Executive Summary

Tennessee Gas Pipeline Company, L.L.C. ("Tennessee") is proposing the construction and operation of the Connecticut Expansion Project (the "Project") in Hartford County, Connecticut, Albany County, New York, and Berkshire and Hampden Counties, Massachusetts. The proposed Project involves the construction of two sections of new 36-inch outside diameter ("OD") pipeline looping, totaling 1.35 miles in New York ("New York Loop") and 3.81 miles in Massachusetts ("Massachusetts Loop"), and one section of new 24-inch OD pipeline looping totaling 8.26 miles in Massachusetts and Connecticut ("Connecticut Loop"), and appurtenant facilities, including one new main line valve ("MLV"), cathodic protection, and pig launchers and receivers.[1] To the extent that it is practicable, feasible, and in compliance with existing law, Tennessee proposes to locate the pipeline loops within or adjacent to its right-of-way ("ROW") associated with its existing pipelines designated as the 200 and 300 Lines.

The Project facilities to be located in Connecticut include the Connecticut Loop, located in Agawam, Massachusetts and Suffield and East Granby, Connecticut, which consists of approximately 8.26 miles of new 24-inch OD pipeline co-located within or adjacent to Tennessee's existing 16-inch 300-1 Line ROW. The loop segment commences in the yard of Compressor Station 261 and extends approximately 8.26 miles southward to the East Granby meter station. The MP system for the Connecticut Loop starts at MP 0.0 commencing at the start of the loop within Compressor Station 261. The proposed pipeline is designed for a maximum allowable operating pressure (MAOP) of 800 psig and will be constructed of carbon steel. In addition, two new pig launchers/receivers will be installed, one at the starting point of the Connecticut Loop within Tennessee's existing Compressor Station 261 and one at the terminus point of the Connecticut Loop within Tennessee's existing East Granby meter station. The Connecticut Loop will tie into Tennessee's existing 300-1 Line. A new MLV will also be installed at approximate MP 4.15 south of Mountain Road in Suffield, Connecticut as well as regulation at MLV 354.1.

Tennessee, a major supplier of natural gas to utilities, local distribution companies, and power generators in the northeast U.S., plans to construct, install, and operate the Project to increase its interstate natural gas pipeline transportation capacity in order to provide additional firm natural gas transportation service into northeast markets for three Project shippers. Tennessee has signed binding, long-term precedent agreements with three shippers, Connecticut Natural Gas Corporation, The Southern Connecticut Gas Company, and Yankee Gas Services Company, for all of the incremental firm transportation capacity, 72,100 dekatherms per day ("Dth per day") that will result from the Project, which demonstrates the immediate need for all of the Project capacity. In order to meet the Project shippers' demand for transportation service, as evidenced by the executed precedent agreements, Tennessee proposes to construct the Project facilities, including the facilities in Connecticut. By constructing and installing the Project facilities, and using certain existing transportation capacity on the Tennessee system that has been reserved for the Project, Tennessee will be able to transport the increased natural gas volumes through its existing 200 Line and 300 Line systems for delivery to the three shippers. This Project and its in-service date of November 1, 2016 are fully supported by the shippers committed to the Project's transportation capacity.

Tennessee is an interstate natural gas pipeline company subject to the Federal Energy Regulatory Commission's ("Commission" or "FERC") jurisdiction under the Natural Gas Act, 15 U.S.C. § 717, et seq. ("NGA"), and submitted to the Commission an application, pursuant to Section 7(c) of the NGA, 15 U.S.C. § 717f(c) and the Commission's regulations, 18 C.F.R. §§ 157.5 et seq. (2014), seeking issuance of a certificate of public convenience and necessity for the Project in Docket No. CP14-529-000 on July 31, 2014. The Commission issued a formal notice of the certificate application on August 14, 2014, setting September 4, 2014 as the deadline for interventions. A number of interventions and comments

[1] "Pig" is an industry-specific term for an internal pipeline tool that is used to inspect and/or clean a pipeline.

were filed in response to the notice. Tennessee filed a response to comments with the Commission on September 30, 2014. Commission staff conducted three scoping meetings and site visits for the Project from October 28 through 30, 2014 (one each in Massachusetts, Connecticut, and New York). At the scoping meetings, interested parties provided scoping comments, and written scoping comments were provided to the Commission as well. The Commission issued a data request on January 22, 2015, requesting additional information to assist in the environmental review of the certificate application, and Tennessee filed responses to those data requests on February 11, 2015. Tennessee received a second data request from the FERC on February 9, 2015, seeking additional information on certain rate and contract issues. Tennessee submitted a response to that data request on February 18, 2015. A third data request from the FERC was provided to Tennessee on February 27, 2015, with Tennessee submitting responses on March 19, 2015. Since the date that the certificate application was filed, the Project has undergone several changes to workspace and routing. A supplemental filing to reflect these revisions to workspace and routing was submitted to the FERC on April 17, 2015. In the certificate application, Tennessee requested that the Commission issue the certificate order for the Project by July 31, 2015, in order to allow Tennessee to complete construction of the Project facilities and place the Project in-service by November 1, 2016, the requested in-service date of the three Project shippers.

As discussed in the certificate application filed with the Commission, Tennessee believes that the Project is fully consistent with the public convenience and necessity standard of Section 7(c) of the NGA and with the Commission's Statement of Policy on the Certification of New Interstate Natural Gas Facilities, 88 FERC ¶ 61,227 (1999); order clarifying Statement of Policy, 90 FERC ¶ 61,128 (2000); order further clarifying Statement of Policy, 92 FERC ¶ 61,094 (2000) ("Policy Statement"). The Commission's Policy Statement establishes criteria for determining whether there is a need for a proposed project and whether that proposed project will serve the public interest. In deciding whether to authorize the construction of a project, the Commission balances the public benefits against the potential adverse consequences. The Commission's goal in evaluating new pipeline construction is to give appropriate consideration to the enhancement of competitive transportation alternatives, the possibility of overbuilding, subsidization by existing customers, the applicant's responsibility for unsubscribed capacity, the avoidance of unnecessary disruptions of the environment, and the unneeded exercise of eminent domain.[2] Pursuant to the Policy Statement, the threshold question in establishing the public convenience and necessity for a project is whether that project can proceed without subsidies from existing customers. When the threshold requirement that a project be independently economically viable is met, the Commission then assesses adverse effects on three interests: (1) existing customers of the pipeline proposing the project, (2) existing pipelines in the vicinity and their captive customers, and (3) landowners and communities affected by the project. If residual adverse effects on these interest groups are identified after efforts have been made to minimize them, the Commission will evaluate the proposed project by balancing the evidence of public benefits to be achieved against these residual effects.

As set forth in the certificate application, the Project meets the threshold requirement and the additional tests set forth in the Policy Statement. To demonstrate market support for the proposed Project, Tennessee submitted as part of the certificate application the firm, long-term precedent agreements with the three Project shippers for all of the transportation capacity to be created by the Project. In the Policy Statement, the Commission recognized that if an applicant for a certificate of public convenience and necessity for new interstate pipeline facilities has precedent agreements for most of the new capacity, then that would be strong evidence of market demand and public benefits which would outweigh the limited need to obtain new ROWs for pipeline facilities.[3] The executed precedent agreements with the Project shippers, for 100 percent of the Project capacity, provide evidence of the market demand for the Project. As Tennessee discussed in more detail in the certificate application filed with the Commission, Tennessee

[2] Policy Statement, 88 FERC ¶ 61,227 at 61,747-48.

