TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Resource Report No. 7
Soils

Transcontinental Gas Pipe Line Company
Northeast Supply Link Project

December 2011

SUMMARY OF FILING INFORMATION		
INFORMATION	**Data Sources[1]**	**Found in**
Minimum FERC Filing Requirement		
1. Identify, describe, and group by milepost the soils affected by the proposed pipeline and aboveground facilities. (§380.12 (i) (1))	X, H	Table 7.2-1, 7.2-2, 7.2-3, 7.2-4, 7.2-5
2. For aboveground facilities that would occupy sites over 5 acres, determine the acreage of prime farmland soils that would be affected by construction and operation. (§380.12 (i) (2))	X, H	Section 7.4
3. Describe, by milepost, potential impacts on soils. (§380.12 (i) (3,4))	X, H	Tables 7.2-1 through 7.2-5
4. Identify proposed mitigation to minimize impact on soils, and compare with the staff's Upland Erosion Control, Revegetation, and Maintenance Plan. (§380.12 (i) (5))	Y,D,K,H,W	Section 7.3

[1] W NRCS
D Applicant
H Comprehensive Plans, County or Land Management Agencies
K Erosion Control and Drainage Handbooks, State and County
X NRCS Soil Surveys
Y Plan

Response to FERC Comments on September 28, 2011	
Comment:	**Found in:**
1. Explain how soil acreages were calculated.	7.3
2. Describe the criteria/ranges that Transco used to classify soils into high, medium, and low categories for stony/rocky soils. Note that "large" or "appreciable" amounts or rock do not correspond to data in soil surveys.	7.3.4
3. Provide information on the K value ranges that were used to classify soils into severe, moderate, and slight erosion risk categories and what impacts would result from each risk category from water and wind erosion during construction.	7.3.2
4. Provide the following for each soil map unit crossed by the Project: a. the wind erodible group rating; b. the land capability classification; c. the surface texture; and d. the drainage classification.	7.2

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List of Acronyms

AST	aboveground storage tank
BMP	best management practice
CEA	Classification Exception Area
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
dt/d	decatherms per day
E&SCP	Erosion and Sediment Control Plan
EDR	Environmental Data Resources, Inc.
EPA	United States Environmental Protection Agency
ERNS	Emergency Response Notification System
FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
hp	horsepower
KCSL	Known Contaminated Sites List
M&R	Meter and Regulator
MLV	Mainline Valve
MP	milepost
NGA	Natural Gas Act
NFA	No Further Action
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
NRCS	Natural Resource Conservation Service
NSL	Northeast Supply Link Project or Project
NYSDEC	New York State Department of Environmental Conservation
PA	Preliminary Assessment
RCRA	Resource Conservation and Recovery Act
ROW	right of way
RR	resource report
SI	Site Investigation
RUSLE	Revised Universal Soil Loss Equation

SSURGO	Soil Survey Geographic
Transco	Transcontinental Gas Pipe Line Company, LLC
USDA	United States Department of Agriculture
UST	underground storage tank
VCP	New York Voluntary Cleanup Program
WEG	wind erodibility group

7. SOILS

7.1 INTRODUCTION

Transcontinental Gas Pipe Line Company, LLC (Transco) is proposing to expand its pipeline systems in the Pennsylvania-New Jersey-New York region to meet the immediate and future demand for natural gas in the Northeast. To accomplish this, Transco will file an application for a Certificate of Public Convenience and Necessity (Certificate) from the Federal Energy Regulatory Commission (FERC). Transco is requesting authorization to construct and operate the Northeast Supply Link Project (NSL Project or Project) to expand its existing pipeline systems located in Pennsylvania, New Jersey, and New York under Section 7(c) of the Natural Gas Act (NGA); and to abandon certain facilities under Section 7(b) of the NGA. The NSL Project will create a new transportation path for 250,000 decatherms per day (dt/d) of natural gas from various receipt points on Transco's Leidy Line in Pennsylvania to various delivery points along Transco's mainline and Leidy systems in Pennsylvania, New Jersey, and New York.

The Project will consist of 12.03 miles of 42-inch diameter pipeline looping extension, 26.95 miles of pipeline uprate, 0.46 miles of 36-inch diameter pipeline replacement, construction of a new compressor station and new electrical substation, and modification of several aboveground facilities. The proposed facilities are located in Pennsylvania, New Jersey, and New York. An overview of the proposed facilities is provided below. Refer to Figure 1.1-1 in Resource Report (RR) 1, "General Project Description," for a Project overview map that shows the location of all proposed facilities and their association with Transco's existing pipeline facilities.

Proposed Pipeline Facilities

- **Muncy Loop (Lycoming County, Pennsylvania):** Approximately 2.22 miles of 42-inch diameter pipeline, extending the existing Leidy Line "D" loop between mileposts (MPs) 128.97 and 131.19.
- **Palmerton Loop (Monroe County, Pennsylvania):** Approximately 3.17 miles of 42-inch diameter pipeline, extending the existing Leidy Line "D" loop between MPs 40.50 and 43.67.
- **Stanton Loop (Hunterdon County, New Jersey):** Approximately 6.64 miles of 42-inch diameter pipeline, extending the existing Leidy Line "C" loop between MPs 6.90 and 13.54.
- **Caldwell B Replacement (Essex County, New Jersey):** Approximately 0.46-mile replacement of the existing 36-inch diameter Caldwell B Loop.

Preliminary alignment sheet mapping for the proposed pipeline facilities is included in the Mapping Supplement in Volume 3.

Proposed Pipeline Uprates

- **Caldwell Uprate (Essex, Passaic, Bergen, and Hudson counties, New Jersey):** Pressure uprate along approximately 25.55 miles of the existing 36-inch Caldwell B Loop, Mainline B, and 72nd Street Lateral.

- **Long Island Extension Uprate (Richmond County, New York):** Pressure uprate along approximately 1.40 miles of the existing 26-inch diameter Long Island Extension pipeline.

The pipeline uprates will not include any ground disturbance and are, therefore, not discussed further in this RR. All work related to the uprates will be at aboveground facilities as described below.

New Compressor Station: New Jersey

- **Compressor Station 303 (Essex County, New Jersey):** A new single-unit 25,000 hp electric-drive compressor station.

New Electrical Substation: New Jersey

- **Electrical Substation (Essex County, New Jersey):** A new high voltage electric substation to be constructed on an existing PSE&G transmission right of way (ROW) to transmit power from the PSE&G grid to Compressor Station 303.

Site plans for the new compressor station and electrical substation are provided in the Mapping Supplement in Volume 3.

Compressor Station Modification: Pennsylvania

- **Compressor Station 515 (Luzerne County, Pennsylvania):** An additional 16,000 horsepower (hp) compressor unit at Transco's existing Compressor Station 515.

Compressor Station Modification: New Jersey

- **Compressor Station 505 (Somerset County, New Jersey):** Facility modifications at Transco's existing Compressor Station 505.

Site plans for the compressor station modifications are provided in the Mapping Supplement in Volume 3.

Other Aboveground Facility Modifications: Pennsylvania

- **Leidy Interchange Hub (Clinton County, Pennsylvania):** Facility modification associated with upgrading the odorization system due to increased flow volumes.

- **Mainline Valves (MLVs) (Lycoming and Monroe Counties, Pennsylvania):** Relocation and modification of MLVs along the Muncy and Palmerton pipeline loops.

Other Aboveground Facility Modifications: New Jersey

- **Roseland Meter and Regulator (M&R) Station (Essex County, New Jersey):** Facility modification due to the Caldwell Uprate including valve and piping replacement and

regulation installation. It may also include modification related to the proposed Compressor Station 303.

- **Montclair State University M&R Station (Passaic County, New Jersey):** Facility modification due to the Caldwell Uprate including valve replacement and isolation of the station during testing of the Caldwell Loop.

- **East Rutherford M&R Station (Bergen County, New Jersey):** Isolation of the scrubbers and heaters during testing of the Caldwell Loop. Facility modification due to the Caldwell Uprate including additional regulation installation.

- **Regulator Station 240 (Bergen County, New Jersey):** Isolation of Regulator Station 240 piping during testing of the Caldwell Loop; pressure testing of Meadows Regulator No. 2 and installation of valves and other equipment.

- **Meadows Heaters (Bergen County, New Jersey):** Modification of existing heaters and installation of a new heater to accommodate increased flow volumes.

- **Mainline Valve (MLV) 505B60 (Essex County, New Jersey):** Modifications and testing to accommodate increased pressure.

- **Paterson Lateral Take-off (Bergen County, New Jersey):** Installation of overpressure protection from Mainline B.

- **MLVs (Hunterdon County, New Jersey):** Relocation and modification of MLVs along the Stanton Loop.

Other Aboveground Facility Modifications: New York

- **Narrows M&R Station (Richmond County, New York):** Modification to accommodate proposed increased delivery volumes.

- **Brooklyn Regulating Vault (Kings County, New York):** Addition of below-grade, downstream regulation facility adjacent to an existing facility to accommodate proposed increased delivery volumes.

- **134th Street Manhattan M&R Station (New York County, New York):** Facility modification due to the proposed increased delivery volumes, including piping replacement, building replacement, and ancillary modifications.

Site plans for all aboveground facility modifications are provided in the Mapping Supplement in Volume 3.

This RR describes the existing soils within the NSL Project area, the effect on these soils from construction and operation of the NSL Project, and measures proposed to minimize or avoid impacts.

7.2 EXISTING SOIL RESOURCES

The following sections describe soil resources underlying the Muncy Loop, Palmerton Loop, Stanton Loop, Caldwell B Replacement, and the aboveground facilities associated with

the Project, including general information about the nature and properties of each soil and/or mapping unit crossed by each component of the proposed Project. Information regarding the existing soil resources underlying the proposed Project are based on review of the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) data found within published County Soil Surveys, results of agency consultation (see Appendix 7A), and the publically accessible USDA-NRCS Web-based Soil Survey Geographic (SSURGO) database.

Maps illustrating the locations for the various soil mapping units crossed by the Project are included in the Mapping Supplement in Volume 3.

7.2.1 Pipeline Facilities

Muncy Loop

Table 7.2-1 lists, by MP, the soil characteristics and selected limitation factors associated with each mapping unit crossed by the proposed Muncy Loop. Soil mapping units that are encountered along the proposed Muncy Loop are further described below based on USDA-NRCS soil series descriptions. The USDA-NRCS defines a soil series as "a group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum." All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Alvira silt loam (AvB), 3 to 8 percent slopes:

The Alvira silt loam mapping unit is a gently sloping, deep, somewhat poorly drained soil located on glaciated uplands along foot slopes of ridges. This soil formed in loamy pre-Wisconsin glacial till derived from sandstone, siltstone, shale, and some quartzite. Alvira silt loam supports a seasonal high water table at a depth of approximately 6 inches to 18 inches. A fragipan is found at a depth between 16 inches to 28 inches and depth to bedrock is 3.5 to 10 feet or more. A fragipan is defined by the USDA-NRCS as "a loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts root growth. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly." Rock fragments of sandstone, shale, or quartzite range from 5 to 30 percent above the fragipan and from 5 to 50 percent in the fragipan. Illite and vermiculite are the dominant clay minerals, with appreciable amounts of kaolinite and detectable amounts of montmorillomite and interstratified minerals. This soil is strongly acid or very strongly acid throughout in unlimed areas and has a moderate erosion hazard.

Table 7.2-1
Soil Characteristics by Milepost Segment for each Soil Map Unit along the Muncy Loop of the Northeast Supply Link Project

MP Begin	MP End	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, e]	Prime Farmland [a, f]	Land Capability Class [g]
						WEG	K					
128.97	129.10	Wy	0 - 3	N	SL	5	.20	SL	60+	H	SWI	IIIs
129.10	129.13	BeD	15 - 25	N	MO	6	.32	vSE	20 - 40	H	N	IVe
129.13	129.26	BeC	8 - 15	N	SL	6	.32	SE	20 - 40	H	SWI	IIIe
129.26	129.33	AvB	3 - 8	I	MO	5	.32	MO	40+	H	SWI	VIIe
129.33	129.46	WkE	25 - 80	N	SE	6	.32	vSE	10 - 20	H	N	VIe
129.46	129.52	WeD	15 - 25	N	MO	6	.32	SE	10 - 20	H	N	IIe
129.52	129.55	WeB	3 - 8	I	SL	6	.32	MO	10 - 20	H	SWI	IIIe
129.55	129.66	BeC	8 - 15	N	SL	6	.32	SE	20 - 40	H	SWI	IIIe
129.66	129.70	WeD	15 - 25	N	MO	6	.32	SE	10 - 20	H	N	VIe
129.70	129.85	WkE	25 - 80	N	SE	6	.32	vSE	10 - 20	H	N	VIIe
129.85	129.95	WeD	15 - 25	N	MO	6	.32	SE	10 - 20	H	N	VIe
129.95	130.02	BeB	3 - 8	N	SL	6	.32	MO	20 - 40	H	SWI	IIe
130.02	130.03	WeD	15 - 25	N	MO	6	.32	SE	10 - 20	H	N	VIe
130.03	130.05	BeB	3 - 8	N	SL	6	.32	MO	20 - 40	H	SWI	IIe
130.05	130.08	BeC	8 - 15	N	SL	6	.32	SE	20 - 40	H	SWI	IIIe
130.08	130.26	TuA	0 - 3	N	SL	5	.28	SL	40+	H	Y	IIs
130.26	130.32	Ba	0 - 3	I	SL	5	.32	SL	60+	H	Y	IIw
130.32	130.33	Water	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
130.33	130.49	Ba	0 - 3	I	SL	5	.32	SL	60+	H	Y	IIw
130.49	130.54	WkE	25 – 80	N	SE	6	.32	vSE	10 - 20	H	N	VIIe
130.54	130.59	BeD	15 - 25	N	MO	6	.32	vSE	20 - 40	H	N	IVe
130.59	130.62	BeC	8 - 15	N	SL	6	.32	SE	20 - 40	H	SWI	IIIe
130.62	130.67	BeB	3 - 8	N	SL	6	.32	MO	20 - 40	H	SWI	IIe
130.67	130.70	BeC	8 - 15	N	SL	6	.32	SE	20 - 40	H	SWI	IIIe
130.70	130.78	BeD	15 - 25	N	MO	6	.32	vSE	20 - 40	H	N	IVe

Table 7.2-1
Soil Characteristics by Milepost Segment for each Soil Map Unit
along the Muncy Loop of the Northeast Supply Link Project

MP Begin	MP End	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, e]	Prime Farmland [a, f]	Land Capability Class [g]
						WEG	K					
130.78	130.99	WkE	25 - 80	N	SE	6	.32	vSE	10 - 20	H	N	VIe
130.99	131.19	BeC	8 - 15	N	SL	6	.32	SE	20 - 40	H	SWI	IIe
131.19	131.19	BeB	3 - 8	N	SL	6	.32	MO	20 - 40	H	SWI	IIe

Notes:

[a] As identified in USDA - NRCS Soil Survey of Lycoming County, Pennsylvania; or NRCS SSURGO database.

[b] Hydric Soils: Y = yes; N = no; I = inclusions; NR = not rated.

[c] Rutting/Erosion Potentials: SL = slight; MO = moderate; SE = severe; vSE = very severe; NR = not rated.

[d] Erosion Factors: WEG = wind erodibility group; K = Revised Universal Soil Loss Equation (RUSLE) soil-erodibility factor.

[e] Stony/Rocky Soils: H = large amount of gravel/stone/rock; M = appreciable amount of gravel/stone/rock; L = free of gravel/stone/rock.

[f] Prime Farmland Soils: Y = yes; N = no; SWI = statewide importance; NR = not rated.

[g] Land capability classes are defined as follows:

Class I – soils with moderate limitations that restrict their use

Class II – soils with moderate limitations that reduce the choice of plants or that require moderate conservation practices

Class III – soils with severe limitations that reduce the choice of plants or that require moderate conservation practices, or both

Class IV – soils with very severe limitations that reduce the choice of plants or that require very careful management

Class V – soils that are not likely to erode but have other limitations that limit their use, impractical to remove

Class VI – soils that have severe limitations that make them generally unsuitable for cultivation

Class VII – soils that have very severe limitations that make them unsuitable for cultivation

Class VIII – soils that have limitations that nearly preclude their use for commercial crop production

Land capability subclasses are defined as follows:

e – main hazard is the risk of erosion

w – water in or on the soil interferes with plant growth or cultivation

s – main limitation is shallow, droughty, or stony soil

c – chief limitation is climate that is very cold or very dry

Barbour fine sandy loam (Ba):

This mapping unit is a nearly level, deep, well drained soil located on convex or plane flood plains, alluvial fans, and low terraces. The Barbour fine sandy loam soil formed in alluvium from areas of reddish sandstone, siltstone, and shale in both glaciated and residual areas. This soil is subject to frequent flooding, mainly in late winter and early spring. Depth to bedrock is greater than 60 inches and rock fragments range from 0 to 35 percent in the upper soil horizons and from 0 to 60 percent in the subsoils. In unlimed areas, the soil is medium acid to very strongly acid in the surface layer and subsoil, and slightly acid to very strongly acid in the substratum. This soil has a slight erosion hazard; however, the USDA-NRCS suggests some streambanks associated with this mapping unit may require stabilization after disturbance due to flooding potentials.

Berks channery silt loam (BeB, BeC, BeD), 3 to 25 percent slopes:

The Berks channery silt loams consist of gently sloping (BeB), sloping (BeC), and steep (BeD), moderately deep and well drained soils. A channery soil is defined by the USDA-NRCS as "a soil that is by volume consists of more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channery fragment" or channers. This soil formed in residuum weathered from shale, siltstone and fine grained sandstone and are located on summits, shoulders, and backslopes of dissected uplands. The USDA-NRCS describes residuum as "unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place." Fractured shale bedrock is at a depth of 28 inches to more than 40 inches. Channery fragments range from 2 to 35 percent in the A horizon, from 5 to 50 percent in the individual B horizons, and from 15 to 70 percent in the lower soil horizons. Reaction of un-limed Berks soils is strongly acid to extremely acid. The erosion hazard is moderate for BeB, severe for BeC, and very severe for BeD mapping units.

Tunkhannock gravelly loam (TuA) 0 to 3 percent slopes:

This mapping unit is a nearly level, deep, well drained and somewhat excessively drained soil located on glacial outwash terraces, kames, and valley trains. Tunkhannock soils formed in water-sorted glacial material derived from reddish sandstone, siltstone, and shale. Depth to bedrock is 3.5 to 10 feet or more. Rock fragments, which are dominantly water rounded sandstone or siltstone, range from 15 to 60 percent, by volume, in individual horizons of the B horizon and from 40 to 80 percent in the C horizon. Rock fragments average more than 35 percent. The soil ranges from extremely acid through moderately acid throughout, where unlimed. The erosion hazard is slight for this mapping unit.

Weikert shaly silt loam (WeB, WeD) 3 to 25 percent slopes:

The Weikert shaly silt loam mapping unit soils are gently sloping (WeB) to moderately steep (WeD), shallow, well-drained and located on convex dissected uplands. These soils formed in weathered residuum from interbedded gray and brown acid shale, siltstone, and fine-grained sandstone. Depth to the fractured shale bedrock ranges from 10 inches to 20 inches. Rock fragments range from 5 to 50 percent in the A horizon, from 35 to 60 percent in the B horizon, and from 60 to 85 percent in the C horizon. Unlimed reaction ranges from moderately acid to very strongly acid. The erosion hazard is moderate for WeB and severe for WeD mapping units.

Weikert and Klinesville shaly silt loams (WkE) 25 to 80 percent slopes:

This mapping unit consists of steep and very steep, shallow, well drained to somewhat excessively drained soils located on upland side slopes. According to the USDA-NRCS, the dominant soil in this mapping unit is the Weikert. The Weikert and Klinesville soils are mapped together because they are similar in use and management needs. This mapping unit formed in weathered residuum from interbedded gray and brown acid shale, siltstone, and fine-grained sandstone (Weikert) and residuum derived from red shale, siltstone, slate, and fine-grained sandstone (Klinesville). Fractured shale bedrock ranges from 10 to 20 inches. In un-limed areas the soil is very strongly acid to moderately acid throughout. The erosion hazard is very severe for this mapping unit.

Wyoming gravelly sandy loam (Wy) occasionally flooded:

The Wyoming gravelly sandy loam soil consists of nearly level, very deep, somewhat excessively drained soils located on low-lying outwash terraces, moraines, kames, eskers, and valley trains that are occasionally flooded. This soil formed in gravelly, water-sorted material derived from red and gray sandstone, siltstone, and shale. Depth to bedrock is commonly 10 feet or more. Rock fragments, dominated by water-rounded sandstone or siltstone up to 8 inches in size, range from 15 to 50 percent by volume in the A horizon, from 20 to 60 percent in the B horizon, and from 35 to 75 percent in the lower soil horizons. The soil ranges from extremely acid to moderately acid in all horizons, unless limed. The erosion hazard is slight for this mapping unit.

Palmerton Loop

Table 7.2-2 lists the soil characteristics and selected limitation factors associated with each mapping unit crossed by the proposed Palmerton Loop by MP. Soil mapping units that are encountered along the proposed Palmerton Loop are further described below based on USDA-NRCS soil series descriptions.

