Scranton Beltway Feasibility Study Phase II

December 21, 2015

To: Joe Sutor, P.E., Capital Planning Manager

From: Melody A. Matter, P.E., PTOE

Date: December 21, 2015

Subject: PTC – Systemwide Planning
Scranton Beltway – Phase 2 Summary Memo

CC: Mark Compton, Brad Heigel, George Roberts, Sue Hazelton, Brian Shunk and Larry Bankert

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The Pennsylvania Turnpike Commission, under their Systemwide Transportation Planning contract, set forth the Scranton Beltway Feasibility Study to explore the achievability to optimize the use of the Turnpike's Northeastern Extension (I-476) and PennDOT's I-81. The intent is to optimize the utilization of both corridors and essentially create a beltway system around Scranton. The Study Area of the project is shown in **Figure 1**.

I-476 provides an alternative route to I-81 from Wyoming Valley (Interchange 115) to Clarks Summit (Interchange 131) but is under-utilized while I-81 frequently operates at or near capacity. I-476 is a tolled roadway, but is three miles shorter in distance and posted 10mph higher (65mph vs 55mph) compared to I-81. Adequate connections at the Wyoming Valley and Clarks Summit interchanges, particularly north to north and south to south, will be essential to increasing the utilization of I-476 and relieving congestion on I-81. Currently, connections exist between I-81 and I-476 in these locations but they are not direct.

Phase 1 of the Scranton Beltway Feasibility Study was completed in April 2014. Based on preliminary traffic analysis and cost estimates, it was determined that the Scranton Beltway Project was feasible (memo dated April 1, 2014). With the potential benefits of the project the PTC and PennDOT decided to advance the Scranton Beltway Project into the next phase of study; Phase 2. Phase 2 included refinements to the design of the ramp connections, refinements to the traffic model, preliminary environmental assessment and review of potential costs and benefits.

Potential Ramp Connections

Potential direct connections were designed to serve the north to north and south to south movements at the Wyoming Valley area (near Interchange 115 on I-476 and Exit 175 on I-81) and Clarks Summit area (near Interchange 131 on I-476 and Exit 194 on I-81); **Figures 2a&2b and 3a&3b**. For design purposes, it was assumed that the toll collection system would implement cashless tolling.

In coordinating with the Federal Highway Administration (FHWA) and based on volumes and operations, the north to north and the south to south connections at Wyoming Valley and the south to south connection at Clarks Summit were designed to be one lane. The north to north connection at Clarks Summit was designed to be two-lanes as it is a terminus of an interstate (I-476 ends at I-81). The design of the Wyoming Valley connection was designed to not impact the Airport Access Road structure that is planned to be constructed over I-476 near milepost 116. The south to south connection was designed with two merge options; a left merge to avoid the development on the west side of I-81 and a right merge to avoid having a left merge which could lead to safety and operational concerns. The Clarks Summit connection was designed to maintain local access to US 6 and would require the toll plaza in this area to be relocated to the south of the new connections.

Traffic Projections and Analysis

The statewide traffic model (received May 22, 2015), which can account for the effect of tolls on travel route selection, was utilized to determine the potential traffic attraction of the direct connections. To further refine the statewide traffic model, the model was supplemented and validated using additional field data including traffic volumes, origin/destination patterns and travel time data. Detailed information on the methodology and results are documented in Traffic Summary Memo and included as **Appendix A**.

Based on the 2045 traffic model, the direct connections between I-81 and I-476 at Wyoming Valley and Clarks Summit results in a decrease on I-81 of approximately 4,800 vehicles per day and an increase on I-476 of approximately 6,400 vehicles per day. Note that the volume differences on I-81 and I-476 are not a one-to-one relationship as there is latent demand to I-81 and volumes shift from other roadways such as Pittston Ave, Cedar Ave, S. Main St. and Keyser Ave. to use the freed up capacity.

The daily traffic forecasted to move through the length of the study area on I-81 is 26,900 vehicles. In looking at the segment of I-81 between Davis Street (Ext 182) and River Street (Exit 184), the diversion in traffic from I-81 to I-476 in 2045 due to the addition of the direct connections is approximately 6,220 vehicles per day, which is an approximate 25% of through traffic on I-81.

As traffic forecasts incorporated several assumptions including heavy truck traffic growth and toll rates, a sensitivity analysis was completed to gauge the sensitivity of the traffic forecasts to these assumptions. A low/high heavy truck growth rate and a low/high toll rate increase were modeled. Based on the sensitivity analysis and for study purposes, it assumed that the direct connections could create a volume change between I-81 corridor and I-476 of 5,500 to 12,200 vehicles per day in 2045.

Preliminary Environmental Assessment

A preliminary environmental assessment was completed using secondary sources and windshield reviews; **Appendix B** includes the Preliminary Environmental Inventory Report. In the area of the Wyoming Valley direct connections, FEMA designated floodplains, wild trout watershed, EV wetlands, hazardous and residual waste, underground utilities, presence of buildings within the proposed footprint, and an early to mid-twentieth century residential neighborhood are present. In the area of the Clarks Summit direct connections, wild trout watershed, EV wetlands, potentially large stream impacts, drinking water wells, underground utilities, residences within the proposed footprint, potential for archaeological resources, potential for buildings 50 years or older along Willowbrook Road and Pauline Drive, and a large tract of land designated as Protected Open Space were identified. The new direct connections may require a Type 1 noise analysis and air quality analysis at the locations of the direct connections.

These resources and further studies and analysis should be considered in preliminary design.

Costs and Benefits

The preliminary cost estimates for the direct connections at Wyoming Valley and Clarks Summit is approximately $160M. This estimate is in today's dollars and includes general assumptions such as right-of-way costs (**Table 1**).

The key benefits from the direct connections will be congestion relief to I-81 (especially during peak periods) and increased utilization of existing highway assets. In addition to the key benefits, there are other anticipated benefits including congestion relief during an incident, construction or an event. In a three year time frame, there were 23 incidents on I-81 that resulted in closures which impacted traffic for an average of 3.3 hours during each incident. The direct connections between I-81 and I-476 would allow I-476 to be better utilized as an incident detour/congestion relief route.

The direct connections could also spur future development and land use. Currently, at some point along the entire stretch of the I-81 corridor, 12 percent of the nation's economy travels on the roadway. Statewide, truck freight is expected to increase 72 percent by 2040 and locally, truck traffic is anticipated to account for 90 percent of trips by tonnage in the Scranton Beltway region by 2040. Also, freight movement from south central Pennsylvania to the Lackawanna/Luzerne region is expected to increase by 110 percent during the same time period. Improved utilization of I-476 could disperse truck traffic, mitigating impact to any single roadway.

Additional information on the benefits of the direct connections is documented in a memo titled Benefits of Direct Connections and included in **Appendix C**.

Conclusion

Based on the Phase 2 study, it was determined that the Scranton Beltway Project is feasible. With the potential benefits of the project, including better utilization of both corridors, the PTC and PennDOT should jointly proceed onto the next steps of the project. The next steps would include identifying funding, developing a work plan to determine an overall schedule and cash flow, and procuring services to begin a traffic and revenue study and preliminary engineering and environmental work to advance the project.

Figure 2a
Wyoming Valley - Left Merge

DECEMBER 4, 2013

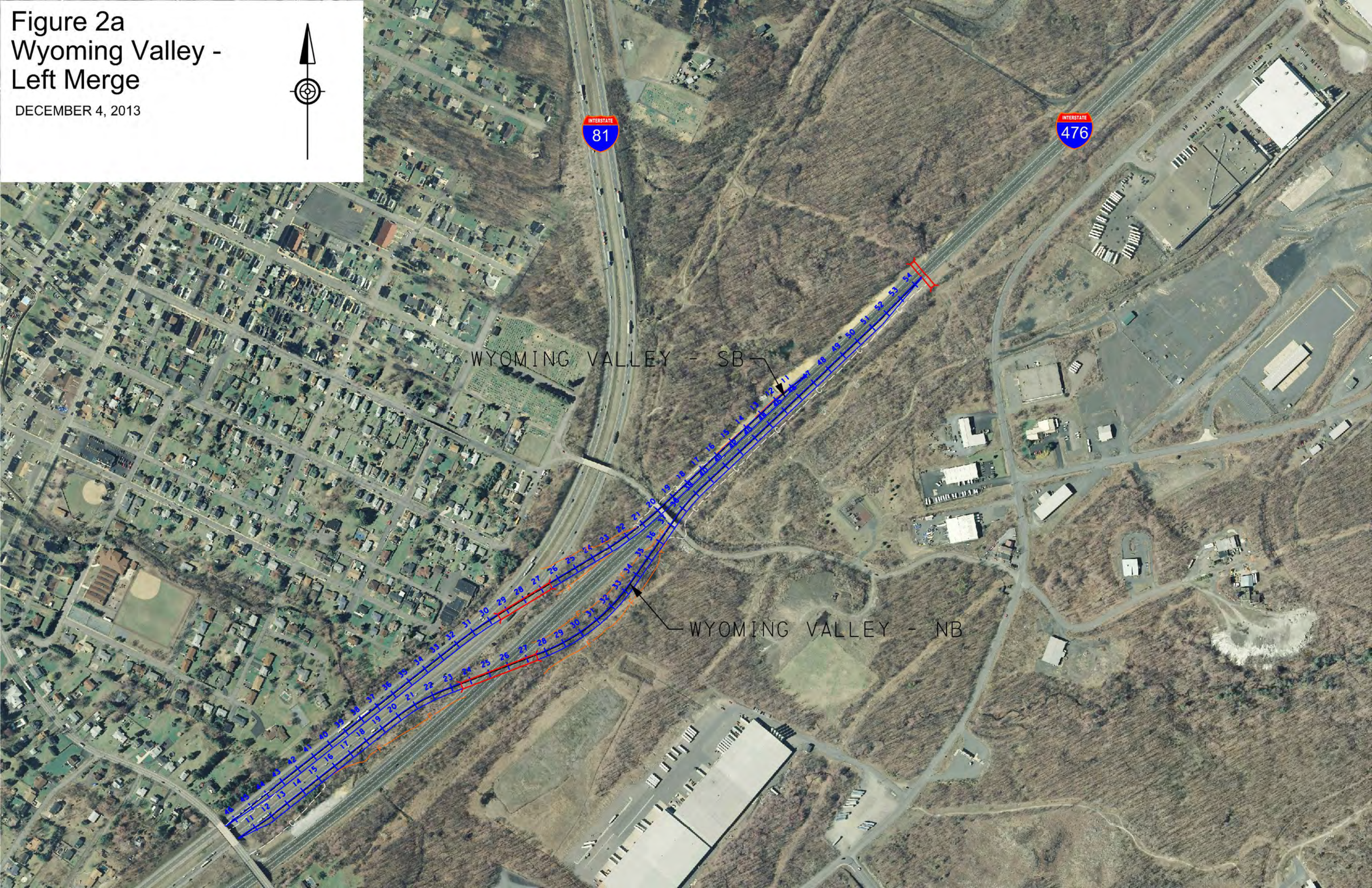

Figure 2b
Wyoming Valley - Right Merge

APRIL 2015

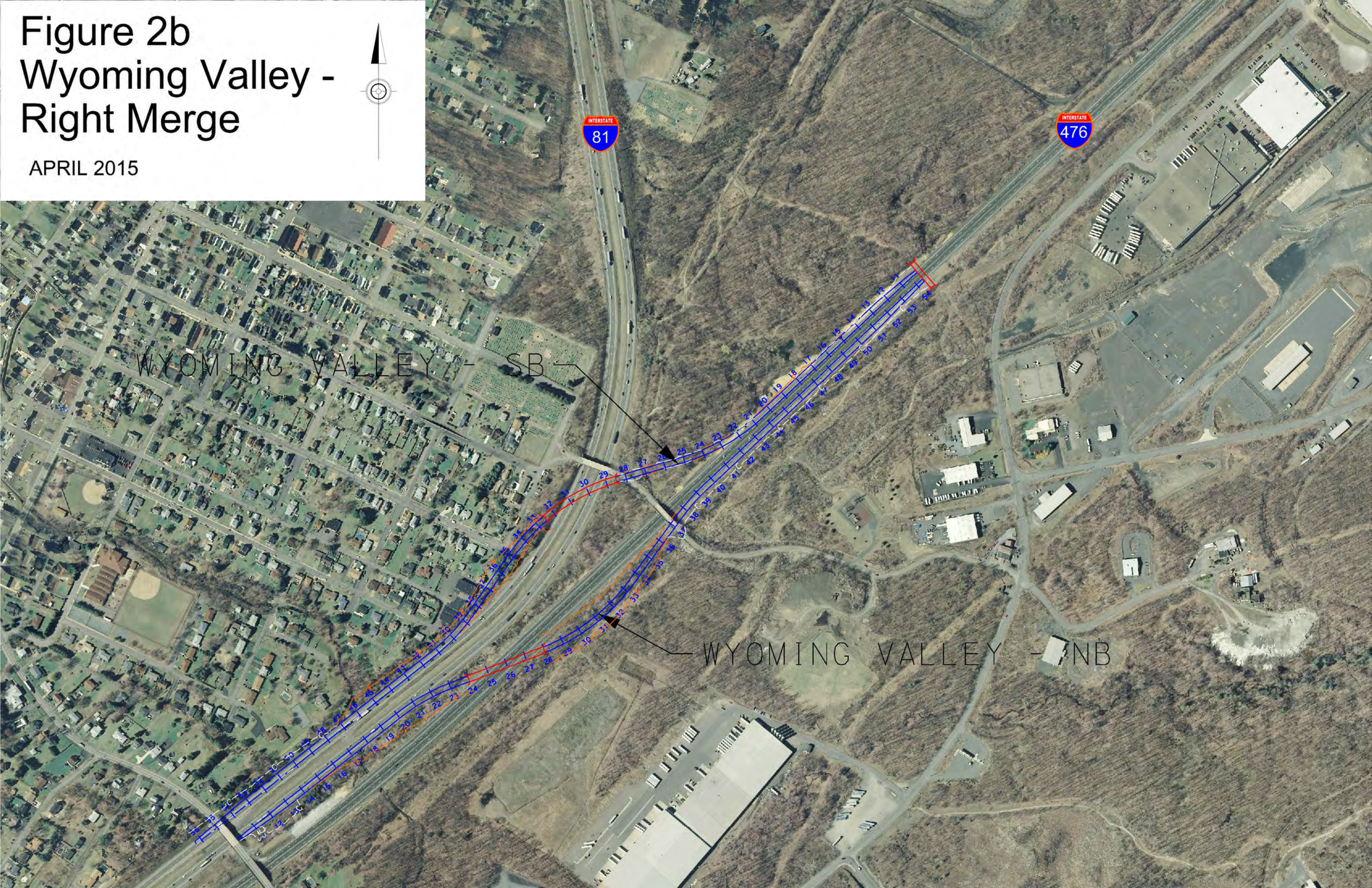

Figure 3a
Clarks Summit

APRIL 23, 2016

CLARKS SUMMIT - SB

CLARKS SUMMIT - NB

INTERSTATE 476

INTERSTATE 81

Figure 3b
Clarks Summit - Local Ramps

APRIL 23, 2015

Table 1 - Cost Estimate

Preliminary Cost Estimate for Connections for the Scranton Beltway Project

Alignment		
Wyoming Valley - NB Connection	$	39,600,000.00
Wyoming Valley - SB Connection (Right)	$	27,000,000.00
Clarks Summit - NB Connection	$	68,100,000.00
Clarks Summit - SB Connection	$	14,100,000.00
Clarks Summit - NB Local Ramp	$	2,600,000.00
Clarks Summit - SB Local Ramp	$	9,000,000.00
Total	**$**	**160,400,000.00**

Table 1 - Cost Estimate

WYOMING VALLEY - NORTHBOUND				
ITEM	**QTY.**	**UNIT PRICE**	**MEASURE**	**TOTAL**
CLEAR/GRUB	1	$ 50,000.00	LS	$ 50,000.00
CLASS 1 EXCAVATION	17,041	$ 18.00	CY	$ 306,734.67
FOREIGN BORROW EXCAVATION	112,439	$ 15.00	CY	$ 1,686,587.78
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE	13,810	$ 12.00	SY	$ 165,722.67
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE	13,810	$ 15.00	SY	$ 207,153.33
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE	13,810	$ 50.00	SY	$ 690,511.11
SUBBASE	13,810	$ 12.00	SY	$ 165,722.67
PAV'T BASE DRAIN	4,439	$ 12.00	LF	$ 53,268.00
STRUCTURE	12,801	$ 400.00	SF	$ 5,120,400.00
MSE WALL	74,218	$ 200.00	SF	$ 14,843,600.00
PIPE	6,659	$ 150.00	LF	$ 998,775.00
INLETS, MH'S, JB	33	$ 3,500.00	EA	$ 116,523.75
TEMP BARRIER	4,639	$ 25.00	LF	$ 115,975.00
TEMP ATT	3	$ 1,500.00	EA	$ 4,500.00
GUIDE RAIL	4,439	$ 18.00	LF	$ 79,902.00
END TREATMENTS	10	$ 2,000.00	EA	$ 20,000.00
SIGNING / PAV'T MARKING	1	$ 50,000.00	LS	$ 50,000.00
SIGN STRUCTURES	2	$ 150,000.00	EA	$ 300,000.00
LIGHTING	1	$ 350,000.00	LS	$ 350,000.00
FIELD OFFICE	1	$ 30,000.00	LS	$ 30,000.00
ROW (RURAL)	4	$ 15,000.00	AC	$ 60,000.00
		Subtotal		**$ 25,365,375.97**
E&S / PCSM - 8%				$ 2,029,230.08
MPT - 8%				$ 2,029,230.08
MOBILIZATION - 5%				$ 1,268,268.80
UTILITIES - 4%				$ 1,014,615.04
		Subtotal		**$ 31,706,719.97**
CONTINGENCY - 25%				$ 7,926,679.99
		Total		**$ 39,633,399.96**

WYOMING VALLEY - SOUTHBOUND				
ITEM	**QTY.**	**UNIT PRICE**	**MEASURE**	**TOTAL**
CLEAR/GRUB	1	$ 50,000.00	LS	$ 50,000.00
CLASS 1 EXCAVATION	5,440	$ 18.00	CY	$ 97,920.00
FOREIGN BORROW EXCAVATION	16,963	$ 15.00	CY	$ 254,445.00
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE	14,389	$ 12.00	SY	$ 172,666.67
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE	14,389	$ 15.00	SY	$ 215,833.33
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE	14,389	$ 50.00	SY	$ 719,444.44
SUBBASE	14,389	$ 12.00	SY	$ 172,666.67
PAV'T BASE DRAIN	4,625	$ 12.00	LF	$ 55,500.00
STRUCTURE	12,950	$ 600.00	SF	$ 7,770,000.00
MSE WALL	1,080	$ 200.00	SF	$ 216,000.00
PIPE	6,938	$ 150.00	LF	$ 1,040,625.00
INLETS, MH'S, JB	15	$ 3,500.00	EA	$ 52,500.00
TEMP BARRIER	4,825	$ 25.00	LF	$ 120,625.00
TEMP ATT	3	$ 1,500.00	EA	$ 4,500.00
GUIDE RAIL	4,625	$ 18.00	LF	$ 83,250.00
SIGNING / PAV'T MARKING	1	$ 50,000.00	LS	$ 50,000.00
SIGN STRUCTURES	2	$ 150,000.00	EA	$ 300,000.00
LIGHTING	1	$ 350,000.00	LS	$ 350,000.00
END TREATMENTS	10	$ 2,000.00	EA	$ 20,000.00
FIELD OFFICE	1	$ 30,000.00	LS	$ 30,000.00
ROW (RURAL)	3	$ 15,000.00	AC	$ 45,000.00
ROW (RESI)	1	$ 150,000.00	AC	$ 150,000.00
ROW (COMM)	1	$ 1,000,000.00	AC	$ 1,000,000.00
SOUND BARRIERS	50,400	$ 85.00	SF	$ 4,284,000.00
		Subtotal		**$ 17,254,976.11**
E&S / PCSM - 8%				$ 1,380,398.09
MPT - 8%				$ 1,380,398.09
MOBILIZATION - 5%				$ 862,748.81
UTILITIES - 4%				$ 690,199.04
		Subtotal		**$ 21,568,720.14**
CONTINGENCY - 25%				$ 5,392,180.03
		Total		**$ 26,960,900.17**

Table 1 - Cost Estimate

CLARKS SUMMIT - NORTHBOUND				
ITEM	**QTY.**	**UNIT PRICE**	**MEASURE**	**TOTAL**
CLEAR/GRUB	1	$ 100,000.00	LS	$ 100,000.00
CLASS 1 EXCAVATION	29,608	$ 18.00	CY	$ 532,936.00
FOREIGN BORROW EXCAVATION	238,708	$ 15.00	CY	$ 3,580,626.67
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE	35,933	$ 12.00	SY	$ 431,200.00
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE	35,933	$ 15.00	SY	$ 539,000.00
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE	35,933	$ 50.00	SY	$ 1,796,666.67
SUBBASE	35,933	$ 12.00	SY	$ 431,200.00
PAV'T BASE DRAIN	7,700	$ 12.00	LF	$ 92,400.00
STRUCTURE	32,400	$ 400.00	SF	$ 12,960,000.00
STRUCTURE (WIDENING)	3,135	$ 400.00	SF	$ 1,254,000.00
MSE WALL	35,938	$ 200.00	SF	$ 7,187,600.00
PIPE	11,550	$ 150.00	LF	$ 1,732,500.00
INLETS, MH'S, JB	58	$ 3,500.00	EA	$ 202,125.00
TEMP BARRIER	7,900	$ 25.00	LF	$ 197,500.00
TEMP ATT	6	$ 1,500.00	EA	$ 9,000.00
GUIDE RAIL	7,700	$ 18.00	LF	$ 138,600.00
END TREATMENTS	12	$ 2,000.00	EA	$ 24,000.00
SIGNING/PAV'T MARKING	1	$ 50,000.00	LS	$ 50,000.00
SIGN STRUCTURES	5	$ 150,000.00	EA	$ 750,000.00
LIGHTING	1	$ 350,000.00	LS	$ 350,000.00
FIELD OFFICE	1	$ 30,000.00	LS	$ 30,000.00
ROW (RURAL)	9	$ 15,000.00	AC	$ 135,000.00
ROW (RESI)	10	$ 150,000.00	AC	$ 1,500,000.00
SOUND BARRIERS	96,858	$ 85.00	SF	$ 8,232,930.00
		Subtotal		**$ 42,257,284.33**
E&S / PCSM - 8%				$ 3,380,582.75
MPT - 8%				$ 2,112,864.22
MOBILIZATION - 5%				$ 3,380,582.75
UTILITIES - 4%				$ 3,380,582.75
		Subtotal		**$ 54,511,896.79**
CONTINGENCY - 25%				$ 13,627,974.20
		TOTAL		**$ 68,139,870.99**