[3] Policy Statement, 88 FERC ¶ 61,227 at 61,749.

believes that the public benefits of the Project far outweigh any potential adverse effects. Tennessee also noted in its certificate application that the Project is not related to or contingent upon any other potential projects or expansions that may be proposed by Tennessee in the Commonwealth of Massachusetts. Please see Section IX, Public Convenience and Necessity, of the certificate application filed by Tennessee with the Commission for further discussion of the purpose and need for the Project.

Construction of the Project will help to alleviate the natural gas pipeline constraints in the northeast United States[4] by increasing pipeline capacity in these high-demand markets. Multiple studies have concluded that additional pipeline infrastructure is needed in the region to serve increasing demand from Local Distribution Companies and the power sector.[5]

The northeast, including Massachusetts and Connecticut, has the "highest natural gas prices" and price volatility in the United States because of a significant lack of pipeline capacity. The rise in natural gas prices experienced in the New England region over the past two winters "suggest a natural gas delivery system that is stretched significantly" and is inadequate to meet the growing demand in the New England region; gas prices in New England are the highest in the United States.[6] MADOER's Low Demand Study/Report dated January 7, 2015 acknowledged that the Northeast's natural gas infrastructure is stressed during peak winter periods and that there is insufficient natural gas capacity for the electricity sector which has contributed to high prices.

High energy prices put significant strain on both businesses and residential consumers throughout New England. ISO New England has stated that "[u]ntil new infrastructure alleviates these pipeline constraints, prices for natural gas and wholesale electricity are likely to remain volatile." The lack of natural gas supply to New England's power generation plants is exacerbated by the recent closings of the Salem Harbor coal-powered plant and the Mt. Tom coal-powered plant in June 2014, and the expected closure of the Somerset Brayton Point coal-powered plant in 2017.

The weather conditions, infrastructure constraints, and price spikes for natural gas during the winter of 2013-2014 clearly demonstrate the need for increased reliable natural gas transportation capacity within

[4] Existing interstate natural gas pipeline systems in the Project area are at or near capacity. The U.S. Energy Information Administration, in a 2013 report, noted that key natural gas pipelines from supply areas to New England are full or nearly full. The report stated that the Algonquin Gas Transmission system and Tennessee's system transport most of the natural gas into the New England market and that both systems have been constrained. See Short-Term Energy Outlook Supplement: Constraints in New England likely to affect regional energy prices this winter, U.S. Energy Information Administration, January 18, 2013, available at http://www.eia.gov/forecasts/steo/special/pdf/2013_sp_01.pdf; see also Gas-Fired Power Generation in Eastern New York and its Impact on New England's Gas Supplies, ICF International, dated November 18, 2013, p. 2; Seizing the Historic Opportunity to Cut New England Energy Costs by Eliminating Gas Pipeline Bottlenecks, Anthony W. Buxton, Industrial Energy Consumer Group, p. 4.

[5] Current natural gas transportation infrastructure is inadequate to meet the growing demand in the New England region. *See*, e.g., U.S. Dept. of Energy, Quadrennial Energy Review Meeting, Statement of Gordon van Welie, President and Chief Executive Officer of ISO New England, at pp. 4-5 (Apr. 21, 2014), available at www.iso-ne.com/pubs/pubcomm/pres_spchs/2014/van_welie_statement_4-21-14.pdf; U.S. Dept. of Energy, Energy Information Administration, High Prices Show Stresses in New England Natural Gas Delivery System at 1 (Feb. 7, 2014), available at www.eia.gov/naturalgas/issuesandtrends/deliverysystem/2013/pdf/newengland_natgas.pdf. *Id.* at 8; *see also* U.S. Dept. of Energy, Energy Information Administration, Natural Gas Explained: Natural Gas Prices (Jun. 29, 2010), available at www.eia.gov/energyexplained/index.cfm?page=natural_gas_prices.

[6] *See* ISO New England, *2013 Wholesale Electricity Prices in New England Rose on Higher Natural Gas Prices: Pipeline Constraints and Higher Demand Pushed Up Prices for Both Natural Gas and Power* at 1 (Mar. 18, 2014), available at http://www.iso-ne.com/nwsiss/pr/2014/2013_price%20release_03182014_final.pdf.

the service area of the Project. Tennessee has evaluated alternative routes to serve the increased demand for the area served by the existing pipeline network, and is proposing pipeline routing and facilities, as well as use of existing reserved capacity, that minimize impacts to the environment, utilizes the existing pipeline infrastructure, and has made every effort to co-locate the proposed work within the existing ROW where practicable. The alternatives that Tennessee considered are discussed in more detail in Attachment M of this Section 401 application. In addition to the discussed alternatives in Attachment M, Tennessee evaluated and has proposed a re-route of a portion of the Connecticut Loop that avoids sensitive environmental resources and eliminates the need for using a horizontal directional drill (HDD) to install a portion of the loop.

The Project has taken measures to minimize or avoid adverse effects to water resources and has sited the Project within or adjacent to existing Tennessee ROW to the extent practicable. In addition, appurtenant facilities and access roads have been sited in a manner to limit impacts to wetlands and watercourses. The plans and drawings provided in Attachment G show the Project's activities within all waterbodies[7] and wetlands (i.e., Waters of The United States per Sections 401/404 of the federal Clean Water Act). No permanent impacts are proposed for watercourses along the Project alignment and permanent impacts to wetlands are entirely related to cover type conversion along the pipeline alignment and minor fill related to improvements to existing access roads to allow for permanent access to the MLV. During construction of the Project, Tennessee will attempt to further avoid impacting these resources by using construction Best Management Practices ("BMP"s) (Attachment Q).

Tennessee will maintain a permanent easement centered over the pipeline after construction is complete. Within this area, forested and scrub-shrub wetland vegetation will require removal to safely operate the new pipeline. As a result, forested wetlands along the proposed new permanent ROW will be converted to scrub-shrub or emergent marsh wetland types. This will not create a loss of overall wetland habitat, but rather a long-term change in habitat type, from forested to shrub-scrub or emergent marsh and from scrub-shrub to emergent marsh. In environmentally sensitive areas such as wetlands, clearing will be accomplished using either low impact clearing or mechanical clearing techniques. Such techniques typically consist of cutting wetland vegetation and removing the felled trees with low ground pressure or track vehicles to minimize compaction and disturbance. In cases where low impact or low pressure equipment cannot be used, temporary corduroy or mat roads would be installed to facilitate clearing and removed after the work is completed.

Tennessee has been coordinating with the State Historic Preservation Office ("SHPO") in Connecticut and has sent correspondence to federally recognized Tribes, non-federally recognized Tribal Organizations, and State Agency Tribal Representatives that may be impacted by the Project for review of the Project for compliance with Section 106 of the National Historic Preservation Act. Tennessee has received responses from the Delaware Tribe of Indians and the Mashantucket Pequot Tribal Nation. Tennessee commissioned The Public Archaeology Laboratory, Inc. ("PAL") to conduct surveys and prepare technical reports for archaeological and historic architectural properties along the Project alignment. The final reports were filed in July 2014 with the Commission, the Connecticut SHPO, and the applicable tribes for review.