Table 7.2-2
Soil Characteristics by Milepost Segment for each Soil Map Unit
along the Palmerton Loop of the Northeast Supply Link Project

MP Begin	MP End	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, e]	Prime Farmland [a, f]	Land Capability Class [g]
						WEG	K					
40.50	40.51	BxC	8 - 25	I	MO	8	.32	SE	60+	H	N	VIIs
40.51	40.59	BuB	3 - 8	I	SL	5	.32	MO	60+	M	Y	IIe
40.59	40.62	CpC	8 - 15	N	SL	5	.24	SE	60+	L	SWI	IIIe
40.62	40.64	BuB	3 - 8	I	SL	5	.32	MO	60+	M	Y	IIe
40.64	40.70	CpC	8 - 15	N	SL	5	.24	SE	60+	L	SWI	IIIe
40.70	40.73	Wb	0 - 1	Y	SE	8	.43	SL	60+	L	N	IVw
40.73	40.85	SmA	0 - 3	Y	SE	8	.32	SL	60+	L	N	IVw
40.85	40.91	BuB	3 - 8	I	SL	5	.32	MO	60+	M	Y	IIe
40.91	40.94	CpC	8 - 15	N	SL	5	.24	SE	60+	L	SWI	IIIe
40.94	41.42	HxC	8 - 25	N	MO	8	.17	MO	60+	H	N	VIIs
41.42	41.46	DxE	25 - 80	N	SE	8	.24	SE	20 - 40	H	N	VIIs
41.46	41.52	HxC	8 - 25	N	MO	8	.17	MO	60+	H	N	VIIs
41.52	41.59	DxE	25 - 80	N	SE	8	.24	SE	20 - 40	H	N	VIIs
41.59	41.62	HxC	8 - 25	N	MO	8	.17	MO	60+	H	N	VIIs
41.62	41.63	DxE	25 - 80	N	SE	8	.24	SE	20 - 40	H	N	VIIs
41.63	41.71	HxC	8 - 25	N	MO	8	.17	MO	60+	H	N	VIIs
41.71	41.87	DxE	25 - 80	N	SE	8	.24	SE	20 - 40	H	N	VIIs
41.87	41.98	DxC	8 - 25	N	MO	8	.24	MO	20 - 40	H	N	VIIs
41.98	42.16	HxC	8 - 25	N	MO	8	.17	MO	60+	H	N	VIIs
42.16	42.20	BxB	0 - 8	I	MO	8	.32	MO	60+	H	N	VIIs
42.20	42.23	SpB	0 - 8	Y	SE	8	.32	MO	60+	L	N	VIIs
42.23	42.29	Wb	0 - 1	Y	SE	8	.43	SL	60+	L	N	IVw
42.29	42.34	Hy	0 - 1	Y	SE	8	.28	SL	60+	L	N	IIIw
42.34	42.37	RuD	15 - 30	N	MO	6	.28	SE	36+	H	N	VIe
42.37	42.41	WeC3	8 - 15	N	SL	6	.32	SE	40 - 60	H	N	IVe
42.41	42.44	WKE	25 - 80	N	SE	8	.32	SE	40 - 60	H	N	VIIe
42.44	42.54	WeC3	8 - 15	N	SL	6	.32	SE	40 - 60	H	N	IVe
42.54	42.67	WKE	25 - 80	N	SE	8	.32	SE	40 - 60	H	N	VIIe
42.67	42.82	WhB	3 - 8	N	SL	6	.32	MO	40 - 60	H	SWI	IIIe
42.82	42.87	WhC	8 - 15	N	SL	6	.32	SE	40 - 60	H	SWI	IVe
42.87	42.90	WKE	25 - 80	N	SE	8	.32	SE	40 - 60	H	N	VIIe
42.90	42.92	WhC	8 - 15	N	SL	6	.32	SE	40 - 60	H	SWI	IVe
42.92	42.98	WeB3	3 - 8	N	SL	6	.32	MO	40 - 60	H	SWI	IIIe

Table 7.2-2
Soil Characteristics by Milepost Segment for each Soil Map Unit
along the Palmerton Loop of the Northeast Supply Link Project

MP Begin	MP End	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, e]	Prime Farmland [a, f]	Land Capability Class [g]
						WEG	K					
42.98	43.05	WeC3	8 - 15	N	SL	6	.32	SE	40 - 60	H	N	IVe
43.05	43.14	WKE	25 - 80	N	SE	8	.32	SE	40 - 60	H	N	VIIe
43.14	43.15	WhC	8 - 15	N	SL	6	.32	SE	40 - 60	H	SWI	IVe
43.15	43.31	WhB	3 - 8	N	SL	6	.32	MO	40 - 60	H	SWI	IIIe
43.31	43.39	WhC	8 - 15	N	SL	6	.32	SE	40 - 60	H	SWI	IVe
43.39	43.44	AnC	8 - 20	N	SL	6	.32	SE	60+	H	SWI	IIIe
43.44	43.47	WhC	8 - 15	N	SL	6	.32	SE	40 - 60	H	SWI	IVe
43.47	43.48	HaB	2 - 8	N	SL	6	.28	SL	40 - 60	H	SWI	IIe
43.48	43.57	HaC	8 - 20	N	SL	6	.24	MO	40 - 60	H	SWI	IIIe
43.57	43.66	MeB	3 – 8	N	SL	6	.32	MO	60+	H	Y	IIe
43.66	43.67	LkB	2 - 8	N	SL	6	.32	MO	40 - 72	H	Y	IIe

Notes:

[a] As identified in USDA - NRCS Soil Survey of Monroe County, Pennsylvania; or NRCS SSURGO database.

[b] Hydric Soils: Y = yes; N = no; I = inclusions; NR = not rated.

[c] Rutting/Erosion Potentials: SL = slight; MO = moderate; SE = severe; NR = not rated.

[d] Erosion Factors: WEG = wind erodibility group; K = Revised Universal Soil Loss Equation (RUSLE) soil-erodibility factor.

[e] Stony/Rocky Soils: H = large amount of gravel/stone/rock; M = appreciable amount of gravel/stone/rock; L = free of gravel/stone/rock.

[f] Prime Farmland Soils: Y = yes; N = no; SWI = statewide importance; NR = not rated.

[g] Land capability classes are defined as follows:

Class I – soils with moderate limitations that restrict their use
Class II – soils with moderate limitations that reduce the choice of plants or that require moderate conservation practices
Class III – soils with severe limitations that reduce the choice of plants or that require moderate conservation practices, or both
Class IV – soils with very severe limitations that reduce the choice of plants or that require very careful management
Class V – soils that are not likely to erode but have other limitations that limit their use, impractical to remove
Class VI – soils that have severe limitations that make them generally unsuitable for cultivation
Class VII – soils that have very severe limitations that make them unsuitable for cultivation
Class VIII – soils that have limitations that nearly preclude their use for commercial crop production

Land capability subclasses are defined as follows:

e – main hazard is the risk of erosion
w – water in or on the soil interferes with plant growth or cultivation
s – main limitation is shallow, droughty, or stony soil
c – chief limitation is climate that is very cold or very dry

Allenwood gravelly silt loam (AnC) 8 to 20 percent slopes:

The Allenwood gravelly silt loam is a sloping to moderately steep, very deep, well-drained soil located on the upper parts of side slopes of ridges in uplands. This soil formed in loamy pre-Wisconsin glacial till derived from sandstone, siltstone and shale, similar to that of the underlying rock. Depth to bedrock is greater than 5 feet and is typically below 10 feet. Rock fragments of subrounded gravel usually increase with depth and range from 5 to 25 percent by volume in the upper horizons, from 5 to 40 percent in subhorizons, and from 10 to 80 percent in the subsoils. Kaolinite is the dominant clay mineral with smaller amounts of illite, chlorite, and vermiculite. The soil ranges from strongly acid through extremely acid, where unlimed, and the erosion hazard is severe.

Buchanan loam (BuB) 3 to 8 percent slopes:

This mapping unit is a gently sloping, very deep, somewhat poorly and moderately well-drained soil located on concave portions of mountain footslopes often extending well into the valleys along drainageways. Buchanan loams formed in colluvium from acid sandstone, quartzite, metarhyolite, siltstone and shale. The USDA-NRCS defines colluvium as “soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.” This soil supports a high water table at a depth of 10 inches to 36 inches for long periods during wet seasons. The subsoil has a firm and brittle fragipan at a depth of 20 inches to 36 inches. Depth to bedrock ranges from 5 feet to 20 feet or more. Rock fragments of both subrounded and flat subangular, hard sandstone and shale, channers, gravels, cobbles and stones, range from 0 to 40 percent in individual horizons above the fragipan and from 5 to 60 percent in the fragipan and C horizon. Typically, rock fragments make up 10 to 15 percent of the soil by volume with higher amounts in the surface layer. This soil ranges from extremely acid through strongly acid throughout, where unlimed. Illite, kaolinite, and vermiculite are the most common clay minerals. The erosion hazard is moderate.

Buchanan extremely stony loam (BxB, BxC) 0 to 25 percent slopes:

The Buchanan extremely stony loams are well drained (BxB), moderately well drained to somewhat poorly drained (BxC), nearly level to moderately steep soils located on broad plateaus and ridgetops (BxB), or foot slopes and side slopes, and ridges (BxC) on uplands. Buchanan soils formed in colluvium from acid sandstone, quartzite, metarhyolite, siltstone and shale. These soils support a high water table at a depth of 10 inches to 18 inches (BxB) and 10 inches to 36 inches (BxC) for long periods during wet seasons. The subsoil has a firm and brittle fragipan at a depth of 20 inches to 36 inches. Depth to bedrock ranges from 5 feet to 20

feet or more. In unlimed areas, reaction is very strongly acid and extremely acid throughout. The erosion hazard is moderate for BxB and severe for BxC.

Clymer loam (CpC) 8 to 15 percent slopes:

This mapping unit is a deep, well drained soil on upland ridges, hills, and side slopes. Clymer loams formed in residuum primarily from sandstone but include some materials from shale and siltstone. Depth to bedrock ranges from 40 inches to 60 inches. Rock fragments of sandstone and siltstone range from 5 to 50 percent in the upper horizons and from 10 to 85 percent in the C horizon. Reaction ranges from strongly acid through extremely acid throughout. The erosion hazard is severe.

Dekalb extremely stony loam (DxC, DxE) 8 to 80 percent slopes:

The Dekalb extremely stony loams are moderately deep, well drained soils located on moderately steep (DxC) and very steep (DxE), sides of ridges, mountains, and plateaus of uplands. This soil formed in material weathered from gray and brown acid sandstone in places interbedded with shale and graywacke. Depth to bedrock ranges from 20 inches to 40 inches. Flat, subangular or angular, sandstone fragments, 1 to 10 inches across increase with depth and range from 10 to 60 percent in the upper horizons and from 50 to 90 percent or more in the C horizon. Reaction ranges from extremely through strongly acid where unlimed. Illite, kaolinite, and vermiculite are common clay minerals. The erosion hazard is severe.

Hartleton channery silt loam (HaB, HaC) 2 to 20 percent slopes:

The Hartleton channery silt loams consist of deep, well-drained soils located on convex uplands and side slopes. This mapping unit formed in glacial till or frost-churned material from brown sandstone and olive brown shale. Depth to bedrock ranges from 40 inches to 60 inches. Rock fragments of shale or thin flat sandstone or siltstone up to 8 inches long range from 15 to 40 percent in the A horizon, from 15 to 80 percent in individual B horizons, and from 50 to 90 percent in the C horizon. The soil surface supports more than 15 percent stones (channers). The soil is strongly acid or very strongly acid throughout, unless limed. Illite and kaolinite are the most common clay minerals. The erosion hazard is moderate for HaB and moderate to severe for HaC.

Hazelton extremely stony sandy loam (HxC) 8 to 25 percent slopes:

This mapping unit is a deep to very deep, extremely stony, well drained soil located on summits, shoulders, and the upper third of back slopes of uplands. The Hazelton extremely stony sandy loam soil formed in residuum of acid gray, brown, or red sandstone. Depth to bedrock ranges from 40 inches to 80 inches. Rock fragments of angular sandstone, dominantly

less than 10 inches in size, range from 5 to 70 percent in individual horizons of the upper horizons and from 35 to 80 percent in the C horizon. Boulders, stones, flags and channers cover about 5 to 60 percent of the surface. Reaction ranges from strongly acid through extremely acid throughout where unlimed. The erosion hazard is moderate.

Holly silt loam (Hy):

Holly silt loam is a very deep, very poorly and poorly drained, nearly level soil located on broad flat areas and in slight depressions on flood plains receiving alluvium from upland areas of low-lime drift and non-calcareous sandstone and shale adjacent to major streams. A high water table is at a depth of 6 inches for most of the year, with rare through frequent flooding events typical. Depth to bedrock is greater than 5 feet. Rock fragment content ranges from 0 to 10 percent in the A horizon, and 0 to 25 percent with depth. In unlimed areas, reaction is medium acid to neutral throughout. The erosion hazard is slight.

Leck Kill channery silt loam (LkB) 2 to 8 percent slopes:

This mapping unit consists of nearly level and gently sloping, deep and very deep, well drained soils located on hilltops and ridges of uplands. The Leck Kill channery silt loam soil formed in a regolith of residuum or glacial till derived from red shale, siltstone, and sandstone. The USDA-NRCS defines regolith as “the unconsolidated mantle of weathered rock and soil material on the earth’s surface; the loose earth material above solid rock.” Depth to bedrock is 40 inches to 72 inches. Rock fragments increase with depth and range from 5 to 25 percent in the surface horizon, from 10 to 40 percent in the subsoil horizon, and from 60 to 90 percent in the C horizon. In unlimed areas, reaction is medium acid to very strongly acid throughout. The clay fraction contains substantial amounts of illite, with lesser amounts of vermiculite, kaolinite, chlorite and interstratified minerals. The erosion hazard is moderate.

Meckesville gravelly loam (MeB) 3 to 8 percent slopes:

The Meckesville gravelly loam is a gently sloping, deep and very deep, well drained soil located on the upper parts of side slopes of ridges, plateaus, and mountains of uplands. This soil formed in colluvium, glacial till, or congeliturbate from red acid sandstone, siltstone and shale. The USDA-NRCS defines congeliturbate as “soil material disturbed by frost action.” Depth to bedrock is more than 5 feet. The subsoil has a very firm fragipan from 25 inches to 48 inches. Rock fragments range from 5 to 30 percent in the upper horizons to between 10 and 50 percent in the lower horizons, and 15 to 80 percent in the C horizon. The surface layer is more than 15 percent gravel. Reaction ranges from extremely through strongly acid where unlimed. The erosion hazard is moderate.

Rushtown shaly silt loam (RuD) 15 to 30 percent slopes:

This mapping unit consists of deep and very deep, excessively drained soils located on long and narrow, gently sloping to very steep, linear to concave, colluvial footslopes and lower backslopes. The Rushtown shaly silt loam formed in colluvial deposits. Depth to bedrock ranges from 5 feet to more than 30 feet. Rock fragments are mostly subrounded to rounded channers of shale and are dominantly from 0.25 to 1 inch in diameter. The rock fragment content ranges from 15 to 70 percent in the A horizon, from 20 to 60 percent in the B horizon, and from 60 to 90 percent in the C horizon. The surface layer is more than 40 percent shale. Where unlimed, reaction is moderately acid through very strongly acid. The erosion hazard is severe.

Shelmadine silt loam (SmA) 0 to 3 percent slopes:

The Shelmadine silt loam is a deep and very deep, poorly drained soil located on upland flats, depressions, drainageways, and stream heads. This mapping unit formed in pre-Wisconsin age glacial or periglacial material derived from shale, siltstone, and sandstone. A high water table is at a depth of less than 6 inches for most of the year. Depth to bedrock is more than 5 feet. The subsoil has a fragipan that ranges in depth from 18 inches to 30 inches. Rock fragments of shale, angular or subrounded sandstone or quartzite, up to 5 inches in diameter, range from 5 to 25 percent in the upper horizons and 15 to 80 percent in the C horizon. The soil ranges from extremely acid through strongly acid throughout, where unlimed. The erosion hazard is slight.

Shelmadine very stony silt loam (SpB) 0 to 8 percent slopes:

This mapping unit is a nearly level and gently sloping, deep, poorly drained soil located on flats and in depressions on uplands. Shelmadine very stony silt loam formed in pre-Wisconsin age glacial or periglacial material derived from shale, siltstone, and sandstone. A high water table is at a depth of less than 6 inches for most of the year. Depth to bedrock is more than 5 feet. The subsoil has a firm and brittle fragipan that ranges in depth from 18 inches to 26 inches. Rock fragments of shale, angular or subrounded sandstone or quartzite, up to 5 inches in diameter, range from 5 to 25 percent in the upper horizons and 15 to 80 percent in the C horizon. In unlimed areas, reaction is strongly acid to extremely acid throughout. The erosion hazard is moderate.

Weikert and Klinesville soils (WKE) steep:

This mapping unit is described above under the Muncy Loop discussion.

Wayland silty clay loam (Wb):

The Wayland silty clay is a deep and very deep, poorly drained and very poorly drained, nearly level soils located on nearly level or depressed parts of flood plains of streams receiving runoff from uplands that contain some calcareous drift. This soil formed in recent alluvium and is mainly in or bordering areas of Wisconsin Age glaciation. An apparent water table is at the surface or to a depth of 0.5 feet below the surface with occasional ponding. Bedrock is deeper than 60 inches. Rock fragments are commonly absent but can range up to 5 percent by volume within a depth of 36 inches and from 0 percent through 30 percent below depths of 36 inches. Rock fragments are mostly gravel or cobbles. In unlimed areas, reaction is medium acid in the upper horizons and slightly acid to slightly alkaline in the lower horizons. The erosion hazard is slight.

Weikert channery silt loam (WeB3, WeC3) 3 to 15 percent slopes, eroded:

This mapping unit is described above under the Muncy Loop discussion; however, this mapping unit is designated as an eroded phase of the Weikert channery silt loam.

Weikert-Hartleton channery silt loams (WhB, WhC) 3 to 15 percent slopes:

These deep, well drained, gently sloping (WhB) and sloping (WhC) soils are located on ridgetops and upper parts of side slopes. This complex consists of 50 to 55 percent Weikert soil and 35 to 40 percent Hartleton soils. The USDA-NRCS mapped these soils together because they occur in such an intricate pattern it is not practical to separate them at the scale used in mapping. Additional detail regarding the individual mapping unit components is discussed above.

Stanton Loop

Table 7.2-3 lists by MP the soil characteristics and selected limitation factors associated with each mapping unit crossed by the Stanton Loop. Soil mapping units that are encountered along the proposed Stanton Loop are further described below based on USDA-NRCS soil series descriptions.

Abbottstown silt loam (AbrB) 2 to 6 percent slopes:

The Abbottstown series consists of deep and very deep, somewhat poorly drained soils on nearly level to sloping concave upland flats, depressions, and drainageways. They formed in residuum weathered from noncalcareous red shale, siltstone, and fine-grain sandstone. Depth to the fragipan is 15 to 30 inches. Depth to bedrock ranges from 40 to 60 inches. Rock fragments of shale, siltstone, sandstone, and quartzite gravel range from 0 to 15 percent in the

Table 7.2-3
Soil Characteristics by Milepost Segment for each Soil Map Unit
along the Stanton Loop of the Northeast Supply Link Project

MP Begin	MP End	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, e]	Prime Farmland [a, f]	Land Capability Class [g]
						WEG	K					
6.90	6.95	ChcB	2 – 6	I	MO/SE	5	.43	MO	42 - 96	L	SWI	IIIW
6.95	7.05	NehDb	12 – 18	N	SL	8	.37	SE	48+	H	N	VIs
7.05	7.15	LegC	6 – 12	N	SL	5	.32	SE	60 -120	M	SWI	IIIe
7.15	7.33	NehEb	18 – 35	N	MO	8	.37	SE	48+	H	N	VIIs
7.33	7.44	LegC	6 – 12	N	SL	5	.32	SE	60 -120	M	SWI	IIIe
7.44	7.47	NehEb	18 – 35	N	MO	8	.37	SE	48+	H	N	VIIs
7.47	7.63	LegC	6 – 12	N	SL	5	.32	SE	60 -120	M	SWI	IIIe
7.63	7.70	NehEb	18 – 35	N	MO	8	.37	SE	48+	H	N	VIIs
7.70	7.82	BucB	2 – 6	N	SL	5	.37	MO	40+	L	Y	IIe
7.82	7.97	PeoC2	6 – 12	N	SL	5	.37	SE	20 - 40	M	SWI	IIIe
7.97	8.01	FNAT	0 – 3	I	SE	5	.32	SL	NR	H	N	IIIw
8.01	8.15	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
8.15	8.35	PeoB	2 – 6	N	SL	5	.37	MO	20 - 40	M	Y	IIe
8.35	8.39	PeoC2	6 – 12	N	SL	5	.37	SE	20 - 40	M	SWI	IIIe
8.39	8.44	AbrB	2 – 6	I	MO/SE	5	.37	MO	40 - 60	L	SWI	IIIw
8.44	8.48	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
8.48	8.56	KkoD	12 – 18	N	SL	5	.28	SE	10 - 20	H	N	VIe
8.56	8.65	PeoC2	6 – 12	N	SL	5	.37	SE	20 - 40	M	SWI	IIIe
8.65	8.82	KkoC	6 – 12	N	SL	5	.28	SE	10 - 20	H	N	IVe
8.82	8.96	KkoD	12 – 18	N	SL	5	.28	SE	10 - 20	H	N	VIe
8.96	8.99	AbrB	2 – 6	I	MO/SE	5	.37	MO	40 - 60	L	SWI	IIIw
8.99	9.06	PeoB	2 – 6	N	SL	5	.37	MO	20 - 40	M	Y	IIe
9.06	9.10	AbrB	2 – 6	I	MO/SE	5	.37	MO	40 - 60	L	SWI	IIIw
9.10	9.14	KkoC	6 – 12	N	SL	5	.28	SE	10 -20	H	N	IVe
9.14	9.36	PeoB	2 – 6	N	SL	5	.37	MO	20 - 40	M	Y	IIe
9.36	9.39	KkoC	6 – 12	N	SL	5	.28	SE	10 - 20	H	N	IVe
9.39	9.43	BoyAt	0 – 2	I	SE	8	.32	SL	72+	L	SWI	VIw
9.43	9.51	KkoC	6 – 12	N	SL	5	.28	SE	10 - 20	H	N	IVe

Table 7.2-3
Soil Characteristics by Milepost Segment for each Soil Map Unit
along the Stanton Loop of the Northeast Supply Link Project

MP Begin	MP End	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, e]	Prime Farmland [a, f]	Land Capability Class [g]
						WEG	K					
9.51	9.62	PeoB	2 – 6	N	SL	5	.37	MO	20 - 40	M	Y	IIe
9.62	9.99	HdyC2	6 – 12	N	SL	5	.32	MO	40 - 80	H	SWI	IIIe
9.99	10.02	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
10.02	10.36	PdtC2	6 – 12	N	SL	5	.37	SE	42 -96	M/H	SWI	IIIe
10.36	10.38	PdtE	18 – 40	N	MO	5	.37	SE	42 - 69	M/H	N	VIIe
10.38	10.39	PdtC2	6 – 12	N	SL	5	.37	SE	42 - 96	M/H	SWI	IIIe
10.39	10.47	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
10.47	10.52	KkoC	6 – 12	N	SL	5	.28	SE	10 - 20	H	N	IVe
10.52	10.63	PdtC2	6 – 12	N	SL	5	.37	SE	42 - 96	M/H	SWI	IIIe
10.63	10.68	PdtE	18 – 40	N	MO	5	.37	SE	42 - 96	M/H	N	VIIe
10.68	10.74	PdtC2	6 – 12	N	SL	5	.37	SE	42 - 96	M/H	SWI	IIIe
10.74	10.78	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
10.78	10.88	PdtE	18 – 40	N	MO	5	.37	SE	42 - 96	M/H	N	VIIe
10.88	11.10	RarAr	0 – 3	I	MO/SE	5	.37	SL	60 – 84+	M	Y	IIe
11.10	11.22	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
11.22	11.26	BhnA	0 – 2	N	SL	5	.37	SL	60 - 120	L	Y	I
11.26	11.29	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
11.29	11.47	BhnA	0 – 2	N	SL	5	.37	SL	60 - 120	L	Y	I
11.47	11.52	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
11.52	11.53	WATER	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11.53	11.70	BoyAt	0 – 2	I	SE	8	.32	SL	72+	L	SWI	VIw
11.70	11.72	NotB	2 – 6	N	SL	5	.32	MO	42 - 120	L	Y	IIe
11.72	11.95	PeoB	2 – 6	N	SL	5	.37	MO	20 - 40	M	Y	IIe
11.95	12.02	PdtC2	6 – 12	N	SL	5	.37	SE	42 - 96	M/H	SWI	IIIe
12.02	12.07	PeoC2	6 – 12	N	SL	5	.37	SE	20 - 40	M	SWI	IIIe
12.07	12.10	PeoD	12 – 18	N	SL	5	.37	SE	20 - 40	M	N	IVe
12.10	12.11	PdtB	2 – 6	I	SL	5	.37	MO	42 - 96	M/H	Y	IIe
12.11	12.15	PeoD	12 – 18	N	SL	5	.37	SE	20 - 40	M	N	IVe

