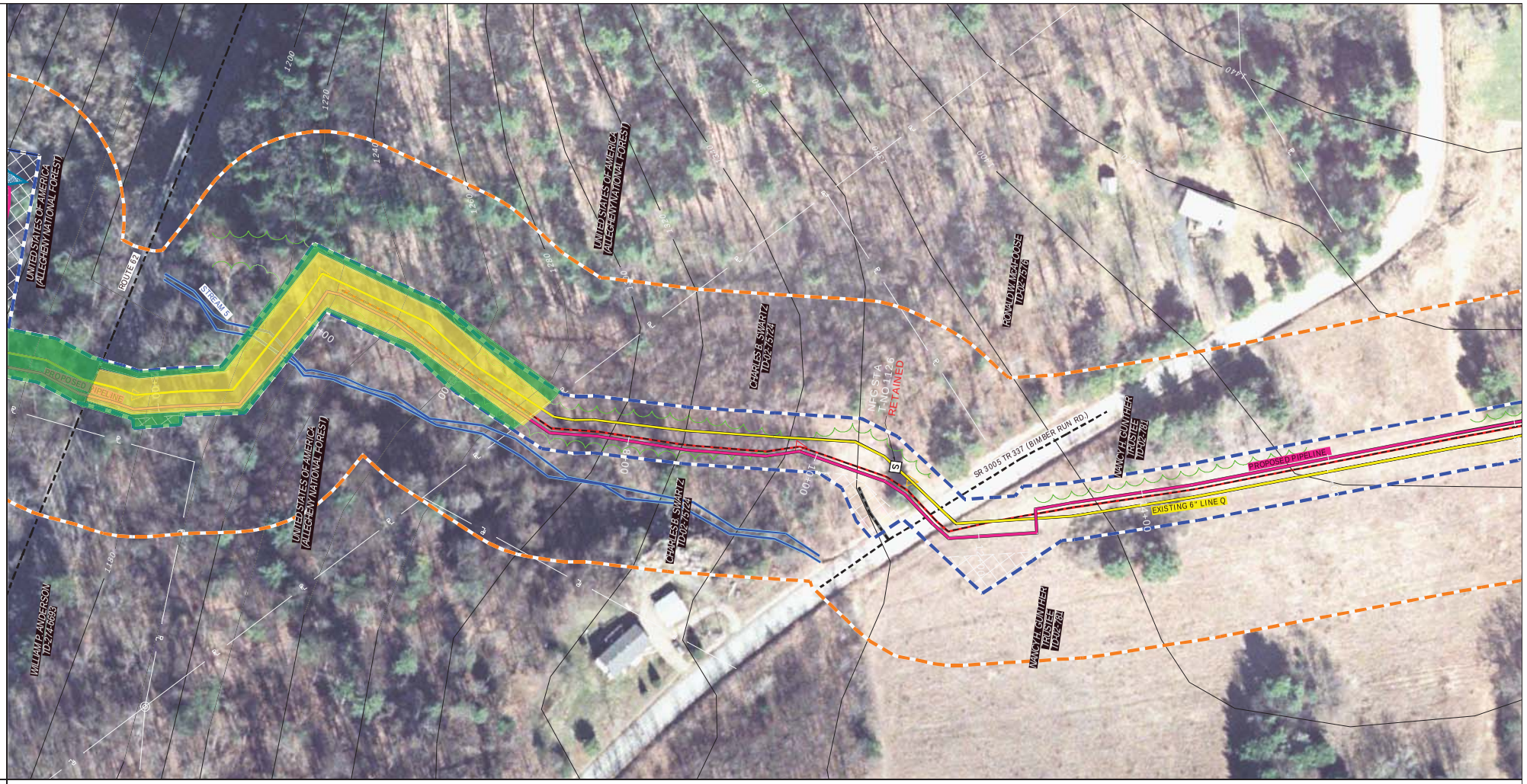
NFG Supply Corporation
LINE OP: TIDIOUTE TO QUEEN STORAGE

Drawn By: D.E.M. Surveying
Chkd By: D.E.M. Surveying
Scale: 1" = 100'
Date: February 2, 2016

REV 5

1 / 20

PIPELINE



FOOTAGE	
DIAMETER–WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

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0 100 200 Feet

National Fuel SUPPLY CORPORATION

NFG Supply Corporation
LINE OP: TIDIOUTE TO QUEEN STORAGE

Drawn By: D.E.M. Surveying
Chkd By: D.E.M. Surveying
Scale: 1" = 100'
Date: February 2, 2016

REV 5

3 / 20

FOOTAGE	
DIAMETER–WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

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National Fuel
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REV 5

5 / 20

PIPELINE

FOOTAGE	
DIAMETER–WALL THICKNESS	
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CLASS BY DESIGN	
COATING	

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Chkd By: D.E.M. Surveying
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Date: February 2, 2016

REV 5

6 / 20

FOOTAGE	
DIAMETER-WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

ISSUED FOR REVIEW

0 100 200 Feet

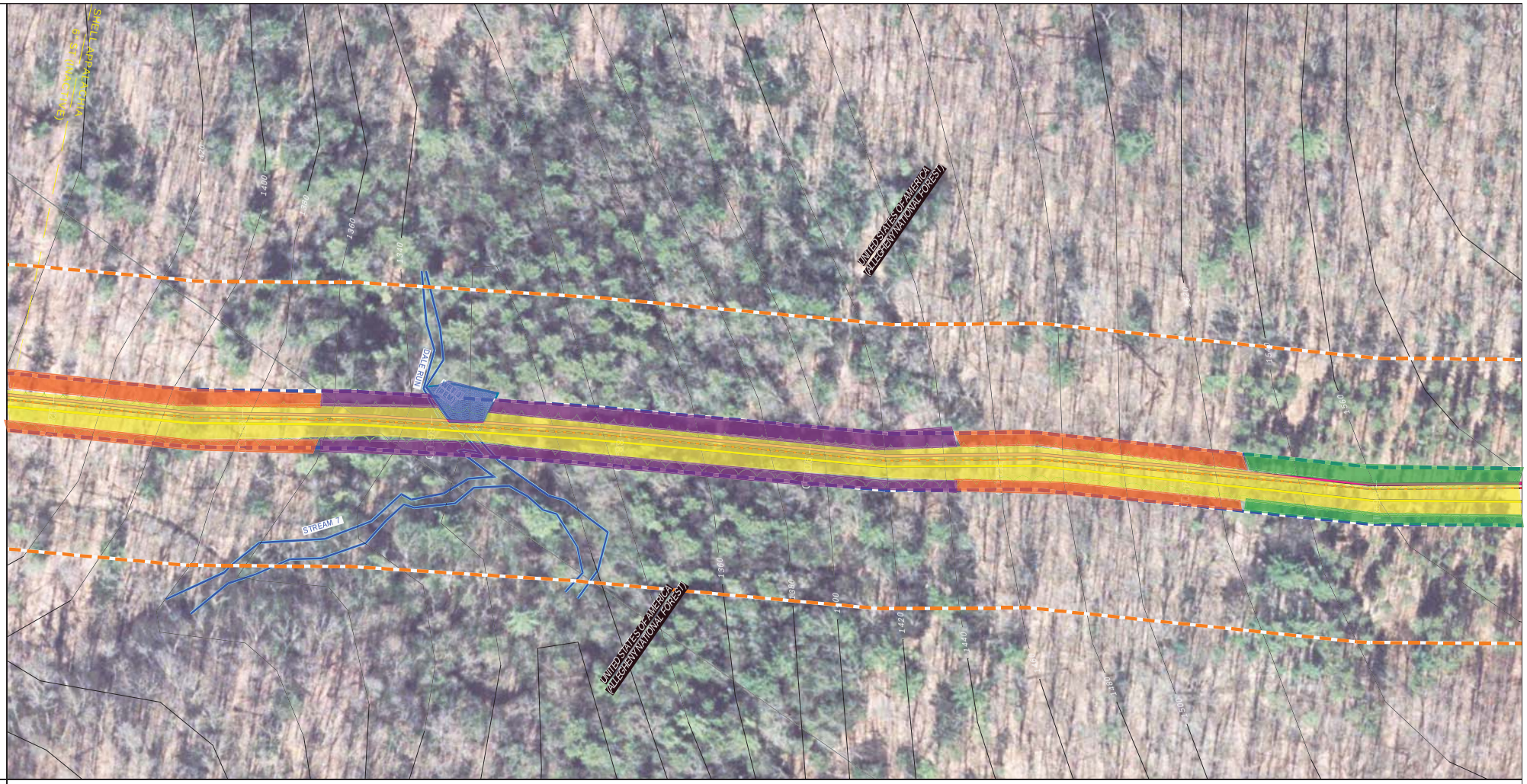
National Fuel SUPPLY CORPORATION

NFG Supply Corporation
LINE QP: TIDIOUTE TO QUEEN STORAGE

Drawn By: D.E.M. Surveying
Chkd By: D.E.M. Surveying
Scale: 1" = 100'
Date: February 2, 2016

REV 5

7 / 20



FOOTAGE	
DIAMETER–WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

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ISSUED FOR REVIEW

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National Fuel
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Chkd By: D.E.M. Surveying
Scale: 1" = 100'
Date: February 2, 2016

REV 5

8 / 20

FOOTAGE	
DIAMETER–WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

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0 100 200 Feet

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NFG Supply Corporation
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Drawn By: D.E.M. Surveying
Chkd By: D.E.M. Surveying
Scale: 1" = 100'
Date: February 2, 2016