On December 30, 2014, PAL submitted a letter report to the Connecticut SHPO with the results of the supplemental archeological investigations for a pipeline re-route north of the Airport Park Road in East Granby, Connecticut. The survey resulted in the identification of 20th century structural remains, which were interpreted by PAL to not have significance. On March 10, 2015 the Connecticut SHPO commented on the letter report, requested that additional background research be performed to provide more information on the structural remains. PAL completed additional research and based on their research,

[7] Waterbodies as used herein encompasses watercourses (e.g., streams, rivers, and other flowing water features) as well as non-flowing waterbodies such as lakes and ponds, and are at times distinguished from vegetated wetlands..

the foundations are not part of the German POW camp and, therefore, the proposed reroute construction will not impact any potentially significant archaeological resources.Additional details regarding archeological investigations in Connecticut are supplied in the Environmental Assessment Report in Attachment K.

Tennessee's representatives submitted written consultations to the United States Fish and Wildlife ("USFWS") and National Marine Fisheries Service ("NMFS") in order to document federal listed species in the Project area. At the state level, the New York State Natural Heritage Program, Massachusetts Natural Heritage and Endangered Species Program and Connecticut Natural Diversity Database were all consulted on state-listed endangered, threatened, or species of special concern, plant and animal species. Based upon the information subsequently received from these agencies, Tennessee has identified areas of the Project alignment where the potential exists for occurrence of federal- and/or state-listed threatened and endangered species. Additional information on each species identified, survey results, and mitigation measures have been provided in Attachment K. Tennessee has worked cooperatively with the state and federal agencies in developing approved field survey protocols to identify and document occurrences of rare plant and animal species in the Project area. Qualified biologists performed field surveys in 2013 and 2014. Survey reports and information related to rare species surveys are provided in Attachment K.

Water Resources

Waters of the United States (i.e., waterbodies and wetlands) located within the ROW were field identified and delineated in the fall of 2013 and spring of 2014 in accordance with the US Army Corps of Engineers' ("USACE") Final *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* and state requirements. AECOM also conducted vernal pool and amphibian breeding habitat surveys along the pipeline ROWs in the spring of 2014. In total, the Project workspace and facilities impact 53 wetlands and 14 watercourses along the route of the Connecticut Loop. All impacted wetlands will be substantially restored in-place, except for a small area of permanent fill for access road construction. Tables 1 and 2 identify wetlands and watercourses delineated along the proposed pipeline route. Attachment K includes the Wetlands/Watercourses, and Vernal Pool/Amphibian Breeding habitat reports prepared for the Project.

The Connecticut Loop crosses the Federal Emergency Management Agency (FEMA) mapped floodway and/or 100-year floodplain associated with the following waterbodies: Muddy Brook, Degrayes Brook, Stony Brook, and Devine Brook.

Tennessee has completed hydraulic modeling for all streams proposed to be crossed by a dry crossing method (Crossing Method II in Tables II) including flume and dam and pump. The flume pipe sizing has been calculated and is provided in Attachment H. Any stream with discernible flow at the time of crossing will be crossed utilizing a dry crossing method. In addition, stormwater analyses have been completed to ensure protection of wetlands and watercourses for the proposed permanent access road, as required by the Connecticut Stormwater Guidelines (Attachment H).

Tennessee will implement its Best Management Practices (BMPs) for construction and restoration, as outlined in the Commission's Plan and Procedures and Tennessee's Construction BMPs (Attachment Q), which are intended to be used to avoid, minimize, and/or mitigate impacts from the Project. BMPs applicable to floodplains include the control of erosion and sedimentation through installation of structural erosion and sedimentation facilities within and at the limits of the Project workspace. BMPs will comply with Connecticut standards for erosion and sediment control, including specifications for flooding frequency and volume. Additionally, the amount of vegetation cleared during construction will be limited to the removal of the minimum amount necessary for safe construction. Tennessee will restore and revegetate temporary workspace areas to minimize impacts on vegetated areas. Restoration and revegetation will comply with state and federal regulations and monitoring requirements. The construction workspace will be restored to pre-construction contours after construction and will not result

in increased flood heights or encroachment within floodways. Tennessee's typical erosion and sediment control and BMP details are included in Attachment Q.

TABLE 1
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
Pipeline Facilities														
WMA-02	0.16	42.03113 -72.63419	Suffield / Hartford	West Springfield	PEM	65.38	0.11	0.00	0.00	0.00	0.00	BVW	II	Low lying forested wetland.
WCT-01	0.26	42.02957 -72.63444	Suffield / Hartford	West Springfield	PEM/PFO	211.20	0.35	0.00	0.01	0.00	0.00	N/A	II	Low lying portion of an agricultural field
WCT-02	0.37	42.02802 -72.63468	Suffield / Hartford	West Springfield	PSS/PFO	25.13	0.07	0.06	0.00	0.00	0.00	N/A	II	Scrub shrub wetland associated with low lying portion of ag field and intermittent stream.
WCT-56	0.56	42.02556 -72.6362	Suffield / Hartford	West Springfield	PEM/PSS/ PFO	1637.90	2.46	0.79	0.37	0.19	0.00	N/A	II	Large wetland associated with agricultural fields and wet forested areas.
WCT-03	1.10	42.01949 -72.64177	Suffield / Hartford	West Springfield	PEM	1164.92	2.07	0.00	0.05	0.00	0.00	N/A	II	Wet agricultural field
WCT-04	1.23	42.01765 -72.64264	Suffield / Hartford	West Springfield	PFO	119.35	0.00	0.22	0.03	0.08	0.00	N/A	II	Forested wetland associated with a high water table
WCT-06	1.29	42.01677 -72.64302	Suffield / Hartford	West Springfield	PFO	325.06	0.21	0.29	0.00	0.08	0.00	N/A	II	Forested wetland with potential vernal pool east of ROW
WCT-07	1.37	42.01564 -72.64343	Suffield / Hartford	West Springfield	PFO	168.08	0.10	0.08	0.00	0.04	0.00	N/A	II	Forested wetland
WCT-08	1.38	42.01562 -72.64356	Suffield / Hartford	West Springfield	PFO	20.73[g]	0.00	0.01	0.00	0.00	0.00	N/A	II	Isolated forested wetland, potential vernal pool
WCT-09	1.44	42.01481 -72.64396	Suffield / Hartford	West Springfield	PFO	212.20	0.18	0.23	0.00	0.01	0.00	N/A	II	Forested wetland associated with a high water table
WCT-10	1.47	42.01435 -72.64419	Suffield / Hartford	West Springfield	PFO	14.59	0.00	0.01	0.00	0.01	0.00	N/A	II	Isolated forested wetland, potential vernal pool
WCT-11	1.55	42.01338 -72.64476	Suffield / Hartford	West Springfield	PFO/PEM	560.60	0.54	0.44	0.07	0.00	0.01	N/A	II	Forested and emergent marsh associated with surface water and Clay Brook (SCT-12).
WCT-12	1.80	42.01012 -72.64676	Suffield / Hartford	West Springfield	PEM/PFO	1510.15	1.78	0.67	0.00	0.21	0.00	N/A	II	Forested and emergent marsh associated with surface water and Clay Brook (SCT-12).
WCT-13	1.99	42.00786 -72.64892	Suffield / Hartford	West Springfield	PFO	6.91	0.00	0.03	0.00	0.00	0.00	N/A	II	Forested wetland associated with surface water, potential vernal pool.
WCT-14	2.00	42.00762 -72.6489	Suffield / Hartford	West Springfield	PEM	0.00	0.01	0.00	0.00	0.00	0.00	N/A	II	Emergent marsh that receives flow from WCT-13 via a small culvert under a cart path
WCT-15	2.08	42.00679 -72.64993	Suffield / Hartford	West Springfield	PEM	447.49	0.76	0.00	0.00	0.00	0.00	N/A	II	Emergent marsh drains to Clay Brook
WCT-16	2.36	42.00338 -72.6526	Suffield / Hartford	West Springfield	PFO/PSS/ PEM	2337.03	3.59	0.58	0.05	0.09	0.00	N/A	II	Large forest and emergent wetland drains east Clay Brook
WCT-17	2.59	42.00028 -72.6543	Suffield / Hartford	West Springfield	PSS/PEM	0.00	0.07	0.00	0.00	0.00	0.00	N/A	II	Large emergent wetland drains east to Clay Brook