Table 7.2-3
Soil Characteristics by Milepost Segment for each Soil Map Unit
along the Stanton Loop of the Northeast Supply Link Project

MP Begin	MP End	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, e]	Prime Farmland [a, f]	Land Capability Class [g]
						WEG	K					
12.15	12.24	PeoB	2 – 6	N	SL	5	.37	MO	20 - 40	M	Y	IIe
12.24	12.30	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
12.30	12.43	PdtB	2 – 6	I	SL	5	.37	MO	42 - 96	M/H	Y	IIe
12.43	12.55	PdtmB	2 – 6	I	SL	5	.37	MO	42 - 96	M/H	Y	IVe
12.55	12.68	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
12.68	12.71	BegC2	6 – 12	N	SL	5	.32	MO	20 - 40	M/H	SWI	IIIe
12.71	12.79	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
12.79	12.90	BegD2	12 – 18	N	SL	5	.32	MO	20 - 40	M/H	SWI	IVe
12.90	12.91	BegB	2 – 6	N	SL	5	.32	SL	20 - 40	M/H	SWI	IIe
12.91	12.95	BegD2	12 – 18	N	SL	5	.32	MO	20 - 40	M/H	SWI	IVe
12.95	13.00	BegC2	6 – 12	N	SL	5	.32	MO	20 - 40	M/H	SWI	IIIe
13.00	13.11	BegB	2 – 6	N	SL	5	.32	SL	20 - 40	M/H	SWI	IIe
13.11	13.15	BegC2	6 – 12	N	SL	5	.32	MO	20 - 40	M/H	SWI	IIIe
13.15	13.18	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
13.18	13.24	BegC2	6 – 12	N	SL	5	.32	MO	20 - 40	M/L	SWI	IIIe
13.24	13.34	BegD2	12 – 18	N	SL	5	.32	MO	20 - 40	M/H	SWI	IVe
13.34	13.40	BegC2	6 – 12	N	SL	5	.32	MO	20 - 40	M/H	SWI	IIIe
13.40	13.46	BegB	2 – 6	N	SL	5	.32	SL	20 - 40	M/H	SWI	IIe

Table 7.2-3
Soil Characteristics by Milepost Segment for each Soil Map Unit
along the Stanton Loop of the Northeast Supply Link Project

MP Begin	MP End	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, e]	Prime Farmland [a, f]	Land Capability Class [g]
						WEG	K					
13.46	13.50	BegC2	6 – 12	N	SL	5	.32	MO	20 - 40	M/H	SWI	IIIe
13.50	13.54	ROPF	25+	N	SL	NR	NR	SE	0	H	N	VIIs

Notes:

[a] As identified in USDA - NRCS Soil Survey of Hunterdon County, New Jersey; or NRCS SSURGO data base.

[b] Hydric Soils: Y = yes; N = no; I = inclusions; NR = not rated.

[c] Rutting / Erosion Potentials: SL = slight; MO = moderate; SE = severe; NR = not rated.

[d] Erosion Factors: WEG = wind erodibility group; K = Revised Universal Soil Loss Equation (RUSLE) soil-erodibility factor.

[e] Stony/Rocky Soils: H = large amount of gravel/stone/rock; M = appreciable amount of gravel/stone/rock; L = free of gravel/stone/rock; NR = not rated.

[f] Prime Farmland Soils: Y = yes; N = no; SWI = statewide importance; NR = not rated.

[g] Land capability classes are defined as follows:

Class I – soils with moderate limitations that restrict their use
Class II – soils with moderate limitations that reduce the choice of plants or that require moderate conservation practices
Class III – soils with severe limitations that reduce the choice of plants or that require moderate conservation practices, or both
Class IV – soils with very severe limitations that reduce the choice of plants or that require very careful management
Class V – soils that are not likely to erode but have other limitations that limit their use, impractical to remove
Class VI – soils that have severe limitations that make them generally unsuitable for cultivation
Class VII – soils that have very severe limitations that make them unsuitable for cultivation
Class VIII – soils that have limitations that nearly preclude their use for commercial crop production

Land capability subclasses are defined as follows:

e – main hazard is the risk of erosion
w – water in or on the soil interferes with plant growth or cultivation
s – main limitation is shallow, droughty, or stony soil
c – chief limitation is climate that is very cold or very dry

upper part of the solum, from 10 to 30 percent in the lower part of the solum, and from 10 to 65 percent in the C horizon. The reaction in unlimed soils ranges from extremely acid to strongly acid in the upper part of the solum and from strongly acid to slightly acid in the lower part of the solum and C horizon. The erosion hazard is moderate.

Berks channery loam (BegB, BegC2, BegD2) 2 to 18 percent slopes, eroded:

The Berks series is described above under the Muncy Loop. However, these mapping units differ slightly in that hard shale bedrock is at a depth of approximately 34 inches and are designated as an eroded phase of the Berks series. Additionally, BegC2 mapping unit differs from the main series as a result of sheet erosion that eroded a few inches of the profile forming shallow gullies. For the BegD2 unit, the content of shale is somewhat greater and depth of bedrock is approximately 2 feet. The erosion hazard is severe.

Birdsboro silt loam (BhnA) 0 to 2 percent slopes:

The Birdsboro series consists of very deep, well drained, and moderately well drained soils located on nearly level to sloping stream terraces and alluvial fans. The soils formed in old alluvial deposits derived from red sandstone, shale and siltstone. Depth to bedrock is 6 feet to 20 feet or more. Depth to gravelly layers is more than 40 inches. Gravel content ranges from 0 to 20 percent in the solum and from 0 to 70 percent in the C horizon. Reaction throughout the soil ranges from extremely acid through strongly acid, unless limed. The erosion hazard is slight.

Bowmansville silt loam (BoyAt) 0 to 2 percent slopes, frequently flooded:

The Bowmansville series consists of very deep, poorly and somewhat poorly drained soils on nearly level floodplains. They formed in alluvial deposits derived from upland soil materials weathered from red and brown shale and sandstone or from dolerite or basalt. Depth to bedrock is more than 6 feet. Water-worn gravel ranges from 0 to 15 percent in the solum, 0 to 30 percent in the C horizon above 40 inches, and 0 to 90 percent below 40 inches. Reaction ranges from strongly acid through slightly acid in the solum and from strongly acid through neutral in the C horizon. The erosion hazard is slight.

Bucks silt loam (BucB) 2 to 6 percent slopes:

The Bucks series consists of deep well drained soil located on upland divides and rolling slopes. They formed in a silty mantle and residuum weathered from red shale, but may include brownish shale or a few layers of siltstone or fine-grained sandstone. Depth to bedrock is more than 40 inches. Fine soft fragments of shale constitute less than 5 percent of the volume of the A horizon and the upper part of the B horizon. Coarse fragments of shale, siltstone, or very

fine-grained sandstone increase in number, size, and hardness through the lower horizons and range from 5 to 30 percent in the lower B horizon and 10 to 50 percent of the lower C horizon. In unlimed areas, the soil ranges from extremely acid through strongly acid throughout. The erosion hazard is moderate.

Chalfont silt loam (ChcB) 2 to 6 percent slopes:

The Chalfont series consists of deep and very deep, somewhat poorly drained soils located on nearly level to sloping uplands. They formed in a loess mantle overlying residuum derived dominantly from shale and sandstone. A perched water table is at a depth of 0.5 to 1.5 feet from November through March. Depth to the fragipan ranges from 15 to 30 inches. Depth to bedrock ranges from 3.5 to 8 feet or more. Rock fragments of shale or sandstone range from 0 to 10 percent in the silty mantle and from 15 to 60 percent in the 2B and 2C horizons. Reaction of the soil ranges from strongly acid through neutral unless limed. The erosion hazard is moderate.

Fluvaquents and Udifluvents (FNAT) 0 to 3 percent slopes, frequently flooded:

A Fluvaquent classification, as described in the USDA's Agricultural Handbook No. 436 (USDA SCS 1975), indicates that these are primarily the wet soils of floodplains. Most have either fine or coarse stratifications that reflect deposition of sediments under changing currents and in shifting channels. The sediments are Holocene and have a relatively high content of organic carbon at considerable depth with compared with many other wet mineral soils. The materials have dried or have partially dried from time to time as they accumulated. These soils are extensive along large rivers. These soils were once classified as Alluvial soils or Low-Humic Gley soils.

The Udifluvent soil classification, as described in the USDA's Agricultural Handbook No. 436 (USDA SCS 1975), indicates that these soils are on floodplains of streams and may be flooded at almost any season. Some areas are under forests, but many have no vegetation except pasture or cultivated crops because the sediments that form the soil were deposited while the soils were being used. These soils were once considered Alluvial soils.

Hazelton channery loam (HdyC2) 6 to 12 percent slopes:

The Hazelton series is described above under the Palmerton Loop. However, this mapping unit differs from the series profile due to erosion thinning the original surface layer several inches. The erosion hazard is moderate.

Klinesville channery loam (KkoC, KkoD) 6 to 18 percent slopes:

The Klinesville series consists of shallow, somewhat excessively drained soils on convex positions of dissected uplands. Klinesville soils formed in weathered reddish shale with some slate, siltstone, or fine-grained sandstone. Depth to bedrock ranges from 10 to 20 inches. Rock fragments are dominantly red shale and range from 15 to 75 percent in the solum, and from 40 to 90 percent in the C horizon. Where unlimed, soil reaction ranges from very strongly acid through moderately acid throughout. Illite and vermiculite are dominant clay minerals and the soil contains detectable amounts of chlorite, kaolinite, and interstratified clay. The erosion hazard is severe.

Legore gravelly loam (LegC) 6 to 12 percent slopes:

This mapping unit consists of very deep, well drained soils on dikes of intruded igneous rock with slopes ranging from 6 to 12 percent in uplands. They formed in residuum from diabase, diorite, and related rocks. Bedrock is commonly at 5 to 10 feet. Rock fragments are mostly gravels but range in size to stones and boulders. The stones and boulders are diabase, diorite, or related basic rocks; gravels are weathered fragments from these kinds of rocks and range from 0 to 35 percent volume throughout. The soil is strongly acid to slightly acid in the A horizon and upper parts of the B horizon, and moderately acid to slightly acid in the lower part of the B horizon and in the C horizon. The erosion hazard is severe.

Neshaminy silt loam (NehDb, NehEb) 12 to 35 percent slopes, very stony:

The Neshaminy series consists of deep and very deep, well drained soils on uplands. They have developed in materials weathered from diabase and other dark colored basic rocks. Depth to bedrock is 48 inches or more. Rock fragments of subrounded diabase and angular quartzite range from 0 to 40 percent in individual horizons of the upper part of the solum and from 0 to 60 percent in the lower part and C horizons. The soil, where unlimed, ranges from very strongly acid through moderately acid in the upper part of the solum and from strongly acid through slightly acid in the lower part of the solum and in the C horizon. The erosion hazard is severe.

Norton loam (NotB) 2 to 6 percent slopes:

The Norton series consists of deep well drained soils on broad, gently sloping uplands. The soils formed in materials derived largely from acid red shale of Triassic age and are underlain by such rocks. The materials are presumed to be mostly glacial till of pre-Wisconsin Age or periglacial deposits of similar age. Locally the materials are colluvium underlain by red shale. Water may be perched over a dense Bt horizon for short periods. Depth to bedrock is 3.5 to 10 feet. Coarse fragments range from 0 to 15 percent in the A and B horizons and 2 to 90

percent in the C horizon. The soil ranges from very strongly acid to medium acid where unlimed. The erosion hazard is moderate.

Pattenburg gravelly loam (PdtB, PdtC2, PdtmB) 2 to 12 percent slopes, eroded, moderately wet:

The Pattenburg series is described above. However, these mapping units differ from the series profile because of the following characteristics, these include: PdtB has a few areas that have seepage spots and farmed areas that are eroded; PdtC2 contains more gravel and bedrock is at a depth of less than 42 inches; and PdtmB contains greater than 35 percent gravels in the surface layer and shallow gullies are common. The erosion hazard is moderate to severe.

Pattenburg gravelly loam (PdtE) 18 to 40 percent slopes:

The Pattenburg series consists of deep and very deep, well-drained soils on rolling to hilly uplands in the Triassic section of the Northern Piedmont at the base of the scarp between the Piedmont and the highlands within uplands. They formed in residuum weathered from reddish quartzose conglomerate or fanglomerate. Depth to bedrock averages more than 6 feet and ranges from 3.5 to 8 or more feet. Rock fragment content ranges from 10 to 45 percent in solum and from 35 to 75 percent in the substratum. Rock fragments consist of dominantly quartzite, some high in hematite, and lesser amounts of red sandstone and sandy red shale. Rock fragment size is dominantly gravel but includes cobbles. The soil is strongly or very strongly acid throughout, unless limed. The erosion hazard is severe.

Penn channery silt loam (PeoB, PeoC2, PeoD) 2 to 18 percent slopes, eroded:

The Penn series consists of moderately deep, well-drained soils on nearly level to steep moderately dissected uplands. They formed in residuum weathered from non-calcareous reddish shale, siltstone, and fine-grained sandstone normally of Triassic age. Depth to bedrock ranges from 20 to 40 inches. Rock fragment content, by volume, ranges from 2 to 30 percent in the A horizon, from 5 to 50 percent in individual B horizons, and from 30 to 90 percent in the C horizon. The soil, where unlimed, ranges from extremely through strongly acid in the upper part of the solum, is strongly acid or moderately acid in the lower part of the solum, and ranges from strongly acid through slightly acid in the C horizon. The mapping units differ from the series profile because of the following characteristics, these include: PeoB has a few areas that have material eroded from adjoining slopes deposited on their surface and the depth of bedrock exceeds that of the series; PeoC2 is shallower to the shale bedrock as a result of erosion and shallow gullies are common; and PeoD is shallower to bedrock as a result of erosion, the content of shale is greater, and gullies are common. The erosion hazard is moderate to severe.

Raritan silt loam (RarAr) 0 to 3 percent slopes:

The Raritan series consists of very deep, moderately well or somewhat poorly drained soils located on nearly level to strongly sloping stream terraces, usually above present overflow. This soil formed in alluvium sediments from reddish, noncalcareous shale, siltstone and sandstone uplands. Depth to the fragipan ranges from 20 to 30 inches. Depth to bedrock ranges from 5 to 20 feet. The amount of water rounded gravel in the solum ranges from 0 to 15 percent in the upper horizons and from 0 to 50 percent in the C horizon. Soil reaction ranges from very strongly acid through moderately acid, unless limed. The erosion hazard is slight.

Rough Broken Land (ROPF) shale:

This mapping unit is located along the Delaware River escarpment and the gorges of short tributaries that feed the river. Approximately 20 percent of this land is rock outcrop. Narrow gorges that are along the southern edge of the Hunterdon Plateau and that cut in the Musconetcong Mountain are included. The relief is very steep, mostly more than 25 percent, and extremely stony. Typically, rocks include red shale, red quartzite conglomerate, calcareous conglomerate, buff and gray sandstone, argillite, red shale, and granite gneiss.

Rowland silt loam (RorAt) 0 to 2 percent slopes, frequently flooded:

The Rowland series consists of very deep, moderately well and somewhat poorly drained soils that formed on relatively narrow nearly level floodplains in alluvial sediments washed from nearby gently sloping to sloping uplands underlain mainly with red and brown shale, sandstone, and conglomerate. The water table fluctuates between 2 and 6 feet. These soils are flooded by streams during wet periods. Depth to stratified sand and gravel is more than 40 inches. Water worn gravel constitutes 0 to 10 percent of the solum, 0 to 25 percent of the C horizon, and 30 to 90 percent of the 2C horizon. Stratified sand, silt, clay or gravel is in some pedons at depths less than 40 inches. Reaction ranges from very strongly to slightly acid throughout. The erosion hazard is slight.

Caldwell B Replacement

Table 7.2-4 lists the soil characteristics and selected limitation factors associated with each mapping unit crossed by the proposed Caldwell B Replacement. Soil mapping units that are encountered along the proposed Caldwell B Replacement are further described below based on USDA-NRCS soil series descriptions.

Table 7.2-4
Soil Characteristics by Milepost Segment for each Soil Map Unit
along the Caldwell B Replacement of the Northeast Supply Link Project

MP Begin	MP End	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, e]	Prime Farmland [a, f]	Land Capability Class [g]
						WEG	K					
1821.11	1821.17	NazA	0 - 2	Y	SE	2	NR	SL	60+	L	UI	Vw
1821.17	1821.37	PrkA	0 - 3	I	MO	3	NR	SL	60+	M	N	IVw
1821.37	1821.40	PbpAt	0 - 3	Y	MO	8	NR	SL	60+	L	N	Vw
1821.40	1821.57	PrkA	0 - 3	I	MO	3	NR	SL	60+	M	N	IVw

Notes:

[a] As identified in USDA - NRCS Soil Survey of Essex County, New Jersey; or NRCS SSURGO database.

[b] Hydric Soils: Y = yes; N = no; I = inclusions; NR = not rated.

[c] Rutting / Erosion Potentials: SL = slight; MO = moderate; SE = severe; NR = not rated.

[d] Erosion Factors: WEG = wind erodibility group; K = Revised Universal Soil Loss Equation (RUSLE) soil-erodibility factor.

[e] Stony/Rocky Soils: H = large amount of gravel/stone/rock; M = appreciable amount of gravel/stone/rock; L = free of gravel/stone/rock; NR = not rated.

[f] Prime Farmland Soils: Y = yes; N = no; SWI = statewide importance; UI = unique importance; NR = not rated.

[g] Land capability classes are defined as follows:

Class I – soils with moderate limitations that restrict their use

Class II – soils with moderate limitations that reduce the choice of plants or that require moderate conservation practices

Class III – soils with severe limitations that reduce the choice of plants or that require moderate conservation practices, or both

Class IV – soils with very severe limitations that reduce the choice of plants or that require very careful management

Class V – soils that are not likely to erode but have other limitations that limit their use, impractical to remove

Class VI – soils that have severe limitations that make them generally unsuitable for cultivation

Class VII – soils that have very severe limitations that make them unsuitable for cultivation

Class VIII – soils that have limitations that nearly preclude their use for commercial crop production

Land capability subclasses are defined as follows:

e – main hazard is the risk of erosion

w – water in or on the soil interferes with plant growth or cultivation

s – main limitation is shallow, droughty, or stony soil

c – chief limitation is climate that is very cold or very dry

Natchaug muck (NazA) 0 to 2 percent slope:

The Natchaug series consists of very deep, very poorly drained soils in depressions on lake plains, outwash plains, moraines, till plains, and floodplains. This soil formed in woody and herbaceous organic materials overlying loamy deposits. The organic material extends to a depth of 16 to 51 inches. Woody fragments commonly occur throughout the organic soil materials in most areas consisting of twigs, branches, logs or stumps, and average from 2 to 15 percent by volume. Fragments range in size from 3/4 inch to 1 foot in diameter. Depth to the seasonal high water table ranges from 1 foot above the surface to 1 foot below the surface from October to June. Some areas are subject to rare, very brief flooding during March and April. Depth to bedrock is more than 5 feet. Rock fragments range from 0 to 20 percent gravel to stones in the C horizon. The reaction ranges from strongly acid to neutral in the substratum. The erosion hazard is slight.

Parsippany silt loam (PbpAt) 0 to 3 percent slope:

The Parsippany series consists of deep, poorly drained soils in extinct lake basins and near streams. These soils formed in silty and clayey sediments containing a high proportion of fines derived from weathered basalt, shale, and granitic materials. The water level is at or near the surface throughout the winter and early spring and following periods of heavy rainfall. Flooding is none to frequent and occurs in most areas of Parsippany soils but particularly adjacent to major streams. Depth to bedrock is more than 6 feet. Coarse fragments are generally lacking but range to 5 percent in subhorizons within the solum and to 20 percent in the C horizon. Unless limed, the reaction is very strongly or strongly acid near the surface and increases with depth to slightly acid to mildly alkaline in the C horizon. The erosion hazard is slight.

Preakness sandy loam (PrkA) 0 to 3 percent slope

The Preakness series consists of very deep, poorly and very poorly drained soils located on broad, nearly level outwash plains or in narrow swales that dissect outwash terraces. The soils formed in stratified coarse textured materials dominantly from granitic rocks with minor amounts or other materials. The water table is at or near the surface from late autumn through winter and spring. The soils are often ponded in winter and during periods of high rainfall because of their low topographic position. In many places adjacent to streams, Preakness soils flood frequently for brief periods in late winter and early spring. They flood more extensively but less often following severe storms of low frequency in August through October. Depth to bedrock is more than 6 feet. Rock fragments, sand, and silt are derived mainly from granitic gneiss and are composed of quartz, feldspar, amphibole, and mica with minor amounts of

sandstone, shale, quartzite and conglomerate. There are 0 to 20 percent cobbles or gravel through the solum and 0 to 70 percent in individual strata of the C horizon. Reaction is strongly or very strongly acid unless limed, and ranges to moderately acid in the lower part of the substratum. The erosion hazard is slight.

7.2.2 Aboveground Facilities

Table 7.2-5 lists the soil characteristics and selected limitation factors associated with each mapping unit underlain by the proposed aboveground facility workspaces. Soil mapping units that are encountered at each aboveground facility are further described below for that specific facility and are based on USDA-NRCS soil series descriptions.

Compressor Station 515

Soils that are encountered at the existing Compressor Station 515 are described below.