CLARKS SUMMIT - SOUTHBOUND				
ITEM	**QTY.**	**UNIT PRICE**	**MEASURE**	**TOTAL**
CLEAR/GRUB	1	$ 100,000.00	LS	$ 100,000.00
CLASS 1 EXCAVATION	28,076	$ 18.00	CY	$ 505,370.67
FOREIGN BORROW EXCAVATION	78,640	$ 15.00	CY	$ 1,179,597.78
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE	14,622	$ 12.00	SY	$ 175,466.67
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE	14,622	$ 15.00	SY	$ 219,333.33
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE	14,622	$ 50.00	SY	$ 731,111.11
SUBBASE	14,622	$ 12.00	SY	$ 175,466.67
PAV'T BASE DRAIN	4,700	$ 12.00	LF	$ 56,400.00
STRUCTURE (WIDENING)	3,135	$ 400.00	SF	$ 1,254,000.00
PIPE	7,050	$ 150.00	LF	$ 1,057,500.00
INLETS, MH'S, JB	35	$ 3,500.00	EA	$ 123,375.00
TEMP BARRIER	4,900	$ 25.00	LF	$ 122,500.00
TEMP ATT	4	$ 1,500.00	EA	$ 6,000.00
GUIDE RAIL	4,700	$ 18.00	LF	$ 84,600.00
END TREATMENTS	12	$ 2,000.00	EA	$ 24,000.00
SIGNING/PAV'T MARKING	1	$ 50,000.00	LS	$ 50,000.00
SIGN STRUCTURES	2	$ 150,000.00	EA	$ 300,000.00
LIGHTING	1	$ 350,000.00	LS	$ 350,000.00
FIELD OFFICE	1	$ 30,000.00	LS	$ 30,000.00
ROW (RURAL)	5	$ 15,000.00	AC	$ 75,000.00
ROW (RESI)	5	$ 150,000.00	AC	$ 750,000.00
SOUND BARRIERS	19,800	$ 85.00	SF	$ 1,683,000.00
		Subtotal		**$ 9,052,721.22**
E&S / PCSM - 8%				$ 724,217.70
MPT - 8%				$ 724,217.70
MOBILIZATION - 5%				$ 452,636.06
UTILITIES - 4%				$ 362,108.85
		Subtotal		**$ 11,315,901.53**
CONTINGENCY - 25%				$ 2,828,975.38
		Total		**$ 14,144,876.91**

Table 1 - Cost Estimate

CLARKS SUMMIT - NB OFF-RAMP				
ITEM	**QTY.**	**UNIT PRICE**	**MEASURE**	**TOTAL**
CLEAR/GRUB	1	$ 100,000.00	LS	$ 100,000.00
CLASS 1 EXCAVATION	4,743	$ 18.00	CY	$ 85,368.67
FOREIGN BORROW EXCAVATION	6,306	$ 15.00	CY	$ 94,594.44
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE	4,356	$ 12.00	SY	$ 52,266.67
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE	4,356	$ 15.00	SY	$ 65,333.33
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE	4,356	$ 50.00	SY	$ 217,777.78
SUBBASE	4,356	$ 12.00	SY	$ 52,266.67
PAV'T BASE DRAIN	1,400	$ 12.00	LF	$ 16,800.00
STRUCTURE		$ -	SF	$ -
PIPE	2,100	$ 150.00	LF	$ 315,000.00
INLETS, MH'S, JB	11	$ 3,500.00	EA	$ 36,750.00
TEMP BARRIER	1,600	$ 25.00	LF	$ 40,000.00
TEMP ATT	2	$ 1,500.00	EA	$ 3,000.00
GUIDE RAIL	1,400	$ 18.00	LF	$ 25,200.00
END TREATMENTS	3	$ 2,000.00	EA	$ 6,000.00
SIGNING/PAV'T MARKING	1	$ 25,000.00	LS	$ 25,000.00
SIGN STRUCTURE	2	$ 100,000.00	EA	$ 200,000.00
LIGHTING	1	$ 200,000.00	LS	$ 200,000.00
FIELD OFFICE	1	$ 30,000.00	LS	$ 30,000.00
ROW (RESI)	1	$ 150,000.00	AC	$ 150,000.00
		Subtotal		**$ 1,715,357.56**
E&S / PCSM - 8%				$ 137,228.60
MPT - 5%				$ 85,767.88
MOBILIZATION - 5%				$ 85,767.88
UTILITIES - 4%				$ 68,614.30
		Subtotal		**$ 2,092,736.22**
CONTINGENCY - 25%				$ 523,184.05
		Total		**$ 2,615,920.27**

CLARKS SUMMIT - SB ON-RAMP				
ITEM	**QTY.**	**UNIT PRICE**	**MEASURE**	**TOTAL**
CLEAR/GRUB	1	$ 100,000.00	LS	$ 100,000.00
CLASS 1 EXCAVATION	88,897	$ 18.00	CY	$ 1,600,142.00
FOREIGN BORROW EXCAVATION	0	$ 15.00	CY	$ -
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA WEARING COURSE	7,467	$ 12.00	SY	$ 89,600.00
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BINDER COURSE	7,467	$ 15.00	SY	$ 112,000.00
SUPERPAVE ASPHALT MIXTURE DESIGN, HMA BASE COURSE	7,467	$ 50.00	SY	$ 373,333.33
SUBBASE	7,467	$ 12.00	SY	$ 89,600.00
PAV'T BASE DRAIN	2,400	$ 12.00	LF	$ 28,800.00
STRUCTURE	4,952	$ 400.00	SF	$ 1,980,800.00
PIPE	3,600	$ 150.00	LF	$ 540,000.00
INLETS, MH'S, JB	18	$ 3,500.00	EA	$ 63,000.00
TEMP BARRIER	2,600	$ 25.00	LF	$ 65,000.00
TEMP ATT	2	$ 1,500.00	EA	$ 3,000.00
GUIDE RAIL	2,400	$ 18.00	LF	$ 43,200.00
END TREATMENTS	4	$ 2,000.00	EA	$ 8,000.00
SIGNING/PAV'T MARKING	1	$ 30,000.00	LS	$ 30,000.00
SIGN STRUCTURES	2	$ 100,000.00	EA	$ 200,000.00
LIGHTING	1	$ 200,000.00	LS	$ 200,000.00
FIELD OFFICE	1	$ 30,000.00	LS	$ 30,000.00
ROW (RURAL)	2	$ 15,000.00	AC	$ 30,000.00
ROW (RESI)	1	$ 150,000.00	AC	$ 150,000.00
		Subtotal		**$ 5,736,475.33**
E&S / PCSM - 8%				$ 458,918.03
MPT - 8%				$ 458,918.03
MOBILIZATION - 5%				$ 286,823.77
UTILITIES - 4%				$ 229,459.01
		Subtotal		**$ 7,170,594.17**
CONTINGENCY - 25%				$ 1,792,648.54
		Total		**$ 8,963,242.71**

Appendix A

Michael Baker INTERNATIONAL

We Make a Difference

MEMORANDUM

To: Joe Sutor, Pennsylvania Turnpike Commission
Cc: Melody Matter, McCormick Taylor

From: William W. Thomas, III

Date: December 21, 2015

Subject: Scranton Beltway Feasibility Study, Phase II – Traffic Forecasts

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As part of Work Order #2 under the Statewide Planning contract, a feasibility study was set forth to examine the use of the tolled Northeastern Extension (I-476) as an alternative route to I-81 in the Scranton area. Supported by "high speed" connection ramps, the Northeastern Extension would provide an alternative route to I-81 from Wyoming Valley (Interchange 115) to Clarks Summit (Interchange 131). Based on a previously completed preliminary traffic analysis and cost estimate, it was determined that with adequate connections between I-476 and I-81 at Wyoming Valley and Clarks Summit the Scranton Beltway Project is feasible. The high speed connections at the Wyoming Valley and Clarks Summit interchanges would serve the north to north and south to south movements (not designed as full interchanges). Forecasts from the preliminary traffic analysis, based on the Pennsylvania Statewide Model (PASM)[1], indicated inclusion of the ramps shifted enough traffic to provide additional toll revenue on I-476 and provide traffic congestion relief to I-81. The PASM is able to account for the effect of tolls on traveler route selection behavior.

This next phase of study provides for the development and application of a more refined traffic model in the study area with the intention of providing better estimates of traffic diversion to I-476 as a result building the high speed connections. This memorandum documents the features of the refined traffic model, validation results, and resulting traffic forecasts.

Note that there are several references to PASM documentation in this memorandum. Documentation received heretofore:

- Technical Memorandum, TRAVEL DEMAND MODEL NETWORK AND TRAFFIC ANALYSIS ZONE SYSTEM, February 2014
- Technical Memorandum, STATEWIDE TRAVEL DEMAND MODEL CALIBRATION AND VALIDATION REPORT, November 2014

[1] Version 1.0, January 2006

C/O PA Turnpike Commission, 700 South Eisenhower Blvd.
Middletown, PA 17057
Office: 717.939.9551 | Fax: 717.986.9762

Approach

Model development proceeded using the relatively new versions of the PASM[2], created as part of PennDOT's "PA On Track" plan, as a point of departure. Use of the updated PASM was complemented by a data collection plan featuring the compilation of origin-destination (O/D) travel data, travel times on key routes in the study area, as well as the collection of traffic volume data for I-476 and I-81. Figure 1 below depicts the study area.

Figure 1
Study Area

[2] Received from PennDOT on February 4, 2015 and from CDM Smith on May 22, 2015

The updated PASM provides more refined description of roadways and land use compared with the previous version of the PASM, and includes refined traffic analysis zone (TAZ) definitions and a complementary roadway network as well as socio-economic data compiled at the TAZ-level for a base year of 2012 and a horizon forecast year of 2040. The new input data provides for a much more refined TAZ structure that increases the number of internal TAZs statewide from approximately 1,000 to approximately 4,000. The roadway network description is correspondingly more detailed as well.

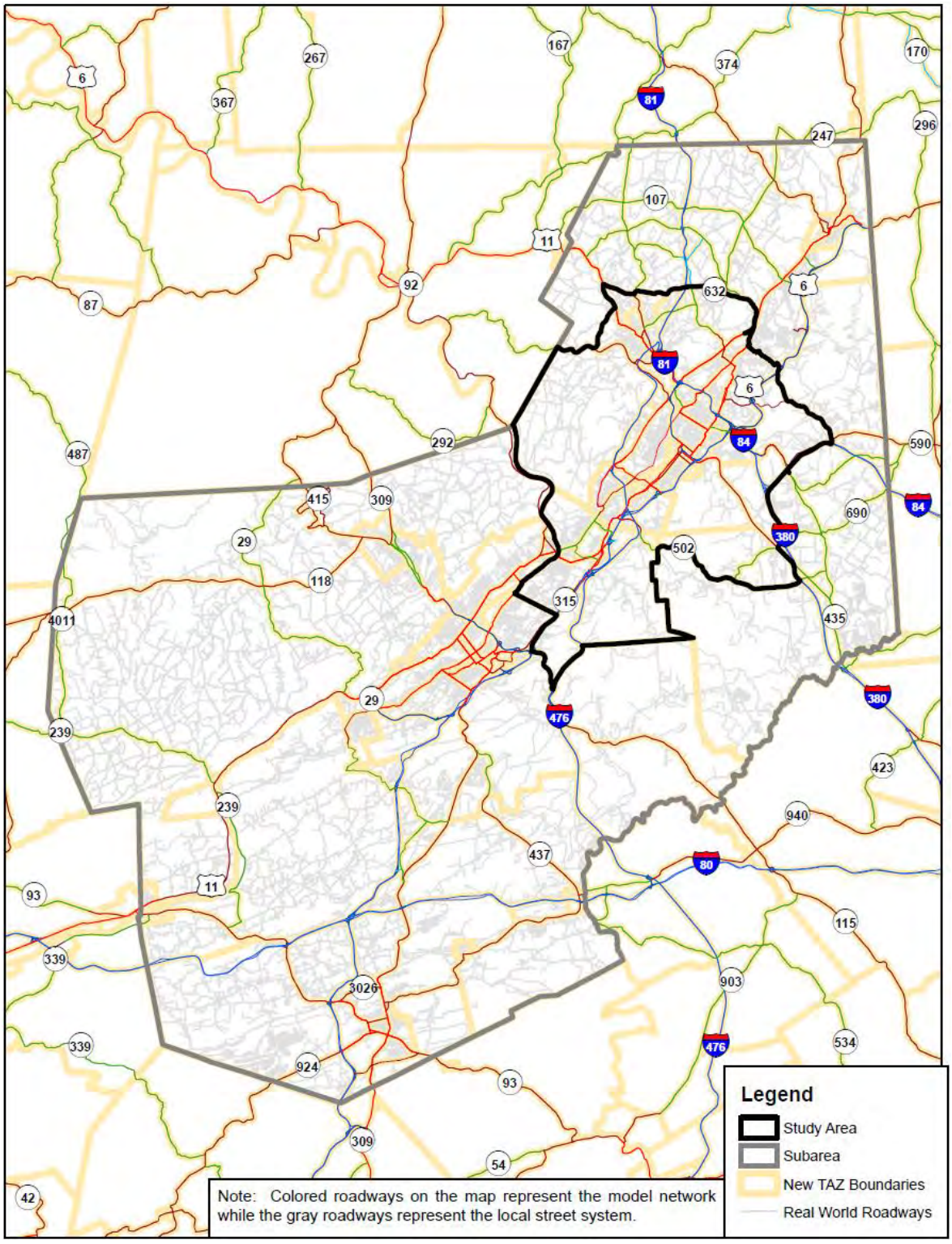
The Scranton traffic model, developed for this study, is a subarea-focused traffic model, based on the PASM, consisting of several components:

- A trip table that describes the magnitude and patterns of travel, or travel flows (trips) from TAZ to TAZ; on an average annual daily basis within, to and from, and through the subarea. This table incorporates land use, trip generation and trip distribution assumptions.
- A network that describes the location, connections, and attributes of the roadways in the subarea. Roadway attributes include travel speed, capacity, allowed direction of travel, and the number of travel lanes; and are measured on an annual average daily basis.
- A trip assignment algorithm/method that "assigns" the travel flows from the trip table to a set of roadway segments defining the route(s) travelers use to move from one TAZ to another. This step takes into account the costs[3] of travel between competing travel routes and yields annual average daily traffic volumes (AADT) on each roadway segment as defined in the network.

The trip table and roadway network used in the Scranton traffic model were derived from the PASM using a process called "subarea extraction". The subarea for the model is approximately defined by the geographic extents of the Lackawanna-Luzerne Transportation Study. The exact location of the subarea boundary was determined by the availability of traffic count data for year 2012. The need for traffic counts on the subarea boundary will be discussed later in this document in conjunction with trip table adjustment. Figure 2 below illustrates the extents of the subarea relative to the immediate study area, as well as the model network and TAZ boundaries. Subsequent discussions in this document detail review and adjustment of the extracted subarea trip table and network in context of study objectives.

[3] Incorporates free-flow travel time, time delay due to traffic congestion, traveler's value-of-time, and tolls

Figure 2
Subarea Model Extents and Network



Data Collection

Travel model development included the collection of travel data to better understand existing traffic conditions and traveler behavior. As indicated earlier in this memorandum, data collection included any available interim products resulting from the current on-going PASM update, including traffic analysis zone (TAZ) definitions, socioeconomic data, and the roadway network. Compilation of O/D data associated with the study area, and travel times for I-81, I-476, and selected routes[4] through the study corridor was completed using location information from mobile devices. Traffic volume data was also collected at several locations on I-81 and I-476 throughout the study corridor.

Traffic Volumes

Traffic volume data, including vehicle classifications, were collected at the following locations on I-81 via two 7-Day and nine 3-Day automatic traffic recorders counts at 15 minute intervals:

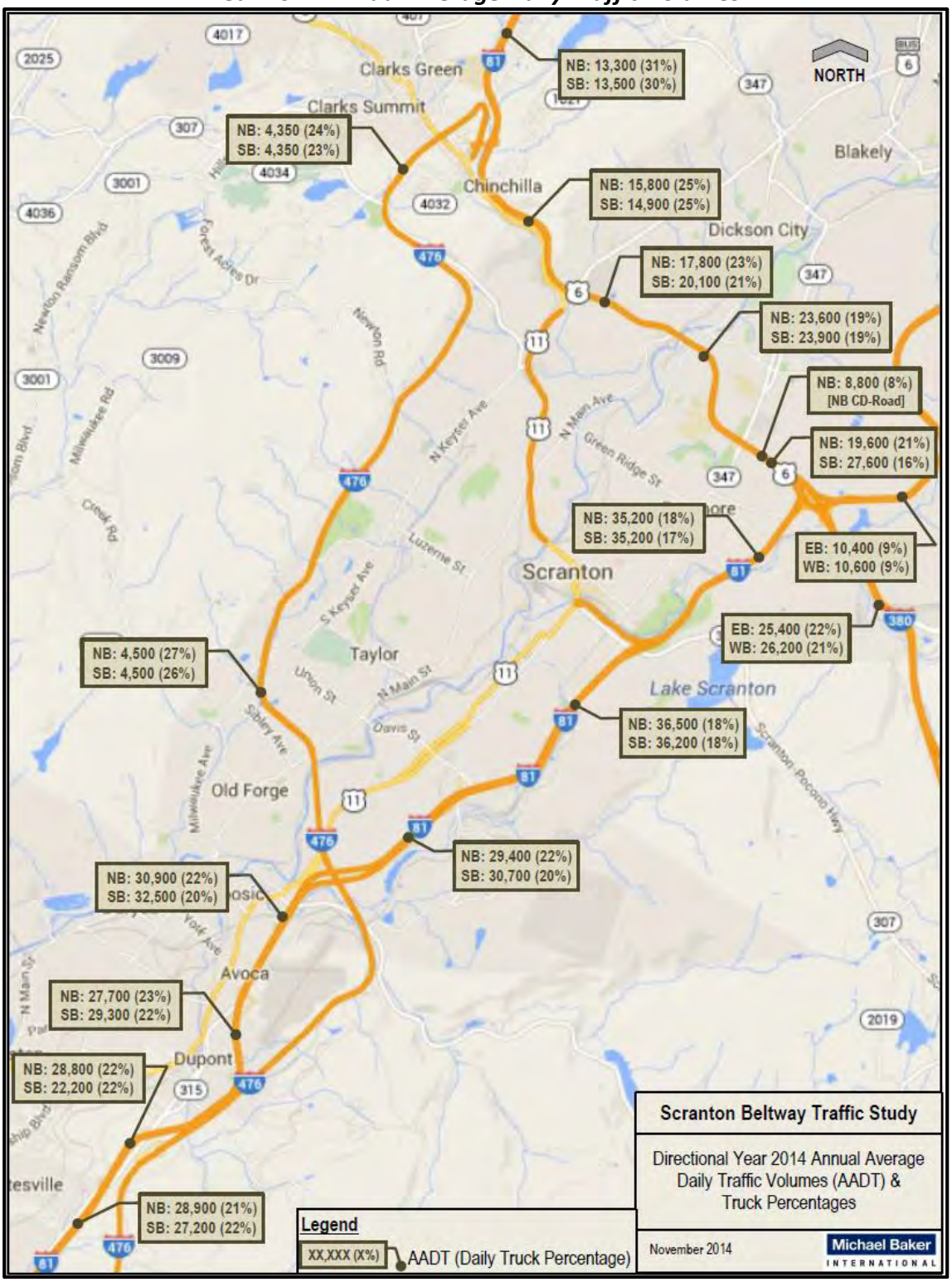
- PA 115 & PA 315*
- PA 315 (S. of Oak St. overpass) & PA 315 (N. of I-476 interchange w/ PA 315)
- PA 315 & Terminal Road
- Terminal Road and US 11
- US 11 & Scranton Expressway
- Scranton Expressway & I-84/US 6
- I-84/US 6 & O'Neil Highway
- Oneil Highway & Main Street
- Main Street & Scranton Carbondale Highway
- Scranton Carbondale Highway & I-476
- I-476 & Carbondale Road*

  * 7-day counts

Data was collected from September 15th to October 18th in 2014. Traffic volume and classification data for the portion of I-476 in the study area[5] was compiled for the same approximate time period. Analysis of the count data associated with I-81 and I-476 revealed two average weekday peak travel periods: 6-9 AM and 2-6 PM. Count data was factored to yield AADT. The map in Figure 3 shows the count locations, the traffic volume (AADT), and the percentage of trucks observed.

[4] Includes US 11, Main Avenue, Keyser Avenue, North Scranton Expressway, Northern Boulevard, and PA 347
[5] Provided by the Pennsylvania Turnpike Commission

Figure 3
Year 2014 Annual Average Daily Traffic Volumes



Origin/Destination Data

Data mining yielded aggregate O/D travel volumes based on information associated with cell phones, tablets, and other mobile devices. Data processing targeted location information with a time/date stamp of September 2013 and April 2014 – excluding periods of atypical travel behavior associated with holidays[6].

O/D volume summaries used aggregations of PASM TAZs or "districts" to identify locations within and outside of Pennsylvania; covering parts of New York, Ohio, West Virginia, Maryland, Delaware, and New Jersey. There are 149 districts. District definitions vary in size and are the same size as the PASM TAZs in the study area and get progressively larger farther away from the study area. Figure 4 shows the statewide geographic definitions for the districts used in the volume summaries. Data summaries produced a set of volumes by destination for each origin and a set of volumes by origin for each destination for an average full weekday[7] and the peak travel periods identified through the traffic count analysis described above (6-9 AM and 2-6 PM). Volumes were based on the number of mobile devices observed for any given origin-destination pair and was weighted based on Census population data – yielding the number of persons traveling from one data district to another. Volumes were also tabulated by imputed trip purpose: home-based work, home-based other, and non-home-based. This determination was made based on the locations and times that the mobile devices remained at one location.

Observations from September 2013 and April 2014 indicate almost identical travel patterns within the study subarea. Figure 5 below shows the high degree of correlation between the two datasets over all trip purposes for data district interchanges contained within the subarea. Subsequent analysis of the O/D data and evaluation of the travel demand model used the September 2013 dataset. The September 2013 dataset contains a total of 89,271,020 average full weekday trips for locations within and outside of Pennsylvania with 1,492,657 of these trips taking place to/from and within the study subarea. Within the study subarea 18% percent of these trips were imputed as home-based work travel, 61% home-based other, and 21% non-home-based.