REV 5

9 / 20

FOOTAGE	
DIAMETER–WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

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0 100 200 Feet

National Fuel
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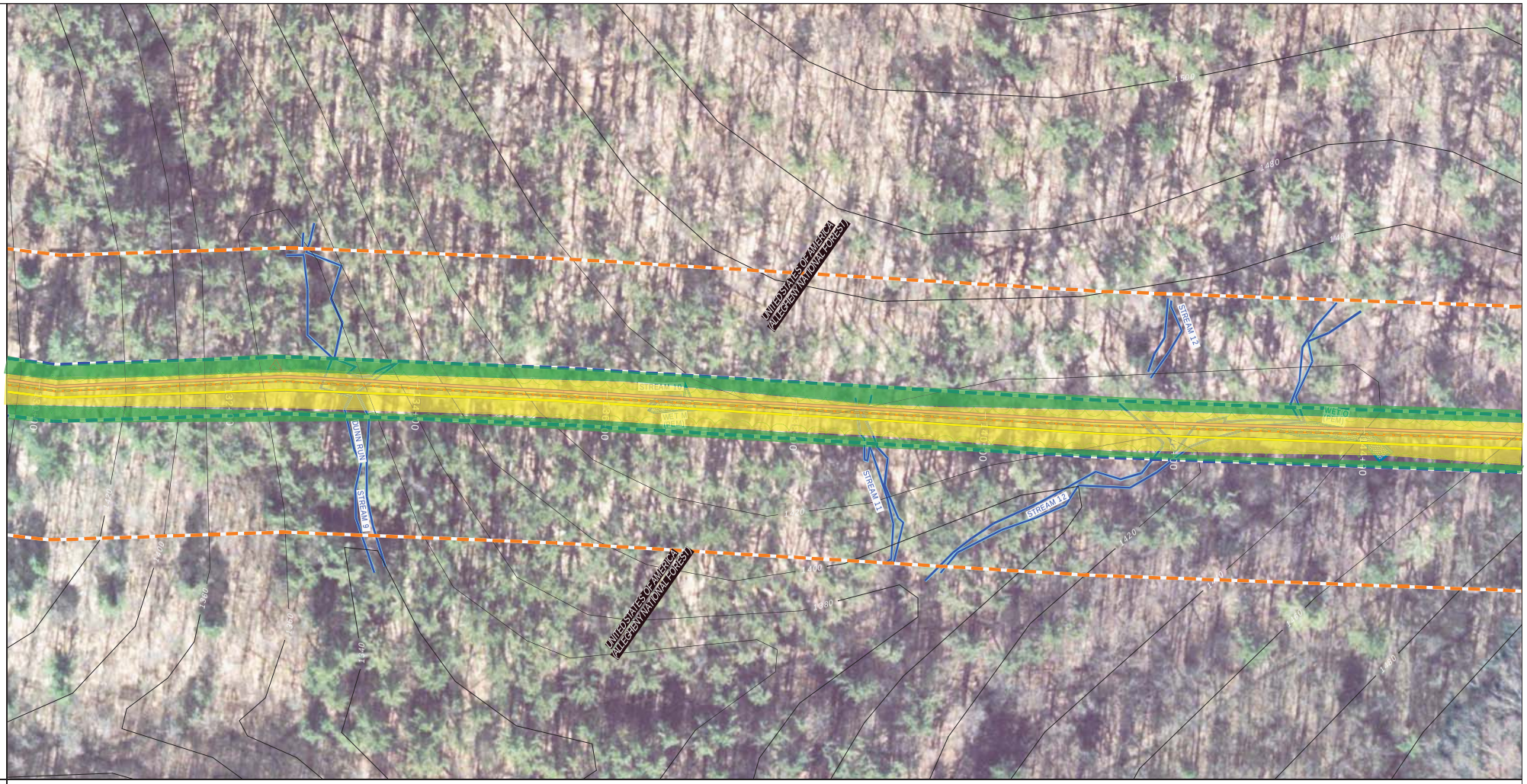
NFG Supply Corporation
LINE OP: TIDIOUTE TO QUEEN STORAGE

Drawn By: D.E.M. Surveying
Chkd By: D.E.M. Surveying
Scale: 1" = 100'
Date: February 2, 2016

REV 5

10 / 20



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0 100 200 Feet

National Fuel
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LINE OP: TIDIOUTE TO QUEEN STORAGE

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Scale: 1" = 100'
Date: February 2, 2016

REV 5

11 / 20

PIPELINE

FOOTAGE	
DIAMETER–WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

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0 100 200 Feet

National Fuel
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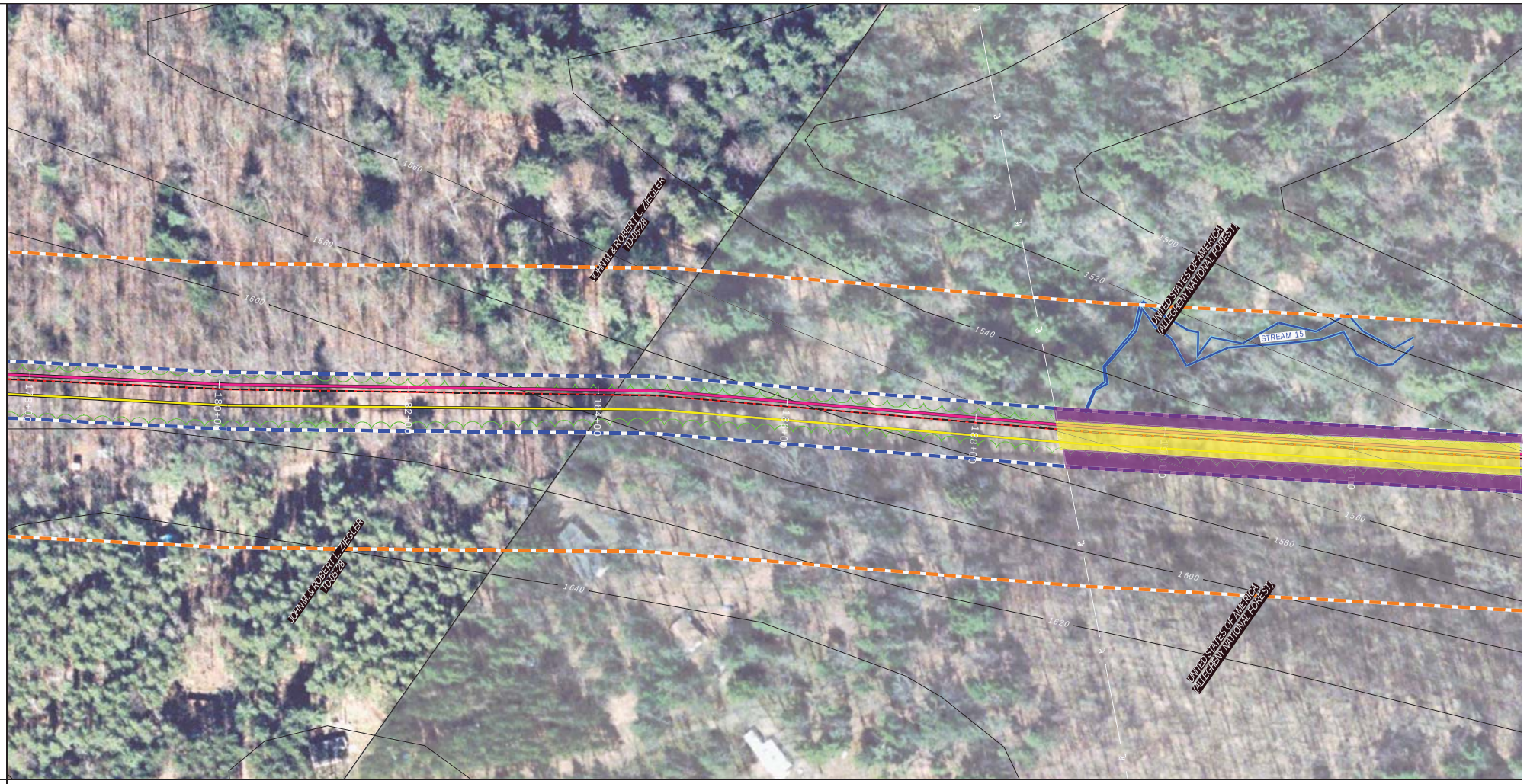
LINE QP: TIDIOUTE TO QUEEN STORAGE

Drawn By: D.E.M. Surveying
Chkd By: D.E.M. Surveying
Scale: 1" = 100'
Date: February 2, 2016

REV	12 / 20
5	



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DIAMETER–WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

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ISSUED FOR REVIEW

0 100 200 Feet

National Fuel SUPPLY CORPORATION

NFG Supply Corporation
LINE OP: TIDIOUTE TO QUEEN STORAGE

Drawn By: D.E.M. Surveying
Chkd By: D.E.M. Surveying
Scale: 1" = 100'
Date: February 2, 2016

REV 5

14 / 20

FOOTAGE	
DIAMETER–WALL THICKNESS	
GRADE	
CLASS BY DESIGN	
COATING	

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0 100 200 Feet

National Fuel SUPPLY CORPORATION

NFG Supply Corporation
LINE OP: TIDIOUTE TO QUEEN STORAGE

Drawn By: D.E.M. Surveying
Chkd By: D.E.M. Surveying
Scale: 1" = 100'
Date: February 2, 2016

REV 5

15 / 20

APPENDIX A

Plant/Wildlife Field Reconnaissance Report

Plant/Wildlife Field Reconnaissance Report

Project Name Line Q **Surveyor Name** Mike Martin

District Bradford **Warrant/Lot Number** _____

Item	Present/Absent	Comment
Den trees/cavity trees		
Fences, ogm, man-made features		
Invasive plants	✓	
Meadows/openings		
Riparian areas	✓	Steep slope to Allegheny River
Rock shelters/complexes - cliffs	✓	Adjacent to ROW
Scattered rocks - cobble	✓	
Seeps – sterile/vegetated		
Skid trails/old roads		
Snags		
Stick nests - rookeries		
Streams		
Surface boulders – house rock	✓	
Utility line row	✓	Pipeline ROW & access road
Vernal ponds		
Wetlands	✓	
White pine/hemlock - inclusions/understory/mid-story	✓	hemlock

Other unique features/plants:
Two small groups of sweet-scented indian plaintain adjacent to Allegheny River.