Oquaga and Lordstown (OpD) extremely stony silt loams, 8 to 25 percent slopes

The Oquaga series consists of moderately deep, somewhat excessively drained soils formed in a thin mantle of till over sandstone, siltstone, and shale bedrock on nearly level to very steep uplands. Depth to bedrock ranges from 20 to 40 inches. Content of rock fragments ranges from 15 to 60 percent in surface horizons and from 25 to 85 percent in individual layers in the remainder of the soil. Unless limed, reaction ranges from extremely acid to moderately acid throughout the soil. The erosion hazard is slight.

The Lordstown series consists of moderately deep, well-drained soils, formed till, and cryoturbated material derived from siltstone and sandstone on bedrock controlled landforms of glaciated dissected plateaus. They are nearly level to very steep soils on hillsides and hilltops in glaciated bedrock controlled uplands. Depth to bedrock ranges from 20 to 40 inches. Rock fragments are dominantly flat and angular, flagstones, and occupy 10 to 35 percent of the volume in the Ap horizon and 20 to 60 percent in the B and C horizons. Reaction is very strongly acid through neutral in the surface layer, very strongly acid through moderately acid in the subsoil and strongly acid or moderately acid in the substratum. The erosion hazard is slight.

Wellsboro very stony silt loam (WmB) 3 to 8 percent slopes

The Wellsboro series consists of very deep moderately well and somewhat poorly drained soils formed in firm till derived from reddish sandstone, siltstone, and shale. Depth to the fragipan ranges from 12 to 30 inches. Depth to bedrock is 60 inches or more. Rock fragments of subangular and rounded sandstone, siltstone, or shale range from 5 to 40 percent

Table 7.2-5
Soil Characteristics for those Soil Mapping Units underlying Aboveground Facilities of the Northeast Supply Link Project

Mapping Unit Name	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, d]	Prime Farmland [a, e]	Land Capability Class [g]
					WEG	K					
Compressor Station 515											
Oquaga and Lordstown extremely stony silt loam	OpD	8 – 25	N	SL	8	.37	SL	20 - 40	H	N	VIIs
Wellsboro very stony silt loam	WmB	3 – 8	I	SL	8	.32	SL	60+	M	N	VIs
Compressor Station 303											
Pompton sandy loam	PohA	0 – 3	I	SL	3	NR	SL	60+	L	Y	IIw
Parsippany silt loam	PbpAt	0 – 3	Y	MO	8	NR	SL	60+	L	N	Vw
Urban Land, Pompton substratum	URPOMB	0 – 8	N	SL	3	NR	SL	60+	M	N	VIIs
Pompton-Urban Land, Pompton substratum complex	PokuB	0 – 8	N	SL	3	NR	SL	60+	L	N	IIw
Compressor Station 505											
Rowland silt loam	RorAt	0 – 2	I	MO	5	.32	SL	48 - 72+	L	N	Vw
Bucks silt loam	BucB	2 - 6	N	SL	5	.37	MO	40+	L	Y	IIe
Penn silt loam	PenA	0 – 2	N	SL	5	.37	SL	20 - 40	L	Y	IIe
Penn channery silt loam	PeoB	2 - 6	N	SL	5	.37	MO	20 - 40	M	Y	IIe
	PeoC	6 – 12	N	SL	5	.37	SE	20 - 40	H	SWI	IIe
Readington silt loam	RedB	2 – 6	I	SL	5	.37	MO	40 – 90	L	Y	IIe
Klinesville channery loam	KkoD	12 – 18	N	SL	5	.28	SE	10 - 20	H	N	VIe
Water	---	NR	NR	NR	NR	NR	NR	NR	NR	N	NR
Leidy Interchange Hub											
Calvin channery silt loam	CaB	3 – 8	N	SL	6	NR	MO	20 - 40	H	SWI	IIIs
Hustontown silt loam	HuB	3 – 8	N	SL	6	NR	MO	60+	L	Y	IIe
Ungers loam	UnB	3 – 8	N	SL	5	NR	MO	40 - 80+	M	Y	IIe

Table 7.2-5
Soil Characteristics for those Soil Mapping Units underlying Aboveground Facilities
of the Northeast Supply Link Project

Mapping Unit Name	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, d]	Prime Farmland [a, e]	Land Capability Class [g]
					WEG	K					
Ungers-Meckesville complex, extremely stony	UpF	25 – 50	N	SL	8	NR	SE	40 - 60+	H	N	VIIs
Electrical Substation											
Pompton sandy loam	PohA	0 – 3	I	SL	3	NR	SL	60+	L	Y	IIw
Pompton-Urban Land, Pompton substratum complex	PokuB	0 – 8	N	SL	3	NR	SL	60+	L	N	IIw
Roseland M&R Station											
Parsippany silt loam	PbpAt	0 – 3	Y	MO	8	NR	SL	60+	L	N	Vw
Pompton sandy loam	PohA	0 – 3	I	SL	3	NR	SL	60+	L	Y	IIw
Pompton-Urban Land, Pompton substratum complex	PokuB	0 – 8	N	SL	3	NR	SL	60+	L	N	IIw
Montclair State University M&R Station											
Boonton silt loam, red sandstone lowland, extremely stony	BooCc	8 - 15	N	SL	5	NR	SE	48+	H	N	IIIe
East Rutherford M&R Station											
Urban Land	UR	NR	N	NR	NR	NR	NR	60+	NR	N	NR
Regulator Station 240											
Udorthents, organic substratum-Urban land complex	UdouB	0 - 8	N	NR	NR	NR	NR	NR	NR	N	NR
Urban Land	UR	NR	N	NR	NR	NR	NR	NR	NR	N	NR
Meadows Heaters											
Transquaking mucky peat, very frequently flooded	TrkAv	0 – 1	Y	SE	8	NR	MO	60+	L	UI	NR
MLV 505B60											
Haledon silt loam	HanBc	0 – 8	I	SL	5	NR	MO	60+	H	N	VIIs

Table 7.2-5
Soil Characteristics for those Soil Mapping Units underlying Aboveground Facilities
of the Northeast Supply Link Project

Mapping Unit Name	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, d]	Prime Farmland [a, e]	Land Capability Class [g]
					WEG	K					
Paterson Lateral Take-off											
Udorthents, organic substratum-Urban Land complex	UdouB	0 - 8	N	NR	NR	NR	NR	NR	NR	N	NR
Transquaking mucky peat, very frequently flooded	TrkAv	0 – 1	Y	SE	8	NR	MO	60+	L	UI	NR
Narrows M&R Station											
Nassau-Mardin-Bernardston	S6005	NR	N	NR	NR	NR	NR	NR	NR	NR	NR
Brooklyn Regulating Vault											
Urban Land	s6009	NR	N	NR	NR	NR	NR	NR	NR	N	NR
Urban land-Udorthents-Sudbury	S6017	NR	N	NR	NR	NR	NR	NR	NR	N	NR
134th Street Manhattan M&R Station											
Urban Land	S6009	NR	N	NR	NR	NR	NR	NR	NR	N	NR

Table 7.2-5
Soil Characteristics for those Soil Mapping Units underlying Aboveground Facilities
of the Northeast Supply Link Project

Mapping Unit Name	Map Unit Symbol	Percent Slope	Hydric Soil [a, b]	Rutting Potential [a, c]	Erosion Factors [a, d]		Erosion Potential [a, c]	Depth to Bedrock [a] (inches)	Stony/Rocky Soils [a, d]	Prime Farmland [a, e]	Land Capability Class [g]
					WEG	K					

Notes:

[a] As identified in USDA - NRCS Soil Survey of Lycoming County, Pennsylvania; or NRCS SSURGO data base.

[b] Hydric Soils: Y = yes; N = no; I = inclusions; NR = not rated.

[c] Rutting / Erosion Potentials: SL = slight; MO = moderate; SE = severe; NR = not rated.

[d] Stony/Rocky Soils: H = large amount of gravel/stone/rock; M = appreciable amount of gravel/stone/rock; L = free of gravel/stone/rock; NR = not rated.

[e] Prime Farmland Soils: Y = yes; N = no; SWI = statewide importance; UI = unique importance; NR = not rated.

[g] Land capability classes are defined as follows:

Class I – soils with moderate limitations that restrict their use

Class II – soils with moderate limitations that reduce the choice of plants or that require moderate conservation practices

Class III – soils with severe limitations that reduce the choice of plants or that require moderate conservation practices, or both

Class IV – soils with very severe limitations that reduce the choice of plants or that require very careful management

Class V – soils that are not likely to erode but have other limitations that limit their use, impractical to remove

Class VI – soils that have severe limitations that make them generally unsuitable for cultivation

Class VII – soils that have very severe limitations that make them unsuitable for cultivation

Class VIII – soils that have limitations that nearly preclude their use for commercial crop production

Land capability subclasses are defined as follows:

e – main hazard is the risk of erosion

w – water in or on the soil interferes with plant growth or cultivation

s – main limitation is shallow, droughty, or stony soil

c – chief limitation is climate that is very cold or very dry

in the A and B horizons, and from 15 to 45 percent in the Bx and C horizons. Reaction commonly ranges from very strongly acid through moderately acid unless limed but the range includes extremely acid. The erosion hazard is moderate.

Compressor Station 303

Soils that are encountered at the proposed Compressor Station 303 site are described below.

Parsippany silt loam (PbpAt) 0 to 3 percent slopes, frequently flooded

The Parippany series is described above under the Caldwell B Replacement.

Pompton sandy loam (PohA) 0 to 3 percent slopes

The Pompton series consists of very deep moderately well-drained and somewhat poorly drained soils on broad outwash plains, deltaic deposits, and in slightly concave drainageways that dissect outwash terraces. The soils developed in water-sorted sandy and gravelly materials dominated by granitic gneiss with lesser amounts of many other kinds of materials. The ground water table is within 12 inches of the surface in the late winter and early spring and also following periods of extended rainfall. Depth to bedrock is more than 5 feet. Rock fragments range from 0 to 35 percent through the solum and from 0 to 75 percent in individual horizons within the C horizon. Rock fragments are primarily composed of granitic gneiss with lesser amounts of sandstone, shale, and quartzite. Reaction is very strongly acid to moderately acid throughout unless limed. The erosion hazard is slight.

Pompton - Urban land, Pompton substratum complex (PokuB) 0 to 8 percent slopes

The Pompton series is described above.

Urban lands consist of nearly level to sloping areas in which 85 percent or more of the surface is covered with asphalt, concrete, or other impervious material. Urban land includes parking lots, shopping and business centers, and industrial parks in urban areas. Included in this mapping unit are small areas of soils that have not been altered or are not under an impervious cover. These areas are mostly lawns or other landscaped areas. Also included are some areas where several feet of fill have been placed on floodplains. Depth to high water table ranges between 6 and 48 inches.

Urban land, Pompton substratum (URPOMB) 0 to 8 percent slopes

This series is discussed above.

Compressor Station 505

Soils that are encountered at the existing Compressor Station 505 are described below.

Bucks silt loam (BucB) 2 to 6 percent slopes

The Bucks soil series is discussed above under the Stanton Loop.

Klinesville channery loam (KkoD) 12 to 18 percent slopes

The Klinesville soil series is discussed above under the Stanton Loop.

Penn channery silt loam (PeoB) 2 to 6 percent slopes

The Penn soil series is discussed above under the Stanton Loop.

Penn channery silt loam (PeoC) 6 to 12 percent slopes

The Penn soil series is discussed above under the Stanton Loop.

Penn silt loam (PenA) 0 to 2 percent slopes

The Penn soil series is discussed above under the Stanton Loop.

Readington silt loam (RedB) 2 to 6 percent slopes

The Readington series consists of deep and very deep, moderately well drained soils on concave, nearly level to sloping lower hillsides, upland flats, drainageways, and stream heads. The soils formed in medium textured residuum largely from reddish non-calcareous shale, siltstone, and fine-grained sandstone. Depth to bedrock ranges from 40 to 90 inches. Depth to the fragipan ranges from 20 to 36 inches. Rock fragments of angular shale, siltstone, sandstone, and quartzite gravel, range from 0 to 20 percent in the upper part of the solum and from 5 to 50 percent in the lower part of the solum and C horizon. Reaction ranges from extremely acid through slightly acid in the upper part of the solum where unlimed, and from very strongly acid through slightly acid in the lower part of the solum and C horizon. The erosion hazard is moderate.

Rowland silt loam (RorAt) 0 to 2 percent slopes, frequently flooded

The Rowland soil series is discussed above under the Stanton Loop.

Leidy Interchange Hub

Soils that are encountered at the existing Leidy Interchange Hub are described below.

Calvin channery silt loam (CaB) 3 to 8 percent slopes

The Calvin series consists of moderately deep, well drained soils formed in residuum of red non-calcareous shale, siltstone, and sandstone on summits, hillslopes and side slopes of

ridges. The depth to bedrock ranges from 20 to 40 inches. Coarse fragments range from 5 to 25 percent in the A and BA horizons, 25 to 55 percent in the Bw and BC horizons, and 40 to 80 percent in the C horizon. Reaction ranges from moderately acid to very strongly acid. The erosion hazard is moderate.

Hustontown silt loam (HuB) 3 to 8 percent slopes

The Hustontown series consists of very deep, moderately well-drained soils on colluvial fans and U-shaped drainageways and headslopes in the Ridge and Valley Province in dissected uplands. They are formed in colluvium derived from acid red shale, siltstone, and sandstone sedimentary rocks. Depth to fragipan is 18 to 32 inches. Depth to bedrock is greater than 60 inches. Rock fragments range from 5 to 30 percent in the solum, and 10 to 50 percent in the fragipan. In unlimed areas, soil reaction ranges from extremely acid to strongly acid in the upper solum and from slightly acid to strongly acid in the lower part of the solum. The erosion hazard is moderate.

Ungers loam (UnB) 3 to 8 percent slopes

The Ungers series consists of deep and very deep, well-drained soils on gently sloping to very steep convex slopes. These soils formed in residuum from red sandstone and shale. Depth to sandstone and shale bedrock ranges from 40 to 80 inches or more. Rock fragments of thin flat sandstone and shale increase with depth, ranging from 5 to 30 percent in the surface, from 5 to 60 percent in the B horizon, and 40 to 90 percent in the C horizon. Reaction ranges from extremely acid through strongly acid when unlimed. The erosion hazard is moderate.

Ungers-Meckesville complex (UpF) 25 to 50 percent slopes, extremely stony

The Ungers series is described above. The Meckesville series consists of very deep well-drained soils formed in colluvium, glacial till, or congeliturbate from red acid sandstone, siltstone, and shale. They are on the concave sideslopes of upland ridges. Depth to the fragipan ranges from 25 to 48 inches. Depth to bedrock is more than 60 inches. Rock fragments, mostly consist of red sandstone or shale but include some subrounded quartzite and sandstone in the upper solum, range from 5 to 30 percent in the upper part of the solum, from 10 to 50 percent in the lower part of the solum, and 15 to 80 percent in the C horizon. Reaction ranges from extremely through strongly acid where unlimed. The erosion hazard is severe.

Electrical Substation

Soils that are encountered at the proposed electrical substation are described below.

Pompton sandy loam (PohA) 0 to 3 percent slopes

The Pompton series is discussed above under Compressor Station 303.

Pompton - Urban land, Pompton substratum complex (PokuB) 0 to 8 percent slopes

This soil association is discussed above under Compressor Station 303.

Roseland M&R Station

Soils that are encountered at the existing Roseland M&R Station are described below.

Parsippany silt loam (PbpAt) 0 to 3 percent slopes, frequently flooded

The Parippany series is described above under the Caldwell B Replacement.

Pompton sandy loam (PohA) 0 to 3 percent slopes

The Pompton series is discussed above under Compressor Station 303.

Pompton - Urban land, Pompton substratum complex (PokuB) 0 to 8 percent slopes

This soil association is discussed above under Compressor Station 303.

Montclair State University M&R Station

Soils that are encountered at the existing Montclair State University M&R Station are described below.

Boonton silt loam, red sandstone lowland (BooCc) 8 to 15 percent slopes, extremely stony

The Boonton series consists of deep or very deep moderately well and well-drained soils formed in till on uplands. They are moderately deep to a fragipan. The top of the fragipan is at a depth of 20 to 36 inches. There is a perched water table at a depth of 18 to 36 inches from November to May of most years. Depth to bedrock is more than 4 feet. Rock fragments of mostly rounded gravel occur throughout the soil, and range from 0 to 35 percent in individual horizons. Reaction is strongly acid to extremely acid in the upper part of the solum. It ranges from strongly acid to slightly acid in the lower part of the solum, and from moderately acid to neutral in the C horizon. The erosion hazard is severe.

East Rutherford M&R Station

Soils that are encountered at the existing East Rutherford M&R Station are described below.

Urban Land (UR)

This mapping unit is identified as Urban Lands, which is discussed above under Compressor Station 303.

Regulator Station 240

Soils that are encountered at the existing Station 240 are described below.

Udorthents, organic substratum-Urban land complex (UdouB) 0 to 8 percent slopes

This mapping unit complex is located in low areas of marine and estuarine deposits and in the uplands. The Udorthents and the Urban land occur as areas so intricately mixed or so small that the USDA-NRCS found them impracticable to map them separately. This mapping unit is about 50 percent Udorthents, organic substratum; 35 percent Urban land; and 15 percent included areas (USDA-NRCS 1995).

Areas of Udorthents, organic substratum, have been filled to variable depths and have been smoothed and partially paved. In most areas, the original soils are presumed to have been deep to shallow, very poorly drained, organic soils that were subject to daily tidal flooding or prolonged ponding. The fill material is made up of stones, boulders, rubble, and varying amounts of soil and nonsoil material.

For this mapping unit, Urban land consists of areas in which the surface is covered by single-family dwellings, commercial buildings, roads and streets, small parking lots, and other structures.

Urban Land (UR)

This mapping unit is identified as Urban Lands, which is discussed above under Compressor Station 303.

Meadows Heaters

Soils that are encountered at the existing Meadows Heaters are described below.

Transquaking mucky peat (TrkAv) 0 to 1 percent slopes, very frequently flooded

The Transquaking series consists of very deep, very poorly drained, and soils that were flooded by tidal waters that formed in organic deposits underlain by loamy mineral sediments. The Transquaking soils are in brackish estuarine marshes along tidally influenced rivers and creeks on the coastal plain. A seasonally high water table is at the surface most of the year. Depth to bedrock is greater than 5 feet. Reaction is slightly acid to neutral in the natural state and upon drying is ultra acid or extremely acid. The erosion hazard is moderate. These soils were previously mapped as tidal marsh miscellaneous area.

Mainline Valve (MLV 505B60)

Soils that are encountered at the existing MLV 505B60 are described below.

Haledon silt loam (HanBc) 0 to 8 percent slopes, extremely stony

The Haledon series consists of very deep, somewhat poorly drained soils in low positions on undulating uplands at the base of steeper sloping uplands and in shallow drainageways. They formed in coarse textured glacial till composed primarily of basalt, red sandstone and shale, and granitic gneiss with lesser amounts of quartzite and gray sandstone and shale. A perched high water table is within 12 inches of the surface in the late winter and early spring of most years, and following periods of extended rainfall. Lateral seepage is common, particularly at slope breaks. Depth to the fragipan is 24 to 36 inches. Depth to bedrock is greater than 6 feet. Rock fragments of mostly gravel, cobbles, and stones of basalt, shale, sandstone, and gneiss range from 5 to 25 percent in the solum and from 15 to 35 percent in the substratum. Reaction ranges from extremely acid to moderately acid in the upper part of the solum, from strongly acid to slightly acid in the lower part of the solum and upper part of the C horizon, and from moderately acid to neutral in the lower part of the C horizon. The erosion hazard is moderate.

Paterson Lateral Take-off

Soils that are encountered at the existing Paterson Lateral Take-off site are described below.

Transquaking mucky peat (TrkAv) 0 to 1 percent slopes, very frequently flooded

This mapping unit is discussed above under Meadows Heaters.

Udorthents, organic substratum-Urban land complex (UdouB) 0 to 8 percent slopes

The mapping unit is discussed under Regulator Station 240 above.

Narrows M&R Station

Soils that are encountered at the existing Narrows M&R Station are described below.

Nassau-Mardin-Bernardston (s6005)

The Nassau series consists of shallow, somewhat excessively drained soils formed in till material derived mainly from local slate or shale. They are nearly level to very steep soils on bedrock controlled glacially modified landforms. Bedrock is at a depth of 10 to 20 inches. Rock fragments are mainly slate and shale with content ranging from 10 to 50 percent by volume in the Ap horizon and 35 to 70 percent in the B horizon. Unless limed, reaction is very strongly acid or strongly acid. The erosion hazard is moderate.

The Mardin series consists of very deep, moderately well-drained soils formed in loamy till. They are in glaciated uplands, mostly on broad hilltops, shoulder slopes and backslopes.

The Mardin soils have a dense fragipan that starts at a depth of 14 through 26 inches below the soil surface. There is 60 percent or more silt plus very fine sand in the fine-earth fraction above the fragipan. Depth to bedrock ranges from 5 through 20 feet or more. Rock fragments are dominantly channers, flagstones, or gravel, and range from 5 to 35 percent in the horizons above the fragipan, and commonly from 15 to 60 percent in the Bx and C horizons. Reaction ranges from extremely acid through moderately acid, unless limed. The erosion hazard is moderate.

The Bernardston series consists of very deep, well-drained soils on glaciated uplands and drumlins. The soils formed in acid, dense till derived mainly from dark gray phyllite, shale, slate, and schist. Depth to bedrock is greater than 5 feet. The volume of rock fragments larger than 3 inches ranges from 0 to 25 percent in the A horizon and 0 to 10 percent in the B and C horizons. The soil ranges from very strongly acid to moderately acid except where limed. The erosion hazard is moderate.

Brooklyn Regulating Vault

Soils that are encountered at the proposed Brooklyn Regulating Vault are described below.

Urban land (s6009)

The Urban land designation is discussed above under Compressor Station 303.

Urban land-Udorthents-Sudbury (s6017)

The Urban land and Udorthent components are discussed above under Compressor Station 303.

The Sudbury series consists of very deep, moderately well and somewhat poorly drained soils on outwash plains. They are nearly level through strongly sloping soils in slight depressions and on terraces and foot slopes in areas of outwash or glaciofluvial deposits. The soils formed in water sorted sandy and gravelly glaciofluvial materials derived mainly from granite, gneiss, and schist. Depth to stratified sand and gravel ranges from 18 inches through 36 inches. Depth to bedrock is more than 5 feet. Rock fragment content of individual horizons of the solum ranges from 0 through 30 percent by volume. Reaction ranges from extremely acid through slightly acid in the solum, unless limed, and from very strongly acid through slightly acid in the substratum. The erosion hazard is not rated.

134th Street Manhattan M&R Station

Soils that are encountered at the proposed 134th Street Manhattan M&R Station are described below.

Urban land (s6009)

The Urban land designation is discussed above under Compressor Station 303.