[6] Easter holiday travel period, April 16-20, 2014 and Labor Day travel period August 29-September 1, 2014.
[7] Average of Monday through Sunday

Figure 4
Statewide Data Districts

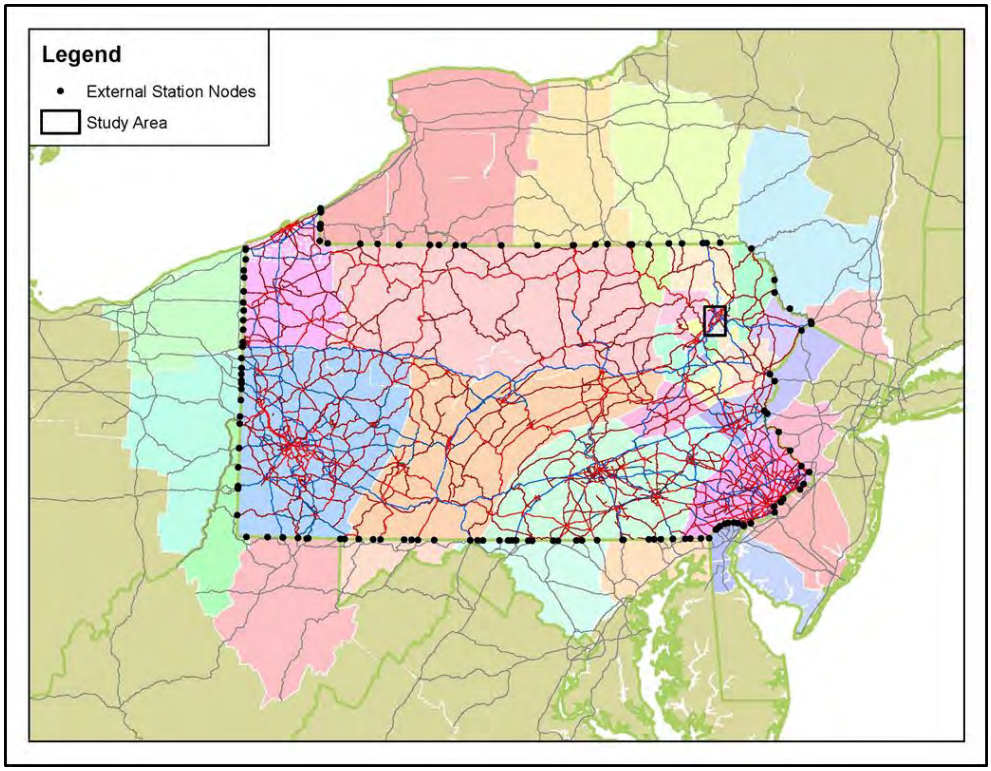


Figure 5
Correlation of September 2013 and April 2014 Datasets in the Study Subarea

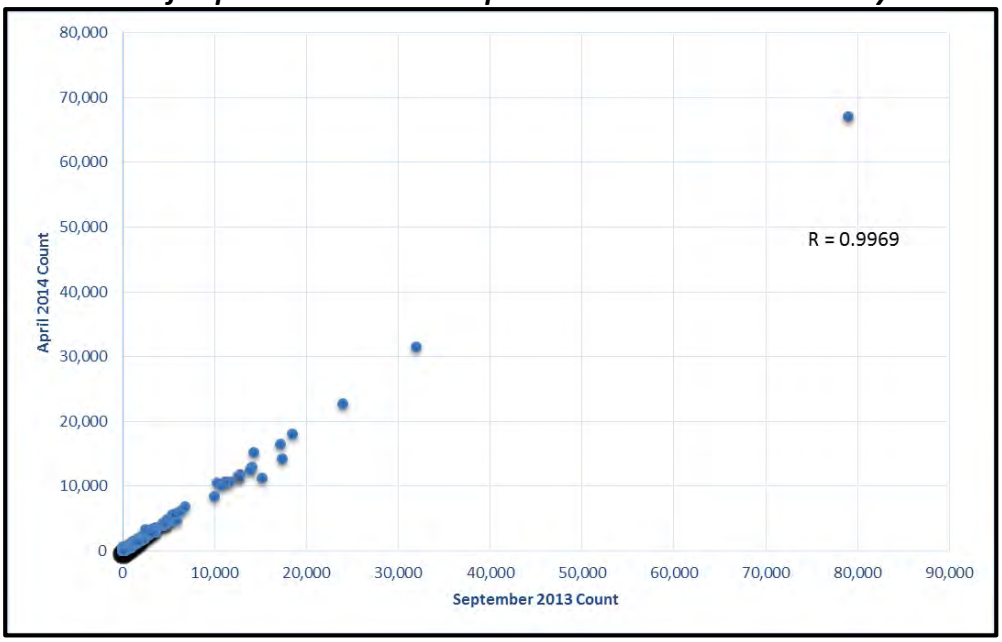
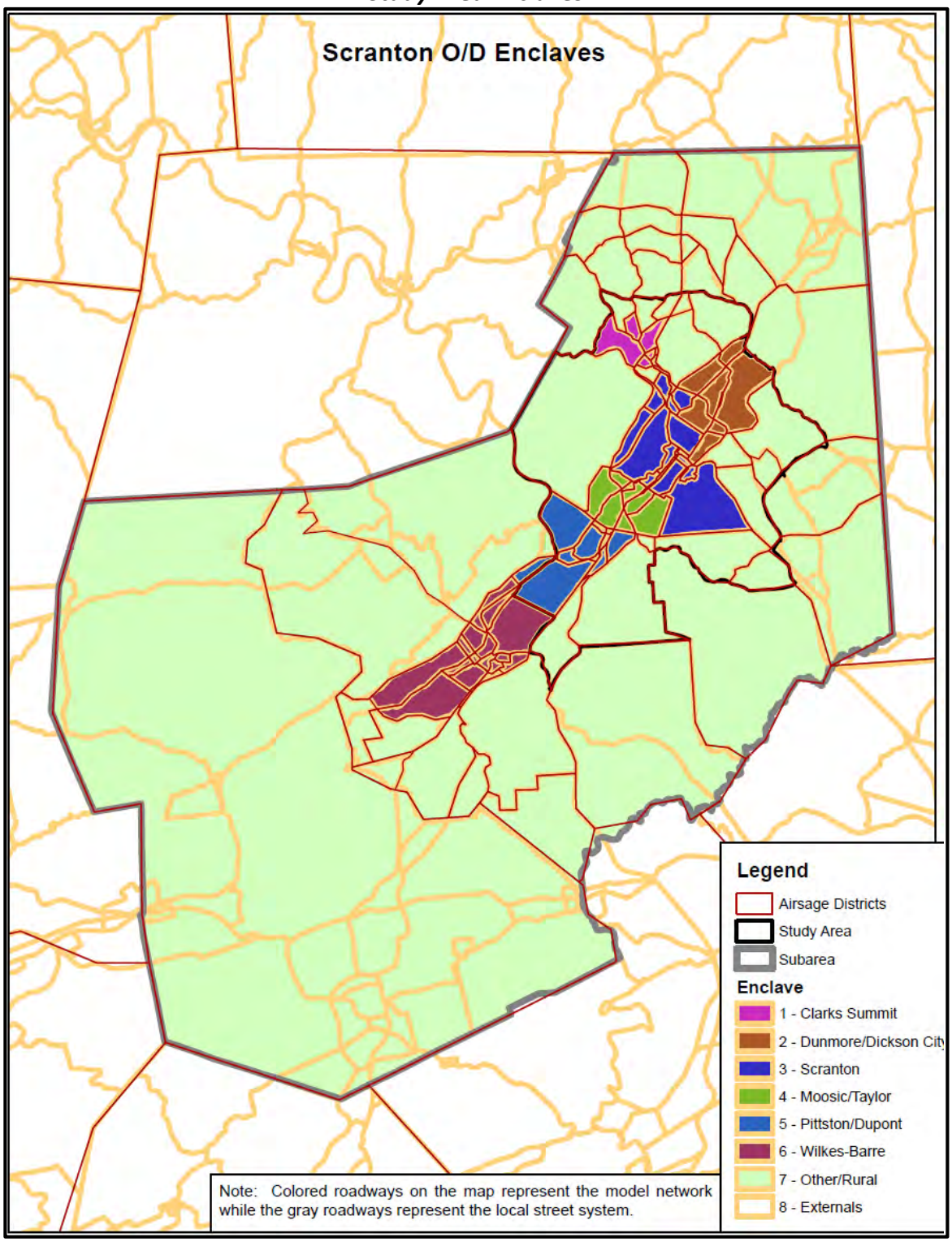


Table 1 below provides a summary of observed average full weekday person-trips to/from and within the study subarea. Origins and destinations in Table 1 represent localities or "enclaves" defined within the study subarea. Figure 6 depicts the enclave definitions. Note that external trips comprise almost 12% of all travel originating from the subarea.

Table 1
Observed Average Full Weekday Person Trips

		Destination								
		Clarks Summit	**Dunmore/ Dickson City**	**Scranton**	**Moosic/ Taylor**	**Pittston/ Dupont**	**Wilkes-Barre**	**Other/ Rural**	**External**	**Total**
Origin	**Clarks Summit**	12,154	2,086	4,389	486	254	402	9,882	3,648	**33,301**
	Dunmore/ Dickson City	2,071	64,105	21,377	3,018	1,520	2,129	23,023	12,666	**129,910**
	Scranton	4,413	21,566	99,384	9,730	4,246	4,702	27,972	19,090	**191,104**
	Moosic/ Taylor	512	3,062	9,565	19,697	3,916	2,703	6,817	4,677	**50,949**
	Pittston/ Dupont	238	1,601	4,313	3,904	32,405	11,022	14,505	7,660	**75,647**
	Wilkes-Barre	372	2,121	4,644	2,579	11,107	137,575	61,805	34,488	**254,692**
	Other/ Rural	9,743	22,687	27,862	6,795	14,274	61,056	349,397	91,333	**583,146**
	External	3,570	12,835	19,315	4,792	7,702	34,776	90,918	-	**173,908**
	Total	**33,073**	**130,062**	**190,850**	**51,002**	**75,424**	**254,365**	**584,319**	**173,562**	**1,492,657**

Figure 6
Study Area Enclaves



Travel Times/Speeds

Travel speeds were derived using floating car data gathered from mobile devices such as cellular phones and GPS devices. Device users voluntarily agree to share their anonymous travel statistics. The resulting travel log data comes from a proprietary database developed and maintained by TomTom and is collected for each roadway segment.

Compilation of mobile device data yielded travel speeds for roadway segments associated with the I-81 and I-476 corridors, from Wyoming Valley to Clarks Summit. Figure 7 shows the location of the nine (9) roadway segments for which speeds were derived. Analysis of the time and location data resulted in reporting average travel speeds for each "link" comprising the segments. Data was compiled with a time/date stamp from July 2013 through February 2014 – excluding periods of atypical travel behavior associated with holidays.[8] Speed data reflects three (3) time periods: weekday AM peak period (6-9 AM), weekday PM peak period (2-6 PM), and weekday[9] for 24 hours. Table 2 provides a description of the survey segments and associated links along with their average travel speeds.

[8] July 4, 2013; November 23 - December 1, 2013; and December 21 - January 1, 2014
[9] Tuesday, Wednesday, and Thursday

Figure 7
Travel Time Survey Segments

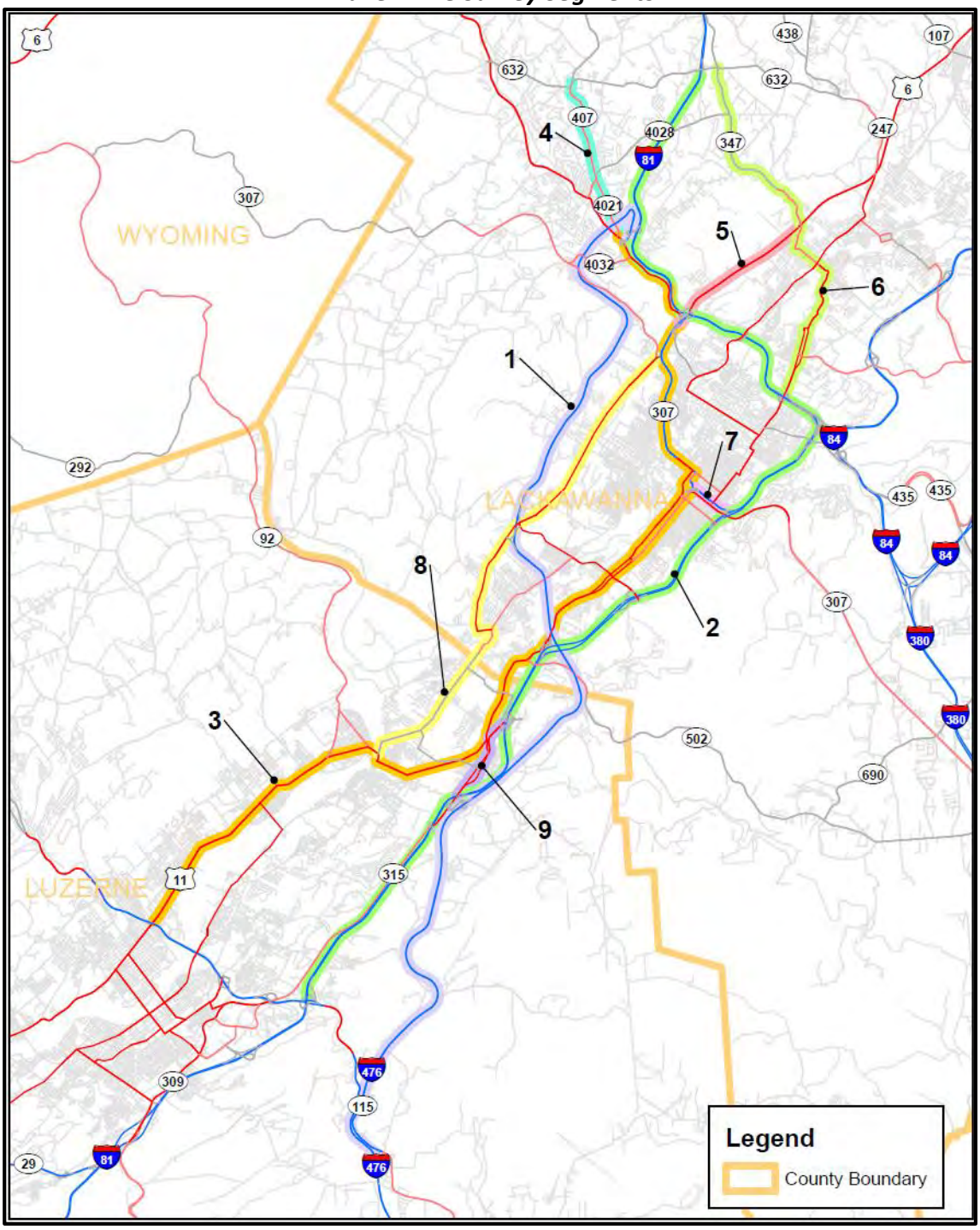


Table 2
Survey Segments and Average Speeds

Segment	Link	Route	Extents		Northbound Speeds			Southbound Speeds		
			From	To	24-Hour	AM Peak Period	PM Peak Period	24-Hour	AM Peak Period	PM Peak Period
1	1	I-476	Exit 105	Exit 115	65.3	62.5	64.6	65.0	62.6	64.0
	2	I-476	Exit 115	Exit 122	67.5	62.0	64.2	68.3	64.7	66.9
	3	I-476	Exit 122	Exit 131	64.6	60.9	63.0	66.7	62.9	66.2
2	1	I-81	Exit 170	Exit 175	60.3	57.8	58.5	61.4	60.3	60.2
	2	I-81	Exit 175	Exit 180	59.9	57.4	57.7	59.1	59.5	57.4
	3	I-81	Exit 180	Exit 185	60.6	57.7	57.4	61.8	62.6	60.1
	4	I-81	Exit 185	I-380	61.0	58.1	58.9	63.0	61.5	63.0
	5	I-81	I-380	PA 347	64.1	61.5	63.0	61.5	61.2	62.1
	6	I-81	PA 347	Exit 191	56.4	54.0	52.5	56.4	56.6	56.3
	7	I-81	Exit 191	Exit 194	52.4	50.2	49.7	53.6	54.8	53.0
	8	I-81	Exit 194	Exit 197	58.4	55.7	56.1	61.1	59.4	60.6
3	1	US 11 (Wyoming Ave)	PA 309 (N Cross Valley Expy in Kingston PA)	8th St	25.8	26.3	25.7	26.9	25.6	27.2
	2	US 11 (Wyoming Ave)	8th St	N Main St	20.2	18.8	19.8	20.9	21.0	20.0
	3	US 11 (William St/N Township Blvd)	N Main St	Quail Hill Dr	22.4	21.2	22.0	21.0	25.4	23.8
	4	US 11 (Pittston Ave/ Main St)	Quail Hill Dr	Springbrook Ave	20.6	15.7	21.0	20.9	23.0	19.9
	5	US 11 (Birney Ave/Pittston Ave)	Springbrook Ave	Davis St	25.9	25.5	26.4	23.9	23.3	23.4
	6	US 11 (Birney Ave/Pittston Ave/ Cedar Ave)	Davis St	River St	20.2	19.4	19.6	18.9	21.6	18.0
	7	US 11 (Pittston Ave/Cedar Ave)	River St	Mulberry St	14.1	14.0	12.9	13.4	12.5	12.9
	8	US 11 (Mulberry St)	Jefferson Ave	Mifflin Ave	11.7	12.3	11.4	11.2	11.8	10.0
	9	US 11 (N Scranton Expy)	Mifflin Ave	N Keyser Ave	45.8	43.4	46.5	44.3	43.6	44.2
	10	US 11 (N Scranton Expy)	N Keyser Ave	US 6 BR (Scranton Carbondale Hwy)	44.1	42.5	43.5	42.9	40.6	43.3
	11	US 11 (N Scranton Expy)	US 6 BR (Scranton Carbondale Hwy)	PA 407 (S Abington Rd in Clarks Summit PA)	30.6	29.6	24.0	29.6	29.1	27.9
4	1	PA 407	US 11 (Northern Blvd)	Fairview Rd	18.0	19.5	18.1	20.5	22.1	20.8
	2	PA 407	Fairview Rd	PA 632 (Carbondale Rd)	27.9	29.8	27.7	27.0	24.8	30.8
5	1	US 6 BR	I-81	PA 347 (Scott Rd)	26.0	28.8	25.7	24.2	27.6	23.1
6	1	PA 347	I-81	Sanderson St	21.5	19.2	18.7	22.2	19.8	19.5
	2	PA 347	Sanderson St	Main St	22.6	23.1	21.1	21.7	21.2	21.3
	3	PA 347	Main St	Scranton Carbondale Hwy	22.1	25.9	23.7	21.8	25.1	23.8
	4	PA 347	Scranton Carbondale Hwy	PA 632 (Carbondale Rd)	27.4	23.8	30.5	27.2	22.5	31.3
7	1	PA 3022 (Central Scranton Expy)	US 11 (Pittston Ave)	I-81	40.1	41.2	40.5	33.5	27.5	40.7
8	1	N Main St	US 11 (Fort Jenkins Bridge)	Parsonage St	19.3	19.5	18.5	21.3	23.7	20.9
	2	Parsonage St	N Main St	Clark Rd	22.6	24.5	22.4	22.5	18.8	21.4
	3	Foote Ave	Clark Rd	Hill St	23.6	21.7	22.9	23.8	20.6	24.4
	4	Bridge St	Hill St	Howard St	21.4	21.7	21.2	21.3	21.2	20.7
	5	S Main St	Howard St	Drakes Ln	19.1	18.3	15.4	18.2	18.6	16.5
	6	Drakes Ln	S Main St	Milwaukee Ave	19.3	26.1	20.9	16.8	18.0	15.5
	7	Milwaukee Ave	Drakes Ln	W Oak St	26.3	30.6	33.2	29.7	24.2	29.1
	8	S Keyser Ave	W Oak St	Jackson St	27.4	21.8	21.1	22.8	22.7	21.0
	9	N Keyser Ave	Jackson St	US 11 (N Scranton Expy)	27.1	22.9	21.8	23.2	22.3	22.4
9	1	PA 315	I-81 (Exit 175)	I-81 (Exit 178)	20.4	17.5	19.9	28.4	25.2	26.8

Scranton Traffic Model Adjustment and Validation

Utilizing the traffic data obtained from the data collection effort, and as a part of the validation process, the Scranton traffic model was adjusted. Adjustments were focused on the three (3) components of the model:

- Trip table; estimated travel patterns compared with those revealed by the observed O/D data providing the basis for adjustments as necessary
- Network; assess the need to add roadways to the network extracted from the PASM and ensure network to zone compatibility. Review network attributes for reasonableness, such as free-flow speeds based on observed speed data.
- Trip assignment; review parameters such as traveler value-of-time for reasonableness – make adjustments as necessary.

After these initial adjustments the Scranton model trip table was assigned to the network and assigned volumes compared, or "validated", against traffic count data contained in the PASM, supplemented by data collected as described in the memorandum. Based on this comparison using "industry standard" metrics, network attributes and trip assignment parameters were adjusted iteratively until traffic volumes estimated by the Scranton traffic model were within recommended tolerances with respect to traffic counts and observed network travel times.

Trip Table Evaluation and Adjustment

Travel of interest in this study on I-81 and I-476 and other competing roadways include travel to, from, through, and internal to the study subarea. First, the Scranton model trip table was evaluated to determine how well the model estimates travel patterns and the distribution of trips within the study subarea compared with those observed in the O/D data collected from cellular devices. Based on the evaluation, the trip table may be adjusted, or factored, as necessary to approximate travel patterns revealed by the collected data. Next, through a factoring process using traffic counts of vehicles at the boundary of the study subarea, the resulting trip table was adjusted to the appropriate magnitude of travel for trips to, from, and through the subarea.

The internal trip evaluation used the collected O/D data for September 2013. The collected O/D data primarily represents personal vehicle travel, therefore evaluation and adjustment of trips was limited to the auto and light truck components of the trip table. The heavy and external truck components of the trip table were not evaluated and adjusted against the collected O/D data as it is not representative of these types of vehicles. Use of the travel patterns implied by the collected O/D data to evaluate those estimated by the model required that the collected O/D data be filtered to remove short person trips inherently present in cellular data[10] Also, the interchange volumes for the observed data and the data from the model were normalized since the magnitudes of the interchange values represent different measures. The observed interchange data from cellular devices has been factored to the population, thus the volume associated with any given interchange represents person trips. In contrast, the modeled or estimated interchange volumes represent vehicle trips. The method of normalization for this study used the ratio of

[10] Cellular data (provided by AirSage) contains person trips for all travel modes, including short trips made by walking and bicycling. In the Scranton area, filtering these trips increases the probability that the remaining person trips are made by autos.

the volume for any given interchange to the total volume for all interchanges associated with a particular origin district; expressed as a percentage.

Figure 8 provides a comparison of average full weekday observed trip patterns and those estimated by the PASM based on the enclave definitions depicted in Figure 6 for travel within the study subarea. Percentages reflect the portion of trips originating from any given enclave.