Overstory: American beech, red maple, red oak, yellow birch, red pine, white pine, eastern hemlock

Shrub Layer: blackberry, grey dogwood, witchhazel

Understory Layer: serviceberry, American beech

Wildlife Species: American crow, chipmunk, blue jay, white-tailed deer

mixed forest

Plant/Wildlife Field Reconnaissance Report

Project Name Line Q **Surveyor Name** Mike Martin

District Bradford **Warrant/Lot Number** _____

Item	Present/Absent	Comment
Den trees/cavity trees		
Fences, ogm, man-made features		
Invasive plants	✓	
Meadows/openings		
Riparian areas		
Rock shelters/complexes - cliffs		
Scattered rocks - cobble	✓	
Seeps – sterile/vegetated		
Skid trails/old roads		
Snags	✓	rare, but present
Stick nests - rookeries		
Streams		
Surface boulders – house rock		
Utility line row	✓	pipline ROW w/ access rd
Vernal ponds		
Wetlands		
White pine/hemlock - inclusions/understory/mid-story		

Other unique features/plants:

Overstory: American beech, red maple, sugar maple, red oak, black cherry

Shrub Layer: blackberry

Understory Layer: American beech, sugar maple, witchhazel

Wildlife Species: white-tailed deer, cedar waxwing

N. hardwood forest

Plant/Wildlife Field Reconnaissance Report

Project Name _____ **Surveyor Name**_____

District Bradford **Warrant/Lot Number** _____

Item	Present/Absent	Comment
Den trees/cavity trees		
Fences, ogm, man-made features		
Invasive plants	✓	
Meadows/openings		
Riparian areas	✓	several small perennial streams
Rock shelters/complexes - cliffs		
Scattered rocks - cobble	✓	
Seeps – sterile/vegetated		
Skid trails/old roads	✓	access road
Snags		
Stick nests - rookeries		
Streams		
Surface boulders – house rock		
Utility line row	✓	pipeline ROW w/ access road
Vernal ponds		
Wetlands		
White pine/hemlock - inclusions/understory/mid-story		

Other unique features/plants:

Overstory:

Shrub Layer:

Understory Layer: Bare ground on access road and vegetated on either side. Canada goldenrod, aster spp., wood fern, bracken fern, varios grasses

Wildlife Species:

open herbaceous

Plant/Wildlife Field Reconnaissance Report

Project Name LineQ **Surveyor Name** Mike Martin

District Bradford **Warrant/Lot Number** _____

Item	Present/Absent	Comment
Den trees/cavity trees		
Fences, ogm, man-made features		
Invasive plants	✓	
Meadows/openings		
Riparian areas	✓	
Rock shelters/complexes - cliffs		
Scattered rocks - cobble	✓	
Seeps – sterile/vegetated		
Skid trails/old roads		
Snags		
Stick nests - rookeries		
Streams	✓	
Surface boulders – house rock		
Utility line row		
Vernal ponds		
Wetlands		
White pine/hemlock - inclusions/understory/mid-story	✓	hemlock forest

Other unique features/plants: steep slopes

Overstory: hemlock, American beech

Shrub Layer:

Understory Layer: American beech

Wildlife Species:

hemlock forest

APPENDIX B

Allegheny National Forest Plant Survey Form

ANF Plant Survey Form

Date of Survey:
Warrant/Lot:

GPS Equipment used:	Handheld GPS unit
Name and Manufacturer	Trimble GeoXH 6000
Degree of Accuracy of Equipment: Also list PDOP if known during survey collection. Minimum number of data collection events per point is 10.	sub-meter
Was data differentially corrected?	

GPS File Name (if applicable): coordinates of rare plants provided below

Survey Location: ROW Other_____

Survey Area – Total Acres surveyed and included on this data sheet: 40
Adjacent Road – or Access to survey area (How area was accessed) #:

Invasive Plant Species Found: Yes
RFSS (Rare) Plants Found: Yes

Survey Start Time: 1100 Survey End Time: 1700
Examiners: Martin, Brewer_____
Data Recorder: Michael S. Martin

SITE ID FOR SURVEY AREA	
SITE ID **0919 0 03 2 0 1 6 1 0 1 7 1 1 0 0 M S M** **DISTRICT Y Y Y Y M M D D T T T T F M L** **Y-**YEAR **M-**MONTH **D-**DAY **T-**TIME **F M L –** FIRST, MIDDLE, LAST NAME	
County No/Name (Circle) : **123 Warren**	**USGS QUAD NAME:** **Tidioute, Cobham**

Comments:

Hand Sketch Map – Include information on how one would get there, access by foot, ATV, special features such as streams, springs, seeps, rocks, roads, utility lines, general location of invasive plants, rare plants, other features of interest in terms of treating invasive plants (safety hazards such as underground line signs etc.)

Pipeline ROW accessed on foot from Route 337, Shanley Road, Red House Hill Road, and Kelly Hill Road.

Used to estimate Non-Native Invasive Plants (NNIP) Infested Area in Table 1.			Phenolgy for Graminoids/ Grass like plants		Phenology for non-grass species (Forbs, Shrubs, trees)	
Acres	**Square feet**	**Length x Width**	**G1**	Leaves partially developed; no heads	**F1**	Pre-flowering (includes vegetative, beginning growth stages and rosettes)
1	43,560	208.7' x 208.7'	**G2**	Inflorescence inside sheath	**F2**	Flowering
0.5	21,780	147.6' x 147.6'	**G3**	Inflorescence partially or	**F3**	Fruiting
0.1	4,356	66' x 66'	**G4**	Seeds maturing or mature	**F4**	Senescent; dormancy
0.01	433	20.8' x 20.8'	**G5**	Senescent; dormancy	**Vertical Distance to Water – standing or running water.**	
0.001	44	6.6' x 6.6'	**RG**	Regrowth (has been cut/chewed down)	**<25**	Less than 25 feet
0.0001	4.4	2.1' x 2.1'			**>25**	More Than 25 feet

Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-1	ROMU	Rosa multiflora	F3	>25	150sf		632733	4615300	
INV-2	ALPE4	Alliaria petiolata	F4	>25	150sf		632731	4615301	
INV-3	ROMU	Rosa multiflora	F3	>25	50sf		632747	4615326	
INV-4	ROMU	Rosa multiflora	F3	>25	75sf		632755	4615355	
INV-5	LOTA	Lonicera tatarica	F4	>25	15sf		632760	4615357	
INV-6	ROMU	Rosa multiflora	F3	>25	25sf		632742	4615386	patchy coverage
INV-7	LOTA	Lonicera tatarica	F4	>25	100sf		632716	4615448	
INV-8	PHAR3	Phalaris arundinacea	G5	<25	400sf		632725	4615505	

*** NRCS Plant Code** http://plants.usda.gov

Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-9	LOTA	Lonicera tatarica	F4	<25	100sf		632728	4615494	
INV-10	LOTA	Lonicera tatarica	F4	<25	100sf		632724	4615486	
INV-11	LYSA2	Lythrum salicaria	F4	<25	10sf		632717	4615491	
INV-12	BETH	Berberis thunbergii	F4	>25	50sf		633265	4614259	
INV-13	LOTA	Lonicera tatarica	F4	>25	120sf		633275	4614263	
INV-14	ROMU	Rosa multiflora	F3	>25	120sf		633275	4614263	
INV-15	PELO10	Persicaria longiseta	F2	>25	100sf		633303	4614214	
RFSS-1	HASU3	Hasteola suaveolens	F3	<25	5sf	5	632724	4615497	

*** NRCS Plant Code** http://plants.usda.gov

Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-16	ROMU	Rosa multiflora	F3	>25	100sf		633324	4614186	sparsely distributed
RFSS-2	HASU3	Hasteola suaveolens	F3	<25	10sf	8	632718	4615505	
INV-17	ROMU	Rosa multiflora	F3	>25	25sf		633533	4613864	
INV-18	PELO10	Persicaria longiseta	F2	>25	5sf		633540	4613855	
INV-19	ROMU	Rosa multiflora	F3	>25	250sf		633548	4613840	
INV-20	BETH	Berberis thunbergii	F4	>25	25sf		633590	4613777	
INV-21	ROMU	Rosa multiflora	F3	>25	50sf		633599	4613765	
INV-22	MIVI	Microstegium vimineum	G5	>25	75sf		633618	4613736	

*** NRCS Plant Code** http://plants.usda.gov

Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-23	MIVI	Microstegium vimineum	G5	>25	200sf		633661	4613686	linear strip on roadside
INV-24	ROMU	Rosa multiflora	F3	>25	30sf		633701	4613614	
INV-25	LOTA	Lonicera tatarica	F4	>25	5sf		633713	4613608	
INV-26	ROMU	Rosa multiflora	F3	>25	25sf		633825	4613430	
INV-27	ROMU	Rosa multiflora	F3	>25	1000sf		633871	4613376	scattered linearly on roadside
INV-28	MIVI	Microstegium vimineum	G5	>25	300sf		633899	4613332	linear strip on roadside
INV-29	LYNU	Lysimachia nummularia	F4	>25	25sf		633912	4613312	
INV-30	LOTA	Lonicera tatarica	F4	<25	125sf		633939	4613268	on edge of perennial stream

*** NRCS Plant Code** http://plants.usda.gov

Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-31	BETH	Berberis thunbergii	F4	>25	50sf		633988	4613188	
INV-32	ROMU	Rosa multiflora	F3	>25	75sf		634021	4613132	
INV-33	MIVI	Microstegium vimineum	G5	>25	50sf		634064	4613076	
INV-34	ROMU	Rosa multiflora	F3	>25	100sf		634089	4613027	scattered along roadside
INV-35	MIVI	Microstegium vimineum	G5	<25 (wetland)	150sf		634263	4612775	scattered along roadside
INV-36	LOTA	Lonicera tatarica	F4	<25 (wetland)	75sf		634279	4612747	
INV-37	ROMU	Rosa multiflora	F3	<25 (wetland)	75sf		634283	4612739	
INV-38	CIAR4	Cirsium arvense	F4	>25	150sf		633242	4614306	

*** NRCS Plant Code** http://plants.usda.gov

Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-39	MIVI	Microstegium vimineum	65	>25	50sf		633231	4614310	
INV-40	ROMU	Rosa multiflora	F3	>25	50sf		633225	4614330	
INV-41	LOTA	Lonicera tatarica	F4	>25	75sf		633227	4614332	
INV-42	ROMU	Rosa multiflora	F3	>25	100sf		633203	4614349	
INV-43	ROMU	Rosa multiflora	F3	>25	25sf		633190	4614384	
INV-44	ROMU	Rosa multiflora	F3	>25	300sf		633175	4614414	
INV-45	PELO10	Persicaria longiseta	F2	>25	5sf		633170	4614413	
INV-46	LOTA	Lonicera tatarica	F4	>25	100sf		633165	4614427	

