Alternatives Analysis Table
Riverine Resources
Northampton County

Watercourse ID and Crossing Number[1]	Watercourse Name	Milepost[2]	Latitude	Longitude	Primary Pipeline Crossing Method[3]	Secondary Pipeline Crossing Method[3]	Tertiary Pipeline Crossing Method[3]	Geology Constraints	Topography Constraints	Insufficient Workspace to Stage Trenchless	Practicality	Other (See Justification)	Implementing Trenchless Technology	Routing to Minimize	Crossing at Narrowest Location	Co-Locating	Reducing LOD	Minimizing Construction Duration	Adhering to Construction Timing Windows	Implementing BMPs	Justification
PennEast Mainline																					
080917_WA_1002_P_MI - 1	UNT to Indian Creek	52.7R3	40.800358	-75.474329	N/A	N/A	N/A				X	X			X	X	X	X	X	X	Workspace reduced to 50' in stream and floodway. Feature not crossed by pipeline.
080917_WA_1002_P_MI - 2	UNT to Indian Creek	52.7R3	40.800152	-75.474330	DPX	FX	CD				X	X			X	X	X	X	X	X	Workspace reduced to 50' in stream and floodway. Estimated crossing timeframe is 24 hours.
080917_WA_1002_P_MI - 3	UNT to Indian Creek	52.8R3	40.799784	-75.474398	N/A	N/A	N/A				X	X				X	X	X	X	X	Tree cutting to take place in 50 foot wide workspace. Earth disturbance activities reduced to 30' in stream and floodway.
110217_WA_1003_P_MI	UNT to Indian Creek	52.9R3	40.797543	-75.475202	DPX	FX	CD				X				X	X	X	X	X	X	Workspace reduced to 50' in stream and floodway. Estimated crossing timeframe is 24 hours.
080917_WA_1001_I_MI	UNT to Indian Creek	53.2R3	40.793855	-75.476191	DPX	FX	DX-NF				X	X			X		X	X	X	X	Workspace reduced to 75' through stream. Timing to cross justifies open cut. Estimated crossing timeframe is 24 hours.
050217_MB_1002_I_MI	UNT to Indian Creek	53.3R3	40.792107	-75.476103	DPX	FX	DX-NF				X	X			X		X	X	X	X	Workspace reduced to 75' through stream. Timing to cross justifies open cut. Estimated crossing timeframe is 24 hours .
050217_MB_1001_P_IN	UNT to Indian Creek	53.4R3	40.790992	-75.475861	DPX	FX	CD				X	X			X		X	X	X	X	Workspace reduced to 75' through stream. Timing to cross justifies open cut. Estimated crossing timeframe is 48 hours.
102815_WA_1001_E_MI	UNT to Hokendauqua Creek	55.7	40.783732	-75.459065	DPX	FX	DX-NF				X	X			X		X	X	X	X	Workspace reduced to 75' through stream. Timing to cross justifies open cut. Estimated crossing timeframe is 48 hours.
051215_JC_1002_P_IN	Hokendauqua Creek	55.9	40.781304	-75.457677	DPX	FX	CD		X		X	X					X	X	X	X	Steep slope on the east side of the crossing (29%) is impractical for trenchless methods (HDD, Direct Pipe and Microtunnel). Workspace reduced to 75' through stream and floodway. Estimated crossing timeframe is 14 days.
051215_JC_1001_E_MI	UNT to Hokendauqua Creek	55.9	40.780606	-75.457279	DPX	FX	DX-NF				X	X			X		X	X	X	X	Workspace reduced to 75' through stream. Timing to cross justifies open cut. Estimated crossing timeframe is 24 hours . PI to the immediate south along alignment would make staging trenchless crossing impractical.
051215_JC_1003_I_MI	UNT to Hokendauqua Creek	56	40.779940	-75.457029	BX	BX	BX				X	X	X		X		X			X	Trenchlessly crossed as part of Rte. 946 bore. Adjacent workspace required to facilitate bored crossing.
062218_WA_1000_P_MI	UNT to Hokendauqua Creek	56	40.779356	-75.456814	DPX	FX	CD			X	X	X			X			X	X	X	Existing route presents challenges to trenchless methods. Adjacent workspace required to facilitate bored crossing. Estimated crossing timeframe is 24 hours.