7.3 SOILS IMPACTS AND MITIGATION

Pipeline and aboveground facility construction activities that have the potential to adversely affect soils and revegetation potential include clearing and grading along the ROWs and other workspaces, trenching, backfilling, and restoration. Potential soil impacts include loss of topsoil due to water or wind erosion, especially on steep slopes or fine sandy soils; reduction of soil fertility by mixing topsoil with subsoils, bringing excess rocks to the surface that impact farm implement use; soil compaction due to traffic by heavy equipment, which can minimize root development; or disruption of agricultural surface and subsurface drainage systems.

The location and acreage of each soil type that the Project would impact and the identification of soils presenting characteristics of potential concern were based on data contained in local county soil surveys and the SSURGO database as identified by milepost (MP) locations and field reconnaissance. Tables 7.2-1 through 7.2-4 in Section 7.2 provide soil limitations of the mapping units traversed by the pipeline facilities; Table 7.2-5 in Section 7.2 provides soil limitations of the mapping units at the aboveground facilities. Soil impacts and mitigation measures are described below.

7.3.1 Rutting Potential and Compaction

Soil compaction and rutting are commonly encountered in finer grained soils (i.e., soils containing high amounts of silts or clays) having a high water holding capacity. Hydric soils, organic soils, and poorly drained non-hydric soils may also be susceptible to rutting. These disturbances typically alter surface hydrology by diverting/holding stormwater runoff, minimize surface water infiltration, and restrict root growth.

Soils rutting/compaction potential was determined through a review of the NRCS Soil Surveys and SSURGO database as identified under Use and Management of the Soils. Specifically, the NRCS identifies *Equipment Limitations* that reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The NRCS chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. Based on these criteria, ratings were extrapolated for use in this report and include the following:

- Severe (SE): An SE rating indicates that equipment use is severely restricted either by the type of equipment or season of use;

- Moderate (MO): An MO rating indicates that equipment use is moderately restricted because of one or more soil factors; and
- Slight (SL): An SL rating indicates that equipment use normally is not restricted either by type of equipment that can be used or time of year because of soil factors.

Overall, construction of the proposed Muncy, Palmerton, and Stanton loops will impact approximately 9.33, 11.35, and 6.12 acres, respectively, of soils with severe rutting potential. The Caldwell B Replacement will impact approximately 0.79 acres of soils with severe rutting potential. For aboveground facilities, construction at the Paterson Lateral Take-off and the Meadows Heaters will also impact approximately 0.36 and 1.89 acres, respectively, of soils with severe rutting potential.

Movement along the ROW and in construction workspaces by heavy equipment could result in soil compaction and/or rutting. These impacts are primarily a concern in actively cultivated fields and wetlands and may be more likely to occur when soils are saturated or moist. Additionally, soils that are wet or poorly drained can experience structural damage from the travel of heavy equipment.

Transco will minimize rutting and compaction by scheduling the majority of the construction activities for the dry season, to the extent practical. Particular attention will be paid to areas identified as having soils that are vulnerable to the rutting and compaction potential. Since some of the soils identified as vulnerable to these damages are partially hydric and occur in wetlands, the proposed wetland construction crossing techniques as identified in Transco's *Procedures* (see Appendix 2E), and further described in RR 2, "Water Use and Quality," will be incorporated into the Project design to effectively minimize impacts. In general, rutting and compaction of soils will be avoided or minimized through the use of timber mats across minor tributaries, adjacent wetlands, and as deemed necessary during construction; other methods may be used as conditions dictate. In addition, Transco will minimize rutting potential to active agricultural lands by stripping topsoil as specified in Table 7.3-1. Transco will also use subsurface decompaction techniques in active agricultural lands in accordance with Transco's Plan and Procedures, utilizing either rippers, para plows, or similar decompaction equipment.

Table 7.3-1
Topsoil Segregation and Method by Milepost Segment along the Northeast Supply Link Project [a]

MP Begin	MP End	Segregation Method[b, c]
Muncy Loop		
128.97	129.06	TS1
129.08	129.10	TWS
129.10	129.31	TS1
129.49	129.76	TS1

Table 7.3-1
Topsoil Segregation and Method by Milepost Segment along the Northeast Supply Link Project [a]

MP Begin	MP End	Segregation Method[b, c]
129.88	130.04	TS1
130.04	130.13	TS1
130.13	130.36	TS1
130.41	130.46	TS1
Palmerton Loop		
42.30	42.23	TWS
Stanton Loop		
7.43	7.47	TWS
8.08	8.14	TWS
8.40	8.46	TWS
8.90	8.96	TS1
8.98	8.99	TWS
9.10	9.13	TWS
9.55	9.71	TS1
10.01	10.09	TWS
10.43	10.49	TWS
10.76	10.79	TWS
10.89	10.95	TWS
11.10	11.20	TWS
11.22	11.22	TWS
11.27	11.39	TWS
11.73	11.90	TS1
11.92	11.98	TS1
12.14	12.25	TS1
12.25	12.34	TWS
12.34	12.36	TS1
12.36	12.41	TWS
12.41	12.44	TS1
12.44	12.50	TWS
12.50	12.58	TS1
12.60	12.66	TWS
12.76	12.77	TWS
13.22	13.49	TS1
Caldwell B Replacement		
1821.11	1821.51	TWS

Notes:

[a] From Soil Erosion and Sediment Control Plan for the Northeast Supply Link Project and Transco's Plan (Appendix 7B)

[b] Segregation Method: **TS1**-Strip topsoil from the trench line and subsoil storage areas; **TS2**- Strip topsoil from the entire certificated construction work corridor and all associated additional temporary work space (ATWS) locations; temporary work space (**TWS)**-Segregate the top 1 foot of topsoil from the trench line, except in areas where standing water or saturated soils are present.

[c] Depth of segregation to 12 inches below ground surface unless otherwise noted.

7.3.2 Erosion

Erosion is a natural process that can be accelerated by human disturbance. Factors that influence the degree of erosion include soil texture, soil structure, length and percent of slope, existing vegetative cover, and rainfall or wind intensity. Soils most susceptible to water erosion are typified by bare or sparse vegetative cover, non-cohesive soil particles, low infiltration rates, and/or moderate to steep slopes. Susceptibility to wind erosion can be affected by these factors as well but is less affected by slope angles. Clearing, grading, and equipment movement can accelerate the erosion process and, without adequate protection, can result in erosion of soils into adjacent wetlands and water bodies. In addition, soil fertility and revegetation potentials also can be adversely affected by accelerated erosion.

Highly erodible soils along the proposed pipeline loops were identified by querying the NRCS published Soil Surveys and SSURGO database. The NRCS identifies *Erosion Hazards*, as listed under Use and Management of the Soils and Physical and Chemical Properties found in the data, as the probability that erosion can occur as a result of site preparation or following cutting operations, in forested areas, and where the soil is exposed. Additionally, erosion potentials were also determined using K-factor values as reported in the local soil surveys and SSURGO database. The soil-erodibility factor K is one of six factors used in the Revised Universal Soil Loss Equation (RUSLE; RUSLE 2002) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. K-factor values range between 0.05 and 0.69. The K-factor represents both susceptibility of soil to erosion and the rate of runoff, as measured under the standard unit plot condition (RUSLE 2002). Soils high in clay have low K values, approximately 0.05 to 0.15, because they are resistant to detachment. Coarse textured soils, such as sandy soils, have low K values, approximately 0.05 to 0.2, because of low runoff even though these soils are easily detached. Medium textured soils, such as the silt loam soils, have moderate K values, approximately 0.25 to 0.4, because they are moderately susceptible to detachment and they produce moderate runoff. Soils having high silt content are most erodible of all soils. They are easily detached, tend to crust, and produce high rates of runoff. Values of K for these soils tend to be greater than 0.4 (RUSLE 2002). A component soil series was considered to be susceptible to water erosion if the soil has a K-factor value equal to or greater than 0.25, as described in the SSURGO database and published soil surveys.

Wind erosion may be anticipated when dry, fine-grained, non-cohesive soils are exposed to high velocity wind. Soils textures meeting these characteristics include silt loam and silty clay loam soils. SSURGO wind erodibility group (WEG) data were queried to evaluate this potential impact. The data is presented as a range between 1 and 8, with 1 being most susceptible to

wind erosion and 8 being least susceptible to wind erosion. A component soil series was considered to have high potential for wind erosion if the soil had a WEG value of 1 or 2.

Based on the data, ratings were interpolated for use in this report. When conflicting data was encountered between the reported K-factor value and the data provided under the *Erosion Hazards*, as listed under *Use and Management of the Soils* and *Physical and Chemical Properties*, the latter data were used to determine erosion potentials because the K-factors represent a measure of erodibility for a standard condition. This standard condition is the unit plot, which is an erosion plot 72.6 feet (22.1 meters) long on a 9 percent slope, maintained in continuous fallow, tilled up and down hill periodically to control weeds and break crusts that form on the surface of the soil (RUSLE 2002), whereas *Use and Management of the Soils Erosion Hazards* are based on the mapping units percent slope and erosion factor K (USDA SCS 1986). The listed erosion potential ratings are defined as follows:

- Severe (SE): An SE rating indicates that significant erosion can be expected and that special erosion control measures are needed;
- Moderate (MO): An MO rating indicates that some erosion is likely and that simple erosion control measures are needed; and
- Slight (SL): An SL rating indicates that little or no erosion is likely.

Overall, construction of the proposed Muncy, Palmerton, and Stanton loops would impact approximately 35.45, 17.74, and 34.59 acres, respectively, of soils with severe erosion potential. The Caldwell B Replacement does not cross any potentially severe erosion hazard lands. For aboveground facilities, construction at Compressor Station 505, Montclair State University M&R Station, and the Leidy Interchange Hub will impact approximately 9.39, 0.22, and 4.00 acres of soils with severe erosion potentials.

To minimize or avoid impacts due to potential soil erosion and sedimentation hazards, Transco is currently developing Erosion and Sediment Control Plans (E&SCPs) that will provide detailed descriptions and schematics of best management practices (BMPs) that will be used to control soil erosion at each identified work area. The plans will complement Transco's Plan and Procedures (see Appendices 7B and 2E, respectively). The E&SCPs will be submitted to FERC concurrently with application submittals to local soil conservation districts for E&SCP certifications. Transco anticipates that these applications will be filed with local soil conservation districts beginning on or before December 15, 2011, and concluding by January 15, 2011.

As will be specified in the E&SCPs, temporary erosion controls, including interceptor diversions and sediment filter devices (e.g., straw bales, silt fence, or sediment basins) will be installed immediately following initial ground disturbance. As required, temporary trench

breakers will be installed immediately following ditch excavation. Jute netting may be used on steep slopes to prevent erosion during restoration efforts. Temporary erosion control devices will be inspected on a regular basis and after each rainfall event of 0.5 inches or greater, to ensure controls function properly.

Implementation of topsoil segregation will help ensure post-construction revegetation success, thereby minimizing the potential for long-term erosion due to lack of vegetative cover. In soils with more than 12 inches of topsoil, topsoil will be segregated to a depth of at least 12 inches. In soils with less than 12 inches of topsoil, the entire topsoil layer will be segregated. In addition, restoration and revegetation will follow the E&SCPs. Table 7.3-1 identifies (by MP) the segments of the proposed pipeline facilities where topsoil segregation methods will be used. During construction, the effectiveness of temporary erosion control devices will be monitored by Transco's environmental inspector(s). The effectiveness of revegetation and permanent erosion control devices will be monitored by Transco operating personnel during the long-term operation and maintenance of the pipeline system. Erosion control devices will be maintained until the ROW is successfully re-vegetated. Following successful revegetation of construction areas, temporary erosion control devices will be removed.

7.3.3 Revegetation

Areas may be classified as having a poor revegetation potential if they support soils with slopes greater than 8 percent or have greater than 15 percent coarse fragments (rocks and stones) in the surface layer. Steep slopes that are either poorly vegetated or exhibit no vegetative cover are susceptible to erosion by stormwater runoff and wind. Stony soils can reduce the efficiency and productivity of a soil by reducing infiltration (reducing moisture content and nutrient transport) and by increasing surface water runoff potentials.

Overall, construction of the proposed Muncy, Palmerton, and Stanton loops will impact approximately 60.85, 50.83, and 47.35 acres, respectively, of soils classified as having poor revegetation potential. The Caldwell B Replacement does not impact soils with the same classification. Revegetation of aboveground facility work areas is not considered problematic based on the limited construction disturbance at these locations and/or absence of native vegetation communities within the construction work areas.

Successful restoration and revegetation is important for maintaining existing agricultural productivity levels, for minimizing topsoil loss, and minimizing sedimentation in to adjacent wetlands and waterbodies. In accordance with the E&SCPs, Transco will apply standard soil amendments (i.e., fertilizer and lime) in poor revegetation potential areas to off-set potential nutrient loss and maximize plant establishment.

Transco is in consultation with the NRCS and local soil conservation districts to obtain recommendations/approvals for seed mixtures to be used during ROW restoration.

7.3.4 Stony/Rocky Soils

Introducing stones or rocks to surface soil layers can reduce soil moisture-holding capacity, resulting in a reduction of soil productivity as well as damage to agricultural equipment. Stony/rocky soils crossed by the Project were identified by the following criteria: 1) a channery, cobbly, stony, gravely, or shaly modifier to the textural class in any layer; or 2) greater than 5 percent weight basis of stones larger than 3 inches in the surface layer. In addition, review of the *Use and Management of the Soils* as *Construction Materials* contained within published local soil surveys (USDA SCS 1986) rates soils as a source of topsoil, in part, based on the ease of excavating, spreading, rock fragments, slope, texture, and the ability to cover an area so that vegetation can be established and maintained. These criteria provide the basis for the soil survey rating system of good, fair, and poor, which were interpolated for this report and rated as follows:

- High (H): a rating of high indicates soils are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, and have slopes of more than 15 percent;
- Moderate (M): a rating of moderate indicates soils are sandy or loamy, have a relatively high content of clay, have only 20 inches to 40 inches of suitable material, have an appreciable amount of gravel, stones, or soluble salts, or have slopes of 8 percent to 15 percent; and
- Low (L): a rating of low indicates that soils consist of friable loamy material to a depth of at least 40 inches. These soils are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. These soils are also low in content of soluble salts, are naturally fertile or respond well to fertilizer.

Overall, construction of the proposed Muncy, Palmerton, and Stanton loops will impact approximately 60.85, 50.83, and 47.35 acres, respectively, of soils with high potential to contain stony/rocky soils. The Caldwell B Replacement does not support soils with a high potential to contain stones or rocks.

Because of the presence of this coarse material along the proposed Project, the potential to introduce subsurface stone and rock into surface soils during construction could be significant. However, the soils along each of the pipeline loops, with the exception of Caldwell B Replacement, already contain significant quantities of stone and gravel in the surface layers. In accordance with Transco's Plan and Procedures, Transco will remove any excess stone and rock greater than 3 inches in size from surface soils along the construction ROW and workspace, so that rock contents in soils on the ROW will be no higher than similar soils in adjacent undisturbed off-ROW locations.

7.3.5 Hydric Soils

Hydric soils are defined as "soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (Federal Register 1994). Soils that are artificially drained or protected from flooding (e.g., by levees) are still considered hydric if the soil in its undisturbed state would meet the definition of a hydric soil. Generally, hydric soils are those soils that are identified by the NRCS data as being poorly and very poorly drained.

Construction of the proposed Muncy and Stanton loops would not impact hydric soils. Construction of the proposed Palmerton loop and Caldwell B Replacement will impact approximately 3.36 and 1.77 acres, respectively, of hydric soils. For aboveground facilities, construction at the Roseland M&R Station, Compressor Station 303, Paterson Lateral Take-off, and the Meadows Heaters will impact approximately 0.08, 0.23, 0.36, and 1.89 acres, respectively, of soils classified as hydric .

Construction through soils classified as hydric will be conducted according to Transco's Plan and Procedures.

7.3.6 Soil Contamination

Contamination from spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils. The effects of contamination typically are minor, because of the low frequency and volumes of spills and leaks. Transco's construction contractor will adhere to the Spill Prevention, Control, and Countermeasures (SPCC) Plan (see Appendix 2B), which specifies cleanup procedures in the event of soil contamination from spills or leaks of fuels, lubricants, coolants, or other hazardous materials. Should a spill occur, Transco and its contractors will use the SPCC Plan to contain accidental spills of any material that may contaminate soils and to ensure that inadvertent spills of hazardous materials are cleaned up and disposed of in an appropriate manner.

7.3.6.1 Pipeline Facilities

Transco completed an environmental database review through Environmental Data Resources, Inc. (EDR). The purpose of the review was to identify sites of potential environmental concern within or adjacent to the pipeline facilities. The search area extended a total distance of 0.25 mile from the pipeline centerlines. Table 7.3-2 provides a summary of impacted soils with 0.25-mile of the pipeline facilities. It should be noted that the data includes a percentage of error in site proximity measurement.

The EDR database search included all federal Superfund, Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and

Liability Information System (CERCLIS) sites, National Priority List (NPL) sites, Emergency Response Notification System (ERNS) sites as well as state and tribal nation databases of similar information including databases of aboveground storage tanks (AST), underground storage tanks (UST), and reported leaks.

As listed in Table 7.3-2, there are no known sites with potential soil contamination identified within 0.25 mile of the proposed Muncy Loop. Consequently, Transco does not anticipate encountering any contaminated soil during construction of this loop.

Table 7.3-2
Soil Contamination Sites for the NSL Pipeline Facilities

Site Name	Site Address	Database [a]	Approximate Distance From Site (miles)	Notes Based on Data Review [b]
Muncy Loop				
No Sites Listed	---	---	---	---
Palmerton Loop				
Not Reported	Monroe County	LUST	0.06	Facility ID: 45-00439 Facility Status: Cleanup completed 7/20/2004
		ARCHIVE UST		Facility ID: 582871 Five USTs. One 4000 gal. UST containing Gasoline. Two 2000 gal. USTs containing gasoline. One 3000 gal. UST containing gasoline. One 550 gal. UST containing kerosene.
Stanton Loop				
Cozze Brothers	49 Race St.	NPDES	0.18	Permit number: NJ0111210 Facility is registered as a Pollutant Discharge Elimination System discharger.
Milligan Farm	80 Pittstown Rd.	SHWS	0.125	ID: 179431 Status: closed.
		VCP		No incident number. Current VCP file.
		BROWNFIELDS		No further information available.
Hunterdon County Correctional Institution for Women	40 Rt. 513	HIST LUST	0.125	ID: 89-06-16-1327 Site is listed as having confirmed soil and ground water contamination. Status is listed as Assigned to a Program.
Bethlehem Presbyterian Church	2 Race St.	SHWS	0.18	ID: 58112 Status: closed.
		UST		ID: 034057 Two USTs have been removed, one abandoned in place.
		HIST LUST		ID: 00-08-16-1218-47 Site Issued Letter of No Further Action for Area(s) of Concern.
		SPILLS		ID: 66278 Information REDACTED due to data corruption.
89 Sidney Rd.	89 Sidney Rd.	SHWS	0.18	ID: 205287 Status pending.
27 Berkshire Ct.	27 Berkshire Ct.	ERNS	0.20	ID: 2001559298 Facility has reported emergency release to the soil. Unknown material, unknown amount. No further information available.
132 Lilac Dr.	132 Lilac Dr.	SHWS	0.10	ID: 176372 Status: closed.
		VCP		ID: 04-05-27-0937-02 Historical VCP file. No further information available.

Table 7.3-2
Soil Contamination Sites for the NSL Pipeline Facilities

Site Name	Site Address	Database [a]	Approximate Distance From Site (miles)	Notes Based on Data Review [b]
Drs. Joseph F. & Carol A. De George DMD	53 Payne Rd.	NPDES	0.24	Permit number: NJG0171999 Facility is registered as a Pollutant Discharge Elimination System discharger.
Red Horse Shoppers Inc.	Rte. 31 & Payne Rd.	HIST SHWS	0.24	ID: 002507 Status: Active.
Kipy Cleaners	Rte. 31S & Payne Rd.	RCRA-NonGen	0.24	ID: NJD982538084 Classified as RCRA Non-Generator and does not presently generate hazardous waste.
		DRYCLEANERS	0.24	Facility ID: L8009
107 Lilac Dr.	107 Lilac Dr.	SHWS	0.14	ID: S109215142 Status: closed.
99 Lilac Dr.	99 Lilac Dr.	SPILLS	0.18	ID: 98-12-11-1559-45 Reported 1000 gal leaking UST. Removal and clean up pending. No further information available.
		SHWS		ID: 79432 Status: closed.
		VCP		ID: 98-12-11-1559-45 Historical VCP file. No further information available.
Twin Oaks Sewage Treatment Facility	Lilac Dr. & Payne Rd.	NPDES	0.18	Permit number: NJ0050857 Permit categorized as an underground sanitary sewer injunction.
Mergentime Corp.	5 7 Bartles Corner Rd.	SHWS	0.18	ID: 50110 Status: closed.
Rolling Hills Care Center	16 Cratetown Rd.	SHWS	0.10	ID: 37990 Status: closed.
1043 Stanton Lebanon Rd.	1043 Stanton Lebanon Rd.	SHWS	0.125	ID: 198129 Status: closed.
		HIST SHWS		ID: 260761 Status: active.
		VCP		ID: 05-02-18-1014-10 Historical VCP.
26 Cratetown Rd.	26 Cratetown Rd.	SPILLS	0.06	ID: 99-05-13-1039-43 Reported soil contamination around 550 gallon UST. Cleanup T.B.D. No further information available.
		SHWS		ID: 79732 Status: closed.
22 Cratetown Rd.	22 Cratetown Rd.	VCP	0.06	ID: 05-12-12-1318-01 No further information available.
		SHWS		ID: 226134 Status: closed.
Rolling Hills of Hunterdon Care Center	16 Cratetown Rd.	UIC	0.06	Permit number: NJ0087335 No further information available.
		NPDES	0.06	Permit number: NJ0087335 Facility is registered as a Pollutant Discharge Elimination System discharger.
1033 Stenton Lebanon Rd.	1033 Stenton Lebanon Rd.	VCP	0.04	ID: 00-09-20-1150-49 Historical VCP file. No further information available.
		SHWS		ID: 80758 Status: closed.
1023 Stanton Lebanon Rd.	1023 Stanton Lebanon Rd.	SHWS	0.23	ID: 214318 Status: closed.
		VCP		ID: 05-05-13-1031-25 Historical VCP file. No further information available.
16 Pleasant View Rd.	16 Pleasant View Rd.	SHWS	0.18	ID: 387241 Status: closed.
11 Pleasant View Rd.	11 Pleasant View Rd.	SHWS	0.18	ID: 401239 Status: closed.