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Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-47	ROMU	Rosa multiflora	F3	>25	200sf		633161	4614425	
INV-48	LOTA	Lonicera tatarica	F4	>25	30sf		634352	4612645	
INV-49	PELO10	Persicaria longiseta	F2	>25	200sf		634394	4612564	linear strip in center of road
INV-50	LIVU	Ligustrum vulgare	F4	>25	1sf		634427	4612507	
INV-51	MIVI	Microstegium vimineum	G5	>25	100sf		634482	4612434	linear strip in center of road
INV-52	PELO10	Persicaria longiseta	F2	>25	75sf		634489	4612428	linear in tire ruts
INV-53	LOTA	Lonicera tatarica	F4	>25	10sf		634505	4612398	
INV-54	ROMU	Rosa multiflora	F3	<25	100sf		634527	4612364	

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Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-55	MIVI	Microstegium vimineum	G5	<25	50sf		634557	4612339	linear in center of road
INV-56	ROMU	Rosa multiflora	F3	>25	100sf		634642	4612264	
INV-57	PELO10	Persicaria longiseta	F2	>25	50sf		634635	4612195	
INV-58	MIVI	Microstegium vimineum	G5	>25	60sf		634654	4612179	linear strip on roadside
INV-59	PELO10	Persicaria longiseta	F2	>25	30sf		634712	4612106	linear strip on roadside
INV-60	MIVI	Microstegium vimineum	G5	>25	75sf		634745	4612032	linear strip on roadside
INV-61	ROMU	Rosa multiflora	F3	>25	5sf		634755	4612024	
INV-62	ROMU	Rosa multiflora	F3	<25	50sf		634888	4611834	

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Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-63	BETH	Berberis thunbergii	F4	<25	30sf		634906	4611818	
INV-64	MIVI	Microstegium vimineum	G5	<25	30sf		634925	4611778	linear strip on roadside
INV-65	ROMU	Rosa multiflora	F3	<25	50sf		634970	4611709	
INV-66	PELOID	Persicaria longiseta	F2	<25	300sf		635681	4610683	linear strip on roadside
INV-67	ROMU	Rosa multiflora	F3	<25	5sf		635697	4610650	
INV-68	ROMU	Rosa multiflora	F3	>25	75sf		635736	4610600	
INV-69	PELOID	Persicaria longiseta	F2	>25	20sf		635772	4610539	
INV-70	ROMU	Rosa multiflora	F3	>25	150sf		635772	4610541	linear strip on roadside

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Table 1. Non-Native Invasive Plant Species Found During Survey.

Time for Polygon /Point ID (TTTT)	NRCS Plant Code*	Scientific Name	Phenology	Vertical Distance To water (feet)	Infested Area (Acres)	No. of Plants	NAD83, UTM Zone North 17 meters Easting x-coordinate	NAD83, UTM Zone North 17 meters Northing y-coordinate	Comments:
INV-71	ROMU	Rosa multiflora	F3	>25	50sf		635786	4610523	

* NRCS Plant Code http://plants.usda.gov

Table 2. ANF Federal and Regional Forester Sensitive Plant Species (Sorted by Broad Habitat – Open dry to Wet shade conditions then by Scientific Name).

NRCS Code	Scientific Name	Common Name	Broad Habitat Considerations	Wetland Status	Suitable Habitat	Suitable Habitat Present in Survey Area No/Yes	Plant(s) present in survey area? No/Yes
PAIN3	*Parthenium integrifolium*	American fever-few	Open - Dry	None	Well-drained soil in openings.	No	No
JUCI	*Juglans cinerea*	Butternut	Open - Moist	FACU+	Typically grows in openings in rich forests, lower slopes, ravines, and bottomlands, floodplains.	No	No
FIRU2	*Filipendula rubra*	Queen-of-the-prairie	Open - Moist/Wet	FACW	Moist to wet soils, prefers light (sandy) or medium (loamy) soils, can also grow in heavy clay soil. Requires full sun for best growth, can tolerate partial shade.	No	No
CAMAI2	*Carex magellanica ssp. Irrigua*	Boreal bog sedge	Open - Wet	OBL	Acid swamps and sphagnum bogs.	No	No
ERTE12	*Eriophorum tenellum*	Rough cotton-grass	Open - Wet	OBL	Bogs and swamps. Such areas are generally hummocky with sphagnum moss.	No	No
HASU3	*Hasteola suaveolens*	Sweet-scented Indian plantain	Open - Wet	FAC-	Dry to moist ground at in floodplains. It is relatively tolerant of light shade.	Yes	Yes
JUFI	*Juncus filiformis*	Threadrush	Open - Wet	FACW	Occurs along the edge of pools, depressions and wetlands and between the high and low water marks of streams, rivers or lakes.	Yes	No
SCAN5	*Scirpus ancistrochaetus*	Northeastern Bulrush	Open - Wet	OBL	Grows in open, herb-dominated wetlands, natural ponds, shallow sinkholes, or seasonally flooded depressions.	No	No
SCPE3	*Scirpus pedicellatus*	Stalked bulrush	Open - Wet	OBL	Usually occurring in lowland marshes in stream valleys, edges of bogs, boggy meadows, and wet sandy shorelines.	Yes	No

NRCS Code	Scientific Name	Common Name	Broad Habitat Considerations	Wetland Status	Suitable Habitat	Suitable Habitat Present in Survey Area No/Yes	Plant(s) present in survey area? No/Yes
RILA	*Ribes lacustre*	Bristly black currant	Open/Partial Shade - Moist	FACW	In sunlight it grows erect, but in shade, branches are often reclining or trailing. Occurs in woods, forests, and shrublands.	Yes	No
DRCA3	*Dryopteris campyloptera*	Mountain wood fern	Partial Shade - Moist	None	Cool, moist woods, acidic soils and prefers to be moist during much of the growing season. It is tolerant to moderately tolerant of shade.	Yes	No
PLHO3	*Platanthera hookeri*	Hooker's orchid	Partial Shade - Moist	FAC	Found in rich, well-drained mixed-deciduous forests.	Yes	No
RITR	*Ribes triste*	Red currant	Partial Shade - Moist/Wet	OBL	Wet, rocky woods, swamps and cliffs, sunny edge or dappled shade canopy condition.	No	No
STBO3	*Stellaria borealis*	Mountain starwort	Partial Shade - Moist/Wet	FACW	Springy wooded slopes, sphagnous swamps and stream banks.	Yes	No
AMBA	*Amelanchier bartramiana*	Bartram shadbush	Partial Shade/Shade - Moist/Wet	FAC	Swamps, sphagnum bogs and peaty thickets; moist woods, and stream banks.	Yes	No
GAHI2	*Gaultheria hispidula*	Creeping Snowberry	Partial Shade/Shade - Moist/Wet	FACW	Bogs and wet woods, where it may occur on a variety of raised substrates including downed logs, stumps, mosses, mud and bare ground.	No	No
ISME2	*Isotria medeoloides*	Small Whorled Pogonia	Shade - Dry	FACU	In PA, occurs on dry oak sites, on benches or saddles, and near the beginning of intermittent drainages, usually on south or southeast facing slopes.	No	No
ERAL9	*Erythronium albidum*	White trout-lily	Shade - Moist	FACU	Moist to wet bottomlands, clay and silt floodplain forests. Prefers mature, old, old-growth or multi-age forest conditions.	No	No

NRCS Code	Scientific Name	Common Name	Broad Habitat Considerations	Wetland Status	Suitable Habitat	Suitable Habitat Present in Survey Area No/Yes	Plant(s) present in survey area? No/Yes
GOTE	*Goodyera tesselata*	Checkered rattlesnake plantain	Shade - Moist	FACU-	Typically found growing in upland coniferous or mixed deciduous/coniferous forest associated with glaciation or areas influenced by glacial outwash.	No	No
PAQU	*Panax quinquefolius*	American ginseng	Shade - Moist	None	Prefers stable habitats, such as the understory of mid-successional to late-successional deciduous forest.	No	No
TACA7	*Taxus canadensis*	Canada yew	Shade - Moist	FAC	Rich, moist woods and wooded swamps; growth is best in at least partial shade. Grows best mature/climax forests, does not occur in early or mid-successional communities.	No	No

Table 3. Wetland Status Code Definitions.

Obligate wetland species	OBL	99% probability of occurring in wetlands under natural conditions.
Facultative wetland species	FACW	67-99% probability of occurring in wetlands under natural conditions.
Facultative species	FAC	34 -66% probability of occurring in wetlands under natural conditions.
Facultative Upland Species	FACU	1-33 % probability of occurring in wetlands under natural conditions.
Upland Species	UPL	1% probability of occurring in wetlands under natural conditions.