Figure 8
Comparison of Average Full Weekday Trip Patterns

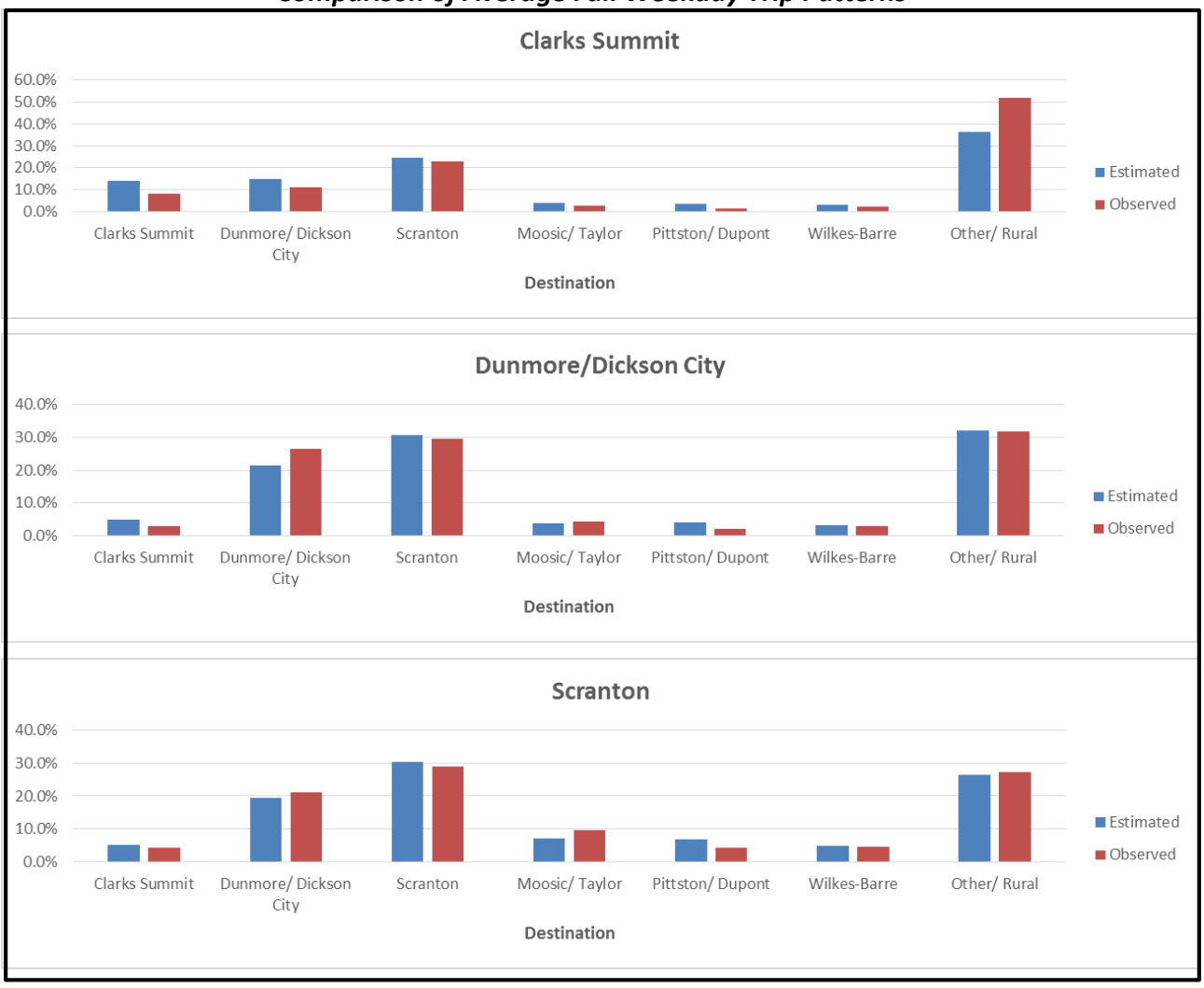


Figure 8
Comparison of Average Full Weekday Trip Patterns (Continued from page 15)

As Figure 8 shows, observed travel patterns between enclaves are generally well estimated by the PASM within the study subarea. The greatest disparity occurs with respect to Clarks Summit, particularly the portion of trips traveling to "Other/Rural" locations within the subarea. Given the relatively small number of trips generated by the Clarks Summit enclave compared to the entire subarea (Table 1), the trip pattern disparity should not have a great impact on travel forecasts associated with the addition of the "high speed" connection ramps between I-476 and I-81 and therefore no adjustments were applied to the trip table with respect to travel within the subarea.

Roadway Network

The description of roadways associated with the extracted PASM network in the subarea was reviewed for accuracy with respect to modeling travel volumes on I-81, I-476, and competing routes. As necessary, review and network refinements in the study area included:

- Add necessary detail to adequately describe routes that can serve as alternates to I-81 and I-476 in the study corridor. As a result of this review Main Street/Avenue from Union Street to the Scranton Expressway was added to the roadway network
- Comprehensive review of access to the roadway from TAZs in the subarea. This review included the use of a GIS database. Adjustments to centroid connection locations were adjusted as necessary.
- General review of parameters used to describe roadways. These parameters include roadway capacity, number of travel lanes, direction of travel, and free-flow travel speeds. As a result of this review roadway capacities were adjusted at a number of locations based on travel volumes observed on the network.[11] Free-flow speeds were also adjusted based on the network travel times mined from the GPS data collected. Free-flow speeds were adjusted to ensure they are at least equal to or greater than the "congested" or capacity restrained speeds implied by the GPS data.

Trip Assignment and Validation

Model validation consisted of a comprehensive review of estimated volumes and speeds at the roadway segment level, as well as a comparison with count data and "observed" travel times/speeds mined from collected GPS data. Model validation consisted of an evaluation of model performance and adjustment to yield acceptable performance. Adjustments largely consisted of adjustment to free-flow speeds to facilities in the study corridor and the evaluation of the ability of the model's network in portraying access and egress points to and from activity centers in the study subarea.

The tables and figures below show the performance of the Scranton Model over the entire study subarea. Assigned volumes by facility type and volume group well approximate observed volumes (Tables 3 and 4). Accuracy of assigned volumes by roadway location is "good" for roadways with AADT greater than or equal to 10,000 vehicles as measured by %RMSE (root mean squared error). Note that facility classification is in accordance with the PASM and that while there is a significant deviation associated with "local" roadways, there are only two (2) observations within the study area.

[11] For cases where roadway capacities were less than observed volumes, capacities were set equal to observed volumes

Table 3
Observed vs. Estimated Volumes by Facility Type

Facility Type	No. of Observations	2012 Observed AADT	2012 Estimated Volume	Difference	% Difference	Accepted Tolerance[1]
Interstate	34	681,844	731,528	49,684	7%	< +/-7%
Principal Arterial	110	904,592	897,133	-7,459	-1%	< +/-10%
Minor Arterial	58	248,409	216,066	-32,343	-13%	< +/-15%
Major Collector	44	97,879	85,619	-12,260	-13%	< +/-25%
Local	2	3,625	4,984	1,359	37%	< +/-25%
Total	248	1,936,349	1,935,330	-1,019	0%	< +/-5%
VMT - vehicle-miles traveled						
1 - "Calibrating and Adjustment of System Planning Models", Federal Highway Administration, December 1990						
2 - Accepted tolerance for urban areas is 5%						

Table 4
Observed vs. Estimated Volumes by Volume Group

Volume Group	No. of Observations	2012 Observed AADT	2012 Estimated Volume	Difference	% Difference	Accepted Tolerance	%RMSE
< 1,000	4	3,113	3,120	7	0%	< +/-200%	83%
1,000 - 2,500	40	60,977	68,018	7,041	12%	< +/-100%	62%
2,500 - 5,000	64	226,051	234,061	8,010	4%	< +/-50%	59%
5,000 - 10,000	79	572,005	591,071	19,066	3%	< +/-25%	39%
10,000 - 25,000	46	625,986	582,404	-43,582	-7%	< +/-20%	33%
> 25,000	15	448,217	456,655	8,438	2%	< +/-15%	16%
Total	248	1,936,349	1,935,329	-1,020	0%	< +/-10%	38%

"Screenlines" in the study area were constructed to depict travel flows to and from, and within the study area. Figure 9 shows the locations of the screenlines relative to the roadway network in the travel model. Table 5 below indicates how well the Scranton Model estimates travel volumes over the designated screenlines. All observed screenline volumes are well estimated within accepted tolerances.

Figure 9
Screenline Locations

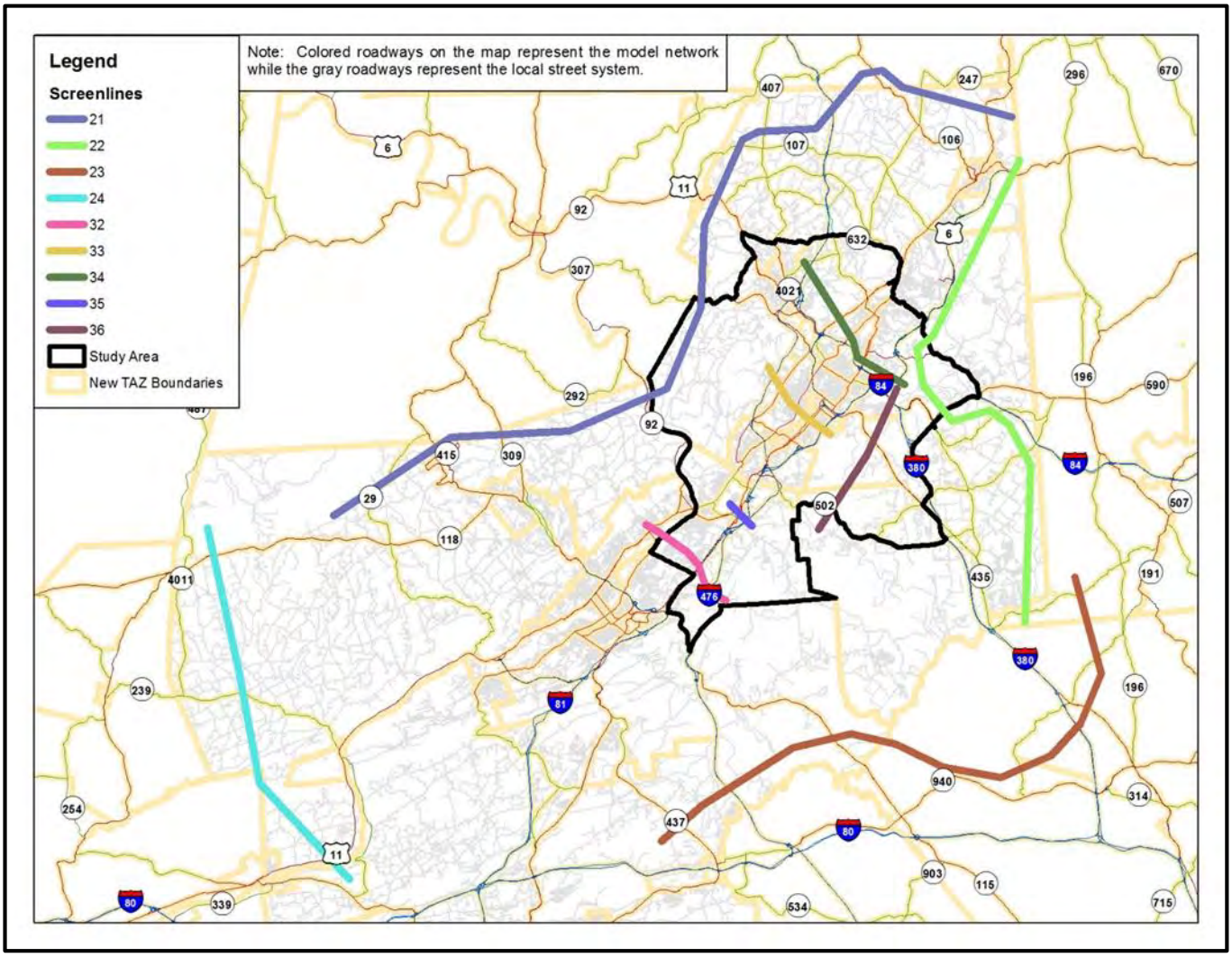


Table 5
Observed vs. Estimated Volumes by Screenline

Screenline	No. of Observations	2012 Observed AADT	2012 Estimated Volume	Difference	% Difference	Accepted Tolerance[1]	%RMSE
21	24	68,406	68,914	508	1%	<+/-28%	3%
22	16	48,116	46,333	-1,783	-4%	<+/-33%	10%
23	16	59,784	59,501	-283	0%	<+/-30%	1%
24	6	13,367	13,384	17	0%	<+/-55%	1%
32	8	99,270	106,791	7,521	8%	<+/-23%	14%
33	10	136,731	118,402	-18,329	-13%	<+/-20%	20%
34	8	68,587	68,736	149	0%	<+/-28%	19%
35	6	78,022	89,041	11,019	14%	<+/-25%	19%
36	6	51,041	58,192	7,151	14%	<+/-32%	36%

1 -" Highway Traffic Data for Urbanized Area Project Planning and Design", Transportation Research Board, December 1982

Figure 10 below indicates how well the model estimates traffic volumes at each location in the network where there is an observed volume. A perfect correlation between modeled and observed volumes is indicated by the line in the figure. Generally most points are close to the line, indicating a good correlation. However several points associated with I-81 in the subarea are above the line indicating an overestimation of traffic volumes on I-81 with respect to those observed in 2012.

Table 6 below shows how well the Scranton model estimates travel time through the corridor on I-81, I-476, and other alternative routes as compared with travel times implied by the collected GPS data. Estimated travel times on most routes are within 10% of the target values. Note that travel times on PA 315 between Exit 175 and 178 of I-81 are underestimated by more than 10%.

Figure 10
Correlation of Estimated and Observed Daily Traffic

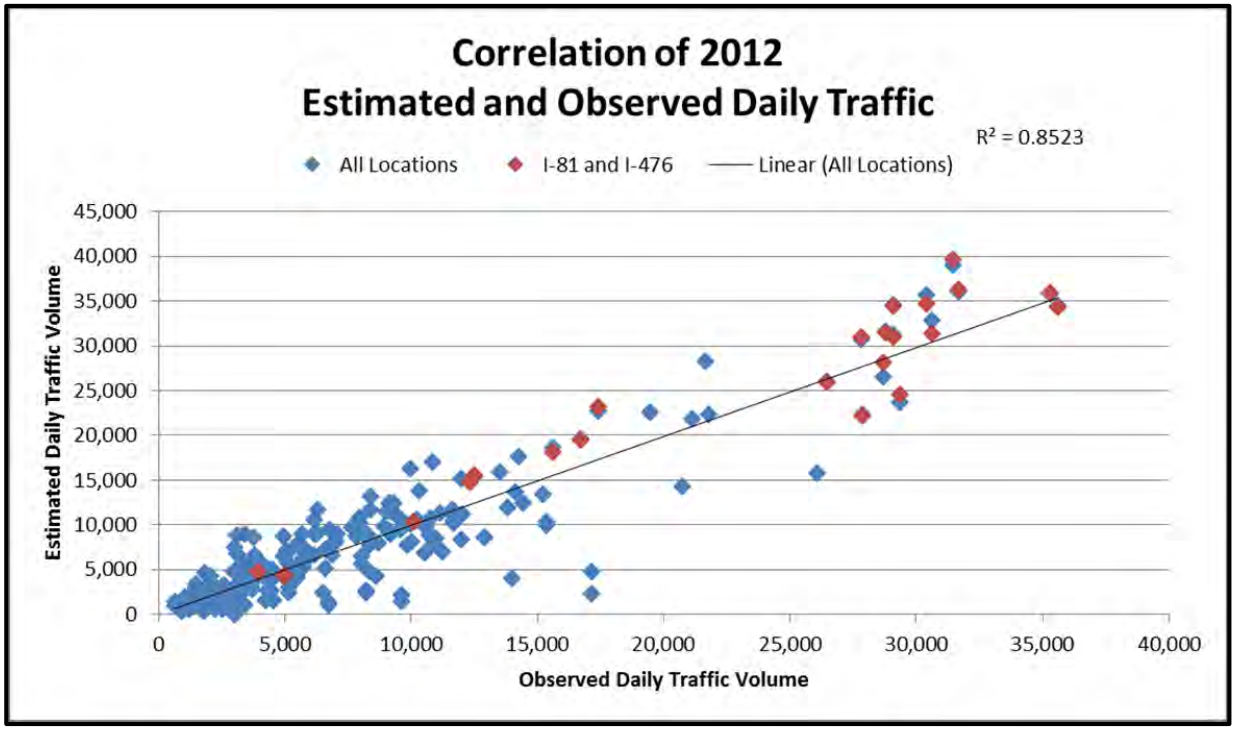


Table 6
Estimated vs. Target Corridor Travel Times (min.)

				Northbound			Southbound		
	Route	From	To	Est	Target	Diff	Est	Target	Diff
1	I-476	Exit 105	Exit 131	*23.6*	*23.3*	*1.3%*	*23.5*	*22.9*	*2.6%*
2	I-81	Exit 170	Exit 197	*28.0*	*26.7*	*4.9%*	*29.1*	*26.9*	*8.2%*
3	US 11	PA 309	PA 407	*42.4*	*44.9*	*-5.6%*	*41.9*	*45.7*	*-8.3%*
4	PA 407	US 11	PA 632	*6.0*	*6.3*	*-4.8%*	*6.0*	*6.4*	*-6.3%*
5	US 6 BR	I-81	PA 347	5.2	5.5	-5.5%	5.1	5.1	0.0%
6	PA 347	I-81	PA 632	*14.8*	*16.0*	*-7.5%*	*15.2*	*17.0*	*-10.6%*
7	Central Scranton Exp.	US 11	I-81	1.7	1.8	-5.6%	1.9	1.9	0.0%
8	Main St/Keyser Ave.	Ft. Jenkins Bridge	N. Scranton Expressway	*21.2*	*22.5*	*-5.8%*	*21.2*	*21.8*	*-2.8%*
9	PA 315	I-81 (Exit 175)	I-81 (Exit 178)	3.9	4.4	-11.4%	4.1	4.7	-12.8%

Traffic Forecasts

Opening year (2025) and horizon year (2045) traffic forecasts are based on an extracted subarea trip table and network from the 2040 PASM; incorporating any adjustments implemented in the base year (2012) Scranton traffic model. The extracted trip table was subsequently factored (fratared) to targets as follows:

a. Internal zones to totals originally present in the PASM 2040 model – Year 2025 targets were based on an interpolation of 2012 and 2040 values.
b. External zones to totals based on observed 2012 volumes at the subarea boundary (cordon counts) grown by an amount implied by the 2012 and 2040 PASM models. Heavy truck targets for interstates (except I-476[12]) in the subarea were treated differently. These targets were based on observed 2012 volumes grown at a rate of 2.5% per year.[13]

After these initial adjustments, the factored trip table was assigned to the extracted 2040 PASM network[14] to yield "no-build" forecasts. Toll amounts and collection locations on I-476 reflect those present in the base year (2012) PASM; $0.83 for autos and light trucks and $4.67 for heavy trucks collected at the Keyser Avenue interchange and at the end of I-476 at Clarks Summit. Forecasts reflect toll amounts increasing at the rate of inflation. The "build" or Alternative #1 network reflects the addition of northbound and southbound ramps between I-81 and I-476 at Wyoming Valley and Clarks Summit. The location at Clarks Summit includes a set of ramps providing "local" access to and from I-476. Daily volume forecasts for I-81 and I-476 in the subarea were developed using observed 2014 volumes, and base year (2012) and future year (2025 and 2040) estimated volumes from the model. Growth implied by the Scranton traffic model estimates was applied to observed volumes[15] yielding forecasts reported in the Tables 7 – 12 below.

[12] grown by an amount implied by the PASM models (0.7% to 1.0% per year)
[13] Based on growth of truck carried freight within, to/from, and through the subarea as indicated by TRANSEARCH 2012 and 2040 freight activity databases
[14] A review of the 2012 and 2040 PASM networks in the subarea revealed no network changes/improvements in the study subarea
[15] p. 50; NCHRP Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board, 1982

Table 7
Opening Year (2025) Forecasts – Total Vehicles

Location		2014 Daily Obs. Volume[1]	Scranton Area Model Volumes (Vehicles)			Daily Forecast Volumes (Vehicles)[2]			
						2025 No Build		2025 Build Alt. #1	Volume Difference (Build Alt. #1 – No Build)
			2012	2025 No Build	2025 Build Alt. #1	Volume	Growth[3]		
I-476									
Existing I-476 Exit 115 TO Proposed NB I-81 to I-476 Connection	NB	**4,500**	5,262	7,858	5,055	**6,800**	3.8%	**4,300**	(2,500)
	SB	**4,500**	4,543	7,020	4,905	**6,900**	4.0%	**4,800**	(2,100)
Proposed Wyoming Valley I-81 to I-476 Connection TO Proposed Moosic I-476 to I-81 Connection	NB	**4,500**	5,262	7,858	12,164	**6,800**	3.8%	**10,800**	4,000
	SB	**4,500**	4,543	7,020	11,114	**6,900**	4.0%	**11,000**	4,100
Proposed Moosic SB I-476 to I-81 Connection TO Existing I-476 Exit 122	NB	**4,500**	5,262	7,858	12,164	**6,800**	3.8%	**10,800**	4,000
	SB	**4,500**	4,543	7,020	11,114	**6,900**	4.0%	**11,000**	4,100
Existing I-476 Exit 122 TO Proposed I-476/I-81 Connection near Clarks Summit	NB	**4,350**	4,231	6,857	11,936	**7,100**	4.6%	**11,700**	4,600
	SB	**4,350**	4,711	6,988	10,337	**6,600**	3.9%	**9,700**	3,100
I-81									
PA 315 (Exit 175) TO Proposed NB I-81 to I-476 Connection	NB	**27,700**	31,632	33,147	35,871	**29,500**	0.6%	**32,000**	2,500
	SB	**29,300**	32,803	29,788	34,623	**26,900**	-0.8%	**31,400**	4,500
PA 315 (Exit 178) - PA 502(Exit 180)	NB	**30,900**	36,033	37,093	34,870	**32,400**	0.4%	**29,900**	(2,500)
	SB	**32,500**	39,067	39,321	37,417	**33,200**	0.2%	**31,000**	(2,200)
Davis St (Exit 182) - River St. (Exit 184)	NB	**36,500**	35,785	36,796	34,485	**37,800**	0.3%	**35,200**	(2,600)
	SB	**36,200**	34,511	34,834	32,388	**36,700**	0.1%	**34,000**	(2,700)
N. Main Ave (Exit 190) - Scranton/Carbondale Hwy (Exit 191)	NB	**17,800**	22,067	23,843	20,107	**19,700**	0.9%	**15,900**	(3,800)
	SB	**20,100**	22,249	23,958	20,012	**21,900**	0.8%	**17,900**	(4,000)
Clarks Summit (Exit 194)- PA 632 (Exit 197)	NB	**13,300**	14,835	17,957	18,161	**16,400**	1.9%	**16,600**	200
	SB	**13,500**	15,405	18,742	18,742	**16,700**	2.0%	**16,700**	-

1 - Scranton Beltway Data Collection Program, Collected October 2014
2 - p. 50; NCHRP Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board, 1982
3 - Annual compound growth rate implied by the travel model from 2012 to 2025