050417_GM_1002_P_MI	UNT to Hokendauqua Creek	56.7	40.772084	-75.448600	DPX	FX	CD		X		X	X			X			X	X	X	Slope south of the crossing (23%) would present challenges to trenchless methods (HDD, Direct Pipe & Microtunnel). Existing route presents challenges to trenchless methods. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 48 hours.
050417_GM_1003_P_IN	UNT to Hokendauqua Creek	56.7	40.771677	-75.448290	DPX	FX	CD		X		X	X			X		X	X	X	X	Slope south of the crossing (23%) would present challenges to trenchless methods (HDD, Direct Pipe & Microtunnel). Existing route presents challenges to trenchless methods. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 48 hours.
071917_MB_1001_I_MI	UNT to Monocacy Creek	58R2	40.760247	-75.429116	DPX	FX	DX-NF				X	X			X		X	X	X	X	Estimated crossing timeframe is 24 hours.
052218_WA_1001_E_MI	UNT to Monocacy Creek	58.1R2	40.759968	-75.427902	DPX	FX	DX-NF				X	X			X		X	X	X	X	Estimated crossing timeframe is 24 hours.
052218_WA_1002_P_MI	UNT to Monocacy Creek	58.5	40.755227	-75.423054	DPX	FX	CD		X		X	X			X		X	X	X	X	Steep slope north and south of the crossing (+15%) is impractical for trenchless methods (HDD, Direct Pipe, Microtunnel). Estimated crossing timeframe is 48 hours . Workspace reduced to 75' in stream
052218_WA_1003_P_MI	UNT to Monocacy Creek	58.5	40.755118	-75.422932	DPX	FX	CD		X		X	X			X		X	X	X	X	Steep slope north and south of the crossing (+15%) is impractical for trenchless methods (HDD, Direct Pipe, Microtunnel). Estimated crossing timeframe is 48 hours . Workspace reduced to 75' in stream

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Watercourse ID and Crossing Number[1]	Watercourse Name	Milepost[2]	Latitude	Longitude	Primary Pipeline Crossing Method[3]	Secondary Pipeline Crossing Method[3]	Tertiary Pipeline Crossing Method[3]	Geology Constraints	Topography Constraints	Insufficient Workspace to Stage Trenchless	Practicality	Other (See Justification)	Implementing Trenchless Technology	Routing to Minimize	Crossing at Narrowest Location	Co-Locating	Reducing LOD	Minimizing Construction Duration	Adhering to Construction Timing Windows	Implementing BMPs	Justification
090314_DB_1011_E_MI	UNT to Monocacy Creek	59	40.749646	-75.416448	DPX	FX	DX-NF				X	X			X		X	X	X	X	Estimated crossing timeframe is 24 hours.
090414_DB_1012_I_MI	UNT to Monocacy Creek	59.2	40.747407	-75.413558	DPX	FX	DX-NF		X		X	X			X		X	X	X	X	Steep topography on either side of crossing makes trenchless alternatives impractical. Estimated crossing timeframe is 24 hours.
090414_DB_1013_I_MI	UNT to Monocacy Creek	59.2	40.747235	-75.413335	DPX	FX	DX-NF		X		X	X			X		X	X	X	X	Steep topography on either side of crossing makes trenchless alternatives impractical. Estimated crossing timeframe is 24 hours.
051215_JC_1005_P_IN	Monocacy Creek	60.3	40.737018	-75.399488	BX	DPX	FX				X				X		X	X	X	X	Steep slope on the east side of the crossing (22%) present challenges to trenchless methods (HDD, Direct Pipe & Microtunnel). Limited workspace due to CTR-987 and steep slope on east side of crossing challenge auger boring methods. Workspace reduced to 75' in stream and floodway.
090314_DB_1005_E_MI	UNT to Monocacy Creek	60.6	40.736004	-75.393631	BX	BX	BX				X	X	X		X					X	Trenchlessly crossed as part of Rte. 512 bore. Adjacent workspace required to facilitate bored crossing.
090314_DB_1007_E_MI	UNT to Monocacy Creek	60.7	40.735815	-75.392502	DPX	FX	DX-NF				X	X			X		X	X	X	X	Estimated crossing timeframe is 24 hours. Workspace reduced to 75' in stream .