Plant Survey Form//Allegheny National Forest//Bradford Ranger District

Project: Pipeline going through Allegheny National Forest
Surveyor(s): Larry Brewer
Date: 10/17/16, 10/18/16
Lot/Warrant: National Pipeline Acres:

TREES

- Apple / Malus sp _____
- Ash - white (*F. americana*) / **red (*F. rubra*) / black (*F. nigra*) GPS**
- Aspen - big-tooth (*P. deltoides*) / quaking (*P. tremuloides*)
- Basswood (T. americana)
- Beech - american (*F. grandifolia*)
- Birch - black (*B. lenta*) / yellow (*B. alleghaniensis*)
- Black gum (N. sylvatica)
- **Butternut (Juglans cinerea) GPS**
- Cherry - black / pin / choke (*P. serotina*) *pensylvanica, virginiana*)
- **Chestnut - american (*Castanea dentata*) GPS** Saplings
- Cucumber magnolia ***(if showing weevil defoliation GPS)***
- Eastern hemlock (*T. canadensis*)
- Elm - american (*U. americana*) / slippery (*U. rubra*)
- Hawthorn Sp
- Hickory - bitternut / **shagbark (*C. ovata*)** Carya ovalis
- ~~Ironwood~~ Blue Beech (*Carpinus caroliniana*)
- Maple - red (*A. rubrum*) / sugar (*A. saccharum*)
- Oak - black / chestnut / red / white / **scarlet (*Q. coccinea*)**
- Pine - white / red / **pitch (*P. rigida*) GPS**
- Sassafras ***(if showing weevil defoliation GPS)***
- Serviceberry - arborea / laevis /**Bartrams (*A. bartramiana*) GPS***
- *Tree of heaven* (Ailanthes altissima) *
- Tulip poplar ***(if showing weevil defoliation GPS)***

SHRUBS & VINES

-
- Autumn olive *
- **Azalea - early pink (*A. prinophyllum*)**
- *Barberry - japanese* (Berberis thunbergii) *
- *Bittersweet - oriental* (C. orbiculatus)*
- Blackberry (*R. allegheniensis / R. pensylvanicus*)
- Blueberry - low sweet (*V. angustifolium*) / (*V. pallidum*)
- *Buckthorn - glossy* (R. frangula / *common (R. cathartica)**
- *Burning bush* (E. alatus)*
- **Canada yew (*Taxus canadensis*) - GPS***
- Carrion-flower (*Smilax herbacea*)
- **Currant -northern (*Ribes hirtellum*)/ skunk (*glandulosum*) GPS ***
- **Currant bristly black (*Ribes lacustre*) GPS ***
- **Currant - red swamp (*R. triste*) GPS ***
- Deerberry (*Vaccinium stamineum*)
- Devil's walking stick (*A. spinosa*)
- Dewberry - prickly (*R. flagellaris*)/ swamp (*R. hispidus*)
- Dogwood - **flowering (*Cornus florida*)**
- Dogwood - alternate leaf / silky / grey / **red-Osier**
- **Elderberry - american (*S. canadensis*) / red (*S. racemosa*)**
- **Gooseberry - prickly (*R. cynosbati*)/ rnd-leaf (*R. rotundifolium*)**

next to Allegheny River

SHRUBS & VINES (cont)

- **Spicebush - northern (*L. benzoin*) GPS**
- Sweet fern (*C. peregrina*)
- **Viburnum - maple-lf (*V.acerifolium*) / hobblebush (*V. lantanoides*)**
- Virginia creeper (*P. quinquefolia*)
- Virgin's bower (*C. virginiana*)
- Willow (*Salix sp*)_____
- Witchhazel (*H. virginiana*)

FORBS

- Aster - (*Symphyotrichum lanceolatum / laterifolium / lowrieanum / novae-angliae / prenanthoides*)
- Aster - wht wood (*E. divaricata*)/ lg-lvd (*E. macrophylla*)
- Avens - white (*G. canadense*) / herb-bennet (*G. laciniatum*)
- Baneberry - white (*A. pachypoda*) / **Red (*A. rubra*) GPS ***
- Bedstraw - *Galium asparine / asprellum / circaezans / lance.*
- Bee-balm - red (*Monarda didyma*) / lavender (*M. fistulosa*)
- **Beechdrops (*Epifagus virginiana*)**
- Begger-ticks (*B. cernua / connata / frondosa / vulgata*)
- **Bellwort - largeflower (*U. grandiflora*) GPS**
- Bellwort - perfoliate (*U. perfoliata*) / sessile (*U. sessilifolia*)
- Bindweed - fringed / black/ climbing false buckwheat)
- *Birdsfoot trefoil (Lotus corniculatus) **
- **Bloodroot (*Sanguinaria canadensis*)**
- Blue cohosh (*Caulophyllum thalictroides*)
- Blue-eyed grass - *S. angustifolium / mucronat./**montanum*** **GPS**
- blue wild indigo (*Baptisia australis var. australis*) **GPS ***
- Boneset (*Eupatorium perfoliatum*)
- Brooklime - american (*Veronica americana*)
- Bunchberry (*Cornus canadensis*)
- *Burdock* (*Arctium minus*) *
- Buttercup - (*R. arborvitus*)/ *common (R. acris)*/swamp (*R. hispidus*)
- Canada mayflower (*Maianthemum canadense*)
- Cattail - *narrow (Typha angustifolia) */ latifolia*
- Cinquefoil - *Potentilla canadensis / norvegica / recta / simplex*
- **Club-spur orchid (*Platanthera clavellata*) GPS**
- *Colts-foot - (Tussilago farfara) **
- **Coralroot (*Corallorhiza maculata / odontorhiza*) GPS**
-
- *Cow wheat (Melampyrum lineare)*
- Creeping snowberry - (*Gaultheria hispidula*)
- Crowfoot - hooked (*Ranunculus recurvatus*)
- *Crownvetch - Coronilla varia **
- *Crown-vetch (Coronilla varia)**
- *Dames rocket (Hesperis matronalis) **
- *Dandelion (Taraxacum officinale)*
- Dewdrop (*Dalibarda repens*)

Plant Survey Form//Allegheny National Forest//Bradford Ranger District

- ✓ **Grape - wild (*Vitis spp*)** Vitis vulpina
- **Holly - mountain (*Ilex montana*)**
- **Honeysuckle - american fly (*Lonicera canadensis*) GPS**
- Honeysuckle - northern bush (*Diervilla lonicera*)
- ✓ Hop-hornbeam - eastern (*Ostrya virginiana*)
- Huckleberry - black
- Laurel - **great (*R. maximum*) /** mountain (*K. latifolia*)
- **Leatherwood - (*Dirca palustris*) GPS**
- Maple - striped (*A. pensylvanica*) / **mountain (*A. spicatum*) GPS**
- ✓ *Multiflora rose** other **Rosa sp** _____
- ✓ Privet - border / european *
- Raspberry - purple flowering (*R.odoratus*)/ **trailing (*R.pubesns*)**
- ✓ Raspberry - red (*R. idaeus*) / black (*R. occidentalis*)

FORBS (cont.)

- Fringed polygala (*Polygala pauciflora*)
- *Galium* (cont.) / *mollugo / tinctorium / triflorum*
- ✓ Garlic mustard (Alliaria petiolata) *
- Geranium - wild (*G. maculatum*)
- Ginseng - dwarf (*P. trifolium*) / **American (*P. quinquefolius*) GPS***
- ✓ *Glechoma hederacea / Gnaphalium uliginosum*
- *Goatsrue* (Galega officinalis) *
- **Golden saxifrage (Chrysosplenium americanum)**
- Goldenrod - (*S. altissima / bicolor / caesia / canadensis / flexicaulis*
- *gigantea / juncea / nemoralis / rugosa / squarrosa / ulmifolia*)
- ✓ Goldenrod- grassleaved (*Euthamia graminifolia*)
- Goldthread (*Coptis trifolia*)
- Hawkweed - panicled (*H. paniculatum*) **/ rattlesnake (H. venosum)**
- *Hellebore (Epipactus helleborine)*
- *Hemp-nettle (Galeopsis bifida)*
- Hepatica - sharplobed (*anemone acutiloba*) / **rounded (*a. obtusa*)**
- *Hieracium aurantiacum / caespitosum*
- Hog peanut (*Amphicarpaea bracteata*)
- ✓ Indian cucumber-root (*Medeola virginiana*)
- ✓ Indian pipe (Monotropa uniflora) / Pinesap (*M. hypopitys*)
- ✓ Indian tobacco (*Lobelia inflata*)
- Jack-in-the-pulpit (*Arisaema triphyllum*)
- Jerusulem artichoke (*Helianthus tuberosus*) / **sunflower sp.**
- ✓ Jewelweed - spotted (*Impatiens capensis*) / yellow (*I. pallida*)
- Joepyeweed (*Eutrochium fistulosum / maculatum / purpureum*)
- *Knapweed* (Centaurea jacea / nigra / stoebe) *
- *Knotweed* (Fallopia japonica) *

- ✓ *Dock - curly (R. crispus) / common(R. obtusifolius)*
- ✓ Dogbane - pink (*A. androsaemifolium*) / indianhemp (*A. cannabinum*)
- **Dutchmans breeches (*Dicentra cucullaria*)**
- Enchanter's nightshade - dwarf (*C. alpina*) / broad (*C. canadensis*)
- False hellebore (*Veratrum virginicum*)
- False solomons-seal (*Maianthemum racemosum*)
- Fireweed (*Epilobium angustifolium*)
- ✓ Fleabane (*Erigeron annuus / philad. / pulchellus / strigosus*)
- Solomon's-seal -hairy (*P. pubescens*) / smooth (*P. biflorum*)
- *Speedwell - corn (Veronica arvensis) / common (V.officinalis)*
- **Spikenard (*Aralia racemosa*)**
- Squaw-root (*Conopholis americana*)
- **Squirrel-corn (*Dicentra canadensis*)**

FORBS (cont.)

- St John's wort - *common (H. perforatum)* / **great (*H. pyramidatum*) GPS**
- ✓ St John's wort - dwarf (Hypericum mutilum) / spotted (H. punctatum)
- Star-flower (*Trientalis* borealis)
- **Stitchwort – boreal starwort,northern (*Stellaria borealis*) GPS***
- ✓ Stitchwort - *Stellaria alsine* / graminea / longifolia / *media*
- ✓ Strawberry - woodland (Fragaria vesca) / wild (*F. virginiana*)
- Sweet cicely - (*Osmorhiza claytonii*) / Sweet-anise (*O. longistylis*)
- ✓ **Sweet scented Indian plantain (*Hasteola suaveolens*) GPS***
- ✓ *Thistle - canada (Cirsium arvense)* / bull (C. vulgare)**
- **Toothwort (*C. diphylla / concatenata*) - (*C. maxima*) GPS***
- ✓ Trailing arbutus (*Epigaea repens*)
- Trillium - purple (*T. erectum*)/ wht. (*T. grandiflorum*)/ painted (*T.undulatum*)
- Trout-lily - yellow (*E. americanum*) / **white (*E. albidum*) GPS ***
- ✓ Turtlehead (*Chelone glabra*)
- Twisted-stalk - rosy (*S. roseus*) / clasping **(*S. amplexifolius*) - GPS***
- ***Viola appalachiensis / selkirkii* - GPS***
- Violet - (*Viola blanda / canadensis / cucullata / hastata*
- Appalachian barren strawberry (*Waldsteinia fragarioides)*
- ✓ Water-horehound (*Lycopus americanus / uniflorus / virginicus)*
- Waterleaf - virginia (*H. virginianum*) / brd-leaf (*H. canadense*)
- *Wild basil (Clinopodium vulgare)*
- *Wild chervil* (Anthriscus sylvestris)*
- Wild Ginger (Asarum canadense)
- wild quinine (*Parthenium integrifolium*) **- GPS***
- ✓ Willow-herb (*Epilobium ciliatum / coloratum*)
- ✓ Wintergreen/teaberry - (*Gaultheria procumbens*) **hispidula - GPS***
- white fawnlily (*Erythronium albidum*) **- GPS***
- Wood sorrel nrthn (*O. acetosella*) / yellw (*O. stricta*)**/ violet (*O. violacea*) GPS**
- ✓ *Yarrow - common (Achillea millefolium)*
- ✓ Yellow mandarin (*Disporum lanuginosum*)