TABLE 1
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
WCT-18	2.81	41.99791 -72.65714	Suffield / Hartford	Windsor Locks	PFO/PEM	1676.00	1.22	1.27	0.35	0.57	0.05	N/A	II	Large emergent wetland and agricultural field adjacent to Muddy Brook
WCT-21	3.34	41.99115 -72.66198	Suffield / Hartford	Windsor Locks	PEM/PFO	1068.22	1.90	0.00	0.00	0.00	0.00	N/A	II	Emergent agricultural field and forested wetland associated with high water table.
WCT-22	3.56	41.98839 -72.66383	Suffield / Hartford	Windsor Locks	PFO/PEM	758.31	1.74	0.00	0.15	0.00	0.00	N/A	II	Emergent agricultural field associated with high water table.
WCT-24	3.73	41.98648 -72.66604	Suffield / Hartford	Windsor Locks	PFO/PEM	537.85	0.48	0.08	0.37	0.02	0.05	N/A	II	Emergent and forested wetland associated with high water table
WCT-25	3.95	41.98409 -72.6687	Suffield / Hartford	Windsor Locks	PFO	524.82	0.28	0.64	0.00	0.22	0.00	N/A	II	Emergent and forested wetland associated with high water table
WCT-26	4.04	41.98297 -72.66952	Suffield / Hartford	Windsor Locks	PEM	127.56	0.14	0.11	0.00	0.03	0.00	N/A	II	Emergent agricultural field associated with high water table.
WCT-27	4.09	41.98235 -72.66999	Suffield / Hartford	Windsor Locks	PEM	337.48	0.31	0.21	0.00	0.08	0.00	N/A	II	Emergent agricultural field associated with high water table.
WCT-28	4.15	41.98143 -72.67052	Suffield / Hartford	Windsor Locks	PFO/PEM	0.00	0.01	0.04	0.00	0.00	0.00	N/A	II	Forested/emergent wetland at the lower edges of ag fields.
WCT-29	4.21	41.98071 -72.67112	Suffield / Hartford	Windsor Locks	PEM	465.53	0.77	0.00	0.00	0.00	0.00	N/A	II	Emergent wetland associated with high water table of an ag field.
WCT-30	4.43	41.97822 -72.67364	Suffield / Hartford	Windsor Locks	PEM	184.99	0.32	0.00	0.00	0.00	0.00	N/A	II	Emergent wetland associated with high water table and intermittent drainage channel within ag field.
WCT-31	4.61	41.97614 -72.67589	Suffield / Hartford	Windsor Locks	PFO/PEM	379.95	0.00	0.68	0.00	0.26	0.00	N/A	II	Primarily a forested wetland associated with high water table.
WCT-32	4.78	41.97418 -72.67798	Suffield / Hartford	Windsor Locks	PFO/PEM	269.52	0.00	0.48	0.00	0.19	0.00	N/A	II	Primarily a forested wetland associated with high water table and intermittent surface water
WCT-33	5.02	41.97151 -72.68083	Suffield / Hartford	Windsor Locks	PFO	1572.94	0.27	2.38	0.00	1.04	0.00	N/A	II	Primarily a forested wetland associated with a high water table with emergent vegetation on the ROW
WCT-34	5.20	41.96942 -72.68303	Suffield / Hartford	Windsor Locks	PFO/PSS/ PEM	108.00	0.00	0.00	0.17	0.00	0.02	N/A	II	Forested, scrub shrub, and emergent wetland associated with a high water table
WCT-36	5.33	41.96798 -72.68457	Suffield / Hartford	Windsor Locks	PFO/PSS/ PEM	927.76	0.02	1.57	0.03	0.64	0.00	N/A	II	Forested, scrub shrub, and emergent wetland associated with a high water table and intermittent drainage.
WCT-37	5.58	41.96504 -72.6873	Suffield / Hartford	Windsor Locks	PFO/PSS/ PEM	437.88	0.75	0.10	0.00	0.04	0.00	N/A	II	Wetland associated with Stony Brook banks and flood plain
WCT-38	5.80	41.96216 -72.68905	Suffield / Hartford	Windsor Locks	PEM/PFO	472.40	0.99	0.00	0.00	0.00	0.00	N/A	II	Primarily an emergent wetland associated with ag field high water table.
WCT-39	5.94	41.96034 -72.69027	Suffield / Hartford	Windsor Locks	PFO/PEM	22.14	0.06	0.02	0.00	0.01	0.00	N/A	II	Primarily a forested wetland associated with an intermittent channel

TABLE 1
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
WCT-40	5.98	41.95982 -72.6906	Suffield / Hartford	Windsor Locks	PFO/PEM	152.23	0.05	0.12	0.00	0.09	0.00	N/A	II	Primarily a forested wetland associated with an intermittent channel
WCT-41	6.18	41.95717 -72.69217	Suffield / Hartford	Windsor Locks	PFO/PEM	1557.60	0.83	1.83	0.00	0.74	0.00	N/A	II	Primarily a forested wetland associated with surface water and intermittent channels.
WCT-42	6.36	41.95493 -72.69381	Suffield / Hartford	Windsor Locks	PSS/PEM	93.80	0.00	0.10	0.00	0.06	0.00	N/A	II	Scrub shrub and emergent wetland associated with an intermittent channel.
WCT-43	6.42	41.95417 -72.69444	Suffield / Hartford	Windsor Locks	PFO/PEM	126.65	0.13	0.08	0.00	0.01	0.00	N/A	II	Forested and emergent wetland downslope of an ag field.
WCT-44	6.45	41.9537 -72.69483	Suffield / Hartford	Windsor Locks	PFO/PEM	38.99	0.01	0.07	0.00	0.03	0.00	N/A	II	Forested and emergent wetland associated with an intermittent channel.
WCT-45	6.53	41.95278 -72.69561	Suffield / Hartford	Windsor Locks	PFO/PEM	483.05	0.00	0.82	0.00	0.33	0.00	N/A	II	Primarily a forested associated with an unnamed perennial stream with emergent vegetation at ROW