Table 7.3-2
Soil Contamination Sites for the NSL Pipeline Facilities

Site Name	Site Address	Database [a]	Approximate Distance From Site (miles)	Notes Based on Data Review [b]
110 Stanton Mountain Rd.	110 Stanton Mountain Rd.	VCP	0.18	ID: 06-04-17-0913-18 Current VCP file. No further information available.
		SHWS		ID: 185352 Status: closed.
Caldwell B Replacement				
Roseland II	103 Eisenhower Pkwy	HIST LUST	0.19	ID: S105487103 No detailed information provided. No Further Action Letter issued 5/28/1992.
Roseland II Limited Partnership	103 Eisenhower Pkwy	UST	0.19	ID: U000371299 550 gallon tank containing Medium Diesel Fuel (No. 2-D). Tank Removed 6/6/1991.
Orange Quarry Share Holders	103 Eisenhower Pkwy.	RCRA-NonGen	0.19	ID: 1004752243 Classified as RCRA Non-Generator and does not presently generate hazardous waste.
Calcomp Inc.	103 Eisenhower Pkwy.	RCRA-NonGen	0.19	ID: 1000832961 Classified as RCRA Non-Generator and does not presently generate hazardous waste.

Notes:

[a] Database IDs:

ARCHIVE LIST

BROWNFIELDS	State Database of Sites Contained in the NJ VCP and Sites Listed on the NJ Brownfields Site List
DRYCLANERS	A listing of registered drycleaners.
ERNS	Database of Emergency Response Actions
FED	Federal IC/EC, Brownfield Management System
FINDS	Facility Index System/ Facility Registry System
HIST HWS	Known Contaminated Sites Listing
HIST LUST	Historical Leaking USTs
HWS ReEval	Site Re-Evaluation Report
UIC	Underground Injection Wells Database
INST	Classification Exception Area Sites
LUST	State Database of Leaking Underground Storage Tanks
MANIFEST	Hazardous Waste Manifest Data
NPDES	Pollution Discharge Elimination System Dischargers
NPL	Confirmed and Proposed Superfund Sites on the National Priorities List
RCRA GEN	Facilities that Generate or Transport Hazardous Waste or Meet other RCRA Requirements
RCRA NonGen	Facilities that do not general or transport hazardous waste or meet other RCRA requirements
SHWS	Known Contaminated Sites in New Jersey
State Sites	Database of Known Contaminated Sites in New Jersey
State Spills	Database of New Jersey Emergency Response Actions and Spill Releases
UST	State Database of Underground Storage Tanks UST/AST
VCP	State Database of Sites in Voluntary Cleanup Program
PCBs	Polychlorinated Biphenyls
PAHs	Polycyclic Aromatic Hydrocarbons

[b] Notes Based on Review of Data – Summary of site specific information obtained from Environmental Data Resources, Inc.

There are several sites with former or existing soil contamination within 0.25 mile of the Palmerton Loop (1 site), Stanton Loop (18 sites), and Caldwell B Replacement (4 sites). None of the sites are either crossed or immediately upgradient of the pipeline facilities such that Transco expects to encounter soil contamination during pipeline construction. Transco will

implement its Unanticipated Discovery of Contamination Plan (see Appendix 7C) during construction and BMPs will be implemented if contaminated soils are encountered.

7.3.6.2 Aboveground Facilities

A search of various federal and state databases including the United States Environmental Protection Agency's (USEPA's) Regulated Facility dataset (USEPA 2011a), the USEPA's Enviromapper for Envirofacts (USEPA 2011b), the New York State Department of Environmental Conservation (NYSDEC) Environmental Facilities Navigator (NYSDEC 2011), and data layers available through PADEP 2010, New Jersey's GeoWeb program, and the NYSDEC Environmental Remediation Sites data layer (NYSDEC 2006) were conducted to determine potential soil contamination areas in the vicinity of the Project aboveground facilities. The search area extended outward and perpendicular from the facilities for a total distance of 0.25 miles in each direction. Table 7.3-3 provides a summary of impacted soils within 0.25-mile of the aboveground facilities.

As shown in Table 7.3-3, contaminated sites have been identified within 0.25 mile of the following aboveground facilities: Compressor Station 505, proposed Compressor Station 303, Electrical substation, Roseland M&R Station, 240 Regulator Station, Meadows Heaters, and 134th Street Manhattan M&R Station. Each site is discussed further below.

Table 7.3-3
Soil Contamination Sites for the NSL Aboveground Facilities

Site Name	Site Address	Database*	Distance from site (miles)	Notes Based on Review of Data*
Compressor Station 515, Luzerne County, Pennsylvania– No sites identified within 0.25 mile				
Compressor Station 303, Essex County, New Jersey				
Intedge Industries, Inc. / ITW MARK-TEX / ITW American Safety Technologies	565 Eagle Rock Avenue Roseland Borough 34013	NJDEP KCSL CEA USEPA RCRA TRI	0.07 S	D: Multi-Phased Remedial Action – Multiple Source/Release to Multi-Media Including Ground Water. Designated in August 1997, site status is No Further Action with limited restricted use and biennial groundwater monitoring. CEA was applied in August 1997. Contaminants of concern in groundwater are listed as TCE, PCE, vinyl chloride, chloroethane,1,1-dichloroethane, 1,1,-dichloroethene, and 1,1,1-trichlororoethene . Possible soil contamination at this address from former seepage pit.
Compressor Station 505, Somerset County, New Jersey				
TGPL Station 505	Case Road Branchburg Township 08853	NJDEP KCSL	0.01	C3: Multi-Phased Remedial Action – Unknown or Uncontrolled Discharge to Soil or Ground Water. Designated in July 1989, site status is active. No Further Action notice received from NJDEP.
Leidy Interchange Hub- No sites identified within 0.25 mile				

Table 7.3-3
Soil Contamination Sites for the NSL Aboveground Facilities

Site Name	Site Address	Database*	Distance from site (miles)	Notes Based on Review of Data*
Electrical Substation, Essex County, New Jersey				
Intedge Industries, Inc. / ITW MARK-TEX / ITW American Safety Technologies	565 Eagle Rock Avenue Roseland Borough 34013	NJDEP KCSL CEA USEPA RCRA TRI	0.10 S	D: Multi-Phased Remedial Action – Multiple Source/Release to Multi-Media Including Ground Water. Designated in August 1997, site status is No Further Action with limited restricted use and biennial groundwater monitoring. CEA was applied in August 1997. Contaminants of concern in groundwater are listed as TCE, PCE, vinyl chloride, chloroethane,1,1-dichloroethane, 1,1,-dichloroethene, and 1,1,1-trichlororoethene . Possible soil contamination at this address from former seepage pit.
Electrical Substation Site	565 Eagle Rock Avenue Roseland Borough 34013	Onsite soil sampling	Onsite	Historical surface soil samples collected in the vicinity of the planned substation area on PSE&G right-of-way show PCB concentrations in soil above applicable standards and additional assessment is pending. Additional remediation, as required, will be performed to comply with NJDEP requirements.
Roseland M&R Station, Essex County, New Jersey				
Intedge Industries, Inc. / ITW MARK-TEX / ITW American Safety Technologies	565 Eagle Rock Avenue Roseland Borough 34013	NJDEP KCSL CEA USEPA RCRA TRI	0.08 S	D: Multi-Phased Remedial Action – Multiple Source/Release to Multi-Media Including Ground Water. Designated in August 1997, site status is No Further Action with limited restricted use. CEA was applied in August 1997. Contaminants of concern in groundwater are listed as TCE, PCE, vinyl chloride and volatile organics. Possible soil contamination at this address from former seepage pit.
Montclair State University M&R Station, Passaic County, New Jersey– No sites identified within 0.25 mile				
East Rutherford M&R Station, Bergen County, New Jersey – No sites identified within 0.25 mile				
240 Regulator Station, Bergen County, New Jersey				
TGPL Station 0240	718 Paterson Plank Road Carlstadt Borough, 07072	NJDEP KCSL CEA	0	D: Multi-Phased RA – Multiple Source/Release to Multi-Media Including Ground Water. Designated in August 1988, site status is active. CEA applied March 1996. Contaminant of concern is listed as benzene.
Meadows Heaters, Bergen County, New Jersey				
Sier-Bath Gear Co.	9252 John F. Kennedy Blvd. North Bergen Township	CEA	0.16 E-SE	Site status is active. Contaminants of concern are listed as TCE, Vinyl chloride, lead, arsenic, volatile organics and base neutral contaminants.
MLV 505B60, Essex County, New Jersey – No sites identified within 0.25 mile				
Narrows M&R Station, Richmond County, New York– No sites identified within 0.25 mile				
Brooklyn Regulating Vault, Kings County, New York– No sites identified within 0.25 mile				
134th Street Manhattan M&R Station, New York County, New York				

Table 7.3-3
Soil Contamination Sites for the NSL Aboveground Facilities

Site Name	Site Address	Database*	Distance from site (miles)	Notes Based on Review of Data*
CE – West 132nd St. Station	12th Ave between West 131st and West 133rd Streets New York 10027	NY VCP	0.16 SE	The site is the location of two former gas holders, the last of which was closed in 1962. The Site Characterization Report has shown that no manufactured gas plant related contamination is located on the site. The NYSDEC determined that no further action was necessary in a letter dated March 18, 2008.
Olin Water Services	609 West 132nd Street New York 10027	USEPA: RCRA TRI	0.21 SE	Site that releases TRI contaminants to the environment, regulated by USEPA.

Notes:

1. Database IDs:

CEA - Classification Exception Area database. Identifies sites in New Jersey where groundwater contamination has been identified and the NJDEP has established a Classification Exception Area. CEAs are institutional controls in geographically defined areas within which the New Jersey Ground Water Quality Standards (NJGWQS) for specific contaminants have been exceeded. When a CEA is designated for an area, the constituent standards and designated aquifer uses are suspended for the term of the CEA (NJDEP SRP 2010).

NY VCP – Site is part of New York's Voluntary Cleanup Program for brownfield site remediation (NYSDEC 2011).

NJDEP KCSL - New Jersey Department of Environmental Protection Known Contaminated Site List

C1 remedial levels are associated with simple sites with one or two contaminants localized to soil and the immediate spill or discharge area.

C2 remedial levels are associated with more complicated contaminant discharges, multiple site spills and discharges, and/or more than one contaminant, with both soil and groundwater impacted or threatened.

C3 remedial levels are associated with high complexity and threatening sites. Multiple contaminants, some at high concentrations with unknown sources continuing to impact soils, groundwater, and possibly surface waters and potable water resources. Dangerous for direct contact with contaminated soils.

D remedial levels are typically the same conditions as C3 remedial levels except that D levels are also usually designated federal Superfund sites.

RCRA - Resource Conservation and Recovery Act - Facilities that generate or transport hazardous waste or meet other RCRA requirements from the EPA-regulated sites database (USEPA 2011a).

TRI -Toxic Release Inventory from EPA-regulated sites database (USEPA 2011a).

WRA – Well Restriction Area. Established by the NJDEP due to levels of groundwater contaminants that exceed the state Groundwater Quality Criteria (GWQC) and Primary Drinking Water Standards.

2. Notes based on review of data – summary of site-specific information obtained from available agency data.

Compressor Station 505

Remediation activities were completed at the existing Compressor Station 505 under C3: Multi-Phased Remedial Action, Unknown or Uncontrolled Discharge to Soil or Ground Water. This plan was designated in July of 1989.

Transco performed extensive soil and groundwater assessment and soil remediation at Compressor Station 505 and, with the exception of four small areas, met the NJDEP's Unrestricted Use Soil Cleanup Criteria (i.e., residential standards). The following areas did not meet Unrestricted Use Soil Cleanup Criteria, but did meet the Restricted Use Soil Cleanup Criteria:

1. AOC 9, the Aboveground Pipeline Condensate Tank, where most soils met the Unrestricted Use Soil Cleanup Criteria, but soils located under the secondary containment with PCBs and TPHC could not be remediated.
2. AOC 18, Heat Exchange and Compressor Engine Exhaust Area (eight units), where soils at Units 1 through 7 met the Unrestricted Use Soil Cleanup Criteria, but soils in a small area in the vicinity of Unit 8 contained TPH above the NJDEP's Total Organic Contaminant Criterion (TOC).
3. Valve 505S1, where soils met the Unrestricted Use Soil Cleanup Criteria, but one sample at 6 feet below ground surface (bgs) on the south side of the valve was just above the Unrestricted Use Soil Cleanup Criteria for arsenic.
4. Valve 505S2, where soils met the Unrestricted Use Soil Cleanup Criteria, but one sample at 5.5 feet bgs on the southeast side of the valve was just above the TOC.

Due to operational considerations and the placement of a deed notice on the property, NJDEP approved the restricted use standard for these four areas. The proposed work at Compressor Station 515 for the NSL Project will not be conducted within or immediately adjacent to any of these restricted use areas. Consequently, contaminated soils are not expected to be present during construction activities at the site.

Compressor Station 303

One site (listed under two separate names) that has the potential for soil contamination was identified within 0.25 miles of Compressor Station 303. The site was identified in the New Jersey Department of Environmental Protection Known Contaminated Site List (NJDEP KCSL), Classification Exception Area (CEA), Environmental Protection Agency Resource Conservation and Recovery Act, and Toxic Release Inventory databases. The site was listed as Intedge Industries, Inc. and ITW Mark-Tex/ITW American Safety Technologies and is approximately 400 feet (0.07 miles) south of the compressor station site. This site has possible soil contamination in the former seepage pit located on site. There was previous groundwater contamination on

site; however, the site was listed as No Further Action in August 1997 with limited restricted use and a CEA was applied.

Based on the remediated nature of the groundwater from this site and the distance from the proposed construction area, no contaminated soil from the site is expected to be present at Compressor Station 303. However, if contaminated soils are identified in the work areas, appropriate remediation measures will be implemented prior to construction.

There are reports of potential surface and subsurface soil contamination on the east side of the existing building at the Compressor Station 303 site due to a former seepage pit used for historical disposal of solvent wastes. Groundwater contamination issues associated with this seepage pit are discussed in Resource Report 2.

Based on the reports of potential soil contamination, Transco will complete a Preliminary Assessment (PA) and Site Investigation (SI) in accordance with NJDEP rules to document the presence and extent of contamination. Transco will remediate any contaminated soil that is found to residential direct contact soil remediation standards prior to the start of construction.

Roseland M&R Station

The same site described above for the Compressor Station 303 site is located within 0.25 miles of the Roseland M& R Station. Based on the remediated nature of the groundwater from this site and the distance from the proposed construction area (422 feet), no contaminated soil is expected to be present at the Roseland M&R Station. However, if contaminated soils are identified in the work areas, appropriate remediation measures will be implemented prior to construction.

Electrical Substation

The same site described above for the Compressor Station 303 site is located within 0.25 miles of the electrical substation site. Based on the remediated nature of the groundwater from this site and the distance from the proposed construction area (528 feet), no contaminated soil is expected to be present at the electrical substation site. As stated in Table 7.3-3, historical surface soil samples collected in the vicinity of the electrical substation site on PSE&G ROW show PCB concentrations in soil above applicable standards and additional assessment is pending. Transco will perform additional remediation, as required, to comply with NJDEP requirements.

240 Regulator Station

The existing 240 Regulator Station is currently listed as D: Multi-Phased Remedial Action, Multiple Source/Release to Multi-Media Including Ground Water. The remediation plan

was designated in August 1988 and the site status has remained active (NJDEP KCSL). The contaminant of concern found at the site is listed as benzene (CEA). Due to the ongoing remedial activities at this site, Transco will coordinate with NJDEP prior to construction activities to obtain any necessary approvals for site disturbance. If contaminated soils are identified in the work areas, appropriate remediation measures will be implemented prior to construction.

Meadows Heaters

One site has been identified which has adversely affected the soil within 0.25 miles of Meadows Heaters. This site was identified in the CEA database as the Sier-Bath Gear Co., and is located approximately 849 feet (0.16 miles) east-southeast of the Meadows Heaters. The site has an artificial road acting as a berm for groundwater flow. The site is listed as active and contaminants of concern are listed as TCE, Vinyl chloride, lead, arsenic, volatile organic and base neutral contaminants (CEA).

Based on the distance of the site from the proposed construction work area, no contaminated soil from the site is expected to be present at the Meadows Heaters.

134th Street Manhattan M&R Station

Two sites which have adversely affected the soil were identified within 0.25 miles of the 134th Street Manhattan M&R Station. These sites were identified in the Currently Known Extent of Groundwater Pollution, Toxic Release Inventory, New York's Voluntary Cleanup Program (VCP), and EPA: RCRA databases. The first site, the CE-West 132nd St. Station has artificial drainage and is approximately 840 feet (0.16 miles) southeast of the 134th Street Manhattan Meter Station. This site was the former location of two gas holders, the last one closing in 1962. The Site Characterization Report showed that no manufactured gas plant related contamination is located on site. NYSDEC determined no further action was necessary as stated in a letter dated March 18, 2008 (New York VCP).

The second site identified as a potential soil hazard is the Olin Water Services, which is located approximately 1,125 feet (0.21 miles) southeast of the 134th Street Manhattan Meter Station. This site releases Toxic Release Inventory contaminants into the environment and is regulated by the USEPA: RCRA.

Based on the remediated nature of the first site and distance of the second site from the proposed construction work area, no contaminated soil from either site is expected to be present at the 134th Street Manhattan Meter Station.

7.4 AGRICULTURAL LANDS

7.4.1 Prime Farmland

The USDA - NRCS defines four classes of Prime farmland: prime, unique, of statewide importance, and of local importance. Prime farmland is defined further, in part, as "…land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to produce a sustained high yield of crops while using acceptable farming methods. Prime farmland produces the highest yields and requires minimal amounts of energy and economic resources, and farming it results in the least damage to the environment" (USDA NRCS 2004). This designation includes cultivated land, pasture, woodland, or other lands but does not consider whether the land is actively farmed. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively eroded or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. The slope range is mainly from 0 to 6 percent. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., artificial drainage).

Unique farmland is defined as "land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables" (USDA NRCS 2004). Unique farmland is not based on national criteria; rather, it is typically based on microclimates (i.e., cranberry bogs).

The third classification, farmland of statewide importance, is defined as "land that does not meet the criteria for prime or unique farmland" (USDA NRCS 2004). This land potentially could meet or exceed yields of prime farmland; however, it does not meet the criteria for prime farmland, because it would require treatment and maintenance to meet or exceed prime farmland yields.

Finally, farmland of local importance is not identified as having national or statewide importance, but is locally important for the production of food, feed, fiber, forage, and oilseed crops.

Overall, construction of the proposed Muncy, Palmerton, and Stanton loops will impact approximately 9.65, 8.06, and 38.01 acres, respectively, of prime farmland soils. The Caldwell B Replacement does not impact prime farmland soils. For aboveground facilities, Compressor Station 505, Roseland M&R Station, Compressor Station 303, Electrical Substation, and the Leidy Interchange Hub will also impact approximately 32.64, 0.03, 0.23, 1.31, and 7.34 acres, respectively, of identified prime farmland soils. Presentation of prime farmland by milepost can be found within the tables in Section 7.2.1 of this RR.

During construction, topsoil and subsoil will be disturbed during grading activities along the ROW, by excavation of the trench, and by heavy equipment movement on the ROW. The mixing of topsoil with the subsoil from these activities could result in a loss of soil fertility and production. Potential impacts to agricultural areas and Transco's measures to minimize impacts are further discussed in RR 8, "Land Use, Recreation, and Aesthetics," Section 8.4.

To prevent mixing of the soil horizons or incorporation of additional rock into the topsoil in agricultural areas, including those with Prime Farmland Soil designations, topsoil segregation will be performed in croplands, pastures, and in areas requested by the landowner. Table 7.3-1 lists areas of proposed topsoil segregation for the Project. Areas proposed for topsoil segregation are also depicted on the alignment sheets in the Mapping Supplement in Volume 3 and the E&SCPs.

In uplands, Transco will perform topsoil segregation over the trench and on the spoil side of the ROW. Full ROW width topsoil segregation will be performed if requested by a landowner. Topsoil stripping will be performed as outlined in Transco's E&SCPs. The topsoil will be segregated and stockpiled away from the subsoil to prevent mixing and will be returned and restored as the surface layer during backfilling and final grading operations. Implementation of proper topsoil segregation will help ensure post-construction revegetation success, thereby minimizing crop productivity loss and minimizing the erosion potential.

7.4.2 Drain Systems, Tiles, and Septic Leach Fields

Drain tiles are subsurface structures used in active agricultural areas to improve the productivity of the land by decreasing a wet soils moisture content. Rutting due to the operation of heavy construction equipment in wet soils and excavation of the pipeline trench can damage existing drainage tiles outside of the trench line.

Based on discussions with landowners, Transco is not currently aware of any drain tiles in the agricultural lands crossed by the Project.

In the event active drain tiles or elements of a drainage system are encountered, Transco will probe the apparent tile beyond the limits of the trench to determine if any damage has occurred. Tiles will be repaired to their original condition or better. Qualified specialists will conduct testing and repair of the drain tiles. Transco will monitor the function of encountered drainage systems after construction to ensure that performance of drain tile systems remains consistent with performance prior to construction.

7.5 REFERENCES

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Appendices to Resource Report No. 7
Soils

Transcontinental Gas Pipe Line Company
Northeast Supply Link Project

December 2011

Appendix 7A

Agency Correspondence

Williams Northeast Supply Link (NESL) Project (Leidy Interchange Hub)
Pre-Application Meeting
Clinton County Conservation District
June 8, 2011

- Attendees

Mary Ann Bower	Clinton Conservation District	mabower@comcast.net	570 726 3798
Paul Dembowski	PADEP	pdembowski@state.pa.us	570 327 3701
Kipp Starks	PADEP	kstarks@state.pa.us	814 342 8110
Ken Alli	Williams	ken.alli@williams.com	713 215 2594
Gary Bardo	Quality Integrated Services		570 419 1979
Bryan Pariseault	URS	Bryan_pariseault@urscorp.com	215 367 2603

- Introductions & Project Description
  - Bryan presented an overview of the entire NESL project
  - Ken provided detail on modifications to the Leidy Interchange Hub

- Permit Requirements
  - Paul stated that as the improvements are in support of a transmission line, the work is eligible for coverage under an ESCGP-1 permit application.
  - As the work is related to a transmission line, the permit will be submitted to the Clinton County Conservation District for review.

- E&S Approach
  - Bryan stated that E&S controls will likely consist of a construction entrance and perimeter controls (silt fence / compost filter sock). The site is still being laid out, final E&S design is not yet complete.
  - Paul stated that the project area is High Quality, and compost filter socks would be acceptable.
  - Bryan addressed the potential for the removal of an odorization tank, and that two separate work areas may be proposed due to the distance between proposed buildings and the optional tank removal.