090314_DB_1006_I_MI	UNT to Monocacy Creek	60.7	40.735773	-75.392255	DPX	FX	DX-NF				X	X			X		X	X	X	X	Estimated crossing timeframe is 24 hours. Workspace reduced to 75' in stream .
111214_JC_1004_P_IM	East Branch Monocacy Creek	61.5R3	40.734494	-75.377316	DPX	FX	CD				X				X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Existing route not conducive to trenchless methods. Estimated crossing timeframe is 48 hours.
102715_WA_1002_P_MI	UNT to East Monocacy Creek	62.4R3	40.730341	-75.364596	DPX	FX	CD				X				X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 24 hours.
051415_JC_1001_I_MI	UNT to East Branch Monocacy Creek	62.8R3	40.726153	-75.356883	BX	BX	BX				X	X	X							X	Trenchlessly crossed as part of railroad bore. Adjacent workspace required to facilitate bored crossing. Workspace reduced to 75' in stream and floodway.
051415_JC_1002_P_IN	UNT to East Branch Monocacy Creek	63.5	40.724871	-75.342878	DPX	FX	CD				X				X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 48 hours.
010615_JC_1000_E_MI	UNT to Lehigh River	70.6R3	40.649869	-75.283240	DPX	FX	DX-NF		X		X	X			X		X	X		X	Timing to cross justifies open cut. Workspace reduced to 75' in stream . Steep togography on east and west of crossing would make trenchless methods impractical. Estimated crossing timeframe is 24 hours.
010615_JC_1001_E_MI	UNT to Lehigh River	70.7R3	40.649000	-75.283198	N/A	N/A	N/A				X	X			X		X			X	Crossing stream perpendicularly to minimize crossing window. Adjacent ATWS required for Lehigh River HDD crossing. Feature not crossed by pipeline.
061416_GM_1001_P_IN	Lehigh Coal and Navigation Canal	70.9	40.643062	-75.280289	HDD	HDD	HDD				X	X	X							X	Trenchlessly crossed as part of Lehigh River HDD.
031918_WA_1004_P_MA	Lehigh River	71	40.641519	-75.280107	HDD	HDD	HDD				X	X	X							X	Trenchlessly crossed as part of Lehigh River HDD.
012116_GM_1001_E_IN	UNT to Lehigh River	71.4	40.636128	-75.279471	HDD	HDD	HDD				X	X	X							X	Trenchlessly crossed as part of Lehigh River HDD.
010615_JC_1002_E_MI	UNT to Bull Run	71.7	40.631975	-75.277520	HDD	HDD	HDD				X	X	X							X	Trenchlessly crossed as part of I-78 HDD.
040318_WA_1000_P_MI	UNT to Bull Run	72.1	40.628502	-75.272379	DPX	FX	CD				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Estimated crossing timeframe is 24 hours.
092614_GO_1001_P_MI	UNT to Bull Run	72.1	40.628373	-75.272134	DPX	FX	CD				X	X			X		X		X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Estimated crossing timeframe is 24 hours.
040318_WA_1001_I_MI	UNT to Bull Run	72.4	40.625788	-75.267975	N/A	N/A	N/A				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Feature not crossed by pipeline.
031918_WA_1003_I_MI	UNT to Bull Run	72.4	40.625754	-75.267798	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Estimated crossing timeframe is 24 hours.
031918_WA_1000_P_MI	UNT to Bull Run	72.5	40.625349	-75.266954	DPX	FX	CD				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Estimated crossing timeframe is 24 hours.
051415_JC_1006_E_MI	UNT to Bull Run	72.5	40.625087	-75.266321	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Estimated crossing timeframe is 24 hours.
012016_GM_1001_I_MI	UNT to Bull Run	72.6	40.623907	-75.264118	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream . Estimated crossing timeframe is 48 hours.

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102715_WA_1001_P_MI - 1	UNT to Bull Run	72.6	40.623853	-75.264152	DPX	FX	CD				X				X		X	X	X	X	Alignment was shifted north to minimize impacts. Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 48 hours.
102715_WA_1001_P_MI - 2	UNT to Bull Run	72.7	40.622647	-75.262633	DPX	FX	CD				X				X		X	X	X	X	Alignment was shifted north to minimize impacts. Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 48 hours.
012016_GM_1003_I_MI	UNT to Bull Run	72.7	40.623831	-75.263938	N/A	N/A	N/A				X	X			X		X	X	X	X	Workspace reduced to 75' in stream and floodway. Feature not crossed by pipeline.