Table 8
Opening Year (2025) Forecasts – Autos + Light Trucks

Location		2014 Daily Obs. Volume[1]	Scranton Area Model Volumes (Vehicles)			Daily Forecast Volumes (Vehicles)[2]			
						2025 No Build		2025 Build Alt. #1	Volume Difference (Build Alt. #1 – No Build)
			2012	2025 No Build	2025 Build Alt. #1	Volume	Growth[3]		
I-476									
Existing I-476 Exit 115 TO Proposed NB I-81 to I-476 Connection	NB	**3,285**	4,411	6,855	4,218	**5,400**	4.6%	**3,100**	(2,300)
	SB	**3,330**	3,514	5,667	3,736	**5,400**	4.5%	**3,500**	(1,900)
Proposed Wyoming Valley I-81 to I-476 Connection TO Proposed Moosic I-476 to I-81 Connection	NB	**3,285**	4,411	6,855	9,363	**5,400**	4.6%	**7,600**	2,200
	SB	**3,330**	3,514	5,667	7,904	**5,400**	4.5%	**7,600**	2,200
Proposed Moosic SB I-476 to I-81 Connection TO Existing I-476 Exit 122	NB	**3,285**	4,411	6,855	9,363	**5,400**	4.6%	**7,600**	2,200
	SB	**3,330**	3,514	5,667	7,904	**5,400**	4.5%	**7,600**	2,200
Existing I-476 Exit 122 TO Proposed I-476/I-81 Connection near Clarks Summit	NB	**3,306**	3,749	5,945	9,155	**5,400**	4.6%	**8,400**	3,000
	SB	**3,350**	3,795	5,717	7,187	**5,200**	4.1%	**6,500**	1,300
I-81									
PA 315 (Exit 175) TO Proposed NB I-81 to I-476 Connection	NB	**21,329**	26,527	26,149	28,707	**21,000**	-0.1%	**23,300**	2,300
	SB	**22,854**	27,693	23,134	27,709	**18,700**	-1.8%	**22,900**	4,200
PA 315 (Exit 178) - PA 502(Exit 180)	NB	**24,102**	30,925	30,093	29,667	**23,400**	-0.3%	**23,000**	(400)
	SB	**26,000**	33,919	32,514	32,465	**24,800**	-0.4%	**24,700**	(100)
Davis St (Exit 182) - River St. (Exit 184)	NB	**29,930**	30,660	29,773	29,260	**29,100**	-0.3%	**28,500**	(600)
	SB	**29,684**	29,373	28,038	27,447	**28,300**	-0.4%	**27,700**	(600)
N. Main Ave (Exit 190) - Scranton/Carbondale Hwy (Exit 191)	NB	**13,706**	18,809	19,373	17,436	**14,200**	0.3%	**12,500**	(1,700)
	SB	**15,879**	18,593	19,157	17,099	**16,400**	0.3%	**14,500**	(1,900)
Clarks Summit (Exit 194)- PA 632 (Exit 197)	NB	**9,177**	11,439	13,266	13,470	**10,800**	1.5%	**11,000**	200
	SB	**4,050**	3,886	5,305	5,305	**5,500**	2.8%	**5,500**	-

1 - Scranton Beltway Data Collection Program, Collected October 2014
2 - p. 50; NCHRP Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board, 1982
3 - Annual compound growth rate implied by the travel model from 2012 to 2025

Table 9
Opening Year (2025) Forecasts – Heavy Trucks

Location		2014 Daily Obs. Volume[1]	Scranton Area Model Volumes (Vehicles)			Daily Forecast Volumes (Vehicles)[2]			
						2025 No Build		2025 Build Alt. #1	Volume Difference (Build Alt. #1 – No Build)
			2012	2025 No Build	2025 Build Alt. #1	Volume	Growth[3]		
I-476									
Existing I-476 Exit 115 TO Proposed NB I-81 to I-476 Connection	NB	**1,215**	851	1,003	837	**1,400**	1.3%	**1,200**	(200)
	SB	**1,170**	1,029	1,353	1,169	**1,500**	2.3%	**1,300**	(200)
Proposed Wyoming Valley I-81 to I-476 Connection TO Proposed Moosic I-476 to I-81 Connection	NB	**1,215**	851	1,003	2,801	**1,400**	1.3%	**3,200**	1,800
	SB	**1,170**	1,029	1,353	3,210	**1,500**	2.3%	**3,400**	1,900
Proposed Moosic SB I-476 to I-81 Connection TO Existing I-476 Exit 122	NB	**1,215**	851	1,003	2,801	**1,400**	1.3%	**3,200**	1,800
	SB	**1,170**	1,029	1,353	3,210	**1,500**	2.3%	**3,400**	1,900
Existing I-476 Exit 122 TO Proposed I-476/I-81 Connection near Clarks Summit	NB	**1,044**	482	912	2,781	**1,700**	4.5%	**3,300**	1,600
	SB	**1,001**	916	1,271	3,150	**1,400**	3.1%	**3,200**	1,800
I-81									
PA 315 (Exit 175) TO Proposed NB I-81 to I-476 Connection	NB	**6,371**	5,105	6,998	7,164	**8,500**	2.7%	**8,700**	200
	SB	**6,446**	5,110	6,654	6,914	**8,200**	2.2%	**8,500**	300
PA 315 (Exit 178) - PA 502(Exit 180)	NB	**6,798**	5,108	7,000	5,203	**9,000**	2.6%	**6,900**	(2,100)
	SB	**6,500**	5,148	6,807	4,952	**8,400**	2.4%	**6,300**	(2,100)
Davis St (Exit 182) - River St. (Exit 184)	NB	**6,570**	5,125	7,023	5,225	**8,700**	2.6%	**6,700**	(2,000)
	SB	**6,516**	5,138	6,796	4,941	**8,400**	2.3%	**6,300**	(2,100)
N. Main Ave (Exit 190) - Scranton/Carbondale Hwy (Exit 191)	NB	**4,094**	3,258	4,470	2,671	**5,500**	2.7%	**3,400**	(2,100)
	SB	**4,221**	3,656	4,801	2,913	**5,500**	2.4%	**3,400**	(2,100)
Clarks Summit (Exit 194)- PA 632 (Exit 197)	NB	**4,123**	3,396	4,691	4,691	**5,600**	2.8%	**5,600**	-
	SB	**4,050**	3,886	5,305	5,305	**5,500**	2.8%	**5,500**	-

1 - Scranton Beltway Data Collection Program, Collected October 2014
2 - p. 50; NCHRP Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board, 1982
3 - Annual compound growth rate implied by the travel model from 2012 to 2025

Table 10
Horizon Year (2045) Forecasts – Total Vehicles

Location		2014 Daily Obs. Volume[1]	Scranton Area Model Volumes (Vehicles)			Daily Forecast Volumes (Vehicles)[2]			
						2045 No Build		2045 Build Alt. #1	Volume Difference (Build Alt. #1 – No Build)
			2012	2040 No Build	2040 Build Alt. #1	Volume	Growth[3]		
I-476									
Existing I-476 Exit 115 TO Proposed NB I-81 to I-476 Connection	NB	**4,500**	5,262	11,426	8,081	**10,700**	2.8%	**7,300**	(3,400)
	SB	**4,500**	4,543	11,413	7,708	**12,000**	3.2%	**7,900**	(4,100)
Proposed Wyoming Valley I-81 to I-476 Connection TO Proposed Moosic I-476 to I-81 Connection	NB	**4,500**	5,262	11,426	13,540	**10,700**	2.8%	**13,000**	2,300
	SB	**4,500**	4,543	11,413	14,321	**12,000**	3.2%	**15,400**	3,400
Proposed Moosic SB I-476 to I-81 Connection TO Existing I-476 Exit 122	NB	**4,500**	5,262	11,426	13,540	**10,700**	2.8%	**13,000**	2,300
	SB	**4,500**	4,543	11,413	14,321	**12,000**	3.2%	**15,400**	3,400
Existing I-476 Exit 122 TO Proposed I-476/I-81 Connection near Clarks Summit	NB	**4,350**	4,231	9,856	12,601	**10,700**	2.9%	**13,200**	2,500
	SB	**4,350**	4,711	10,175	13,874	**10,100**	2.8%	**14,000**	3,900
I-81									
PA 315 (Exit 175) TO Proposed NB I-81 to I-476 Connection	NB	**27,700**	31,632	33,010	36,496	**29,900**	0.2%	**33,500**	3,600
	SB	**29,300**	32,803	27,158	30,513	**24,500**	-0.6%	**28,000**	3,500
PA 315 (Exit 178) - PA 502(Exit 180)	NB	**30,900**	36,033	36,407	35,658	**32,300**	0.1%	**31,300**	(1,000)
	SB	**32,500**	39,067	37,331	36,663	**31,800**	-0.1%	**30,700**	(1,100)
Davis St (Exit 182) - River St. (Exit 184)	NB	**36,500**	35,785	35,374	35,649	**36,700**	0.0%	**36,800**	100
	SB	**36,200**	34,511	32,776	31,967	**34,800**	-0.1%	**33,600**	(1,200)
N. Main Ave (Exit 190) - Scranton/Carbondale Hwy (Exit 191)	NB	**17,800**	22,067	26,452	24,673	**22,800**	0.8%	**20,800**	(2,000)
	SB	**20,100**	22,249	25,803	23,283	**24,300**	0.6%	**21,500**	(2,800)
Clarks Summit (Exit 194)- PA 632 (Exit 197)	NB	**13,300**	14,835	22,416	22,749	**21,600**	1.6%	**22,000**	400
	SB	**13,500**	15,405	23,947	24,068	**22,600**	1.7%	**22,800**	200

1 - Scranton Beltway Data Collection Program, Collected October 2014
2 - p. 50; NCHRP Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board, 1982
3 - Annual compound growth rate implied by the travel model from 2012 to 2045

Table 11
Horizon Year (2045) Forecasts – Autos + Light Trucks

Location		2014 Daily Obs. Volume[1]	Scranton Area Model Volumes (Vehicles)			Daily Forecast Volumes (Vehicles)[2]			
						2045 No Build		2045 Build Alt. #1	Volume Difference (Build Alt. #1 – No Build)
			2012	2040 No Build	2040 Build Alt. #1	Volume	Growth[3]		
I-476									
Existing I-476 Exit 115 TO Proposed NB I-81 to I-476 Connection	NB	**3,285**	4,411	10,021	7,278	**8,700**	3.2%	**6,100**	(2,600)
	SB	**3,330**	3,514	9,696	6,668	**10,000**	3.6%	**6,700**	(3,300)
Proposed Wyoming Valley I-81 to I-476 Connection TO Proposed Moosic I-476 to I-81 Connection	NB	**3,285**	4,411	10,021	11,280	**8,700**	3.2%	**9,900**	1,200
	SB	**3,330**	3,514	9,696	11,139	**10,000**	3.6%	**11,800**	1,800
Proposed Moosic SB I-476 to I-81 Connection TO Existing I-476 Exit 122	NB	**3,285**	4,411	10,021	11,280	**8,700**	3.2%	**9,900**	1,200
	SB	**3,330**	3,514	9,696	11,139	**10,000**	3.6%	**11,800**	1,800
Existing I-476 Exit 122 TO Proposed I-476/I-81 Connection near Clarks Summit	NB	**3,306**	3,749	8,738	10,347	**8,500**	3.1%	**10,200**	1,700
	SB	**3,350**	3,795	8,593	10,763	**8,300**	3.0%	**10,600**	2,300
I-81									
PA 315 (Exit 175) TO Proposed NB I-81 to I-476 Connection	NB	**21,329**	26,527	24,565	27,449	**19,400**	-0.3%	**22,200**	2,800
	SB	**22,854**	27,693	18,402	21,090	**13,500**	-1.7%	**16,200**	2,700
PA 315 (Exit 178) - PA 502(Exit 180)	NB	**24,102**	30,925	27,962	28,068	**21,200**	-0.4%	**21,300**	100
	SB	**26,000**	33,919	28,547	29,345	**20,700**	-0.7%	**21,500**	800
Davis St (Exit 182) - River St. (Exit 184)	NB	**29,930**	30,660	26,933	28,061	**25,900**	-0.5%	**27,100**	1,200
	SB	**29,684**	29,373	23,997	24,653	**23,700**	-0.7%	**24,400**	700
N. Main Ave (Exit 190) - Scranton/Carbondale Hwy (Exit 191)	NB	**13,706**	18,809	20,380	19,474	**15,200**	0.3%	**14,300**	(900)
	SB	**15,879**	18,593	18,604	17,565	**15,900**	0.0%	**14,800**	(1,100)
Clarks Summit (Exit 194)- PA 632 (Exit 197)	NB	**9,177**	11,439	15,607	15,940	**13,300**	1.2%	**13,700**	400
	SB	**9,450**	11,519	15,877	15,997	**13,800**	1.2%	**14,000**	200

1 - Scranton Beltway Data Collection Program, Collected October 2014
2 - p. 50; NCHRP Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board, 1982
3 - Annual compound growth rate implied by the travel model from 2012 to 2045

Table 12
Horizon Year (2045) Forecasts – Heavy Trucks

Location		2014 Daily Obs. Volume[1]	Scranton Area Model Volumes (Vehicles)			Daily Forecast Volumes (Vehicles)[2]			
						2045 No Build		2045 Build Alt. #1	Volume Difference (Build Alt. #1 – No Build)
			2012	2040 No Build	2040 Build Alt. #1	Volume	Growth[3]		
I-476									
Existing I-476 Exit 115 TO Proposed NB I-81 to I-476 Connection	NB	**1,215**	851	1,405	803	**2,000**	1.6%	**1,200**	(800)
	SB	**1,170**	1,029	1,717	1,040	**2,000**	1.7%	**1,200**	(800)
Proposed Wyoming Valley I-81 to I-476 Connection TO Proposed Moosic I-476 to I-81 Connection	NB	**1,215**	851	1,405	2,260	**2,000**	1.6%	**3,100**	1,100
	SB	**1,170**	1,029	1,717	3,182	**2,000**	1.7%	**3,600**	1,600
Proposed Moosic SB I-476 to I-81 Connection TO Existing I-476 Exit 122	NB	**1,215**	851	1,405	2,260	**2,000**	1.6%	**3,100**	1,100
	SB	**1,170**	1,029	1,717	3,182	**2,000**	1.7%	**3,600**	1,600
Existing I-476 Exit 122 TO Proposed I-476/I-81 Connection near Clarks Summit	NB	**1,044**	482	1,118	2,254	**2,200**	2.4%	**3,000**	800
	SB	**1,001**	916	1,582	3,111	**1,800**	1.9%	**3,400**	1,600
I-81									
PA 315 (Exit 175) TO Proposed NB I-81 to I-476 Connection	NB	**6,371**	5,105	8,445	9,047	**10,500**	1.6%	**11,300**	800
	SB	**6,446**	5,110	8,756	9,423	**11,000**	1.7%	**11,800**	800
PA 315 (Exit 178) - PA 502(Exit 180)	NB	**6,798**	5,108	8,445	7,590	**11,100**	1.6%	**10,000**	(1,100)
	SB	**6,500**	5,148	8,784	7,318	**11,100**	1.7%	**9,200**	(1,900)
Davis St (Exit 182) - River St. (Exit 184)	NB	**6,570**	5,125	8,441	7,588	**10,800**	1.6%	**9,700**	(1,100)
	SB	**6,516**	5,138	8,779	7,314	**11,100**	1.7%	**9,200**	(1,900)
N. Main Ave (Exit 190) - Scranton/Carbondale Hwy (Exit 191)	NB	**4,094**	3,258	6,072	5,199	**7,600**	2.0%	**6,500**	(1,100)
	SB	**4,221**	3,656	7,199	5,718	**8,400**	2.2%	**6,700**	(1,700)
Clarks Summit (Exit 194)- PA 632 (Exit 197)	NB	**4,123**	3,396	6,809	6,809	**8,300**	2.3%	**8,300**	-
	SB	**4,050**	3,886	8,070	8,071	**8,800**	2.5%	**8,800**	-

1 - Scranton Beltway Data Collection Program, Collected October 2014
2 - p. 50; NCHRP Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board, 1982
3 - Annual compound growth rate implied by the travel model from 2012 to 2045

Horizon year forecasts (no build - 2045) indicate average growth rate of all traffic on I-476 of 2.8% to 3.2% per year and on I-81 at -0.6% to +0.8% per year.[16] While truck traffic growth is similar for both roadways at 1.6% to 2.5% per year, depending on location; auto traffic growth on I-81 ranges from slightly negative to slightly positive. Auto traffic on I-476 grows at 3.0% to 3.6% per year, which is greater than historical data indicates, and is due to autos diverting to I-476 since several sections of I-81, south of Exit 184, are presently near capacity.

Addition of the subject northbound and southbound ramps between I-81 and I-476 at Wyoming Valley and Clarks Summit results in an overall decrease in 2045 daily volumes on I-81 from Exit 178 to Exit 191 of up to 4,800 vehicles and an increase of up to 6,400 vehicles on I-476, north of Exit 122 (Table 10). Over 60% (4,000 vehicles) of the traffic increase on I-476 are autos and light trucks; the remainder (2,400 vehicles) are heavy trucks. Note that the volume differences on I-81 and I-476 are not the same in absolute magnitude because they are the result of two components: 1) diversion from I-81 to I-476 due the addition of the ramp connections and 2) shifts in traffic volumes from other roads due to latent demand. This can be illustrated if we examine the volume difference components over several roadways that compete with I-81 and I-476 at the same location in the study corridor as shown by the screenline in Figure 11.

The screenline in Figure 11 includes I-81 and I-476; and alternative routes through the corridor: Pittston Avenue, Cedar Avenue, S. Main Avenue, and Keyser Avenue. Table 13 below shows volume differences[17] on these roadways as a result of the addition of the subject ramps. Note that when examining traffic diversion due to the addition of the ramp connections (leftmost columns), most of the increase on I-476 is due to traffic leaving I-81. Traffic on the other roads in the corridor shift in response to the ramps, but to a much lesser degree. However, there is a shift in traffic to I-81 of up to approximately 5,000 vehicles per day; that utilizes the capacity freed up by the diversion due to the addition of the ramps (highlighted columns). Over 95% of this shift is composed of auto and light truck traffic (shown in red).

[16] Excluding the segment of I-81 just north of Clarks Summit

[17] Volumes are directly from the travel model and are different from forecast volumes reported in Tables 10-12

Figure 11
Volume Difference Analysis Screenline Location

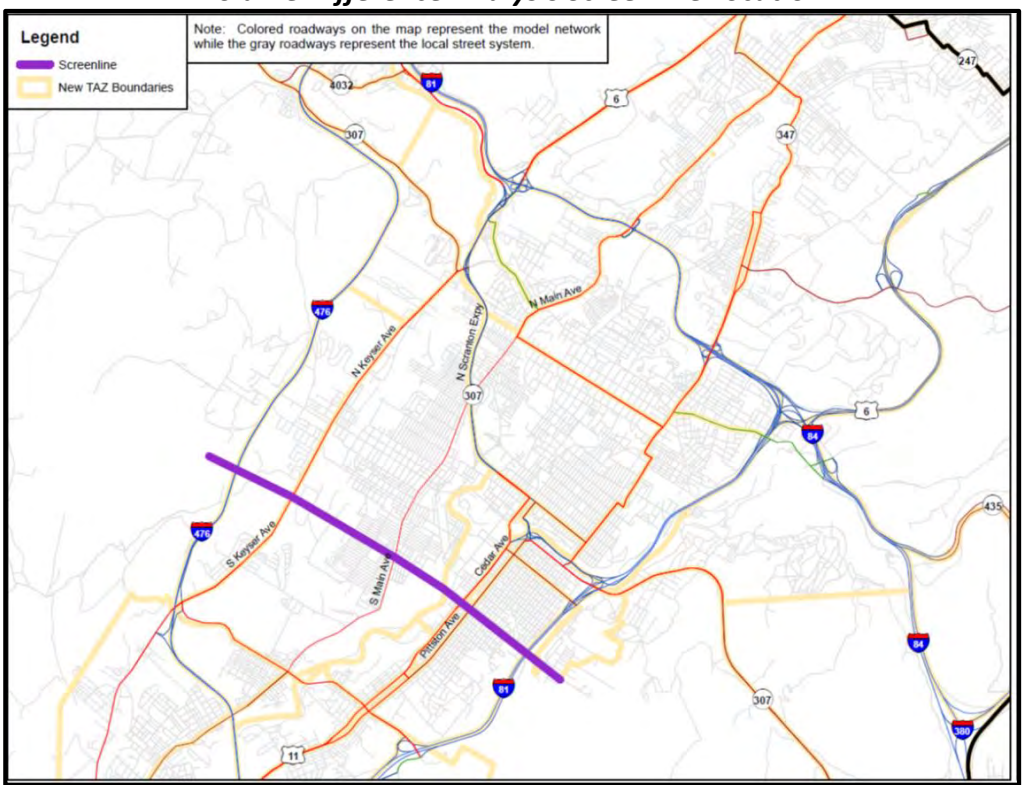


Table 13
Horizon Year (2045) Volume Changes on Competing Routes in Study Corridor

Road	Volume Change Due to Ramps		Volume Change Due to Latent Demand		Net Volume Change	
	Auto	Truck	Auto	Truck	Auto	Truck
I-81 NB	-1,449	-872	2,577	19	1,128	-853
I-81 SB	-2,357	-1,501	3,013	36	656	-1,465
Pittston Avenue NB	-668	-1	-972	0	-1,640	-1
Pittston Avenue SB	0	0	-965	0	-965	0
Cedar Avenue NB	5	0	-82	-1	-77	-1
Cedar Avenue SB	-28	0	-639	0	-667	0
S. Main Avenue NB	-307	0	-221	0	-528	0
S. Main Avenue SB	-228	0	65	0	-163	0
S. Keyser Avenue NB	441	-241	-983	-41	-542	-282
S. Keyser Avenue SB	363	-28	-1,271	-35	-908	-63
I-476 NB	1,405	1,113	204	23	1,609	1,136
I-476 SB	2,962	1,529	-792	0	2,170	1,529

The daily traffic forecasted to move through the length of the study area on I-81 is 26,900 vehicles in 2045 without the ramp connections. Between Davis St. (Exit 182) and River St. (Exit 184) this comprises 38% of all traffic, while between N. Main Ave. (Exit 190) and Scranton/Carbondale Hwy. (Exit 191) the percentage

is 58%. With the addition of the ramps, approximately 25% of this through traffic diverts from I-81 to I-476 in 2045. Table 14 below details this change in through traffic movement on I-81 and I-476 due to addition of the ramp connections.