- Stormwater Requirements
  - Bryan stated that stormwater measures will likely involve infiltration practices such as rain gardens and infiltration trenches. Soil testing has not yet been completed however and will impact the design.
  - Paul stated that infiltration berms are becoming popular and can be woven through wooded areas so as to not require the removal of trees. An infiltration trench could be installed in front of the berm.
  - Paul suggested that credit for soil amendments could be taken in the stormwater design.
  - Paul indicated that the more trees that could be saved, the better.

- Questions / Discussion
  - Kipp asked if wetlands were present on site. Ken indicated that the project area is more upland and wetlands are unlikely. Bryan stated that a wetland and watercourse determination is currently in progress, and that the results will be reviewed and the project designed accordingly.
  - Bryan asked about the presentation of the stormwater design in the context of an ESCGP-1 application, as the application does not include the stormwater tables of the NPDES permit. Paul indicated that stormwater changes, measures, impacts and benefits should all be stated in the narrative.
  - Mary Ann stated that 3 separate checks will be needed with the application, and provided a fee schedule for the E&S review.
  - Kipp asked what was to be installed in the proposed buildings, and about secondary containment for the proposed odorization tank(s). Ken stated that the buildings will include titration and odorization equipment, and that the tanks are double walled.

  - The following mapping materials were provided to all attendees:

    - NESL overview map
    - USGS quad map showing the Leidy Interchange Hub
    - Aerial photo of the Leidy Interchange Hub
    - Preliminary site plan showing proposed improvements

The minutes of the meeting have been prepared by URS Corporation. We feel they accurately reflect the discussions of the meeting. Any additions, deletions or corrections to these minutes should be forwarded to URS, by Tuesday June 21, 2011. If no comments are received, the minutes presented above shall be considered acceptable to all parties

Williams Northeast Supply Link (NESL) Project (Station 515)
Pre-Application Meeting
Luzerne County Conservation District
June 9, 2011

- Attendees

Heater Berlew	Luzerne Conservation Distr	h.graham@luzernecd.org	570 674 7991
Gary Bardo	Quality Integrated Services		570 419 1979
Bryan Pariseault	URS	Bryan_pariseault@urscorp.com	215 367 2603

- Introductions & Project Description
  - Bryan presented an overview of the entire NESL project
  - Ken provided detail on modifications to Station 515

- Permit Requirements
  - Bryan stated that the intent it to submit under an ESCGP-1
  - Heather stated that as long as disturbance is less than 1 acre, a permit is not required, nor is stormwater. The E&S plan would need to be submitted for review.

- E&S Approach
  - Bryan stated that E&S controls will likely consist of a construction entrance and perimeter controls (silt fence / compost filter sock). The site is still being laid out, final E&S design is not yet complete.
  - Bryan asked about temporary laydown areas. If areas to be used are industrial in nature and the ground is not being disturbed, laydown areas will not be considered in the total disturbed area / Limit of Disturbance.

- Stormwater Requirements
  - If the disturbed area is less than 1 acre, stormwater management measures will not be required.

- Questions / Discussion
  - None

  - The following mapping materials were provided to all attendees:

    - NESL overview map
    - USGS quad map showing Station 515
    - Aerial photo of Station 515
    - Preliminary site plan showing proposed improvements

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Williams Northeast Supply Link (NESL) Project (Muncy Loop)
Pre-Application Meeting
Lycoming County Conservation District
June 9, 2011

- Attendees

Eric Beaver	Lycoming Conservation Dis.	ebeaver@lyco.org	570 433 3003
Curtis Swanger	Lycoming Conservation Dis.	cswanger@lyco.org	570 433 3003
Gary Bardo	Quality Integrated Services		570 419 1979
Bryan Pariseault	URS	Bryan_pariseault@urscorp.com	215 367 2603

- Introductions & Project Description
  - Bryan presented an overview of the NESL project, and the Muncy loop expansion
  - Road Crossings (5 total)
  - Stream Crossings (5 total, including Muncy Creek)
  - Wetlands (5 impacted)
  - Gary explained the general sequence of construction
  - Construction yards: The access road to, and areas for project trailers will be stoned. The remaining laydown areas will not be stoned. All areas used for laydown will be scarified to a depth of 12 inches following completion of work.
  - Eric asked if the project limits may still change, and suggested that if they might that the entire area be permitted such that changes later on would be minor and happen within the permitted area. Bryan explained that the workspace would be pretty well set by application time, but potential changes would be considered in the final application area.
  - Eric asked how the JPA was being submitted. Bryan stated that the Northeast and North Central districts of PADEP were considering the Muncy and Palmerton loops as two separate submittals. Eric asked that the method of 105 submittal be addressed in the ESCGP-1 application for informational purposes, so that the Lycoming Conservation District (LCD) will be aware.

- Wetlands and Waterways
  - Stream crossings – primarily dam & pump.
    - Cofferdams will likely be used for the Muncy crossing, with ½ of the crossing made from each side of the creek.
  - Eric stated that PAs stream classifications are constantly changing. LCD goes by the classification on the day of submittal. Eric stated that the classifications seem to be changing on a monthly basis.
  - Eric stated that the Fish & Boat Commission recently changed the stream listing, and that could impact the classification of some wetlands.

- PNHC Findings
  - USFWS – Indiana Bat
  - DCNR – No impact anticipated
  - PAFBC – No impact anticipated
  - PA Game Commission – No impact

- Permit Requirements
  - ESCDP-1

- E&S Approach
  - Compost Filter Sock
  - Silt Fence
  - Diversion Terraces
  - Trench Breaks
  - As appropriate at valve stations
  - Eric asked that a note be added in the Sequence of Construction (SOC) directing that the LCD be notified should the approved SOC by changed.
  - Curtis asked how big of a section of pipe is installed at a time. Gary stated that Williams performs steps (clearing, trenching, assembly, etc.) along the entire project, and that there will be a point where the entire trench is open, with pipe assembled above ground.
  - Eric stated that Rock Construction Entrances (RCE) are to be placed anywhere vehicles will enter and exit a road. Particular attention to cleanliness be paid to the entrances along State Route 220.
  - Eric stated that the E&S regulations have changed, and in cases where work has temporarily ceased, the area is to be stabilized with four (4) days. If for example Friday and Monday were to be days off, and work was not occurring on the weekend, stabilization would need to occur on Thursday.
    - Further discussion occurred on what "work ceased" means. If pipe is on blocks, and the trench is open it is still work in progress. When the pipe is in the ground and final grading is complete, the site needs to be stabilized.
  - Existing terraces were discussed. In cases where terraces are in place from previous work, and are removed for installation of the Muncy loop, the new terraces will be tied into the old.
  - Curtis stated that temporary stabilization measures will need to be in place during the work, even for temporary diversion terraces.
  - Eric asked what was going to be done for outlet protection on steep slopes. Bryan and Gary stated that measures would be installed as appropriate to manage flows.
  - Curtis asked about access points that will need to be upgraded / restored following use for access. These will need to be identified on the plan. For example, a culvert that needs to be installed or upgraded to allow for installation of an RCE.
  - Eric stated that any measure in the DRAFT E&S manual is acceptable for use by the LCD, and called attention to the "stacked compost filter sock" that can be used as a temporary sediment trap.
  - For access roads that extend beyond the detailed survey, existing PA contour data can be can be used in conjunction with the project topo.
  - Curtis asked about erosion control matting, and stated that it should be installed on all sloped greater the 3:1.

- Stormwater
  - Linear project
  - RoW to be restored to grass condition (meadow)

- Questions / Discussion
  - Curtis asked if station markings would be included on the plan. Bryan stated that they would.
  - Eric asked that a complimentary copy of the 105 permit be submitted to the LCD. The copy is not for review, but to aid in coordination between LCD and PADEP.
  - Bryan asked about standard plan notes that LCD desires on plans. Eric stated that LCD does not have any, and follows the Draft E&S manual.
  - The submittal requires 3 set of plans, however LCD asks that initially 1 set be submitted. Once it is reviewed and found to be adequate, additional copies of the plans are to be submitted.

  - The following mapping materials were provided to all attendees:

    - NESL overview map
    - Aerial map showing the extents of the Muncy Loop.

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Williams Northeast Supply Link (NESL) Project (Palmerton Loop)
Pre-Application Meeting
Monroe County Conservation District
June 10, 2011

- Attendees

Craig Todd	Monroe Cons. Distr.	monroecd@ptd.net	570 629 3060
Orianna Roth Richards	Monroe Cons. Distr.	monroecd@ptd.net	570 629 3060
Drew Wagner	Monroe Cons. Distr.	dwmccd@ptd.net	570 629 3060
Gary Bardo	Quality Integrated Services		570 419 1979
Bryan Pariseault	URS	Bryan_pariseault@urscorp.com	215 367 2603

- Introductions & Project Description
  - Bryan presented an overview of the NESL project, and the Palmerton loop expansion
  - Road Crossings (10 total; mix of open cuts and bores)
  - Stream Crossings (2 total, several more to be crossed by directional drill)
  - Wetlands (2 impacted)
  - Bryan explained the general sequence of construction
  - Construction yards: The access road to, and areas for project trailers will be stoned. The remaining laydown areas will not be stoned. All areas used for laydown will be scarified to a depth of 12 inches following completion of work. Craig stated that perimeter controls would be needed.
  - Orianna will look into whether the construction yards would need a separate permit (NPDES - general) or would be covered under the ESCGP-1.
  - Orianna asked if the project was occurring in existing RoW. Bryan stated that it is, however there are some areas of Temporary Additional Workspace.
  - Craig asked what the project schedule is. Bryan stated that the In Service Date is 2013.

- Wetlands and Waterways
  - Stream crossings – primarily dam & pump.
    - Cofferdams will likely be used for the Muncy crossing, with ½ of the crossing made from each side of the creek.
  - Craig asked how wetlands are shown on the plans. Bryan stated that a wetland delineation has been performed and the delineated boundaries will be shown on the E&S plans.
  - Orianna stated that a petition has been filed to raise the classification of the Aquashicola Creek to EV status. The impact of that would be to require an HDD for the crossing. At some point in the process, the District is required to consider the proposed status, Orianna did not know if that point had been reached. The project as currently planned call for crossing of the Aquashicola via HDD.

- PNHC Findings
  - USFWS – Indiana Bat
  - DCNR – No impact anticipated
  - PAFBC – No impact anticipated

- PA Game Commission – No impact

- Permit Requirements
  - ESCDP-1
  - The JPA was discussed, and Bryan stated that two packages would be submitted, one each to the Northeast and North Central PADEP regions.

- E&S Approach
  - Compost Filter Sock
  - Silt Fence
  - Diversion Terraces
  - Trench Breaks
  - As appropriate at valve stations
  - The Monroe Conservation District does not favor Compost Filter Sock over Silt Fence, or vice versa. The selected measure is dependent on the application.

- Stormwater
  - Linear project
  - RoW to be restored to grass condition (meadow)
  - While the majority of the project involves the installation of pipe with restoration to a meadow condition, one valve station will be expanded, and one is planned for removal.
  - Craig asked what the square footage of the changes in valve stations is. Bryan stated that a final area is not available as the design is still process.

- Questions / Discussion
  - E&S plans will be submitted at 100 scale. Orianna stated that certain locations (such as stream & road crossings, and the drill locations for the HDD) would need to be shown at 50 scale. This can be done on a separate sheet from the main alignment sheets.
  - Orianna asked who is performing the geo-technical work for the HDD. geoEngineers Orianna would like to hold a conference call with geoEngineers to discuss the scope of the test borings and determine if that will be a permitted activity. Bryan will coordinate the call.
  - Orianna asked how land acquisition works, and if it involved eminent domain. Bryan stated that Williams has a land department that is coordinating land acquisition and access.
  - Craig indicated that if restrictions are placed on tree clearance due to Indiana Bat, but the ESCGP-1 was not yet issued the District may be able to authorize tree clearance so as to not impact the project schedule. Gary stated that in the past this has been done and trees were cut and left in place. If this becomes an issue, the District can discuss further.
  - Overall project length was discussed. Bryan stated that it will be a two to three month construction process. If topsoil, subsoil, etc is stockpiled for that long, interim stabilization will be required. This is due in part to the 4 day requirement to stabilize disturbed area following cessation of work.
  - Craig asked if Williams hauls material off-site for disposal. Gary stated that between back fill and grading excavated material is typically used on site.

- Drew asked if a stone base would be installed for the travel way. Bryan stated that Williams does not plan to install a stone travel way.
- Orianna stated that if the travel way will not be stoned, particular attention will need to be paid to access points. Wash racks and tire cleaners may be needed.

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Williams Northeast Supply Link (NESL) Project
(Station 303, Caldwell Replacement & Caldwell Uprate)
Pre-Application Meeting
Hudson-Essex-Passaic Soil Conservation District
July 26, 2011

- Attendees

Glen Van Olden	HEP Conservation Distr.	glen@HEPSCD.org	973 364 0786
Bryan Pariseault	URS	Bryan_pariseault@urscorp.com	215 367 2603
Monica Sweeney	URS	Monica_Sweeney@urscorp.com	215 367 2514

- Introductions & Project Description
  - Bryan presented an overview of the NESL project, Station 303, the Caldwell Uprate and the Caldwell Replacement
  - Construction yards: The access road to, and areas for project trailers will be stoned. The remaining laydown areas will not be stoned. All areas used for laydown will be scarified to a depth of 12 inches following completion of work. Perimeter controls will be installed while yards are in use.

- Permit Requirements
  - E&S Review
    - One package should be submitted to cover all areas of the Caldwell Uprate.
    - The three aspects of the project (Station 303, the Caldwell Replacement & the Caldwell Uprate) can be submitted as one package or three separate packages. A single package allows for a single 5G3 permit, however everything remains open and weekly reports for all areas are required for the duration of the project. Separate submittal requires a 5G3 permit for each piece, however individual components can be closed out as they are completed.
  - Stormwater
    - 5G3 permit requirements are addressed by virtue of the approved E&S plan. Electronic application for stormwater coverage must still be made.
    - If site improvement results in a reduction in impervious cover (CN) due to a change from asphalt to stone, then additional site stormwater measures likely are not needed.
  - One signed and sealed set of plans will be required by the District.

- E&S Approach
  - Construction Entrances
  - Compost Filter Sock
    - Silt fence & super silt fence is preferred. Compost Filter Sock can be used as a last resort.
  - Silt Fence
  - Diversion Terraces
  - Trench Breaks
  - As appropriate at sites (Station 303 & locations along the Caldwell Uprate)

- Stormwater
  - Linear underground utility project (Caldwell Replacement), RoW to be restored to grass condition therefore post-construction stormwater management is not required.

- Questions / Discussion
  - Water from trench dewatering will need to be discharged to some type of facility. A filter bag is acceptable.

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Williams Northeast Supply Link (NESL) Project (Stanton Loop)
Pre-Application Meeting
Hunterdon County Soil Conservation District
July 25, 2011

- Attendees

Mark Symancek	Hunterdon Cons. Distr.	HCSCD687@embarqmail.com	908 788 9466
Michael DePalma	Hunterdon Cons. Distr.	HCSCD687@embarqmail.com	908 788 9466
Bryan Pariseault	URS	Bryan_pariseault@urscorp.com	215 367 2603
Dave Ellis	URS	Dave_Ellis@urscorp.com	215 367 2562

- Introductions & Project Description
  - Bryan presented an overview of the NESL project, and the Stanton Loop expansion
  - Road Crossings (20 total; mix of open cuts and bores)
  - Stream Crossings (15 total, two to be crossed by directional drill)
  - Wetlands (15 impacted)
  - Bryan explained the general sequence of construction
  - Construction yards: The access road to, and areas for project trailers will be stoned. The remaining laydown areas will not be stoned. All areas used for laydown will be scarified to a depth of 12 inches following completion of work. Perimeter controls will installed while yards are in use. It was noted that it may be necessary to strip topsoil from construction yards.

- Wetlands and Waterways
  - Stream crossings – primarily dam & pump.
    - A Horizontal Directional Drill (HDD) will be used to cross the Raritan River and a portion of the associated wetlands.
  - Wetlands
    - In most cases, the Conservation District will agree with NJDEP in terms of requirements for work in wetlands.

- T&E Issues
  - USFWS – Indiana Bat, Bog Turtle
  - Additional State listed species are present

- Permit Requirements
  - E&S Review
    - There is a 30 day review window. An additional 30 extension can be provided for comments
  - Stormwater
    - 5G3 permit requirements are addressed by virtue of the approved E&S plan. Electronic application for stormwater coverage must still be made.

- E&S Approach
  - Construction Entrances
    - Due to the silt loam nature of soils in Hunterdon County, Construction Entrances need to be at least 100 feet long.
  - Compost Filter Sock
    - Compost Filter Socks are not used much in Hunterdon County. It is preferred that silt fence be used. The District noted that compost filter sock is not (yet) an NJDEP approved BMP.
  - Silt Fence
  - Diversion Terraces
    - The District requested that the NJDEP manual be consulted for spacing frequency. Bryan stated that whichever spacing requirements are more stringent (NJDEP or FERC) will be utilized.
  - Stockpiles
    - Must be immediately stabilized. All other earth disturbances must be stabilized within 30 days.
  - Trench Breaks
  - As appropriate at valve stations

- Stormwater
  - Linear underground utility project, RoW to be restored to grass condition therefore post-construction stormwater management is not required.
  - While the majority of the project involves the installation of pipe with restoration to a grass condition, expansion work is planned at valve stations along the loop expansion.

- Questions / Discussion
  - E&S plans will be submitted at 100 scale. It may be necessary to use a larger scale for valve stations, steep terrain and other select areas.
  - The Conservation District will need to be made aware of both the source and ultimate disposition of water used for hydrostatic testing.
  - Vegetative stabilization typically consists of lime, fertilizer, mulch and seed. The Conservation has not seen good results with hydro-seeding. If soil testing is conducted, final stabilization may vary from prescribed liming and fertilizing requirements.
  - There have been problems in the past with tracking material off-site. Tire wash stations may be needed at construction entrances.
  - Topsoil stockpiles will need to be immediately temporarily stabilized (seeded) during construction.
  - The District noted that there have been instances where a project owner makes an agreement with a property owner to do one thing, and the contractor does another. This has led to problems in the past.
  - The District would like to see a grass seed mix (as opposed to a meadow mix) used to restore the RoW.
  - The District asked what will be done with excess material (to include material from the HDD). Bryan stated that in most cases there is enough opportunity to distribute excess material within the RoW while grading, installing diversion terraces, etc. All material will be utilized on site, or properly disposed of.

- The District will require E&S plans for any offsite areas to where soil will be transported.

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Appendix 7B

Transco's Upland Erosion Control, Revegetation, and Maintenance Plan

Transcontinental Gas Pipe Line Company

Project-Specific Wetland and Waterbody Construction and Mitigation Procedures

Northeast Supply Link Project

December 2011

UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN (DRAFT)

TABLE OF CONTENTS

I. APPLICABILITY

A. Transcontinental Gas Pipeline Company (Transco) has prepared this Northeast Supply Link Project (Project) Upland Erosion Control, Revegetation and Maintenance Plan (Transco Plan) to meet or exceed the best management practices and mitigation measures included in the Federal Energy Regulatory Commission (FERC) Upland Erosion Control, Revegetation and Maintenance Plan (FERC Plan). The intent of the Transco Plan document is to identify baseline mitigation measures for minimizing erosion and enhancing revegetation. The Transco Plan will also be provided to the contractor(s) and inspectors who will be constructing the pipeline on behalf of Transco.

Where the Transco Plan departs substantially from the FERC Plan, the Project specific text is highlighted as bold text. Other changes throughout the Transco Plan are noted in italics. Very minor formatting changes (Project sponsor to Transco should to will, etc.) are not specifically called out in the Transco Plan text..

Once the project is certificated, changes to the Transco Plan can be approved only upon Transco submitting a written request to the Office of Energy Projects (Director), and if the Director agrees that an alternative measure:

1. provides equal or better environmental protection;
2. is necessary because a portion of this Plan is infeasible or unworkable based on project-specific conditions; or
3. is specifically required in writing by another Federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Any requirements in this Plan to file material with the Secretary of the FERC (Secretary) do not apply to projects undertaken under the provisions of the blanket certificate program. This exemption does not apply to a request for alternative measures.

Project-related impacts on wetland and waterbody systems are addressed in Transco's Wetland and Waterbody Construction and Mitigation Procedures (Transco Procedures).

II. SUPERVISION AND INSPECTION

A. ENVIRONMENTAL INSPECTION

1. At least one Environmental Inspector is required for each construction spread during construction and restoration (as defined by section V). The number and experience of Environmental Inspectors assigned to each construction spread should be appropriate for the length of the construction spread and the number/significance of resources affected.

2. Environmental Inspectors shall have peer status with all other activity inspectors.

3. Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the Certificate, state and Federal environmental permit conditions, or landowner requirements; and to order appropriate corrective action.

B. RESPONSIBILITIES OF ENVIRONMENTAL INSPECTORS

At a minimum, the Environmental Inspector(s) shall be responsible for:

1. Ensuring compliance with the requirements of this Transco Plan, the Transco Procedures, the environmental conditions of the Certificate authorization, the mitigation measures proposed by Transco (as approved and/or modified by the Certificate), other environmental permits and approvals, and environmental requirements in landowner easement agreements;

2. Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance;

3. Verifying that the limits of authorized construction work areas and locations of access roads are properly marked before clearing;

4. Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area;

5. Identifying erosion/sediment control and soil stabilization needs in all areas;

6. Ensuring that the location of dewatering structures and slope breakers will not direct water into known cultural resources sites or locations of sensitive species;

7. Verifying that trench dewatering activities do not result in the deposition of sand, silt, and/or sediment near the point of discharge into a wetland or waterbody. If such deposition is occurring, the dewatering activity shall be stopped and the design of the discharge shall be changed to prevent reoccurrence;

8. Ensuring that subsoil and topsoil are tested in agricultural and residential areas to measure compaction and determine the need for corrective action;

9. Advising the Chief Construction Inspector when conditions (such as wet weather) make it advisable to restrict construction activities to avoid excessive rutting;

10. Ensuring restoration of contours and topsoil;

11. Verifying that the soils imported for agricultural or residential use have been certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner;

12. Determining the need for and ensuring that erosion controls are properly installed, as necessary to prevent sediment flow into wetlands, waterbodies, sensitive areas, and onto roads;

13. Inspecting and ensuring the maintenance of temporary erosion control measures at least:

    a. on a daily basis in areas of active construction or equipment operation;

    b. on a weekly basis in areas with no construction or equipment operation; and

    c. within 24 hours of each 0.5 inch of rainfall;

14. Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification;

15. Keeping records of compliance with the environmental conditions of the FERC certificate, and the mitigation measures proposed by Transco in the application submitted to the FERC, and other Federal or state environmental permits during active construction and restoration; and

16. Identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase.

III. PRECONSTRUCTION PLANNING

Transco shall do the following before construction:

A. CONSTRUCTION WORK AREAS

1. Identify all construction work areas (e.g., construction right-of-way, extra work space areas, pipe storage and contractor yards, borrow and disposal areas, access roads, etc.) that would be needed for safe construction. Transco will ensure that appropriate cultural resources and biological surveys have been conducted.