TABLE 1
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
WCT-46	6.82	41.94922 -72.69871	East Granby / Hartford	Windsor Locks	PFO/PEM	2054.50	0.51	3.10	0.00	1.21	0.00	N/A	II	Forested wetland associated with perennial streams, and with emergent vegetation at ROW.
WCT-47	7.11	41.946 -72.70232	East Granby / Hartford	Windsor Locks	PFO	23.61	0.00	0.06	0.00	0.02	0.00	N/A	II	Forested wetland associated with perennial streams.
WCT-48A	7.19	41.94532 -72.70335	East Granby / Hartford	Windsor Locks	PEM/PFO	64.56	0.09	0.08	0.00	0.04	0.00	N/A	II	Forested and emergent wetland
WCT-49	7.23	41.94486 -72.70395	East Granby / Hartford	Windsor Locks	PFO	86.53	0.00	0.00	0.13	0.00	0.02	N/A	II	Forested wetland
WCT-50	7.27	41.94444 -72.70456	East Granby / Hartford	Windsor Locks	PFO/PEM	14.86	0.01	0.06	0.00	0.01	0.00	N/A	II	Forested wetland and emergent marsh associated with DeGrayes Brook
WCT-50A	7.30	41.94421 -72.705	East Granby / Hartford	Windsor Locks	PFO	41.18	0.00	0.07	0.00	0.03	0.00	N/A	II	Forested wetland associated with DeGrayes Brook
WCT-51	7.34	41.9439 -72.70557	East Granby / Hartford	Windsor Locks	PFO/PEM	214.51	0.22	0.08	0.00	0.03	0.00	N/A	II	Primarily emergent marsh
WCT-52	7.42	41.9431 -72.7067	East Granby / Hartford	Windsor Locks	PFO/PEM	149.59	0.09	0.00	0.00	0.00	0.00	N/A	II	Forested and emergent wetland
WCT-53	7.56	41.94079 -72.70791	East Granby / Hartford	Windsor Locks	PSS/PFO	1130.37	0.66	1.24	0	0.29	0	N/A	II	Primarily scrub shrub wetland associated with DeGrayes Brook
Pipeline FacilitiesTotal						**25246.90**	**24.16**	**18.70**	**1.78**	**6.70**	**0.15**			
Wetlands Associated with Proposed Pipeyards														
None Identified (workspace layout will avoid impacting identified wetlands)														
Pipeyard Facilities Total						0.00	0.00	0.00	0.00	0.00	0.00			
Wetlands Associated With Access Roads														
WCT 4	1.20	42.01788 -72.64205	Suffield / Hartford	West Springfield	PFO	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	Forested wetland associated with a high water table
WCT 21	3.34	41.99135 -72.66224	Suffield / Hartford	Windsor Locks	PEM/PFO	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	Emergent agricultural field and forested wetland associated with high water table.
WCT 21B	3.40	41.99062 -72.66291	Suffield / Hartford	Windsor Locks	PEM/PFO	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	Primarily an agriculture field, Impacts to pipeline workspace and access road # 4
WCT 22	3.47	41.98964 -72.66325	Suffield / Hartford	Windsor Locks	PFO/PEM	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	Emergent agricultural field associated with high water table.
WCT 26	4.05	41.98319 -72.66962	Suffield / Hartford	Windsor Locks	PEM	0.00	0.00	0.004	0.00	0.004	0.00	N/A	N/A	Emergent agricultural field associated with high water table. Impacts to pipeline and access road #5

TABLE 1
WETLANDS ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Wetland ID[a]	Milepost	Latitude Longitude	Town / County	Quadrangle	Wetland Class[b]	Crossing Length (ft)[c]	Wetland Impact (acres)[d]					State Wetland Classification[e]	Crossing Method[f]	Comments
							Construction			Operation				
							PEM	PFO	PSS	PFO	PSS			
WCT 27	4.03	41.98318 -72.66978	Suffield / Hartford	Windsor Locks	PEM	0.00	0.00	0.0001	0.00	0.0001	0.00	N/A	N/A	Emergent agricultural field associated with high water table. Impacts to pipeline and access road #5
WCT 29	4.17	41.98118 -72.67048	Suffield / Hartford	Windsor Locks	PEM	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	Forested/emergent wetland at the lower edges of ag fields. Impacts to pipeline and access road #5
WCT 41	6.28	41.9561 -72.69363	Suffield / Hartford	Windsor Locks	PFO/PEM	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	Emergent wetland associated with high water table of an ag field. Impacts to pipeline and access road #5
WCT 41A	6.20	41.95737 -72.69371	Suffield / Hartford	Windsor Locks	PFO/PEM	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	Primarily a forested wetland associated with surface water and intermittent channels. Adjacent to access road # 7 no impact to pipeline workspace.
WCT 41D	6.27	41.95626 -72.69371	Suffield / Hartford	Windsor Locks	PFO/PEM	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	Primarily a forested wetland associated with surface water and intermittent channels. Adjacent to access road # 7 no impact to pipeline workspace.
Access Roads Total						**0.00**	**0.00**	**0.004**	**0.00**	**0.004**	**0.00**			
Connecticut Loop Total						**25246.90**	**24.16**	**18.70**	**1.78**	**6.70**	**0.15**			

N/A: Not applicable

a: Wetlands associated with MLV and pig launcher/receiver facilities included in the corresponding pipeline segment.

b: Wetland classifications according to Cowardin et al 1979: PEM = Palustrine Emergent Wetland; PSS = Palustrine Scrub-Shrub Wetland; PFO = Palustrine Forested Wetland.

c: 0.0 = wetland is not crossed by pipeline but is in workspace.

d: Construction Acreage = all workspace during construction activities (TWS and ATWS plus permanent easement); Operation Acreage = 10-foot wide corridor permanently maintained in herbaceous vegetated cover through PSS wetlands, and 30-foot wide corridor permanently maintained through PFO wetlands where trees within 15 feet of the pipeline will be selectively cut and removed. The permanently maintained corridors represent a change in cover type from PFO to PSS and PEM or PSS to PEM; there is no operation impact on PEM wetlands, since there is no change in the pre- and post-construction vegetation cover type. Construction impacts were calculated using a proposed construction footprint surface area and existing landuse based on field surveys. Surface area of operational maintenance corridor as described above were used to calculate acres of operation impact to each pre-construction wetland vegetation cover type for each wetland included in the table. The ROW width at all most wetland crossings is 75 feet. Operation impacts are a subset of the construction impacts. For example, there are 18.70 acres of impact to PFO wetlands during construction. Of this, 18.70 acres of impact during construction, 6.70 acres will be permanently converted during operation. Operation impacts and construction impacts should not be combined to get a larger impact number.

e: Massachusetts Wetlands Classification BVW = Bordering Vegetated Wetland, Connecticut Inland Wetland and Watercourses Act (Section 22a-36 through 45 of the Connecticut General Statue) does not provide specific state wetland classifications.

f: Methods for wetlands are described in Section 2.3.5; I = Standard Crossing; II = Conventional Crossing; III = Push/Pull Crossing; IV = Horizontal Directional Drill; N/A = Wetland not crossed by pipeline

Note: The totals shown in this table may not equal the sum of addends due to rounding.