Plant Survey Form//Allegheny National Forest//Bradford Ranger District

- *labradorica / pubescens / rostrata / rotundifolia / sororia* / unk.
- **Ladies-tresses - *Spiranthes casei / romanzoffiana* - GPS***
- **Ladies-tresses - *Spiranthes cernua / lacera / ochroleuca* - GPS**
- **Lady slipper - pink (*Cypridedium acaule*) - GPS**
- **Lady slipper - yellow (*C. parviflorum*) / showy (*C. reginae*) GPS ***
- **Leeks (*Allium tricoccum*)**
- Mayapple - (*Podophyllum peltatum*)
- Meadow-rue - early (*T. dioicum*) / tall *(T. pubescens*)
- **Milkweed (*A. syriaca / exaltata / incarnata / tuberosa*) GPS**
- *Mullein - common (*Verbascum thapsus*)*
- Nettle - wood (*Laportea canadensis*) / stinging (*Urtica dioica*)
- **Pad-leaf orchid (*Platanthera hookeri / macrophylla*) GPS***
- Partridgeberry (*Mitchella repens*)
- Pearly everlasting (*Anaphalis margaritacea*)
- Pennywort - marsh (*Hydrocotyle americanum*)
- **Pogonia - lg whrld (*Isotria verticillata*) / sml (*I. medeoloides*) GPS***
- *Purple loosestrife (Lythrum salicaria)**
- **Purple-fringed orchid (*Platanthera psycodes*) GPS**
- Pussy-toes (*Antennaria howellii / parlinii / plantaginifolia*)
- queen-of-the-prairie (*Filipendula rubra*) **GPS***
- Queen Anne's Lace *(Daucus carota)*
- **Ragged-fringed orchid - (*Platanthera lacera*) GPS**
- **Rattlesnake plaintain - dwarf (*G.repens*) / checkered (*G.tesselata*) GPS***
- **Rattlesnake plantain - downy (*Goodyera pubescens*) GPS**
- **Rock harlequin (*Corydalis sempervirens*) GPS**
- **Round-leaf orchid (*Platanthera orbiculata*) GPS**
- Sarsaparilla - bristly (*A. hispida*) / wild (*A. nudicaulis*)
- Scullcap (*Scutellaria lateriflora*)
- Self-heal (Prunella vulgaris)
- Sheep sorrel (Rumex acetosella)
- Shinleaf (*Pyrola americana*)
- **Showy orchis (*Galearis spectabilis*) GPS**
- Smartweed - tearthumb (P. sagittata) / *waterpepper (P. hydropiper)*

CLUBMOSSES/LYCOPODIA

- Ground cedar (*Diphasiastrum digitatum / tristachyum*)
- Shining clubmoss (*Huperzia lucidula*)
- Ground-pine (*Lycopodium annotinum/clavatum/dendroideum / obscurum*)
- **Hickey's tree clubmoss (*Lycopodium hickeyi*) GPS**

SEDGES

- ***Carex albursina / baileyi / platyphylla* - GPS**
- **awned sedge *(Carex atherodes)* - GPS***
- ***Carex tuckermanii / woodii* - GPS**
- ***Carex disperma / ormostachya* - GPS***

FERNS

- Bracken fern (*Pteridium aquilinum*)
- Christmas fern (*Polystichum acrostichoides*)
- Cinnamon fern (*Osmunda cinnamomea*)
- Fragile fern (*Cystopteris fragilis / tenuis*) **sp_____ GPS**
- **Glade fern (*Diplazium pycnocarpon*) GPS***
- **Goldies fern (*Dryopteris goldiana*) GPS**
- **Grape fern - *Botrychium dissectum/oneidense*/other - GPS**
- Hay-scented fern (*Dennstaedtia punctilobula*)
- Interrupted fern (*Osmunda claytoniana*)
- Lady fern (*Athyrium filix-femina*)
- Maidenhair fern (*Adiantum pedatum*)
- *marginalis / x triploidea*)
- **Mountain wood fern (*Dryopteris campyloptera*) GPS ***
- **Clinton's wood fern (*Dryopteris clintoniana*) GPS***
- New york fern (*Thelypteris noveboracensis*)
- **Ostrich fern (*Matteuccia struthiopteris*)**
- ***Phegopteris connectilis / hexagonoptera***
- Polypody (*Polypodium virginianum*)
- **Rattlesnake fern (*Botrychium virginianum*) GPS**
- **Royal fern (*Osmunda regalis*)**
- Sensitive fern (*Onoclea sensibilis*)
- Silvery glade fern (*Deparia acrostichoides*)
- Wood fern (*Dryopteris carthusiana / cristata / intermedia*)

COTTON GRASSES

- *Eriophorum virginicum* / **tenellum - GPS/***

SPIKE-RUSHES

- *Eleocharis* _____ **- GPS**

UMBRELLA SEDGEES

- *Cyperus bipartitus / esculentus / strigosus*

BULRUSHES/WOOL-GRASS

- *northeastern bulrush (Scirpus ancistrochaetus)*
- *Scirpus atrovirens / cyperinus / hattorianus / polyphyllus* / ***pedicellatus* - GPS/***

RUSHES

- *Luzula acuminata / echinata / multiflora*
- *Juncus acuminatus / effusus / tenuis / thread rush (Juncus filiformis)* - **GPS/***

ADDITIONAL SPECIES

Plant Survey Form//Allegheny National Forest//Bradford Ranger District

- [ ] **boreal bog sedge (*Carex magellanica spp.Irrigua*) - GPS***
- [ ] ***Carex retrorsa / wiegandii* - GPS***
- [ ] *Carex annectens / appalachica / bromoides /*
- [ ] *brunnescens / communis / crinita / debilis/*
- [ ] *deweyana / digitalis / folliculata / gracilescens /*
- [ ] *gracillima / gynandra / intumescens / lacustris /*
- [ ] *laxiculmis / laxiflora / leptonervia / lupulina*
- [ ] */ lurida / pedunculata / normalis / pensylvanica*
- [ ] */ plantaginea / prasina / radiata rosea / scabrata*
- [ ] *scoparia / stipata / swanii / torta / tribuloides /*
- [ ] *trisperma / vulpinoidea*
- [x] *Carex* crinita
- [ ] *Dulichium arundinaceum*

GRASSES

- [x] *Agrostis perennans / scabra*
- [ ] *Anthoxanthum odoratum*
- [x] *Brachyelytrum erectum* Short husk grass
- [ ] *Cinna arundinacea / latifolia*
- [x] *Dactylis glomerata*
- [ ] *Danthonia compressa / spicata*
- [ ] **tufted hairgrass (*Deschampsia caespitosa*) - GPS***
- [x] *Dichanthelium acuminatum / clandestinum /*
- [x] *Elymus hystrix / riparius / virginicus* Bottle brush
- [x] *Glyceria canadensis / melicaria / striata*
- [ ] *Holcus lanatus*
- [x] *Leersia oryzoides / virginica*
- [ ] *linearifolium / sp* _____
- [x] Microstegium vimineum * Japanese stiltgrass
- [ ] *Milium effusum*
- [ ] *Oryzopsis asperfolia*
- [x] *Panicum capillare / dichotomiflorum /*
- [ ] **Philadelphia panicgrass (*Panicum philadelphicum*) - GPS***
- [x] *Phalaris arundinacea **
- [ ] *Phleum pratense*
- [ ] *Phragmites australis ssp australis **
- [x] *Poa alsodes / compressa / palustris / pratensis*
- [ ] *saltuensis / trivialis*
- [ ] *Schizachne purpurascens*
- [x] *Setaria pumila / verticillata / viridis*

SCOURING RUSHES

- [x] *Equisetum arvense / sylvaticum*

MOSSES

- [x] *Sphagnum spp*
- [ ] moss spp

- [x] Cornus florida (Flowering dogwood)
- [x] Lonicera tartarica (Tartarian honeysuckle)
- [x] Pilea pumila (Clearweed)
- [x] Trifolium repens (White clover)
- [x] Prunus americana (American plum)
- [x] Trifolium pratense (Red clover)
- [x] Corylis americana (Hazelnut)
- [x] Geum canadense (White avens)
- [x] Cirsium arvense (Canada thistle)
- [x] Lysimachia nummularia (Moneywort)
- [x] Smilax rotundifolia (Common greenbrier)
- [x] Polygonum virginiana (Jumpseed)
- [x] Echinochloa crus-galli (Barnyard grass)
- [x] Phytolacca americana (Pokeweed)
- [x] Saxifraga pensylvanica (Swamp saxifrage)
- [x] Tiarella cordifolia (Foamflower)
- [x] Artemisia vulgaris (Mugwort)
- [x] Lysimachia quadrifolia

GPS COORDINATES - UTM's

- [x] Collinsonia canadensis (Horsebalm)
- [x] Senecio aureus (Golden ragwort)
- [x] Phalaris arundinacea (Reed Canary grass)
- [x] Solidago patula (Spreading goldenrod)
- [x] Eupatorium rugosum (White snakeroot)
- [x] Rubus hispidus (Swamp dewberry)
- [x] Viola soria (Common Blue Violet)
- [x] Impatiens capensis (Orange touch-me-not)
- [x] Mentha x piperata (Peppermint)
- [x] Verbena urticifolia (White vervain)
- [x] Epilobium coloratum (Willow-herb)

KEY TO SYMBOLS

No italics for latin name – Non-native

Bold - note species location on map

GPS - record GPS coordinates

***** - complete data collection form /photograph/do not collect

Comments:

APPENDIX C
Invasive Species Control Plan

HALEY ALDRICH

INVASIVE SPECIES CONTROL PLAN

LINE Q REPLACEMENT AND ABANDONMENT BY SALE
WARREN AND FOREST COUNTIES, PENNSYLVANIA

DATE: NOVEMBER 2015

Prepared For: National Fuel Gas Supply Corporation
1100 State Street
Erie, Pennsylvania 16512

Prepared By: Haley & Aldrich, Inc.
200 Town Centre Drive, Suite 2
Rochester, New York 14623

HALEY ALDRICH

National Fuel

INTRODUCTION

National Fuel Gas Supply Corporation (National Fuel) proposes abandon by sale their existing Queen Storage Field and Queen Compressor Station (collectively Queen Storage Facilities) in Hickory Township, Forest County, Pennsylvania, and approximately 6 miles of their existing 6-inch steel natural gas pipeline (Line Q) beginning at the Queen Compressor Station and traversing northwest to National Fuel's existing Tidioute South Station north of the Allegheny River in the Borough of Tidioute, Warren County, Pennsylvania. The proposed buyer, EmKey Gathering, LLC (EmKey), intends to incorporate the facilities into their existing, non-FERC jurisdictional gathering system. Prior to selling the facilities, National Fuel proposes to replace the existing 6-inch Line Q Allegheny River crossing with a 12-inch steel pipe. To maintain service to existing local distribution customers, National Fuel also proposes installing approximately 6 miles of new 4-inch plastic natural gas pipeline (Line QP) primarily within the existing Line Q 50-foot right-of-way (ROW) from the Tidioute South Station on the north side of the Allegheny River to a location approximately 2,000-feet west of the existing Queen Compression Station in Hickory Township, Forest County, Pennsylvania. Installation will also include a new regulator station in Limestone Township, Warren County, Pennsylvania. This proposed action is referred to herein as the Line Q Replacement and Abandonment by Sale Project, or Project.

As mentioned above, the Project is proposed to be located primarily within the existing 50-foot wide permanent ROW corridor. Additional, temporary workspace may also be utilized during construction as part of the overall construction ROW.

Pennsylvania Department of Conservation and Natural Resources (DCNR) defines invasive species those plants, animals and pathogens that are not native to the State, grow aggressively, and can cause harm to the environment, to the economy and to human health. An invasive species could be a plant, animal, or microbial species. Invasive plant species are non-native species that can disrupt functioning ecosystems by displacing native species and reducing overall diversity. Invasive plant species are typically the most problematic of all the possible invasive species on linear transmission projects such as this Project.

DCNR has prepared a list of invasive plants to guide management efforts, primarily of DCNR lands, but no regulations exist to control invasive plants. This list was used to determine the presence of common invasive plant species within the Project corridor. After considering the species on the list, field investigations along the Project corridor included surveys for these species (see discussion below).

PURPOSE

The purpose of this plan is to describe the procedures to minimize the introduction and spread of target invasive plant species into currently uninfected areas. National Fuel has already committed to implementing the procedures and mitigation measures contained in the Project's Erosion Sedimentation Control and Agricultural Mitigation Plan (ESCAMP) as part of the required Stormwater Pollution Prevention Plan (SWPPP). The ESCAMP describes environmental construction, agricultural mitigation techniques, and best management practices that National Fuel's contractors will use to construct and operate the Project. The Project will result in temporary and permanent impacts to wetlands and streams that occur within the construction ROW. Impacts to delineated wetlands and streams will be minimized through the implementation of practices outlined in the ESCAMP, adherence to general and special conditions of issued permits, and application of invasive species control measures. Potential

construction impacts may include, but not be limited to, the movement or introduction of non-native invasive species into these communities. Transport of invasive species can occur through the movement of heavy equipment and/or fill materials during the clearing, installation and restoration phases of the Project.

INVENTORY

Ecological investigations along with wetland and stream delineations were conducted along the Project's right-of-way (ROW) corridor during the month of September 2015. During this investigation, water resources identified within or immediately adjacent to the Study Area were found to be one or a combination of the following types: 1) emergent wetland, 2) scrub-shrub wetland, or 3) streams (perennial, intermittent and ephemeral). A total of 14 wetlands and 22 streams were delineated along the 6-mile pipeline corridor. Thirteen of the 14 wetlands identified and delineated are classified (either partially or wholly) as emergent, and the other remaining wetland was characterized as scrub-shrub.

Of the 22 streams identified, 17 were perennial, 2 were intermittent, and 3 were classifies as ephemeral. 4 streams (Streams 1, 6, 7 and 9) are mapped and classified by the Pennsylvania Department of Environmental Protection (PADEP) as a CWF – Cold Water Fishery, while 4 streams (Streams 16, 18, 20 and 22) are mapped and classified by PADEP as HQ – High Quality. Two of these streams (Streams 18 and 20) are also Approved Trout Waters. The Allegheny River is mapped and classified as a WWF – Warm Water Fishery. Tributaries to these streams that are not specifically mapped and classified by PADEP are considered to have the same classification as the streams they flow into.

During the field investigations, only one invasive plant species, Common reed (*Phragmites australis*), was identified along the Project survey area (within Wetland B) during wetland delineations in September 2015.

INVASIVE SPECIES CONTROL

Controlling the spread of target invasive plant species will be accomplished by applying the following control measures:

1. Inspector training
   At least one Environmental Inspector having knowledge of the wetland and stream conditions in the Project corridor is required throughout construction and restoration. The number and experience of Environmental Inspectors assigned to each construction spread will be appropriate for the length of the construction spread and the number/significance of resources affected. At least one inspector shall be trained on identifying the target invasive plant species and site specific measures for preventing their possible transport onto or throughout the construction spread.

2. Equipment sanitation
   The contractor(s) shall be instructed to bring in clean machinery and materials free of any visible soil, vegetation or debris prior to entering construction spreads. As necessary, cleaning will take place within an elevated wash rack station with clean water (no soaps). This wash water will be discharged and disposed appropriately. A BMP for this wash station is incorporated into the Project ESCAMP.

3. Construction materials
   Construction materials such as seed mixes, mulch material, gravel, and soil if being brought into the construction spread from an outside source shall be visually inspected or documented by vendors (as practicable) to be free of possible invasive plant material. During the monitoring phase, the contractor(s) shall avoid of mowing infested invasive areas into non-infested invasive areas.

4. Restoration
   All wetlands and streams that are impacted by the construction activities will be restored to preconstruction conditions as soon as applicable. An appropriate seed or planting plan will be utilized based on the pre-existing conditions prior to disturbance. National Fuel will use their typical seed mixes appropriate for site restoration. If possible, seed mixes will be utilized from a local source.

5. Monitoring
   Restoration monitoring, including invasive species assessment, will take place for 3 years (as required by FERC) following the restoration phase of this Project by appropriately trained personnel. Inspection of the corridor will occur at least once a year during the growing season (April-November). A measurable increase in areal coverage of invasive plant species will be reported to FERC and copies will be sent to both the Pennsylvania DCNR and United States Army Corps of Engineers (USACE). This plan will be considered successful if at the end of the monitoring period there is no net increase in the areal coverage. If there is an increase then this plan will be reviewed with FERC with consultation from USACE and Pennsylvania DCNR to formulate new alternative control criteria. This new criteria will be used to develop a restoration plan.

Appendix I
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Appendix J
List of Preparers

List of Preparers

Anthony Jernigan - Project Manager, Project Description, Land Use, Cultural Resources, Cumulative Impacts, Alternatives, Geology, Soils

B.A., Geophysical Sciences, 1995, The University of Chicago

Peconom, John – Resource Specialist, Vegetation, Fisheries, and Wildlife; Threatened, Endangered, and Special Status Species

B.S., Environmental Biology & Management, 2000, University of California – Davis

Jeudy, Harry – Resource Specialist, Air Quality, Noise, Reliability and Safety

B.S., Mechanical Engineering, 2000, Pennsylvania State University

Graduate Studies, Mechanical Engineering, Temple University

Armbruster, Ellen – Cultural Resources

M.A., Anthropology, 1986, University of Pennsylvania

B.A., Anthropology, 1979, Bryn Mawr College

Appendix K
Mitigations and Guidelines on NFS Lands

Mitigations and Guidelines on NFS Lands

Invasive Species Control

Potential construction impacts may include, but not be limited to, the movement or introduction of nonnative invasive species into natural communities. Transport of invasive species can occur through the movement of heavy equipment and/or fill materials during the clearing, installation and restoration phases of the Project. As noted below and in the Invasive Species Control Plan (Appendix C) submitted to FERC, National Fuel is committed to 3 years of post-construction monitoring and no net increase in the areal coverage of invasive plant species during that time. As a result, no significant impacts to the species discussed in this report, or any other native species, are anticipated to result from the spread of invasive species. Controlling the spread of target invasive plant species will be accomplished by applying the following control measures:

Controlling the spread of target invasive plant species will be accomplished by applying the following control measures:

- Inspector training: At least one Environmental Inspector having knowledge of the wetland and stream conditions in the Project corridor is required throughout construction and restoration. The number and experience of Environmental Inspectors assigned to each construction spread will be appropriate for the length of the construction spread and the number/significance of resources affected. At least one inspector shall be trained on identifying the target invasive plant species and site specific measures for preventing their possible transport onto or throughout the construction spread.
- Equipment sanitation: The contractor(s) shall be instructed to bring in clean machinery and materials free of any visible soil, vegetation or debris prior to entering construction spreads. As necessary, cleaning will take place within an elevated wash rack station with clean water (no soaps). This wash water will be discharged and disposed appropriately. A BMP for this wash station is incorporated into the Project ESCAMP.
- Construction materials: Construction materials such as seed mixes, mulch material, gravel, and soil if being brought into the construction spread from an outside source shall be visually inspected or documented by vendors (as

practicable) to be free of possible invasive plant material. During the monitoring phase, the contractor(s) shall avoid of mowing infested invasive areas into non-infested invasive areas.