012016_GM_1002_I_MI	UNT to Bull Run	72.7	40.623713	-75.263907	N/A	N/A	N/A				X	X			X		X	X	X	X	Workspace reduced to 75' in stream and floodway. Feature not crossed by pipeline.
102715_WA_1001_I_MI	UNT to Bull Run	72.7	40.623170	-75.263291	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Estimated crossing timeframe is 24 hours.
102715_WA_1002_I_MI	UNT to Bull Run	72.7	40.623072	-75.263168	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Estimated crossing timeframe is 24 hours.
042815_JC_1005_I_MI	UNT to Bull Run	72.8	40.621954	-75.261760	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Estimated crossing timeframe is 24 hours.
042815_JC_1001_E_MI	UNT to Bull Run	73	40.620310	-75.259908	DPX	FX	DX-NF			X	X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream . Pis in immediate vicinity of crossing make staging trenchless crossing equipement impractical. Estimated crossing timeframe is 24 hours.
042117_GM_1003_P_MI	UNT to Frys Run	73.6R2	40.619979	-75.249033	DPX	FX	CD				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream. Estimated crossing timeframe is 24 hours.
042117_GM_1001_P_MI	UNT to Frya Run	73.6R2	40.619979	-75.248304	DPX	FX	CD				X						X	X	X	X	Workspace reduced to 75' in stream and floodway. Stream complex can be crossed in 48 hours.
042418_WA_1005_P_MI	UNT to Frya Run	73.6R2	40.619979	-75.248248	DPX	FX	CD				X				X		X	X	X	X	Workspace reduced to 75' in stream and floodway. Stream complex can be crossed in 48 hours.
042418_WA_1004_P_MI	UNT to Frya Run	73.7R2	40.619977	-75.246728	DPX	FX	CD				X				X		X	X	X	X	Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 24 hours.
042418_WA_1003_P_MI	UNT to Frya Run	73.7R2	40.620095	-75.246668	N/A	N/A	N/A				X	X			X		X	X	X	X	Workspace reduced to 75' in stream and floodway. Feature not crossed by pipeline.
042418_WA_1002_I_MI - 2	UNT to Frya Run	73.7R2	40.619977	-75.246412	DPX	FX	DX-NF				X				X		X	X	X	X	Workspace reduced to 75' in stream and floodway. Intermittent Estimated crossing timeframe is 24 hours.
042418_WA_1002_I_MI - 1	UNT to Frya Run	73.7R2	40.619897	-75.246774	N/A	N/A	N/A				X				X		X	X	X	X	Workspace reduced to 75' in stream and floodway. Intermittent Estimated crossing timeframe is 24 hours.
091814_MK_1009_P_IM	Frya Run	74.6	40.608674	-75.233521	DPX	FX	CD				X				X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 48 hours
062415_BT_1001_P_MI	UNT to Frya Run	74.9	40.606894	-75.229171	DPX	FX	CD				X				X		X	X	X	X	Temporary equipment bridge on existing road / Cross on existing culvert. Stream complex can be crossed in 48 hours.
062415_BT_1002_I_MI	UNT to Frya Run	74.9	40.606889	-75.229400	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 48 hours.
122016_LZ_1001_P_MI	UNT to Frya Run	75.1	40.605250	-75.226333	DPX	FX	CD				X				X		X	X	X	X	Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 24 hours.
111314_JC_1003_E_MI	UNT to Cooks Creek	75.7	40.601787	-75.219056	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 24 hours.
111314_JC_1002_I_MI	UNT to Cooks Creek	75.7	40.601783	-75.219050	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 24 hours.
111314_JC_1001_I_MI	UNT to Cooks Creek	75.7	40.601426	-75.218445	DPX	FX	DX-NF				X	X			X		X	X	X	X	Timing to cross justifies open cut. Workspace reduced to 75' in stream and floodway. Estimated crossing timeframe is 48 hours.
Hellertown Lateral					0	0	0														

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062218_WA_1002_P_IN	Bull Run	0.3	40.629789	-75.281329	DPX	FX	CD			X	X	X					X	X	X	X	Steep terrain on either side of stream crossing (~18%) present challenges to trenchless crossing methods. Workspace reduced to 75' through stream. Estimated crossing timeframe is 48 hours.