TABLE 2
WATERBODIES ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Waterbody ID	Waterbody Name[a]	Approximate MP[b]	Latitude Longitude	Town / County	Quadrangle	Type[c]	Water Crossing Length[d] (feet)	FERC Class[e]	Water Quality Designation / Fishery Classification[f]	Timing Restriction[g]	Crossing Method[hi]	Comment
SCT-56	Unknown	0.79	42.02304 -72.63899	Suffield / Hartford	West Springfield	I	10	I	Unknown	June 1 - Sept 30	I	
SCT-11	Clay Brook	1.58	42.01264 -72.64508	Suffield / Hartford	West Springfield	P	7	MI	A / Cool water fishery	None	II	
SCT-12	Clay Brook	1.70	42.01069 -72.64604	Suffield / Hartford	West Springfield	P	24	I	A / Cool water fishery	None	II	
SCT-19	Muddy Brook	2.98	41.99555 -72.65913	Suffield / Hartford	Windsor Locks	P	55	I	A / Cool water fishery	None	II	
SCT-37	Stony Brook	5.56	41.96379 -72.68815	Suffield / Hartford	Windsor Locks	P	29	I	A / Warm water fishery	None	II	
SCT-45	Unnamed tributary to Stony Brook	6.52	41.95294 -72.69553	Suffield / Hartford	Windsor Locks	I	2	MI	A / Warm water fishery	June 1 - Sept 30	I	
SCT-46	Unnamed tributary to DeGrayes Brook	6.85	41.94883 -72.69906	East Granby / Hartford	Windsor Locks	P	3	MI	A / Warm water fishery	None	II	
SCT-46A	Unnamed tributary to DeGrayes Brook	6.90	41.94697 -72.70082	East Granby / Hartford	Windsor Locks	I	3	MI	A / Warm water fishery	June 1 - Sept 30	I	
SCT-47	Unnamed tributary to DeGrayes Brook	7.11	41.94598 -72.70238	East Granby / Hartford	Windsor Locks	I	1	MI	A / Warm water fishery	June 1 - Sept 30	I	
SCT-50	Unnamed tributary to DeGrayes Brook	7.27	41.94382 -72.70574	East Granby / Hartford	Windsor Locks	I	1	MI	A / Warm water fishery	June 1 - Sept 30	I	
SCT-50B	Unnamed tributary to DeGrayes Brook	7.30	41.94420 -72.70508	East Granby / Hartford	Windsor Locks	I	2	MI	A / Warm water fishery	June 1 - Sept 30	I	
SCT-53	Unnamed tributary to DeGrayes Brook	7.50	41.94181 -72.70772	East Granby / Hartford	Windsor Locks	I	2	MI	A / Warm water fishery	June 1 - Sept 30	I	
SCT-53A	Unnamed tributary to DeGrayes Brook	7.51	41.94186 -72.70769	East Granby / Hartford	Windsor Locks	I	2	MI	A / Warm water fishery	June 1 - Sept 30	I	
SCT-55	Unnamed tributary to DeGrayes Brook	8.08	41.935175 -72.709242	East Granby / Hartford	Windsor Locks	I	23	MI	A / Warm water fishery	June 1 - Sept 30	I	
Pipeline Facilities Crossing Length Total							**164**					
Waterbodies Associated With Access Roads												
SCT-50C	Unnamed tributary to DeGrayes Brook	7.34	41.94502 -72.70679	East Granby / Hartford	Windsor Locks	P	0	MI	A / Warm water fishery	N/A	N/A	Culverted under existing access road, no impacts anticipated

TABLE 2
WATERBODIES ASSOCIATED WITH THE CONNECTICUT EXPANSION PROJECT – CONNECTICUT LOOP

Waterbody ID	Waterbody Name[a]	Approximate MP[b]	Latitude Longitude	Town / County	Quadrangle	Type[c]	Water Crossing Length[d] (feet)	FERC Class[e]	Water Quality Designation / Fishery Classification[f]	Timing Restriction[g]	Crossing Method[hi]	Comment
SCT-50D	Unnamed tributary to DeGrayes Brook	7.34	41.94510 -72.70677	East Granby / Hartford	Windsor Locks	P	0	MI	A / Warm water fishery	N/A	N/A	Culverted under existing access road, no impacts anticipated
Access Road Crossing Length Total							**0**					
Connecticut Total Crossing Length							**164**					

N/A = Not Applicable
a: Unnamed tributary: waterbody is not mapped as a tributary on available GIS datalayers; tributary name was identified based on review of USGS topographical mapping.
b: MP = milepost; MP provided for access roads indicate the point at which the access road meets the proposed pipeline.
c: P = perennial; I = intermittent
d: 0 = waterbody is not crossed but is in workspace. For minor waterbodies less than 3 feet in width delineated in the survey area and shown as a single line feature on the Project alignment sheets, an assumed 3 foot width has been used for this analysis.
e: MI = Minor (<10 feet); I = Intermediate (10 - 100 feet); MA = Major (>100 feet).
f: State Water Quality Designation:
A Known or presumed to meet water quality criteria that support potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, and other legitimate uses, including navigation. Surface waters which are not specifically classified shall be considered Class A or Class AA (CTDEEP 2013). None of the waterbodies crossed by the Project are listed in DEEP fisheries management activities. Fisheries classifications supplied by CTDEEP (Hagstrom 2014).
Water quality classifications were identified by AECOM through a desktop review of available GIS datalayers. Waterbodies that were not assigned a water quality classification on the GIS datalayer were given the same classification of the waterbody it drains into.
g: Open cut crossings must occur between June 1-September 30, no timing restriction for dry crossing methods (Mysling 2014). Timing restrictions for fisheries are based on CTDEEP state fishery classification restrictions. Potential timing restrictions reflect dates during which construction activities may occur and are subject to CTDEEP review. Tennessee will adhere to the CTDEEP fishery timing restriction during construction; state fishery timing restrictions are designed by the state to protect the resources during the time period that the state has determined is critical.
h: I = Conventional, Wet Crossing Method; II = Dry Crossing Method including Flume and Dam and Pump; HDD=Horizontal Directional Drill. Intermittent streams containing discernable flow at the time of construction will be crossed using a dry crossing method.
i: Tennessee will implement a dry-crossing construction technique on all waterbody crossings with discernable flow at the time of construction unless an alternative crossing method is approved by the CTDEEP, USACE, and Commission.

Impact Evaluation

Tennessee has taken measures to minimize or avoid adverse effects from the Project to water resources. The proposed Connecticut Loop has been sited parallel and adjacent to existing permanent ROW to the extent practicable to minimize impacts. As discussed herein, the Project facilities are proposed to cross wetlands and waterbodies. In the majority of these locations, the effects of the construction of Project facilities on wetlands and watercourses will be temporary, except for one permanent access road in Suffield, Connecticut, where a small amount of permanent wetland fill is required to improve an existing access road to allow for access following construction. ROW configuration drawings are provided in Attachment Q of this Section 401 application.