Table 14
Horizon Year (2045) Through Traffic Diversion

Scenario	I-81 (Exit 182 to Exit 184)			I-476 (N. of Exit 122)		
	Autos + Light Trucks	Heavy Trucks	Total	Autos + Light Trucks	Heavy Trucks	Total
No Build	9,180	17,720	26,900	8,200	3,450	11,650
Build Alt. #1	4,890	15,790	20,680	12,370	5,590	17,960
Difference	-4,290	-1,930	**-6,220**	4,170	2,140	6,310
% Difference	-46.7%	-10.9%	**-23.1%**	50.9%	62.0%	54.2%

Additional observations include:

- On I-81 heavy trucks constitute the majority of through traffic, while the opposite is true for I-476.
- Almost all of the traffic increase on I-476 (6,400 vehicles) can be attributed to through traffic (6,310 vehicles)
- The majority of through traffic diverted from I-81 to I-476 are autos and light trucks.

Forecast Sensitivity

The traffic forecasts incorporated several assumptions including heavy truck traffic growth and toll rates. Forecasts incorporated external heavy truck growth rates for I-476 in accordance with those forecasted by the PASM; 0.7% to 1.0% per year. Based on other cited data sources, truck growth rates for other interstates associated with the study area were set at 2.5% per year. Forecasts assumed that toll rates would increase at the rate of inflation. Changes in these assumptions may result in significantly different outcomes with respect to volume forecasts and changes in traffic volumes on I-476 as a result of the added ramp connections. In order to gauge the sensitivity of the forecasts to these assumptions, several forecasts were prepared for the horizon year (2045) and reported for I-476, just north of Exit 122, varying heavy truck growth and toll rates. Table 15 below provides a summary of these forecasts.

Table 15
Horizon Year (2045) Forecast Sensitivity

Dir	Toll Increase Assumption	2014 Daily Obs. Volume	Daily Forecast Volumes (Vehicles)				
			2045 No Build		2045 Build Alternative #1	Volume Change (Build Alt #1 -No Build)	2 - Way Volume Change
			Volume	Growth			
Truck Growth @ 1%/year on Interstates							
NB	Low (2.83%/year)	**4,350**	**8,300**	2.1%	**12,600**	4,300	8,500
SB		**4,350**	**7,300**	1.7%	**11,500**	4,200	
NB	High (3.95%/year)	**4,350**	**3,800**	-0.4%	**10,800**	7,000	12,200
SB		**4,350**	**4,500**	0.1%	**9,700**	5,200	
Truck Growth @ 2.5%/year on Interstates							
NB	Low (2.83%/year)	**4,350**	**11,000**	3.0%	**13,600**	2,600	6,500
SB		**4,350**	**11,000**	3.0%	**14,900**	3,900	
NB	High (3.95%/year)	**4,350**	**9,000**	2.4%	**11,700**	2,700	5,500
SB		**4,350**	**9,700**	2.6%	**12,500**	2,800	
Forecast Scenario Truck Growth @ 2.5%/year on Interstates (Except I-476)							
NB	Rate of Inflation (2.83%/year)	**4,350**	**10,700**	2.9%	**13,200**	2,500	6,400
SB		**4,350**	**10,100**	2.8%	**14,000**	3,900	

Two variations of heavy truck growth at 1% and 2.5 % per year, and two variations of toll rate increases at 2.83%[18] and 3.95% per year provide for four (4) sensitivity alternatives – representing a low/high heavy truck growth rate and a low/high schedule of toll rate increases. The low and high bounds for heavy truck growth were chosen considering a review of PennDOT growth factors, PennDOT Freight Trans Search Study, PTC Traffic and Revenue Report; and input from PennDOT District 4, I-81 Corridor Coalition, and the NEPA Alliance. PTC projects a truck growth rate of 2% which is within the tested range of 1% to 2.5% per year. The high bounds for toll rate increases represents an addition of a little more than 1% per year over the rate of inflation.

An examination of the 2045 No Build and Build Alternative #1 volumes shows the expected relationships in magnitude between the alternatives tested. The "low" toll rate schedule results in higher volumes on I-476 and the "high" toll rate schedule results in lower volumes for any given truck growth rate assumption. The alternatives with higher truck growth result in higher volumes on I-476, not only as a consequence that there are more trucks, but that more vehicles are choosing to use I-476 as opposed to using I-81 because of an advantage in travel time. In the future several sections of I-81 will be operating at or near capacity compared to I-476 that will have ample capacity. The greater increase in truck growth increases travel times on I-81 much more so than I-476.

[18] average rate of inflation from 1995 - 2015 (www.usinflationcalculator.com)

Variations in the magnitude of volume change as a result of the introduction of the ramps is less intuitive. Two-way volume change varies from 5,500 to 12,200 daily vehicles and indicates that different assumptions in truck growth and toll rates have a significant effect on changes in I-476 traffic volumes as a result of the added ramp connections. Lower volume changes associated with the higher truck growth rate alternatives can be rationalized in that higher truck volumes on I-81 result in more diversion to I-476 without the ramps and the incremental travel time advantage introduced by the ramps is less than in the lower truck growth alternatives. Examination of the volume changes between the low and high toll rate schedule alternatives for the low truck growth rate alternatives show results that cannot be entirely explained at this time – an increase in I-476 volume change with a higher toll rate. It may be that the no build volumes under the low truck growth rate alternatives are more sensitive to toll increases, resulting in the greater change in volume with the addition of the ramps.

Table 15 (bottom of table) also shows the demand associated with the subject forecast scenarios. Note that volumes, volume growth rates, and volume changes closely match the high truck growth/low toll rate alternative. This is expected since the subject forecasts assume the same toll rate increases and similar truck growth.

Appendix B

Preliminary Environmental Inventory Report

Scranton Beltway Project

Borough of Dupont, Pittston Township, Borough of Moosic, and South Abington Township
Luzerne and Lackawanna Counties, Pennsylvania

The Pennsylvania Turnpike Commission
Engineering Department
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October 2015

Scranton Beltway Project
Preliminary Environmental Inventory Report
October 2015

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EXECUTIVE SUMMARY

The Pennsylvania Turnpike Commission (PTC) seeks to optimize the use of the Northeastern Extension (I-476) and I-81 in the Scranton, PA area (Luzerne and Lackawanna Counties). The Northeastern Extension provides an alternative route to I-81 from Wyoming Valley (Interchange 115) to Clarks Summit (Interchange 131), but is underutilized compared to I-81 which frequently operates at or near capacity. As a result, the PTC performed feasibility and preliminary traffic analysis, as well as design services for a potential Scranton Beltway Project which would include direct connections between I-476 and I-81. It is expected that the proposed improvements will benefit both the PTC and the Pennsylvania Department of Transportation (PennDOT) as diverted traffic will improve operations and congestion on I-81 and increase utilization and toll revenue on I-476. The proposed improvements consist of new, direct connections at the external locations of **Wyoming Valley (Milepost A-115 to A-116.2)** and **Clarks Summit interchanges(Milepost A-129.8 to A-130.4)** and potential internal connections including **Moosic (Milepost A-118.7 to A-119.7)**. These areas are located in the Borough of Dupont, Pittston Township, Borough of Moosic, and South Abington Township in Luzerne and Lackawanna Counties, Pennsylvania. Preliminary environmental investigations were conducted for the Wyoming Valley, Moosic, and Clarks Summit study areas to document resources that are present within the proposed project area. Available online resources were consulted and a reconnaissance survey was conducted without entering private properties on October 21, 2014. This report documents the environmental features that could potentially be impacted by the proposed interchange connections.

Several environmental resources are located within the study areas. Consideration of these resources and further studies and analysis are recommended in preliminary design. Please refer to the report for identification of all resources within the study areas.

FEMA designated floodplains, wild trout watershed, EV wetlands, hazardous and residual waste, underground utilities, presence of buildings within the proposed footprint, and an early to mid-twentieth century residential neighborhood are present within the Wyoming Valley study area.
Within the Moosic study area, the presence of a wild trout watershed, EV wetlands, hazardous or residual waste, abandoned mines, potential threatened and endangered plant and wildlife species, residences within the proposed footprint, and the location of utilities will require further evaluation. In addition, the presence of any structures 50 years or older and the known location of the Pennsylvania Coal Company Gravity Railroad may require additional survey and documentation.

Wild trout watershed, EV wetlands, potentially large stream impacts, drinking water wells, underground utilities, residences within the proposed footprint, potential for archaeological resources, potential for buildings 50 years or older along Willowbrook Road and Pauline Drive, and a large tract of land designated as Protected Open Space were identified within the Clarks Summit study area and will need further investigation.

The new direct connections may require noise analysis and air quality analysis at all study areas. The presence of resources listed above and within the report will require further study and evaluation in preliminary design.

I. INTRODUCTION

The Pennsylvania Turnpike Commission (PTC) seeks to optimize the use of the Northeastern Extension (I-476) and I-81 in the Scranton, PA area (Luzerne and Lackawanna Counties). The Northeastern Extension provides an alternative route to I-81 from Wyoming Valley (Interchange 115) to Clarks Summit (Interchange 131), but is underutilized compared to I-81 which frequently operates at or near capacity. As a result, the PTC performed feasibility and preliminary traffic analysis, as well as design services for a potential Scranton Beltway Project which would include direction connections between I-476 and I-81. Based on preliminary engineering studies it was determined that by providing adequate connections between I-476 and I-81, anticipated shifts in traffic from I-81 to the Northeastern Extension would provide relief to I-81. It is expected that the proposed improvements will benefit both the PTC and the Pennsylvania Department of Transportation (PennDOT) as diverted traffic will improve operations and congestion on I-81 and increase utilization and toll revenue on I-476.

The proposed improvements consist of new, direct connections at the external locations of Wyoming Valley (Milepost A-115 to A-116.2) and Clarks Summit (Milepost A-129.8 to A-130.4) interchanges and potential internal connections including Moosic (Milepost A-118.7 to A-119.7). These areas are located in the Borough of Dupont, Pittston Township, Borough of Moosic, and South Abington Township in Luzerne and Lackawanna Counties, Pennsylvania (**Appendix A: Figure 1 and Figure 2**). The three locations are existing interchanges off of I-476 or I-81 that currently provide connections to local or state roadways. The Wyoming Valley and Clarks Summit interchange areas are proposed to provide direct connections between I-476 and I-81, while the Moosic interchange area was included as a potential additional connection between I-476 and I-81. Preliminary environmental investigations were conducted for the proposed improvements to the Wyoming Valley (Milepost A-115 to A-116.2), Moosic (Milepost A-118.7 to A-119.7), and Clarks Summit (Milepost A-129.8 to A-130.4) study areas to document resources that are present within the proposed project area. Available online resources were consulted and a reconnaissance survey was conducted without entering private properties on October 21, 2014. This report documents the environmental features that could potentially be impacted by the proposed interchange connections. General photographs of environmental features within the proposed project areas are provided in **Appendix B**.

II. HYDROLOGY

A. Surface Waters

The project area lies within the Susquehanna River Basin, Lackawanna River watershed (Main Stem, SR 0347 Bridge to Mouth). With a few exceptions, the majority of the project area watersheds include waters suitable for Cold Water Fishes (CWF) and Migratory Fishes (MF) in accordance with 25 Pa. Code § 93. None of the stream sections identified within the project area are classified as Approved Trout Waters, Class A Wild Trout Waters, or Wilderness Trout Waters by the Pennsylvania Fish and Boat Commission (PAFBC). Streams within the project area are not known to be used by recreational boats (Gertler, 2004), are not classified by the

PAFBC as PA Water Trails, and are not classified as navigable waterways by the U.S. Army Corps of Engineers.

During the October 2014 reconnaissance survey and review of online resources, four streams were observed within the project area. Surface waters are provided on mapping included in **Appendix A: Figure 3**. Additional surface waters may be identified during the water and wetland identification and delineation survey of the project area during preliminary design.

The proposed **Wyoming Valley** direct connection project area includes Mill Creek (CWF, MF) and Collins Creek (CWF, MF) (Figure 3a).

The proposed **Moosic** direct connection project area includes Stafford Meadow Brook (Warm Water Fishes (WWF), MF) and Spring Brook (CWF, MF) (Figure 3b). The basin of Stafford Meadow Creek, Spring Brook, and Lidy Creek (4^{th} order tributary to Mill Creek) are classified as streams that support the natural reproduction of trout (wild trout streams).

The proposed **Clarks Summit** direct connections includes unnamed tributaries to Leggetts Creek (CWF, MF) and Leggetts Creek (CWF, MF and Trout Stocking Fishery (TSF), MF) (**Appendix B: Photographs 1 and 2**), and Leggetts Creek contains a stream segment known to support the natural reproduction of trout; however, this segment is located downstream of the project area.
In accordance with 58 Pa. Code § 57.11b(4), tributaries to wild trout streams are to be classified as wild trout streams. In accordance with 25 Pa. Code § 105.17(1)(iii), all wetlands within the floodplain of a designated wild trout stream are classified as Exceptional Value (EV). In addition, in-stream construction restrictions will likely be applicable from October 1 through December 31 on all streams within these basins. Leggetts Creek will not require a time of year restriction, but it is likely that wetlands within the floodplain of Leggetts Creek within the project area will be classified as EV, due to the downstream wild trout designation.

B. Wetlands

A review of the National Wetland Inventory (NWI) mapping indicates that no wetlands were previously mapped by NWI in the vicinity of the **Wyoming Valley** study area. A review of the NWI mapping indicates that there are previously mapped palustrine forested, scrub shrub, and emergent wetlands within the vicinity of the **Moosic** and **Clarks Summit** study areas. A small portion of wetlands classified as palustrine forested wetlands (PFO1A) are mapped within the **Clarks Summit** study area (**Appendix A: Figure 3**).

During the October 2014 reconnaissance survey, two additional potential wetland areas were identified within the project area (**Appendix A: Figure 3)**. The first is located in the **Wyoming Valley** study area (**Appendix B: Photograph 3**), the other is located in the **Moosic** study area (**Appendix B: Photograph 4**). No delineation of wetland boundaries was completed as private property access was not permitted at the time. A full wetland delineation will be required during preliminary design of the project.

Due to portions of the project area being located within a wild trout stream basin, EV wetlands may be present within the project area. Wetlands within 50 feet of streams in the northern portion of the **Wyoming Valley**, the **Moosic** and the **Clarks Summit** study areas may be classified as EV. All NWI and field identified potential wetland areas are provided on **Appendix A: Figure 3**.

C. Floodplain/Floodways

Copies of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) were obtained for the area along I-476 and I-81 at the three proposed direct connection locations (Wyoming Valley, Moosic, and Clarks Summit). The direct connection study areas include map panels 42079C0253E, 4205330005B, 4217580006A and 4217580004A. FEMA mapped floodplains are displayed on **Appendix A: Figure 3**.

The proposed **Wyoming Valley** direct connection is within the southernmost study area of the Scranton Beltway Project and is located in the Borough of Dupont and Pittston Township (42079C0253E). The study area begins just north of the I-476 and I-81 crossing of Mill Creek No. 2. Proposed construction of the direct connections is located within the detailed study area of Collins Creek (Zone AE). Zone AE is the Special Flood Hazard Area (SFHA), which is defined as the area that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year, also known as the base flood. The proposed direct connections within the Wyoming Valley study area are anticipated to end prior to the crossing of Lidy Creek.

The proposed **Moosic** direct connection is located in the Borough of Moosic (4205330005B). The study area begins along Spring Brook and portions of the proposed direct connections are designated within Zone B of Spring Brook. Zone B is defined as areas between the limits of the 100-year flood (1% annual chance flood) and 500-year flood (0.2% annual chance flood). The proposed direct connections will additionally cross Zone A of Stafford Meadow Brook. Zone A is defined as approximate areas of the 100-year flood where base flood elevations and flood hazard factors were not determined. The majority of the study area is within Zone C, which is defined as areas of minimal flooding.

The proposed **Clarks Summit** direct connections are the northernmost improvements planned as part of the Scranton Beltway Project and are located in South Abington Township (421758 0004A and 0006A). Proposed Clarks Summit direct connections would not impact any FEMA delineated or approximated floodplains or floodways. The study area of the Clarks Summit direct connections lies entirely in Zone C.

D. Groundwater Resources

Sole or principal source aquifers are aquifers that supply at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend on the aquifer for drinking water. Proposed federally financially assisted projects that have the

potential to contaminate a designated sole source aquifer are subject to U.S. Environmental Protection Agency (USEPA) review. USEPA Region III has not designated any sole source aquifers within or adjacent to the project area.

According to the Pennsylvania Groundwater Information System website there are approximately 19 wells actively used for private or public water consumption, 2 wells used for commercial purposes, 26 wells used for observation or monitoring, 3 industrial wells, and 12 abandoned or unused wells located within 0.5 miles of the study areas. All active drinking water wells are located more than 100 feet beyond the edge of the Turnpike's right-of-way. Wells that were located greater than 100 feet from the study area were not shown on the project mapping.

Wyoming Valley and Moosic – There are no wells located within 100 feet of these study areas.

Two wells are located within 100 feet of the **Clarks Summit** study area, but are not currently in use (**Appendix A: Figure 3c**).

III. THREATENED AND ENDANGERED SPECIES

A Pennsylvania Natural Diversity Inventory (PNDI) online environmental review was completed for each of the three study areas in September 2014 and repeated in May 2015. (Receipts included in **Appendix D**). The agency determinations and responses are valid for two years (from the date of the review), and are based on the project information that was provided including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If more than two years go by, or any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies.

Wyoming Valley - The results indicate that no threatened or endangered plants, animals or other resources under the jurisdiction of the United States Fish and Wildlife Service (USFWS), Pennsylvania Department of Conservation and Natural Resources (PA DCNR), Pennsylvania Game Commission (PGC), or the PAFBC are known to exist within this study area.

Moosic - Results of the environmental review require additional coordination with PA DCNR and USFWS for the proposed Moosic direct connections. The proposed direct connections may have potential impacts to resources under PA DCNR jurisdiction including Coastal Juneberry (*Amelanchier obovalis*, proposed state endangered), Appalachian Sandwort (*Minuartia glabra,* state threatened), Slender Mountain-ricegrass (*Oryzopsis pungens or Piptatherum pungens,* state endangered) and an unnamed, sensitive species (state endangered). In addition, further detailed review of the proposed Moosic direct connections is requested by USFWS in order to determine potential conflicts with a federally listed species of special concern in the vicinity. The environmental review receipts are valid for two years and are provided in **Appendix D**.

Coastal Juneberry is a shrub of the Rose Family with dark green foliage, white flowers, and dark blue to purple berries. The shrub can grow as tall as 10 feet at maturity, but is typically 1-5 feet tall. The shrub blooms in early spring and its fruit/seed begins in summer and ends in fall. The species grows in sandy soils in a variety of coastal habitats.

Appalachian Sandwort is an annual herb that can grow up to 6 inches in height. The herb flowers from May to July, but sporadically later in the year as well. The species grows on open well drained sandstone and shale bedrock outcrops and in dry open woods. This species is known to be present in the surrounding areas. Approximately 5,000 feet southwest of the Moosic project area, North Branch Land Trust owns the Montage Mountain Wildflower Sanctuary. The sanctuary is 18.27 acres in Pittston Township, Luzerne County and is preserved in order to protect critical habitat for a wildflower state listed as threatened in Pennsylvania, Appalachian sandwort (*Minuartia glabra*).

Slender Mountain ricegrass is a perennial grass that can grow up to 18 inches in height. The leaves are alternately arranged. The grass flowers primarily in May and June. It grows in well-drained, sandy habitats that receive considerable sunlight, such as mountain tops and rock outcrops.

A botanical survey may be required by PA DCNR, during the appropriate time of year, by a qualified botanist. Coordination is required with USFWS for a federally listed plant or animal species (species was not identified during PNDI environmental review). Based on the project description and needs of the species, USFWS may require a survey or additional studies. At this point in the project, further coordination was not conducted with the environmental resource agencies as noted on the PNDI receipt. Further coordination should be conducted during preliminary design once additional information is known (i.e. limit of disturbance, additional engineering details, presence of wetlands and habitat types, etc.).

Clarks Summit - The results indicate that no threatened or endangered plants, animals or other resources under the jurisdiction of the United States Fish and Wildlife Service (USFWS), Pennsylvania Department of Conservation and Natural Resources (PA DCNR), Pennsylvania Game Commission (PGC), or the PAFBC are known to exist within this study area.

IV. LAND USE AND COMMUNITY RESOURCES

A. Land Use

United State Geological Survey (USGS) Topographic Mapping and publicly available online aerial photography was reviewed to determine general land use and land cover within and adjacent to the study areas. County land use GIS layers (obtained from Luzerne and Lackawanna County) are displayed on **Appendix A: Figure 4**. In addition, mapping was field verified in October 2014. In some instance overlaying a provided land use seems to conflict with aerial mapping imagery. These areas were not adjusted for this investigation. Additional information will need to be collected during preliminary design to determine current/appropriate

land use. The majority of the area adjacent to the interchange areas consists of residential or forested areas. The **Wyoming Valley** proposed direct connection may result in a business displacement. The business name and type will need to be determined in preliminary design. The **Moosic and Clarks Summit** proposed direct connections may result in residential displacements and/or acquisition of residential land (**Appendix B: Photograph 5, 6 and 7**).

B. Community Resources

According to data available, all lands within the proposed direct connection study areas are PennDOT ROW, PTC ROW, or otherwise privately owned. A nearby cemetery (Figure 2a), a municipal owned compost dump (Figure 2a**),** and Baptist Bible College (Figure 2c) can be viewed on **Appendix A: Figure 2**; however, no other community or public facilities are located within or adjacent to the project area. Ownership of some land parcels could not be determined through publicly available online resources or during site reconnaissance and detailed property ownership searches were not conducted at this time. Additional public lands may be identified in preliminary design.

V. AGRICULTURAL RESOURCES

A. Agricultural Security Areas, Preserved Farms, and Conservation Easements

Luzerne and Lackawanna counties, as well as Dupont Borough, Pittston Township, Moosic Borough, and South Abington Township were contacted to inquire about the presence and location of Agricultural Security Areas (ASAs), preserved farms, conservation easements, parcels zoned agricultural, and farmlands enrolled in preferential tax assessment programs (i.e. Clean and Green) within the study areas. County and municipal responses are provided in **Appendix C**. No preserved farms, ASAs, or agricultural conservation easements exist within the study area. During a field view of the study areas in October 2014, agricultural land use of the parcels was investigated. None of the property within the study areas was observed in active agricultural production.

B. Agricultural Zoning, Farmed Lands, Preferential Tax Assessment Programs

According to review of online mapping (i.e. aerial photographs from www.googlemaps.com) and a reconnaissance survey of the project area, no lands within the project area are currently being used for farming purposes (fallow fields or cropland). According to online review of publicly available data and correspondence with municipality and county organizations, none of the project area is zoned as agriculture. Information concerning parcels enrolled in preferential tax assessment programs could not be obtained at this time. Once specific parcel numbers are known further coordination with the municipalities can be conducted to determine if any parcels are enrolled in preferential tax assessment programs.