- Restoration: All wetlands and streams that are affected by the construction activities will be restored to preconstruction conditions as soon as applicable. An appropriate seed or planting plan will be utilized based on the pre-existing conditions prior to disturbance. National Fuel will use their typical seed mixes appropriate for site restoration. If possible, seed mixes will be utilized from a local source.
- Monitoring: Restoration monitoring, including invasive species assessment, will take place for 3 years (as required by FERC) following the restoration phase of this Project by appropriately trained personnel. Inspection of the corridor will occur at least once a year during the growing season (April-November). A measurable increase in areal coverage of invasive plant species will be reported to FERC and copies will be sent to both the Pennsylvania DCNR and United States Army Corps of Engineers (USACE). This plan will be considered successful if at the end of the monitoring period there is no net increase in the areal coverage. If there is an increase then this plan will be reviewed with FERC with consultation from USACE, USDA-FS and Pennsylvania DCNR to formulate new alternative control criteria. This new criteria will be used to develop a restoration plan.

Conservation Measures from the Biological Evaluation

In addition to the Forest Plan guidelines mentioned in previous sections of the report, Resource Report 2 of the FERC Environmental Report details the following conservation measures applicable to proposed stream work at the Allegheny River and protection of RFSS and species with viability concerns:

- Minimizing in-stream trench width and construction corridor.
- Salvage of mussel species within affected areas upstream, lateral, and downstream of the Project which will experience disturbances (Action Area) and relocation to suitable habitat upstream per an approved Relocation Plan by approved, qualified personnel.

- Minimize stream bank disturbances to approximately 15-feet wide corridor, and installation and maintenance of BMPs (e.g. silt barriers) for erosion and sedimentation control.
- Restoration of banks and riparian zone habitat to preconstruction conditions by following National Fuel's ESCAMP procedures for waterbody restoration.
- Utilizing native stream materials for in-stream fill and native and clean material for fill at the river banks.
- Ensuring all equipment used within the Allegheny River is clean and free of contamination and ensuring National Fuel's SPRP is followed at all times.
- A qualified monitor will be present at all times during river crossing construction.
- Sedimentation monitoring will be conducted upstream and downstream during construction per a USFWS-approved Turbidity Monitoring Plan.
- Post-construction monitoring will be completed.

Aquatic Resources

National Fuel will also utilize a variety of mitigation measures to minimize potential adverse impacts to other waterbodies and wetlands as a result of the construction of the proposed facilities. BMPs will be implemented throughout construction to protect the environment and to minimize potential effects of the pipeline Project. Measures to avoid or minimize potential impacts to waterbodies may include:

- Expediting construction in the waterbody, reducing disturbance to the streambed and adjacent soils and the quantity of suspended sediments.
- During clearing operations (anticipated to be minimal), vegetative strips will be maintained along the bank of the waterbody. Trees will be cut flush with the surface, but removal of stumps or roots will be avoided or minimized to the extent feasible while allowing for safe working conditions.
- Construction of waterbody crossings will be conducted as perpendicular as possible to the axis of the channel when engineering and routing conditions allow.
- The length of actual, temporary, bank disturbance will be limited to the width of trench excavation necessary to place fabricated pipe in the crossing

(typically less than 10 feet) plus the travel area which will be bridged across the stream.

- Waterbody crossings will be conducted during low flow conditions, to the maximum extent possible. Construction will be delayed if a storm/rain event is expected based on weather reports. Backup pumps will be available and used as necessary if unexpected high stream/water flow conditions are experienced during construction.
- Limit the amount of necessary construction equipment traffic (e.g., initially limit to that which is needed to clear and grade right-of-way and minimize overall equipment during construction).
- Construction equipment will not be parked, stored, or refueled within 100 feet of a stream.
- Equipment crossings subsequent to clearing will be performed utilizing travel mats elevated above the water level.
- Restoration of the waterbody to its original configuration and contour to the best extent possible. Permanent stabilization of the banks of the waterbody and adjacent areas using erosion control measures and vegetative cover as soon as possible after construction.
- Native stone will be used to the extent possible during stream bed restoration and stabilization.
- Removal of construction materials and related structures from each waterbody promptly after construction.
- Inspection of crossing points periodically during and after construction, and repairs to areas as needed.

Specific measures to avoid or minimize potential impacts in wetlands may include a combination of the following in accordance with the Project ESCAMP:

- Wetland boundaries and buffers will be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.
- Sediment barriers (i.e., silt fence, silt logs, straw bales) will be installed across the construction right-of-way) immediately upslope of the wetland boundaries at all wetland crossings to prevent sediment flow into wetlands. Where wetlands are adjacent to the right-of-way and the right-of-way slopes

towards the wetlands, sediment barriers will be installed along the edge of the right-of-way as is necessary to prevent sediment flow.

- Assembly of the pipeline will be conducted in upland areas unless the wetland is dry enough to adequately support skids and pipe.
- National Fuel will utilize “push-pull” or “float” techniques as necessary to place the pipe in the trench where water and other site conditions allow.
- Trenching of wetlands will not be conducted until the pipeline is assembled and ready for lowering in, minimizing the length of time that the trench is open.
- Trench dewatering will be limited or controlled to that which does not result in silt-laden water flowing into a wetland.
- Construction equipment will be limited to that which is needed to clear and grade the right-of-way, excavate the trench, install the pipeline, backfill the trench, and restore the construction right-of-way.
- Any additional equipment crossings will be limited to the wetland’s travel-way.
- Construction equipment will not be parked, stored, or refueled within 100 feet of wetlands.
- Vegetation will be cut to just above ground level, leaving existing root systems in place. Cut vegetation will be removed from the wetland. Removal of tree stumps and in-ground root systems will be minimized unless the Chief Environmental Inspector determines safety related construction constraints require their removal.
- At a minimum, the top one foot of topsoil will be segregated within dry wetlands (no standing water or saturated soils at time of construction) from the areas disturbed for trenching. The segregated topsoil will be restored to its original location following the backfilling of the trench.
- The trench will be excavated by mechanical backhoe to a depth that provides at least three feet of cover on top of the pipe, except in bedrock areas, where a minimum of two feet will be provided.
- Low-ground pressure equipment (i.e. lighter weight, rubber tire, wider tracks) will be utilized if standing water or saturated soils are present in wetlands, or if normal construction equipment causes excessive ruts or mixing of the topsoil and subsoil in wetlands. Alternatively, or if such

equipment is not available, normal equipment will be supported by approved travel mats.

- If a portion of the work or final cleanup is suspended over winter, a winter construction plan will be developed prior to winter work suspension, including details regarding removal, anchoring or maintaining mats and bridging, and applicable monitoring requirements.
- Removal of construction materials including work mats, temporary rip-rap, and other construction debris will be conducted after final grading of the ROW.
- Additionally, no blasting is proposed during construction of this Project.

In addition, the following conservation measures have been requested by the USFS on properties managed by the Forest Service:

- Tree clearing within the Limits of Disturbance will be limited to what is needed to safely construct the Project in order to protect shading and cover at streams and wetlands.
- Restoration of waterbodies channel, floodplain width and characteristics to the best extent possible. Particular caution will be used while restoring Streams 12 and 16, due to the length of parallel pipe being installed.
- National Fuel will use topsoil segregation for the pipeline trench.
- Soils disturbed by pipeline access and trench will be decompacted.
- Soil tests will be performed along the pipeline to determine soil additives necessary to foster healthier revegetation.

Other mitigations specific to National Forest System Lands

- Access roads and staging areas (including temporary work areas) on NFS lands will require approval by the Forest Service Permit Administrator. These roads and staging areas will, if practical, avoid wetlands and riparian areas.
- Regional Forester Sensitive Plant Species: Sweat-scented Indian Plantain: two occurrences (totaling 13 individual plants) were documented within a PEM wetland along the Allegheny River. National Fuel would dig up by hand or heavy equipment the area where the plants are found with sufficient

soil and maintain the plants in a moist condition so they can be replaced intact during restoration of the area.

- If any RFSS species are located during implementation of the project, project activities would halt, and an ANF biologist will be notified and the appropriate protection measures will be put into place to mitigate impacts to the species.
- Soils within temporary workspace and along the pipeline will be decompacted.
- Native soil should be removed and stockpiled prior to starting ground disturbing activities. This soil should be spread on disturbed areas.
- Disturbed areas more than 25 feet from the pipeline will be planted with native tree species. Except within the construction right-of-way and the stream crossing construction, no trees will be removed within 10 feet of the stream bank and heavy equipment should be kept 25 feet from the bank.
- Trench breakers will not be constructed of polyurethane foam on USFS owned property.
- National Fuel's Land Department would work with the USFS to set up reasonable and typical right-of-way barriers for the USFS to prevent unauthorized access.

Forest Plan standards and guidelines (USFS 2007a) relevant to project activities:

- After ground-disturbing activities and after appropriate site preparation (e.g. raking, soil testing, soil amendments, etc.), native or desired non-native species should be planted where natural revegetation is sparse or unlikely to occur.
- To reduce the risk of fuel loading, trees should be directionally felled away from well pads, pipelines, power lines, roads, private property, and recreational facilities.
- Maintain watershed health and water quality by following guidelines contained in the current versions of "Timber Harvest Operations Field Guide for Waterways, Wetlands, and Erosion Control" and "Erosion and Sediment Pollution Control Program Manual," Department of Environmental Protection, Commonwealth of Pennsylvania.

- Where new or existing permanent roads are within 300 feet of perennial and intermittent streams, a high quality, non-erosive surfacing material, binding material, or other suitable material should be used to control sediment delivery.
- On streams containing reproducing wild trout, the construction or replacement of stream crossings should be accomplished between January 1 and September 30 to avoid impacts to spawning trout.
- ANF may request a suspension of construction activities during the spring thaw or during exceptionally wet weather.
- All clearings (i.e., for roads, pipelines, well pads) should be limited to the minimum size necessary to safely conduct operations.
- Intake pipes used to siphon water from streams should be screened in order to protect aquatic species.
- Where natural revegetation is unlikely, or sedimentation and erosion are concerns, plant native or desirable non-native species immediately after construction or reconstruction.
- To avoid uniformity and unnatural appearance, vegetative openings should be irregular and vary in size and shape. It may be desirable to provide a gradual transition between openings and densely forested lands for a more natural appearing landscape.