Access roads (for construction and access to appurtenant facilities) already exist along certain portions of the existing pipeline ROW that will be utilized for the Project. However, in the majority of cases, improvements to these temporary access roads will need to be made (i.e., widened, graded, or filled) to allow safe passage to construct the Project. Access roads will typically consist of a 10-20 foot wide travel surface. Tennessee identified existing access roads to be used for construction, some of which may require improvements including laying down new gravel or tree trimming to allow passage of vehicles and equipment. Roads may be graveled or consist of construction mats, using a variety of materials to maintain drainage patterns across the ROW. These temporary access roads will accommodate rubber tired light duty trucks only. All access roads in Connecticut will be temporary except for one. One new permanent access road is proposed in Connecticut, as discussed above, which will involve improvement and widening of an existing access road to access the new MLV at approximate MP 4.51. Roads must have sufficient width and capacity for heavy construction and maintenance equipment and both over-the-road and off-road vehicles, including oversize tractor-trailers. The need for access by flat-bed trailers typically determines the scope of access road improvements. All roads, temporary and permanent, have been designed to avoid and minimize impacts to Waters of the United States to the extent feasible. Where alternative means of access across uplands does not exist, temporary matting (i.e., swamp mats) will provide temporary access across Waters of the United States to minimize rutting and wetland impacts. Attachment B contains Project mapping depicting the proposed temporary and permanent access roads which will be used for the Project.

Along the proposed Project, vegetation removal and tree clearing will be required for temporary workspace to install the pipeline facilities. As a result, trees within forested wetlands along new ROW areas will be removed. In temporary workspace areas, trees will be allowed to regrow and return to forested wetlands following construction. In forested wetlands, Tennessee will minimize tree clearing to the maximum extent practicable while maintaining safe construction conditions. Following construction, tree clearing within wetlands during operation of the Connecticut Loop will be limited to selectively clearing trees with roots that could compromise the integrity of the pipeline coating within 15 feet centered on the pipe, according to the Commission's May 2013 Plan and Procedures (Attachment Q). Tennessee will also maintain a 10-foot corridor, centered on the Connecticut Loop, in herbaceous cover to allow for annual pedestrian walkover surveys that would convert scrub-shrub to herbaceous cover type. These maintenance procedures will result in forested wetlands being converted to scrub-shrub and scrub-shrub to emergent marsh wetland types. This will not create a loss of overall wetland habitat, but rather a long-term change in habitat type, from forested to scrub-shrub and emergent marsh. In-situ restoration plans for the forested wetland areas have been provided in Attachment L and additional details regarding the restoration activities are provided in Attachment K.

Access within the ROW across wetlands will only be permitted where soils are non-saturated and able to support construction equipment at the time of crossing, during frozen soil conditions (for winter tree clearing) or with the use of timber mats to avoid rutting of the wetland soil. Within wetlands, no rubber tire equipment will be permitted unless it will not damage the root systems and its use is approved by the on-site Environmental Inspector ("EI"). Excessive traffic from rubber-tired clearing equipment, such as

skidders, on saturated soils can result in soil compaction and damage to existing root systems. Where wetlands are saturated and root damage is likely, clearing will be done manually or will be completed with equipment operating on timber mats. If the wetland must be crossed by rubber-tired equipment to access the remainder of the ROW, a travel lane of timber mats will be installed to facilitate access along the ROW. Bulldozers will not be used for clearing in wetlands. Trees and brush will be cut at ground level by hydroaxes, tree shears, grinders or chain saws. Within wetlands stumps will be left in place, except on the trenchline or unless the removal is necessary to ensure worker safety. Stumps may be ground to a suitable height for safety reasons.

The Project will be constructed in several stages, some overlapping in time. Certain work activities and sequences may vary, based on factors such as site-specific conditions, the final Project designs, and the requirements of regulatory approvals. Tennessee will complete pre-construction planning activities and continue consulting with the municipalities and state and federal agencies to minimize or avoid adverse effects to the environment and to the public. Tennessee will use conventional buried pipeline construction techniques and will follow all permit conditions and requirements set forth in the Commission's Plan and Procedures.

At a minimum, Tennessee will follow the following pipeline construction procedures for the Project:

- Survey and stake the centerline of the new pipeline and ROW boundaries;
- Clearing and grading;
- Trenching;
- Stringing;
- Pipe preparation (welding, bending, weld coating, X-ray, and coating repair) and lowering in;
- Backfilling and grade restoration;
- Hydrostatic testing and tie-ins; and
- Cleanup and restoration

The above procedures typically follow the sequence listed, however; certain areas requiring specific construction procedures may include, but are not limited to: road crossings, residential areas, waterbodies and wetlands, rugged topography or unstable soils, agricultural areas, and areas requiring blasting.

In the town of Suffield, the proposed pipeline will cross below Muddy Brook and Stony Brook. The crossing at these two brooks will require a temporary equipment bridge. A temporary bridge will allow the construction contractor to access both sides of the brooks with equipment for the construction of the pipeline crossing. The bridge will span 1.25 times the active channel width and allow for the passage of a two year storm event. Construction mats will be placed at the boundary of the channel with a minimum width of 10 feet on either side. The crossing of Muddy Brook and Stony Brook will occur during the dry season so that flow within the streams will be minimal. The bridge will be secured to prevent movement during construction. The equipment bridge will be removed after construction is complete and the area restored and stabilized. Construction of the pipeline crossing will be completed with a dam and pump method, flume crossing method, or a combination of both. While the typical depth of cover of the proposed pipeline will be three (3) feet, Tennessee will provide five (5) feet depth of cover at the crossing below each brook. The additional depth of cover will provide a greater margin of safety under flowing water conditions to ensure adequate cover remains over the pipe beneath the streambed. The material removed during the pipeline trenching will be stockpiled onsite. Two stockpiles will be provided, one for channel bottom material and one for embankment material. The stockpiled material will be reused onsite and supplemented with additional suitable material, if required. If any unsuitable or excess material is generated, it will disposed offsite in accordance with all applicable requirements. Any material transported offsite will be dewatered prior to being transported. After the pipeline installation below each

streambed for these two brooks, the disturbed construction areas will be completely restored. As noted above, the channel bottom material will be temporarily stockpiled and reused. At both sites, a dry seed mix will be specified within the areas of turf establishment.

Protecting the natural features of each waterbody and the associated wildlife habitat is the highest priority for each stream crossing. Application of Tennessee's BMPs at each crossing will ensure that the selected construction contractor will protect the waterbodies during construction and provide a stable post-construction environment. Re-vegetation of trees and shrubs in areas adjacent to these waterbodies which currently support forested wetland, outside of the 30-foot corridor directly along the pipe, will further contribute to restoring riparian habitat values along the waterbodies.

The effects from the Project on air quality in the area will be short-term and minimal, occurring only during construction activities. Construction of the Project may cause a temporary reduction in the local ambient air quality due to fugitive dust and emissions generated by construction equipment. These effects will only occur in the vicinity of the construction activity. The emissions from vehicles and equipment will have minimal effects on the air quality of the region. Once construction activities are completed, emissions will subside and ambient air quality will return to pre-construction levels.