C. Farmland Soils

According to the United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) soil survey mapping, the **Wyoming Valley** study area contains prime farmland soils and farmland soils of statewide importance; no soils are mapped as unique farmland soils or farmland soil of local importance. The **Moosic** study area did not contain any prime farmland soils, farmland soils of statewide importance, unique farmland soils, or farmland soils of local importance. The **Clarks Summit** study area contains farmland soils of statewide importance (**Appendix A: Figures 5a, 5b and 5c**).

Prime Farmland Soils (within project area):

- Basher soils, (Bf)
- Mardin channery silt loam, 3 to 8 percent slopes (McB)
- Wurtsboro channery loam, 3 to 8 percent slopes (WrB)

Farmland Soils of Statewide Importance (within project area):

- Mardin flaggy silt loam, 8 to 15 percent slopes (MfC
- Morris channery loam, 3 to 8 percent slopes (MrB)
- Morris channery loam, 8 to 15 percent slopes (MrC)
- Volusia channery silt loam, 3 to 8 percent slopes (VcB)
- Volusia flaggy silt loam, 3 to 8 percent slopes, (VfB)
- Volusia channery silt loam, 8 to 15 percent slopes (VoC)
- Wellsboro channery loam, 8 to 15 percent slopes, (WcC)
- Wurtsboro channery loam, 8 to 15 percent slopes, (WrC)

VI. UNIQUE GEOLOGIC RESOURCES

According to Outstanding Scenic Geological Features of Pennsylvania, one unique geologic resource is located within Pittston Township, PA. Campbell Ledge (Dial Rock) is located 2.5 miles north of Pittston, on the east bank of the Susquehanna River. This resource is not located within the study areas. No unique geologic resources are listed in Dupont Borough, Moosic Borough, or South Abington Township.

VII. STATE GAME LANDS, STATE AND NATIONAL FORESTS AND PARKS, NATURAL LANDMARKS, SANCTUARIES AND/OR REFUGES, AND LOCAL PARKS

Based on secondary information including United States Geological Survey mapping, online mapping available on the PA DCNR, PGC, and U.S. National Park Service (NPS) websites, conservation group websites (Nature Conservancy, Wildlands Conservancy, Countryside Conservancy, and North Branch Land Trust), and field views, no state game lands, state or national forests or parks, natural landmarks or sanctuaries and/or refuges exist within the project area. During the October 2014 field reconnaissance, no locally-owned parks were observed

within or directly adjacent to the study areas. There are no Lackawanna or Luzerne County parks within Dupont Borough, Pittston Township, Moosic Borough, or South Abington Township.

Within the **Clarks Summit** study area, an area of forested private land is enrolled in the Cooperative Forest Program with PGC. In addition, in the vicinity of the Clarks Summit study area, a large tract of land is designated as Protected Open Space by the county. The property owner information for this parcel is not publicly available online and will need to be determined in preliminary design.

VIII. SECTION 6(f) AND OTHER RECREATIONAL GRANT LAND RESOURCES

Public recreational lands may have been purchased utilizing grant money and therefore may be protected from conversion to other land uses. Lands purchased through Section 6(f) (Land and Water Conservation Funding), Project 70, Project 500, and other Commonwealth grant programs may have restrictions or otherwise be protected from land use conversion. Based on secondary source review and field reconnaissance, no parklands or other recreational resources are mapped or were observed within or immediately adjacent to the project area. Parcels within the project area were not identified as utilizing Land and Water Conservation Funding, in accordance with the National Park Service or PA DCNR records. Further investigation will be conducted in preliminary design.

IX. POTENTIAL WASTE SITES AND MINED LANDS

A. Waste Sites

According to secondary information obtained in PA DEP's Environment Facility Application Compliance Tracking System (eFACTS) database and preliminary field reconnaissance, there is a potential for waste pollution within and adjacent to the study areas. The majority of facilities identified in PA DEP eFACTS database in the vicinity of the project that contain a permit or violation include Water Pollution Control Facilities (discharge points), Storage Tank Locations, Land Recycling Cleanup Locations (soil and groundwater), Landfills (municipal waste operation), U.S. Environmental Protection Agency (EPA) Enviro Facts Facilities (small quantity generators and other storage facilities) and Toxic Release Inventory (TRI) Facilities.

A business located within the **Wyoming Valley** study area contained several 55-gallon drums of unknown contents when viewed in Google Earth Street View. During field reconnaissance activities, two additional properties were identified as potential areas of concern. A residential waste dumping area (**Appendix B: Photograph 8, Figure 6a**) was observed within the Wyoming Valley study area adjacent to I-476 (see photographs in **Appendix B**). A potential former gas station may be located within the **Moosic** study area (**Appendix B: Photograph 9, Figure 6b**). Facilities and potential areas of concern are mapped on **Appendix A: Figure 6** and listed in **Table 1**.

Table 1. Potential Waste Sites of Concern[1] Within or Adjacent[2] to Study Areas

Project Area	Name	Address	Finding	Notes
Wyoming Valley (MP A-115 to A-116.2)	Ireco Inc., Suscon Plant	112 Armstrong Rd., Pittston, PA 18640	Toxic Release Inventory (TRI)	TRI ID = 18640NDPND112AR 1987 release of ethylene glycol, sulfuric acid, nitric acid, nitroglycerin, and ammonium nitrate.
	Exxon 739 Corp	Info not provided by data source.	Water Pollution Control Facility	PA Facility ID = PA0038709 Intermittent Industrial Waste Discharge Point
	Falcon Oil Co, Inc.	Info not provided by data source.	Land Recycling Cleanup Location	Groundwater Media
	Gulf Oil LTD Partnership	674 Suscon Rd. Pittston, PA 18640	-Land Recycling Cleanup Location -Water Pollution Control Facility -Enviro Facts Facility -Storage Tank Location	PA Facility ID = PAG102316 Soil Media (Land Recycling Cleanup) Industrial Waste Discharge during hydrostatic testing of tanks 10 storage tanks (8 currently in use)
	Dupont Bulk Petroleum Storage Terminal	675 Suscon Rd. Pittston, PA 18640	-Water Pollution Control Facility -Enviro Facts Facility	PA Facility ID = PAG052229 Industrial stormwater discharge points (4) Enviro Facts Facility (EPA)
	Cleveland Bros Equip Co Inc	Info not provided by data source.	Storage Tank Location	3 storage tanks (1 exempt)
	Herr Foods Inc	Info not provided by data source.	Storage Tank Location	2 storage tanks
	Dupont Tool & Machine Shop	311 Elm St. Dupont, PA 18641	Enivro Facts Facility	PA Facility ID = PAD987400835 Small Quantity Generator
	Informal Dumping Area[3]	adjacent to I-476 and Wyoming Ave. bridge	Info not provided by data source.	Residential waste observed and visible on aerials

Table 1. Potential Waste Sites of Concern[1] Within or Adjacent[2] to Study Areas

Project Area	Name	Address	Finding	Notes
Moosic (MP A-118.7 to A-119.7.4)	Northeast Chrysler Plymouth	4250 Birney Ave. Moosic, PA 18507	Enivro Facts Facility	PA Facility ID = PAD167892736 Small Quantity Generator
	Sun Buick	4230 Birney Ave. Moosic, PA 18507	Enivro Facts Facility	PA Facility ID = 4206944039
	Ertley Chrysler	4225 Birney Ave. Moosic, PA 18507	Enivro Facts Facility	PA Facility ID = 4206944042
	Dunmore Oil Co Inc/Dunmore Oil Mobil	Info not provided by data source.	Storage Tank Location	10 storage tanks, gas station
	Wingfoot Commercial Tire Sys	698 Rocky Glen Rd. Avoca, PA 18641	Enivro Facts Facility	not active
	H. Wilson Auto	604 Rocky Glen Rd. Avoca, PA 18641	Enivro Facts Facility	PA Facility ID = PAU123484
	Fed Express	Rock Glen Rd. Moosic, PA 18507	Enivro Facts Facility	PA Facility ID = PAD987281193
	Eddyleon Chocolate Co Inc	Info not provided by data source.	Land Recycling Cleanup Location	Soil Media - cleanup during tank closure
	Moosic Borough	Info not provided by data source.	Water Pollution Control Facility	Municipal stormwater discharge points (2 facilities)
	Mesko Glass & Mirror Co Inc	Info not provided by data source.	Storage Tank Location	Inactive/Closed without a permit (2 tanks)
	Potential Former Gas Station[3]	Route 11 Moosic, PA 18507	Info not provided by data source.	Pavement patching in a parking lot may indicate a former gas station location.

Table 1. Potential Waste Sites of Concern[1] Within or Adjacent[2] to Study Areas

Project Area	Name	Address	Finding	Notes
Clarks Summit (MP A-129.8 to A-130.4)	PA Turnpike Commission	Info not provided by data source.	Storage Tank Location	2 storage tanks located just off the mapping.
	Baptist Bible College	Info not provided by data source.	-Landfill - Municipal Waste Operation -Storage Tank Location	BBC Demolition Landfill 10 storage tanks
	South Abington Township	Info not provided by data source.	Water Pollution Control Facility	PA Facility ID = PAG132208 Municipal stormwater discharge point

[1]Information obtained from PA DEP emappa website http://www.emappa.dep.state.pa.us/emappa/viewer.htm, unless otherwise indicated

[2] Adjacent to Project Area = facilities within approximately 1,000 feet of anticipated project disturbance

[3] Observed during field reconnaisance by McCormick Taylor in October 2014

B. Mining

According to PA DEP Abandoned Mine records, anthracite coal mining activities have historically occurred in the vicinity of the **Wyoming Valley** study area and within the **Moosic** study area, but no mining activities have historically occurred within or adjacent to the **Clarks Summit** study area. The location of abandoned mined lands is provided on **Appendix A: Figure 6**. According to DEP's 2013 Annual Report on Mining Activities, no active mines are located in Dupont Borough, Pittston Township, Moosic Borough, or South Abington Township.

X. CULTURAL RESOURCES

A. Above Ground Historic Properties

A review of the Pennsylvania Historical and Museum Commission's (PHMC) Cultural Resources Geographic Information System (CRGIS) indicates that there are no National Register listed or eligible resources in the immediate vicinity of the **Wyoming Valley** study area. The Pennsylvania Turnpike (Key # 155199) was previously determined not eligible for the National Register. An early-to-mid twentieth century residential neighborhood is located along the west side of I-81 between Mill Creek and Lidy Creek which may have potential as an historic district and may require further investigations during preliminary design.

A review of the PHMC's CRGIS indicates that no National Register listed or eligible resources are located in the **Moosic** study area. The Pennsylvania Coal Company Gravity Railroad (Key #155622) extends through the project area **Appendix A: Figure 2b**, but no formal evaluation has been completed on this resource. The gravity railroad operated between 1850 and 1885 and was removed in 1886. The gravity railroad may require survey and documentation as part of further studies in preliminary design. No other potential historic resources appear to be in the Moosic study area, but if there are any structures 50 years or older present they may require documentation either with abbreviated or full PHRS forms, depending on their potential for National Register eligibility.

A review of the PHMC's CRGIS indicates that there are no National Register listed or eligible resources located in the **Clarks Summit** study area. Three (3) National Register ineligible resources are in the immediate vicinity of the project location: L.R. 35020 Bridge (Key # 092508), Chinchilla Historic District (Key # 156584), and Pennsylvania Turnpike (Key # 155199). There are no other previously identified resources in the project area. There is a limited potential for historic structures within the project location. There is potential for a small number of buildings 50 years or older along Willowbrook Road and Pauline Drive which may require further documentation, either with abbreviated or full PHRS forms, depending on their potential for National Register eligibility.

B. Archaeological Resources

A review of the CRGIS indicates that no previously identified archaeological sites are located within or in the near vicinity of the **Wyoming Valley, Moosic, or Clarks Summit** study areas.

A previous Phase I archaeological survey, conducted in 1989 by CHRS, Inc., for the PTC Interchange International Distribution Center, covered the northernmost 1100 feet of the proposed **Wyoming Valley** study area. This Phase I survey did not identify any archaeological sites along I-476, and no additional archaeological investigations would be necessary in this area, provided that the proposed project stays within the limits of the previous survey.

In general, current conditions suggest low archaeological potential within the proposed project areas for the three proposed direct connections due to previous ground disturbance associated with road construction, utility installation, and possible mining activities. In other areas, archaeological potential was considered to be low due to steeply sloping landforms and the lack of water sources in proximity to the project areas. One exception occurs within the **Clarks Summit** study area. A section of this project area would likely impact a gently sloping stream bench overlooking a tributary to Leggetts Creek. This area lies to the north and west of the I-476 access ramp curve and to the south of I-81 (**Appendix B: Photograph 10**). The relatively flat and undisturbed portions of this landform exhibit moderate potential for containing archaeological sites, therefore a Phase I Archaeological Survey may be necessary in the undisturbed areas associated with the Clarks Summit study area.

XI. PUBLICLY-OWNED PARKS/RECREATION AREAS/REFUGES

No publicly-owned parks, recreation areas, or refuges were observed during field reconnaissance or identified during secondary source review within or immediately adjacent to the project area. Within the **Clarks Summit** study area, a large tract of land is designated as Protected Open Space by the county. Further investigation should take place during preliminary design to determine the ownership of this parcel.

XII. AIR QUALITY AND NOISE

A. Air Quality

EPA established National Ambient Air Quality Standards (NAAQS) for commonly found air pollutants including carbon monoxide (CO), ozone, particulate matter ($PM_{2.5}$ and PM_{10}) nitrogen oxides (NOx), sulfur dioxide (SO2) and lead (Pb). The project is located within Luzerne and Lackawanna Counties, which are both in attainment with the NAAQS on a regional level, with the exception of 8-hour ozone (1997). Luzerne and Lackawanna Counties are both designated as maintenance areas for 8-hour ozone, which may require the project to be considered being included in a regional conformity analysis.

B. Noise

In accordance with PennDOT Publication #24, Noise Manual, "*(5) The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange*" is considered a Type I highway traffic noise project. Aerial mapping and field reconnaissance confirmed that the proposed direct connection study areas all contain sensitive receptors within

100 – 1,000 feet of the project. **Wyoming Valley** study area contains approximately 80-100 residential houses within 1,000 feet of the proposed project while some of the housing is as close as 150 feet from the project area. The **Moosic** study area contains approximately 25 – 40 newly built residential housing within 1,000 feet of the proposed project while some of the housing is within or immediately adjacent to the study area. The **Clarks Summit** study area contains approximately 125 – 150 residential houses within 1,000 feet of the proposed project while some of the housing is within and immediately adjacent to the study area.

XIII. UTILITIES

The presence and general location of overhead utility lines and pipeline markers was observed during the October 2014 field reconnaissance.

Utilities observed within the **Wyoming Valley** study area included both overhead utilities and a water pipeline. Overhead utilities were observed crossing I-81 and I-476 along the Suscon Road bridge and the Wyoming Avenue bridge. Overhead transmission lines run parallel to I-476, but likely just outside of the project area. PA American Water pipeline markers (**Appendix B: Photograph 11**) were observed running parallel between I-476 and I-81 in the vicinity of the Suscon Road bridge.

Within the **Moosic** study area, overhead utilities were observed along SR 0011, crossing over I-476. Natural gas pipeline markers (**Appendix B: Photograph 12**) were observed parallel and east of I-476, crossing under I-81.

Within the **Clarks Summit** study area, overhead utilities were present only when the interstates crossed a local or state route. Overhead utilities crossed the interstate at the bridge over SR 4030 (Edella Rd.), located along Hilltop Lane (adjacent to I-81, partially within project area), and along the Simorelli Road bridge over I-81. Sanitary sewer manholes were observed between I-81 and Willowbrook Road within the study area.

The PTC provided their utility logs for each of the three project direct connection study areas. These logs are included in **Appendix E**.

XIV. SUMMARY OF RESULTS AND RECOMMENDATIONS

Several environmental resources are located within all three direct connection study areas. Consideration of these resources and further studies and analysis are recommended in preliminary design:

- Potential emergent wetlands were identified within and/or adjacent to the study area. A detailed wetland and stream identification and delineation is recommended. Design should take into account presence of aquatic resources and avoidance and/or minimization of impacts, where practicable.

- Potential areas of concern associated with waste are present within and/or adjacent to the study area. A Phase I Environmental Site Assessment is recommended.
- Luzerne and Lackawanna Counties are both designated as NAAQS maintenance areas for 8-hour ozone, which may require the project to be considered being included in a regional air quality conformity analysis.
- The project will require a Type I highway traffic noise analysis and sensitive receptors are located within and adjacent to the project area (residential housing).
- If there are any structures 50 years or older present they may require documentation either with abbreviated or full PHRS forms, depending on their potential for National Register eligibility.
- Threatened and Endangered species inquiries were conducted in May of 2015. The agency determinations and responses are valid for two years (from the date of the review), and are based on the project information that was provided including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If more than two years pass and/or any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies.

A. Wyoming Valley Proposed Direct Connections Study Area (Milepost A-115 to A-166.2

- The project area will cross Collins Creek, which has a designated FEMA 100 and 500 year floodplain. Project impacts to the FEMA delineated floodplain and water surface elevations will need to be evaluated during preliminary design.
- The northern portion of the study area is located within a wild trout watershed. All wetlands identified within 50 feet of any streams will be designated as Exceptional Value. In-stream construction restrictions may apply from October 1st through December 31st.
- A business displacement may be necessary.
- A Pennsylvania-American Water pipeline is located between I-476 and I-81. Further information concerning the pipeline will need to be determined to assess impacts to project design.
- An early-to-mid twentieth century residential neighborhood is located along the west side of I-81 between Mill Creek and Lidy Creek which may have potential as an historic district and may require further investigations.

B. Moosic Proposed Direct Connections Study Area (Milepost A-118.7 to 119.7)

- The study area is located within a wild trout watershed. All wetlands identified within 50 feet of any streams will be designated as Exceptional Value. In-stream construction restrictions may apply from October 1st through December 31st.

- Abandoned mines are present within the study area. Further information concerning the mine and associated lands will need to be determined to assess impacts to project design.
- Plant species listed as state threatened and state special concern species are known within the vicinity of the study area and could potentially be impacted by the project. Further coordination with DCNR will be required in preliminary design. A botanical habitat assessment and/or survey for specific species may be required.
- A federally listed plant or animal species is known within the vicinity of the study area and could potentially be impacted by the project. Further coordination with USFWS will be required in preliminary design. A habitat assessment and/or survey for a specific species may be required.
- A natural gas pipeline is present within and/or adjacent to the project area. Further information concerning the pipeline will need to be determined to assess impacts to project design.
- Residential displacements may be necessary.
- The Pennsylvania Coal Company Gravity Railroad extends through the Moosic study area and may require survey and documentation as part of cultural resource studies.

C. Clarks Summit Proposed Direct Connections Study Area (Milepost A-129.8 to Milepost A-130.4)

- The study area is located within a wild trout watershed. All wetlands identified within 50 feet of any streams will be designated as Exceptional Value. The wild trout section of stream is located downstream of the project area therefore the in-stream construction restrictions will not be required.
- Drinking water wells currently not in use were identified within the study area. Wells will need to be closed in accordance with PA DEP regulations and guidance, prior to construction of the project as currently designed.
- A sanitary sewer pipeline and associated manholes are located within and/or adjacent to the study area. Further information concerning the pipeline will need to be determined to assess impacts to project design.
- Residential displacements may be necessary.
- There is potential for a small number of buildings 50 years or older along Willowbrook Road and Pauline Drive which may require further documentation, either with abbreviated or full PHRS forms, depending on their potential for National Register eligibility.
- The potential for archaeological resources exists within relatively flat areas adjacent to the tributary to Leggetts Creek. Further archaeological studies are recommended in preliminary design.
- A large tract of land is designated as Protected Open Space by the county within the study area. If impacts are anticipated to this parcel, further investigation and coordination may be required.