2. *Transco has expanded the* cultural resources and endangered species survey corridors in anticipation of the need for activities outside of certificated work areas.

B. DRAIN TILE AND IRRIGATION SYSTEMS

1. Attempt to locate existing drain tiles and irrigation systems.

2. Contact landowners and local soil conservation authorities to determine the locations of future drain tiles that are likely to be installed within 3 years of the authorized construction.

3. Develop procedures for constructing through drain-tiled areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction.

4. Engage qualified drain tile specialists, as needed to conduct or monitor repairs to drain tile systems affected by construction. Use drain tile specialists from the project area, if available.

C. GRAZING DEFERMENT

Develop grazing deferment plans with willing landowners, grazing permittees, and land management agencies to minimize grazing disturbance of revegetation efforts.

D. ROAD CROSSINGS AND ACCESS POINTS

Plan for safe and accessible conditions at all roadway crossings and access points during construction and restoration.

E. DISPOSAL PLANNING

Determine methods and locations for the disposal of construction debris (e.g., timber, slash, mats, garbage, drilling fluids, excess rock, etc). Off-site disposal in other than commercially operated disposal locations is subject to compliance with all applicable survey, landowner permission, and mitigation requirements.

F. AGENCY COORDINATION

Transco will coordinate with the appropriate local, state, and Federal agencies as outlined in this Plan and in the Certificate.

1. Obtain written recommendations from the local soil conservation authorities or land management agencies regarding permanent erosion control and revegetation specifications.

2. Develop specific procedures in coordination with the appropriate agency to prevent the introduction or spread of noxious weeds and soil pests resulting from construction and restoration activities.

G. STORMWATER POLLUTION PREVENTION PLAN

Make available on each construction spread the Stormwater Pollution Prevention Plan prepared for compliance with the U.S. Environmental Protection Agency's National Stormwater Program General Permit requirements.

IV. INSTALLATION

A. APPROVED AREAS OF DISTURBANCE

1. Project-related ground disturbance shall be limited to the construction right-of-way, extra work space areas, pipe storage yards, borrow and disposal areas, access roads, and other areas approved in the Certificate. Any project-related ground disturbing activities outside these Certificated areas,

except those needed to comply with the Plan and Procedures (e.g., slope breakers, energy-dissipating devices, dewatering structures, drain tile system repairs) will require prior Director approval. All construction or restoration activities outside of the Certificated areas are subject to all applicable survey and mitigation requirements.

2. **Each of the three pipeline loops will use a typical 105-foot-wide construction ROW in uplands and a 75-foot-wide construction ROW in wetlands. Transco also proposes to use 15 feet of additional temporary workspace (ATWS) at wetland crossings, for a total workspace width through wetlands of 90 feet, due to a variety of project and site-specific considerations. The 105-foot-wide construction ROW width in uplands and 75-foot-wide construction ROW width in wetlands (with an additional 15 feet of ATWS) is necessary in order to provide a safe work environment and promote effective implementation of the various industry-standard construction techniques. The proposed increase in the nominal construction right-of-way will not impact or prevent the implementation of other measures to provide for upland erosion control and protection of waterbodies and wetlands. The proposed construction right-of-way will allow Transco to implement the FERC construction measures of the Plan and Procedure while addressing site conditions and meeting OSHA regulations (29 CFR Part 1926.650-.652, Subpart P).** Project use of these additional limited areas is subject to landowner approval and compliance with all applicable survey and mitigation requirements. When such additional areas are used, each one should be identified and the need explained in the weekly or biweekly construction reports to the FERC, if required. The following material should be included in the reports:

   a. the location of each additional area by station number and reference to a previously filed alignment sheet, or updated alignment sheets showing the additional areas;

   b. identification of where the Commission's records contain evidence that the additional areas were previously surveyed; and

c. a statement that landowner approval has been obtained and is available in project files.

Prior written approval of the Director is required when the Certificated construction right-of-way width would be expanded by more than 25 feet.

B. TOPSOIL SEGREGATION

1. Unless the landowner or land management agency specifically approves otherwise, prevent the mixing of topsoil with subsoil by stripping topsoil from the trench and subsoil storage area (ditch plus spoil side method in):

   a) actively cultivated or rotated croplands and pastures;

   b) residential areas;

   c) hayfields; and

   d) other areas at the landowner's or land managing agency's request.

2. In residential areas importation of topsoil is an acceptable alternative to topsoil segregation.

3. In deep soils (more than 12 inches of topsoil), segregate at least 12 inches of topsoil. In soils with less than 12 inches of topsoil make every effort to segregate the entire topsoil layer.

4. Where topsoil segregation is required, maintain separation of salvaged topsoil and subsoil throughout all construction activities.

5. Segregated topsoil may not be used for padding the pipe.

C. DRAIN TILES

1. Mark locations of drain tiles damaged during construction.

2. Probe all drainage tile systems within the area of disturbance to check for damage.

3. Repair damaged drain tiles to their original or better condition. Do not use filter-covered drain tiles unless the local soil conservation authorities and the landowner agree. Use qualified specialists for testing and repairs.

4. For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with

the new pipeline with at least the same depth of cover as the existing pipeline(s).

D. IRRIGATION

Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.

E. ROAD CROSSINGS AND ACCESS POINTS

1. Maintain safe and accessible conditions at all road crossings and access points during construction.

2. If crushed stone access pads are used in residential or active agricultural areas, place the stone on synthetic fabric to facilitate removal.

F. TEMPORARY EROSION CONTROL

Install temporary erosion controls immediately after initial disturbance of the soil. Temporary erosion controls must be properly maintained throughout construction (on a daily basis) and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration is complete.

1. Temporary Slope Breakers

a. Temporary slope breakers are intended to reduce runoff velocity and divert water off the construction right-of-way. Temporary slope breakers may be constructed of materials such as soil, silt fence, staked hay or straw bales, or sand bags.

b. Install temporary slope breakers on all disturbed areas, as necessary 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, and road crossings at the following spacing (closer spacing should be used if necessary):

Slope (%)	Spacing (feet)
5 – 15	300
>15 – 30	200
>30	100

c. Direct the outfall of each temporary slope breaker to a stable, well vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way.

d. Position the outfall of each temporary slope breaker to prevent sediment discharge into wetlands, waterbodies, or other sensitive resources.

2. Sediment Barriers

a. Sediment barriers are intended to stop the flow of sediments and to prevent the deposition of sediments into sensitive resources. They may be constructed of materials such as silt fence, staked hay or straw bales, compacted earth (e.g., drivable berms across travel ways), sand bags, or other appropriate materials.

b. At a minimum, install and maintain temporary sediment barriers across the entire construction right-of-way at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody, wetland, or road crossing until revegetation is successful as defined in this Plan. Leave adequate room between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.

c. Where wetlands or waterbodies are adjacent to and downslope of construction work areas, install sediment barriers along the edge of these areas, as necessary to prevent sediment flow into the wetland or waterbody.

3. Mulch

a. Apply mulch on all slopes (except in actively cultivated cropland) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the area to cover at least 75 percent of the ground surface at a rate of 2 tons/acre of straw or its equivalent, unless the local soil conservation authority, landowner, or land managing agency approves otherwise in writing.

b. Mulch can consist of weed-free straw or hay, wood fiber hydromulch, erosion control fabric, or some functional equivalent.

c. Mulch before seeding if:

(1) final grading and installation of permanent erosion control measures will not be completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas), as required in section V.A.1; or

(2) construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.

d. If mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre of straw or equivalent.

e. If wood chips are used as mulch, do not use more than 1 ton/acre and add the equivalent of 11 lbs/acre available nitrogen (at least 50 percent of which is slow release).

f. Ensure that mulch is adequately anchored to minimize loss due to wind and water.

g. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. Do not use liquid mulch binders within 100 feet of wetlands or waterbodies.

h. Install erosion control fabric on waterbody banks at the time of final bank recontouring. Anchor the erosion control fabric with staples or other appropriate devices.

V. RESTORATION

A. CLEANUP

1. Commence cleanup operations immediately following backfill operations. Complete final grading, topsoil replacement, and installation of permanent erosion control structures within 20 days after backfilling the trench (10 days in residential areas). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls

(temporary slope breakers and sediment barriers) until conditions allow completion of cleanup.

2. Transco shall file with the Secretary for the review and written approval of the Director, a winterization plan if construction will continue into the winter season when conditions could delay successful decompaction, topsoil replacement, or seeding until the following spring.

3. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed (as specified in section IV.F.) and inspected and maintained (as specified in sections II.B.12 through 14). When access is no longer required, the travel lane must be removed and the right-of-way restored.

4. Rock excavated from the trench may be used to backfill the trench only to the top of the existing bedrock profile. Rock that is not returned to the trench should be considered construction debris, unless approved for use as mulch or for some other use on the construction work areas by the landowner or land managing agency.

5. Remove excess rock from at least the top 12 inches of soil in all actively cultivated or rotated cropland and pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. The landowner may approve other provisions in writing.

6. Grade the construction right-of-way to restore pre-construction contours and leave the soil in the proper condition for planting.

7. Remove construction debris from all construction work areas unless the landowner or land managing agency approves otherwise.

8. Remove temporary sediment barriers when replaced by permanent erosion control measures or when revegetation is successful.

B. PERMANENT EROSION CONTROL DEVICES

9. Trench Breakers

a. Trench breakers are intended to slow the flow of subsurface water along the trench. Trench breakers may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers.

b. An engineer or similarly qualified professional shall determine the need for and spacing of trench breakers. Otherwise, trench breakers shall be installed at the same spacing as and upslope of permanent slope breakers.

c. In agricultural fields and residential areas where slope breakers are not typically required, install trench breakers at the same spacing as if permanent slope breakers were required.

d. At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland.

10. Permanent Slope Breakers

a. Permanent slope breakers are intended to reduce runoff velocity, divert water off the construction right-of-way, and prevent sediment deposition into sensitive resources. Permanent slope breakers may be constructed of materials such as soil, sand bags, or some functional equivalent.

b. Construct and maintain permanent slope breakers in all areas, except cultivated areas and lawns, using spacing recommendations obtained from the local soil conservation authority or land managing agency.

In the absence of written recommendations, use the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-of-way:

Slope (%)	Spacing (feet)
5 – 15	300
>15 – 30	200
>30	100

c. Construct slope breakers to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices at the end of the breaker.

d. Slope breakers may extend slightly (about 4 feet) beyond the edge of the construction right-of-way to effectively drain water off the disturbed area. Where slope breakers extend beyond the edge of the construction right-of-way, they are subject to compliance with all applicable survey requirements.

C. SOIL COMPACTION MITIGATION

1. Test topsoil and subsoil for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to approximate preconstruction conditions. Use penetrometers or other appropriate devices to conduct tests.

2. Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil.

   Alternatively, make arrangements with the landowner to plant and plow under a "green manure" crop, such as alfalfa, to decrease soil bulk density and improve soil structure. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

3. Perform appropriate soil compaction mitigation in severely compacted residential areas.

D. REVEGETATION

1. General

a. Transco will be responsible for ensuring successful revegetation of soils disturbed by project-related activities, except as noted in section V.D.1.b.

b. Restore all turf, ornamental shrubs, and specialized landscaping in accordance with the landowner's request, or compensate the landowner. Restoration work must be performed by personnel familiar with local horticultural and turf establishment practices.

2. Soil Additives

Fertilize and add soil pH modifiers in accordance with written recommendations obtained from the local soil conservation authority, land management agencies, or landowner. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as possible after application.

3. Seeding Requirements

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

b. Seed disturbed areas in accordance with written recommendations for seed mixes, rates, and dates obtained from the local soil conservation authority or as requested by the landowner or land management agency. Seeding is not required in actively cultivated croplands unless requested by the landowner.

c. Perform seeding of permanent vegetation within the recommended seeding dates. If seeding cannot be done within those dates, use appropriate temporary erosion control measures discussed in section IV.F. and perform seeding of permanent vegetation at the beginning of the next recommended seeding season. Lawns may be seeded on a schedule established with the landowner.

d. In the absence of written recommendations from the local soil conservation authorities, seed all disturbed soils within 6 working days of final grading, weather and soil conditions permitting, subject to the specifications in section V.D.3.a-c.

e. Base seeding rates on Pure Live Seed. Use seed within 12 months of seed testing.

f. Treat legume seed with an inoculant specific to the species using the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydro).

g. In the absence of written recommendations from the local soil conservation authorities, landowner, or land managing agency to the contrary, a seed drill equipped with a cultipacker is preferred for seed application.

Broadcast or hydroseeding can be used in lieu of drilling at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or imprinter after seeding. In rocky soils or where site conditions may limit the effectiveness of this equipment, other alternatives may be appropriate (e.g., use of a chain drag) to lightly cover seed after application, as approved by the Environmental Inspector.

VI. OFF-ROAD VEHICLE CONTROL

To each owner or manager of forested lands, offer to install and maintain measures to control unauthorized vehicle access to the right-of-way. These measures may include:

A. Signs;

B. Fences with locking gates;

C. Slash and timber barriers, pipe barriers, or a line of boulders across the right-of-way; and

D. Conifers or other appropriate trees or shrubs across the right-of-way.

VII. POST-CONSTRUCTION ACTIVITIES

A. MONITORING AND MAINTENANCE

1. Conduct follow-up inspections of all disturbed areas after the first and second growing seasons to determine the success of revegetation.

2. Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation shall be considered successful if crop yields are similar to adjacent undisturbed portions of the same field.

   Continue revegetation efforts until revegetation is successful.

3. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in active agricultural areas until restoration is successful.

4. Restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless requested otherwise by the land owner or land managing agency), revegetation is successful, and proper drainage has been restored.

5. Routine vegetation maintenance clearing shall not be done more frequently than every 3 years. However, to facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width-centered on the pipeline may be maintained annually in a herbaceous state. In no case shall routine vegetation maintenance clearing occur between April 15 and August 1 of any year.

6. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and vehicle trails as necessary.

B. REPORTING

1. Transco shall maintain records that identify by milepost:

   a. method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;

   b. acreage treated;

   c. dates of backfilling and seeding;

   d. names of landowners requesting special seeding treatment and a description of the follow-up actions; and

e. any problem areas and how they were addressed.

2. Transco shall file with the Secretary quarterly activity reports documenting problems, including those identified by the landowner, **if any**, and corrective actions taken for at least 2 years following construction.

Appendix 7C

Transco's Unanticipated Discovery of Contamination Plan

Williams Gas Pipeline
Procedure 35.04.01
Attachment A

Williams Gas Pipeline

Unanticipated Discovery of Contamination Plan

Construction and Maintenance Projects

June 2011

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Unanticipated Discovery of Contamination Plan

The intent of this *Unanticipated Discovery of Contamination Plan* is to outline practices to employ in the event of an unanticipated discovery of contamination in soil, groundwater, and sediment when excavating during construction and/or maintenance activities, as well as debris or waste materials deposited on the pipeline right-of-way at Williams Gas Pipeline facilities. The purposes of this plan are to:

- Protect human health and worker safety;
- Prevent the spread of contamination; and
- Comply with applicable state and/or federal regulations.

Pre-job planning

When planning a project at Williams Gas Pipeline facilities and/or along the pipeline Right-of-Way (ROW), The Chief Inspector (CI), Environmental Inspector (EI), District Manager, and/or their designee shall complete a review of the proposed pipeline and/or aboveground facility locations prior to the construction and/or maintenance activity in order to assess the potential for the presence of known or potential contamination. An assessment should also be made of the likelihood of encountering contamination during an excavation or along surface. The scope of the review and assessment will depend upon the size of the project, past experience, and available information.

For pipeline construction projects, the review and assessment will consist of a site reconnaissance of the proposed work area, interviews with property owners, and a review of any readily available information. It may also be necessary to consult with the Permits and Natural Resources and/or Environmental Compliance Departments to conduct an environmental database search (e.g., EDR search) and/or perform additional investigation. Generally, it is not anticipated that this review will identify contamination along the ROW, but it will likely identify areas where there is a higher potential for contamination.

For maintenance-related excavations at compressor and meter stations, these have a higher likelihood of encountering something unexpected due to the age of these facilities as well as the use of regulated substances at these facilities.

If it is determined that there is a high likelihood that the planned work will be conducted in close proximity to, or within, known or suspected contaminated sites, the Permits and Natural Resources and Environmental Compliance Departments should be consulted.

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The results of this search/investigation will be reviewed prior to start of construction and/or maintenance activity and any identified contaminated sites and/or areas will be located and available information reviewed for potential impacts. In the event the planned work will impact a confirmed contaminated site, the Environmental Compliance Department will work with the appropriate regulatory agency, property owner, and responsible party to ensure the construction and/or maintenance activities are conducted in accordance with applicable and established site requirements. Where feasible, a re-route or other modification to the project should be considered. Postponement of the project may also be necessary.

If contaminated sites are identified for areas of the project, a list of the sites should be kept along with how the determination was made (EDR, property owner, agency report, etc.). An example of this list is included in *Worksheet A* at the end of this document.

Unanticipated Discovery Response

In the event unanticipated contaminated soil, groundwater or other potential environmental contamination are encountered during the project (e.g., malodorous soils and/or groundwater with visible staining and/or sheen), the following general procedures will be implemented:

1. All construction and/or maintenance work in the immediate vicinity of areas where suspected contamination or unknown wastes are encountered will be halted.
2. All construction, oversight, and observing personnel will be evacuated to a road or other accessible up-wind location until the types and levels of potential contamination can be verified by qualified personnel. This assessment may include, but not be limited to: observation by a qualified health and safety professional, field screening using the appropriate air sampling devices, and/or laboratory analysis of suspect material.
3. The Chief Inspector, Environmental Inspector, and/or District Manager will be notified and they will consult with the company's Environmental Compliance Department. The contacts for the Environmental Compliance Department are provided at the end of this plan.
4. Following consultation with on-site personnel, the Environmental Compliance Department will be responsible for designating follow-up actions, including mobilizing emergency response personnel and coordinating with the EPA and/or state and local agencies as appropriate.
5. If an immediate or imminent threat to human health or the environment exists, the EI, CI, District Manager, and/or their designee will immediately contact the appropriate responding agency.

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- For construction projects, the contact numbers for fire, police, and the state environmental hotline can be found on the Environmental Contacts List for the project.
- For maintenance projects, the contact numbers for fire, police, and the state environmental hotline can be found on the compressor station's Spill Plan.

6. If an immediate or imminent threat to human health or the environment does **not** exist, or has been abated, a determination will be made, after consulting with all responsible parties, for conducting any remedial action. If the company or their qualified contractor personnel are responsible for any remedial action it will be limited to the planned work area only and no additional disturbance should be made except as needed to facilitate construction and/or maintenance activities.
   - Representative samples of the suspected contaminated media (i.e., soil, water, and waste) may need to be submitted for laboratory analysis to determine waste classification and/or agency notification requirements, which can vary from state-to-state.
   - The CI, EI, District Manager, and/or their designee shall consult with the Environmental Compliance Department for the appropriate analyses, sampling methodology, and sampling frequency.
   - Any excavated soils or waste that are suspected of containing contamination above the appropriate clean-up standard, or otherwise regulated for disposal, will be placed on plastic sheeting and covered at the end of each work day or placed in an appropriate container to prevent the spread of any further contamination. Containers must be closed or covered and any storage areas cordoned off with orange safety fence. All containers should be clearly labeled with the name of the contents and any known hazard associated with the material identified on the container. Known hazardous wastes should be labeled with the words "Hazardous Waste" and the date the waste was placed in the container.
   - Water or groundwater suspected of being contaminated will **not** be discharged to grade without prior state approval. Options such as on-site storage tanks or discharge to a publicly owned treatment works should be considered. Limiting and/or diverting the flow of clean surface water away from the affected area, as well as other measures, may be implemented to minimize impacts and exposure to the work area.
7. If it is determined that the company or it's qualified contractor will be responsible for arranging for disposal of any affected media (soil, water, waste), the material will be characterized and disposed of properly at a

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permitted facility in a timely manner. All disposal documentation should be obtained and filed in the project files and copies sent to the Environmental Compliance Group.

- If USEPA regulated hazardous wastes, Toxic Substance Control Act wastes, or state hazardous wastes are generated, a USEPA generator identification number will need to be obtained. The Environmental Compliance Group must be contacted to assist in either obtaining a project specific ID number or providing an EPA ID number for an existing facility.

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WORKSHEET A – KNOWN OR SUSPECTED CONTAMINATED SITES

Instructions: Please complete a separate sheet for each location where contamination has been noted

I. Site Name

TBD

II. Physical Location

TBD

III. How Contamination Determination Was Determined (Visual, Sampling, Smell, etc.)

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INTERNAL ENVIRONMENTAL ASSISTANCE CONTACT SHEET

District/Location: _____

District Manager: _____

Office:_____Home:_____ Pager/Cell:_____

Assistant District Manager: _____

Office:_____Home:_____ Pager/Cell:_____

DIVISION CONTACTS

PRINCETON DIVISION (PA, NJ, NY)

Mario DiCocco – Director, Operations
Office: 609-936-2401
Home: 215-968-2639
Cell: 609-658-6941

Mike Maben – Division Environmental Engineer
Office: 607-431-1180
Home: 607-432-6482
Cell: 609-865-1929

ENVIRONMENTAL COMPLIANCE AND NATURAL RESOURCES DEPARTMENTS

Mark Bisett – Manager, Environmental Compliance
Office: 713-215-2781
Home: 281-225-9683
Cell: 713-213-2581

Tim Powell – Manager, Natural Resources
Office: 713-215-2719
Home: 281-859-1517
Cell: 713-854-1153

Mark Nelson – Team Leader, Operations Support and Remediation Groups
Office: 713- 215-4563
Home: 713-622-7122
Cell: 713-822-8479

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Mary Beth Whitfield – Air Quality Compliance
Office: 713-215-4562
Home: 281-494-1599
Cell: 713-806-5202

Craig Linn – Director, Technical Services OPS
Office: 713-215-2554
Home:
Cell: 281-513-2588

EXTERNAL NOTIFICATION LIST

Fire – _____

Police – _____

Hospital – _____

State Environmental Hotline – _____

National Response Center – _____