Types of Material Being Discharged

Construction of the Project will require both temporary and permanent discharges of materials to Waters of the United States. Discharges will result from temporary stockpiling of soils in wetlands and from installation of the new pipeline, the modifications made to existing temporary access roads, the maintenance, improvement, or extension of one permanent access road, and the placement of temporary timber construction mats to serve as construction workspace in wetlands and floodplains. The types of materials that would be discharged include trench spoil, rock or gravel for permanent access road improvements and wood matting for temporary access roads or work areas (e.g. temporary workspace or pipeyards). Table 3 summarizes the estimated cubic yards of materials being discharged.

TABLE 3
ESTIMATED MATERIAL BEING DISCHARGED FOR THE PROJECT

Project Activity	Estimated Volume of Temporary Discharge (cubic yards)	Estimated Volume of Permanent Discharge (cubic yards)
Connecticut		
Workspace[1]	72,019	0
Access Roads[1]	10	10
Pipeyards/Contractor Yards[1]	0	0
Stream Bed (linear feet crossed)	164	0
Connecticut Total	72,029	10

[1] For the purposes of calculating cubic yards of discharge from workspace, access roads, stream beds and pipeyards, a depth of 1 foot was assumed. No permanent fills, beyond the two permanent access roads are proposed for this project so cubic yards of discharge were only calculated for the permanent access road impacts.

No upland spoils generated during construction will be deposited or stored in wetlands. In wetlands, up to the top 12 inches of the wetland topsoil over the trenchline will be segregated from subsoil, unless saturated according to the Commission's Plan and Procedures. Trench spoil will be temporarily stockpiled along the pipeline trench. Construction mats, whether wood or other material, will be removed and the disturbed area restored, as close as practicable, to pre-construction conditions. If shallow groundwater is encountered during excavation, dewatering would be performed in accordance with local permit conditions and/or construction BMPs. Such practices typically include pumping the water into a

temporary sediment filter device such as a hay-bale corral or filter bag in an adjacent upland area to minimize sediments from entering wetlands and waterbodies (see Tennessee Construction BMPs in Attachment Q).

Table 4 below provides a summary of impacts by wetland type in each municipality in Connecticut. Detailed summaries of the temporary (construction) and permanent (operation) impacts to each wetland along the pipeline loop are presented in Table 1. Detailed site specific permit drawings for wetlands and watercourses are provided in Attachment B. Table 5 lists all wetlands confirmed during field surveys performed in spring 2014 to contain vernal pool and/or amphibian breeding habitat.

A general sequencing of pipeline construction methods is provided above and also in Attachment K. Soil erosion and sediment control procedures, including the basic measures to be used to minimize erosion and sedimentation into Waters of the United States are included in Attachment Q.

In summary, the Project has implemented measures to avoid and minimize adverse impacts to water resources. The Project been sited parallel and adjacent to existing pipeline ROWs that have been periodically cleared of vegetation and maintained since installation. All Project appurtenant facilities including MLVs and pig receivers have been sited outside of Waters of the United States. The Project will result in temporary direct wetland impacts totaling 44.64 acres during construction and 6.85 acres of impacts during operation (i.e., vegetative maintenance). Permanent direct wetland filling impacts from the Project will be limited to 0.004 acres, a result of improvements to an existing access road to allow permanent access to the MLV. Permanent cover type conversion will account for the majority of the 6.85 acres. Mitigation for these wetland impacts is being proposed in the form of in-situ restoration, including re-establishment of existing grades and hydrology, replacement of wetland topsoils, and re-vegetation with a wetland seed mix and/or plantings of wetland woody vegetation (trees and shrubs). Additional information on the in-situ restoration proposed for the Project is provided in Attachment K, and the restoration planting plans are provided in Attachment L along with a conceptual mitigation plan submitted to the USACE. Accordingly, it is believed that the Project has effectively avoided and minimized impacts to Waters of the United States, and will adequately mitigate for any unavoidable adverse impacts.

TABLE 4
WETLAND IMPACT SUMMARY BY WETLAND TYPE FOR THE CONNECTICUT LOOP

Town	County	Palustrine Emergent (acres affected)		Palustrine Forested (acres affected)		Palustrine Scrub-Shrub (acres affected)		Total (acres affected)	
		Construction[a]	Operation[b]	Construction[a]	Operation[b]	Construction[a]	Operation[b]	Construction[a]	Operation[b]
Suffield	Hartford	22.58	0	14.01	5.07	1.65	0.13	38.24	5.2
East Granby	Hartford	1.58	0	4.69	1.63	0.13	0.02	6.4	1.65
Connecticut Loop Total		**24.16**	**0**	**18.70**	**6.70**	**1.78**	**0.15**	**44.64**	**6.85**

a: Construction Acreage = all workspace during construction activities (TWS and ATWS plus permanent easement).

b: Operation Acreage = For conventional crossing methods: 30-foot width permanently maintained through forested wetlands, 10-foot width permanently maintained through scrub-shrub wetlands; there are no operation impacts to PEM wetlands as there is no change in the pre- and post-construction vegetation cover type.

Note: The totals shown in this table may not equal the sum of addends due to rounding.

TABLE 5
POTENTIAL IMPACTS TO WETLANDS PROVIDING VERNAL POOL HABITAT

Wetland ID	Municipality	Type of Impact to Surrounding Wetland (square feet)	Type of Impact to Vernal Pool (square feet)
CONNECTICUT			
East Granby/CT	WCT 46	Temporary Workspace (71,521) Wetland Conversion (18,436)	
East Granby/CT	WCT 49	Temporary Workspace (5,688)	Temporary Workspace (5,688)
East Granby/CT	WCT 51	Temporary Workspace (12,795) Operation Impact (1,439)	Workspace (1,394) Operation Impact (436)
Suffield/CT	WCT 11	Workspace (45,956) Operation Impact (50)	Workspace (90)
Suffield/CT	WCT 13	Workspace (1,485) Operation Impact (217)	Workspace (489)
Suffield/CT	WCT 18	Workspace (123,692) Operation Impact (24,816)	
Suffield/CT	WCT 32	Workspace (21,175) Operation Impact (8,141)	Workspace (1,431)
Suffield/CT	WCT 33	Workspace (115,486) Operation Impact (45,165)	
Suffield/CT	WCT 34	Workspace (7,660)	
Suffield/CT	WCT 36	Workspace (70,506) Operation Impact (27,741)	

TABLE 5
POTENTIAL IMPACTS TO WETLANDS PROVIDING VERNAL POOL HABITAT

Wetland ID	Municipality	Type of Impact to Surrounding Wetland (square feet)	Type of Impact to Vernal Pool (square feet)
Suffield/CT	WCT 39	Workspace (3,662) Operation Impact (309)	Workspace (1,097)
Suffield/CT	WCT 41	Workspace (114,717) Operation Impact (32,292)	Workspace (1,166)
Suffield/CT	WCT 45	Workspace (35,834) Operation Impact (14,529)	
Suffield/CT	WCT 46	Workspace (85,975) Operation Impact (34,453)	
Suffield/CT	WCT6	Workspace (22,083) Operation Impact (3,697)	
Suffield/CT	WCT7	Workspace (7,637) Operation Impact (1,826)	
Suffield/CT	WCT9	Workspace (17,975) Operation Impact (619)	Workspace (1,264) Operation Impact (47)