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Appendix A
Figures

Preliminary Environmental Inventory Report
Scranton Beltway Project

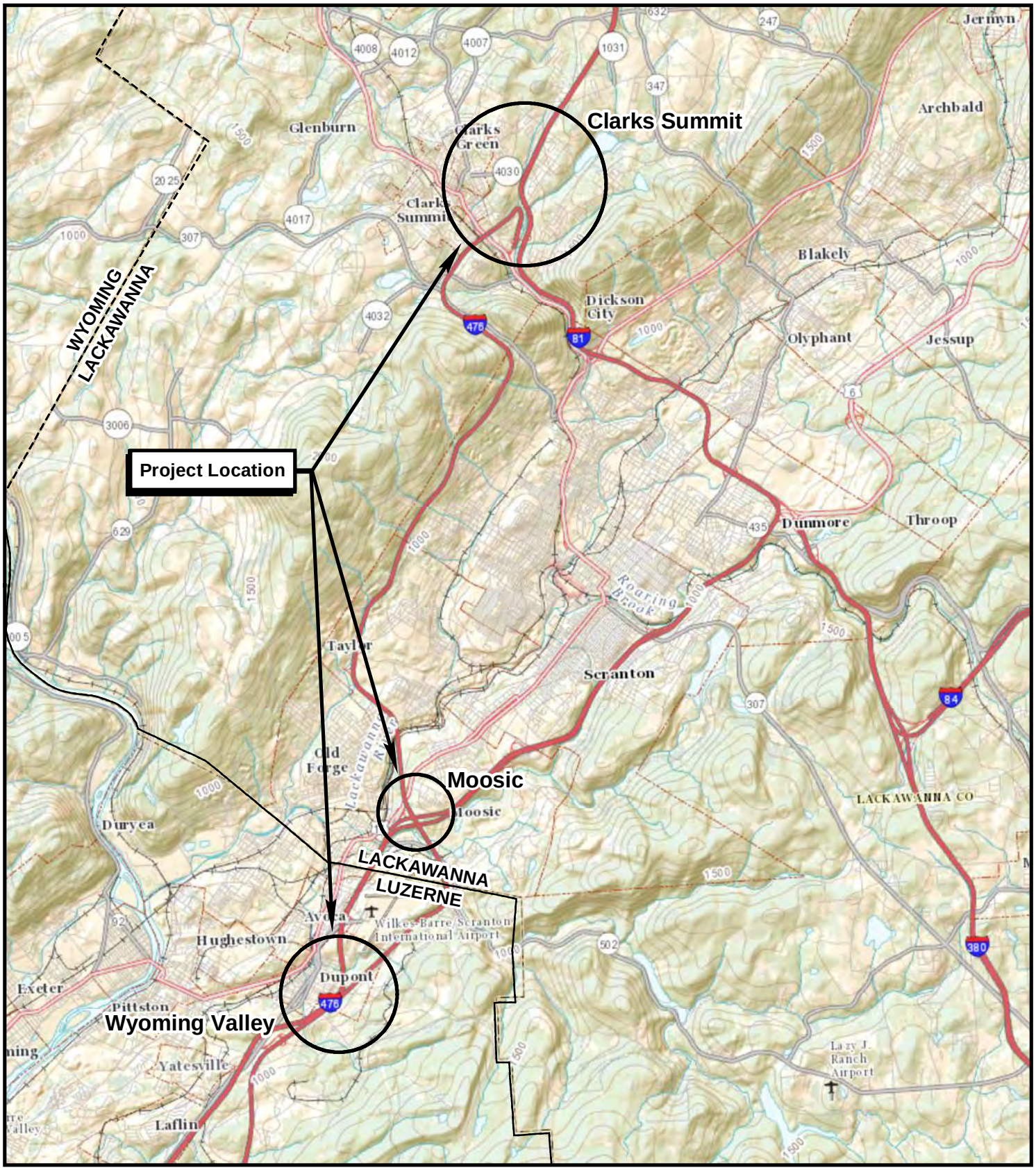

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Figure 1
Project Location Map
Scranton Beltway Project
Luzerne and Lackawanna Counties, PA

County

Source: USGS National Map, basemap service

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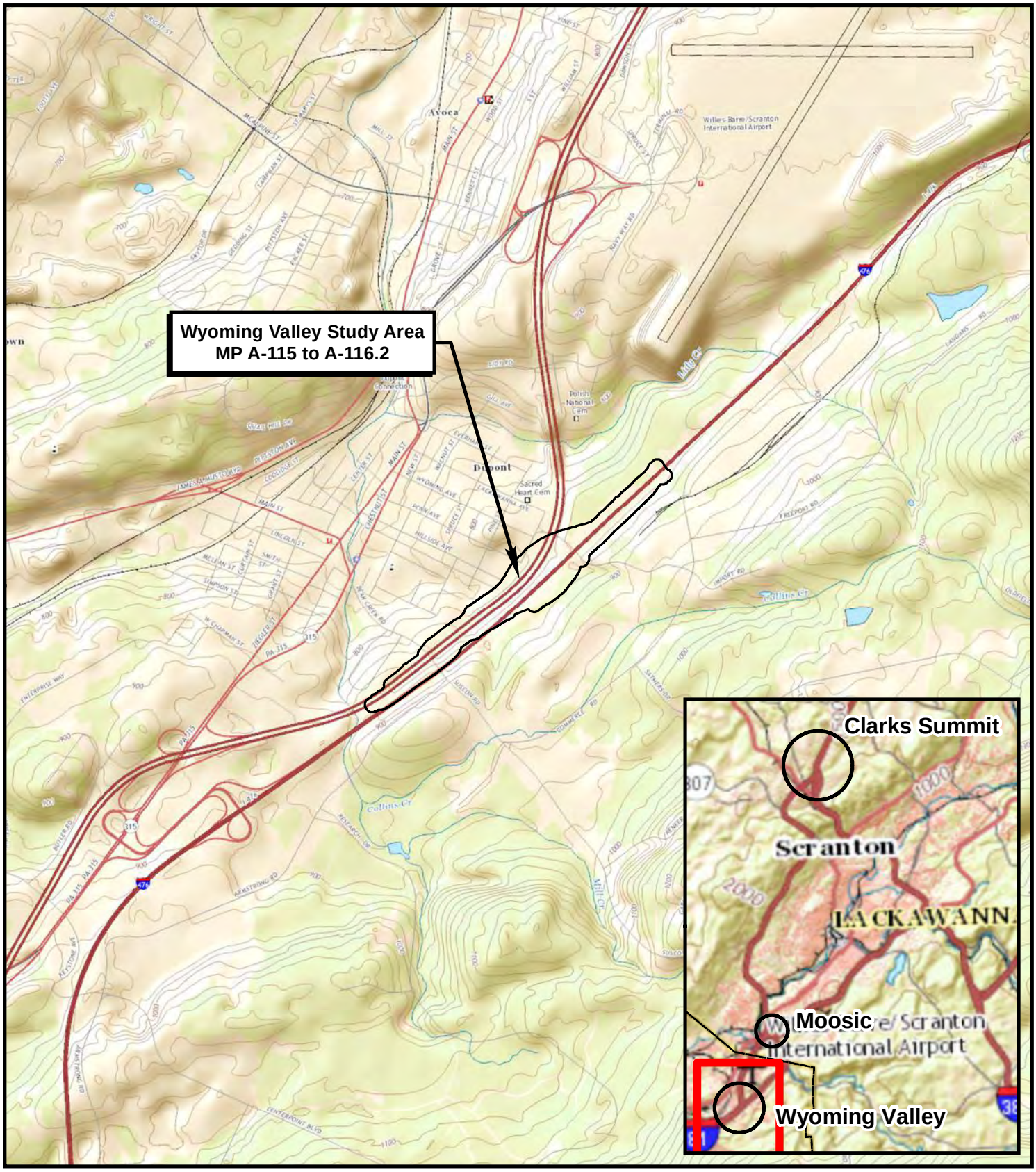

Figure 1a
Project Location Map
Scranton Beltway Project
Wyoming Valley Study Area
Luzerne County, PA

Project Location

Source: USGS National Map, basemap service

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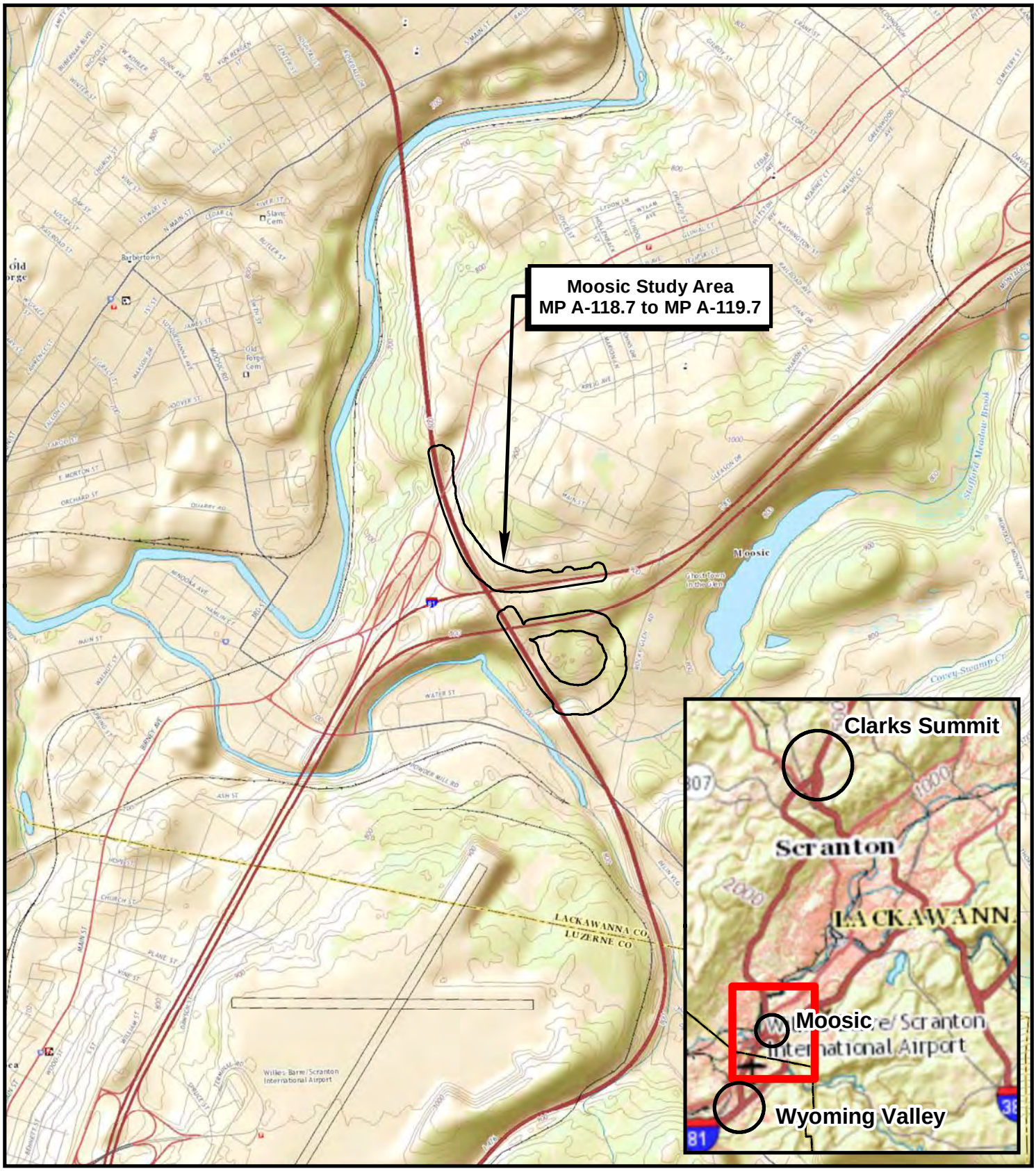

Figure 1b
Project Location Map
Scranton Beltway Project
Moosic Study Area
Lackawanna County, PA

Project Location

Source: USGS National Map, basemap service

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Feet

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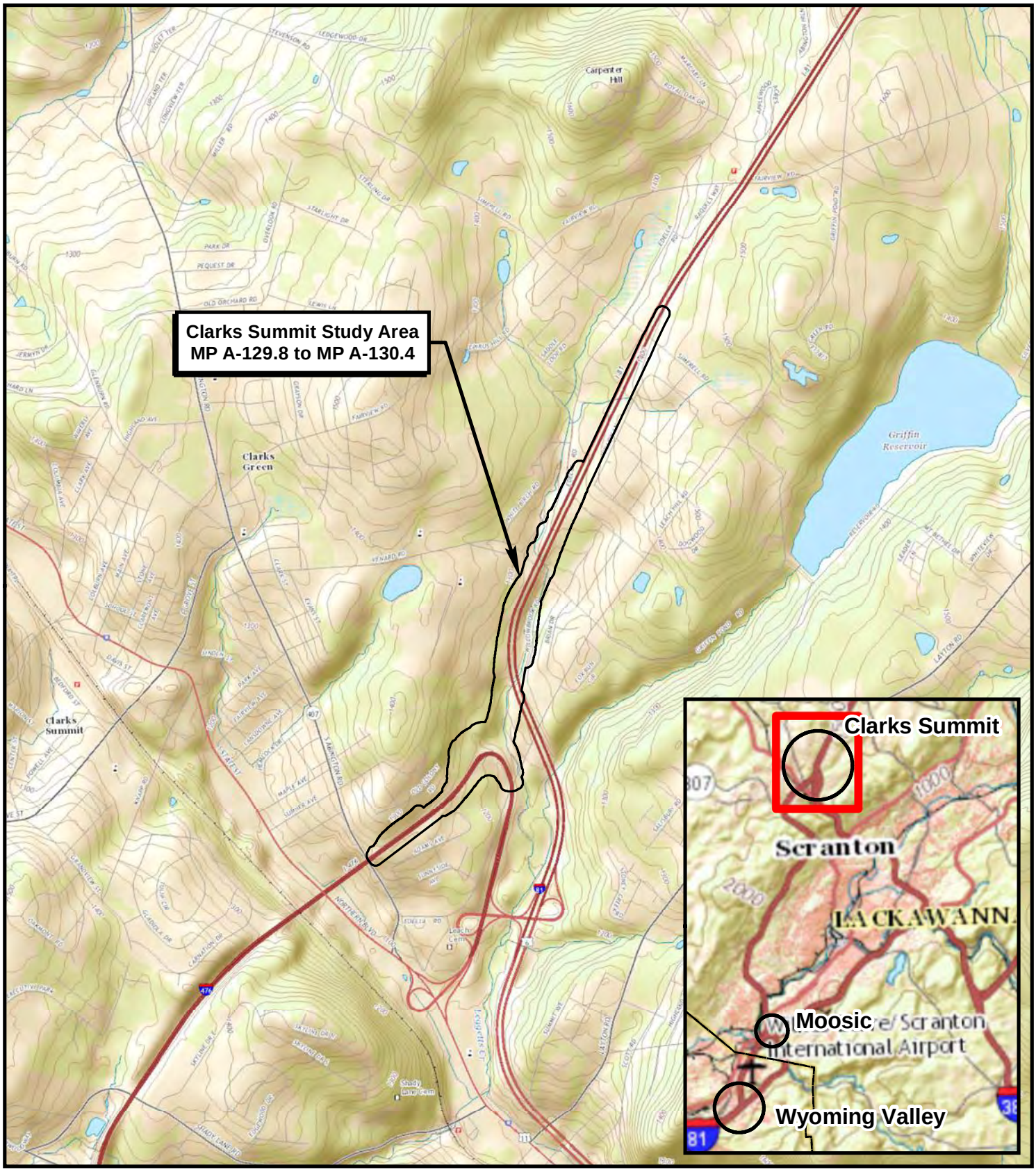


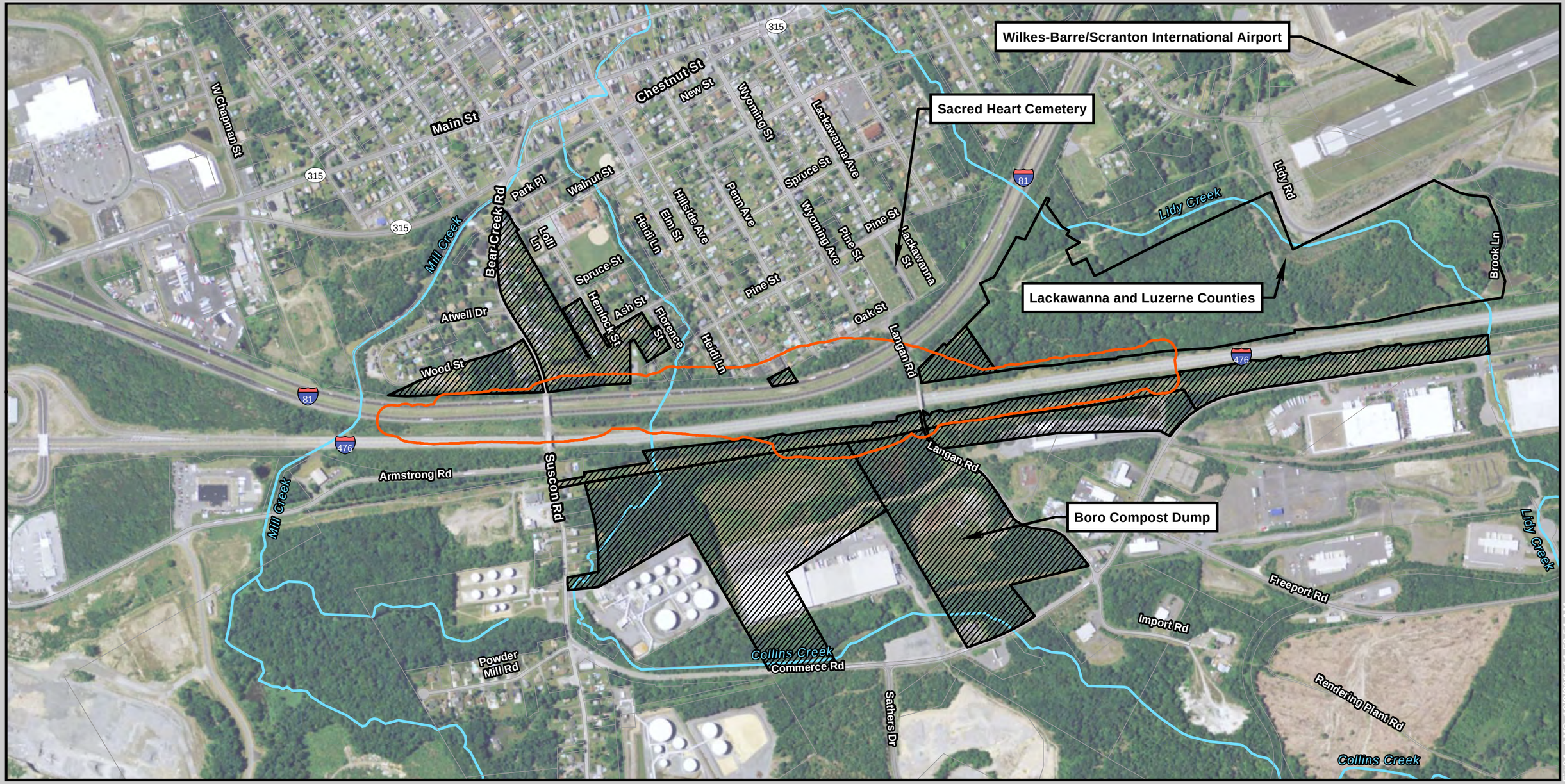
05422_hb_PTCScrantonBeltway_8x11_Fig1c_AMS 7/20/2015 3:55:01 PM

Figure 1c
Project Location Map
Scranton Beltway Project
Clarks Summit Study Area
Lackawanna County, PA

Project Location

Source: USGS National Map, basemap service

0 2,000
Feet



Project Limit

Potentially Impacted Parcel with Unknown Owner

Parcels

Streams

N

0 350 700 1,400 Feet

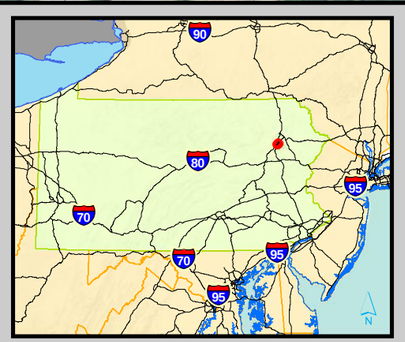


Figure 2a - Project Area Map

Pennsylvania Turnpike Commission

Scranton Beltway Project - Wyoming Valley Study Area (MP A-115 to MP A-116.2)

Dupont Borough and Pittston Township
Luzerne County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05425_hb_PTCScrantonBeltway_11x17_Fig2A_AMS_10/8/2015 11:52:54 AM

RESIDENTIAL PARCEL

DUNMORE OIL CO INC

RESIDENTIAL PARCEL

RESIDENTIAL PARCEL

RESIDENTIAL PARCEL

RESIDENTIAL PARCEL

RESIDENTIAL PARCEL

RESIDENTIAL PARCEL

RESIDENTIAL PARCEL

RESIDENTIAL PARCEL

Project Location

Potentially Impacted Parcel

Potentially Impacted Parcel with Unknown Owner

Approximate Gravity Railroad Corridor

Other Parcels

Streams

N

0 350 700 1,400 Feet

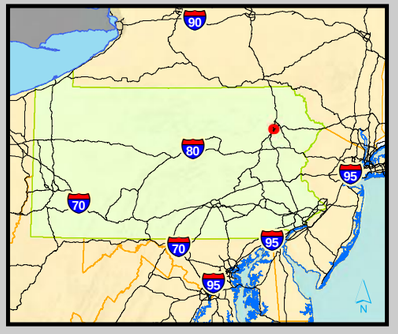


Figure 2b - Project Area Map

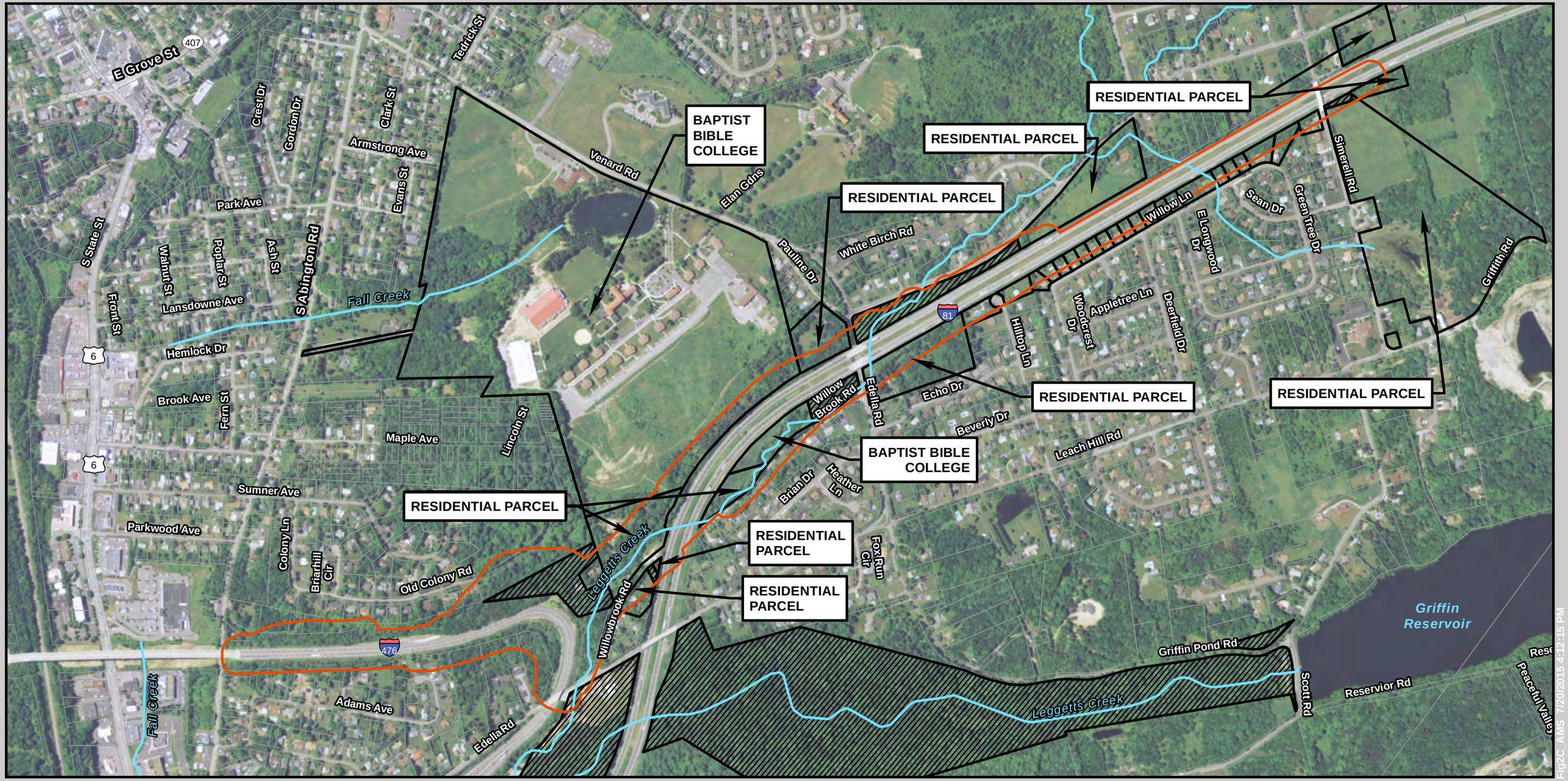
Pennsylvania Turnpike Commission

Scranton Beltway Project - Moosic Study Area (MP A-118.7 to MP A-119.7)

Moosic Borough
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05425_hb_PTCScrantonBeltway_11x17_Fig2B_AMS_7/21/2015 12:11:34 PM



Project Limit

Potentially Impacted Parcel

Potentially Impacted Parcel with Unknown Owner

Other Parcels

Streams

N

0 350 700 1,400 Feet

Figure 2c - Project Area Map

Pennsylvania Turnpike Commission

Scranton Beltway Project - Clarks Summit Study Area (MP A-129.8 to MP A-130.4)

South Abington Township
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

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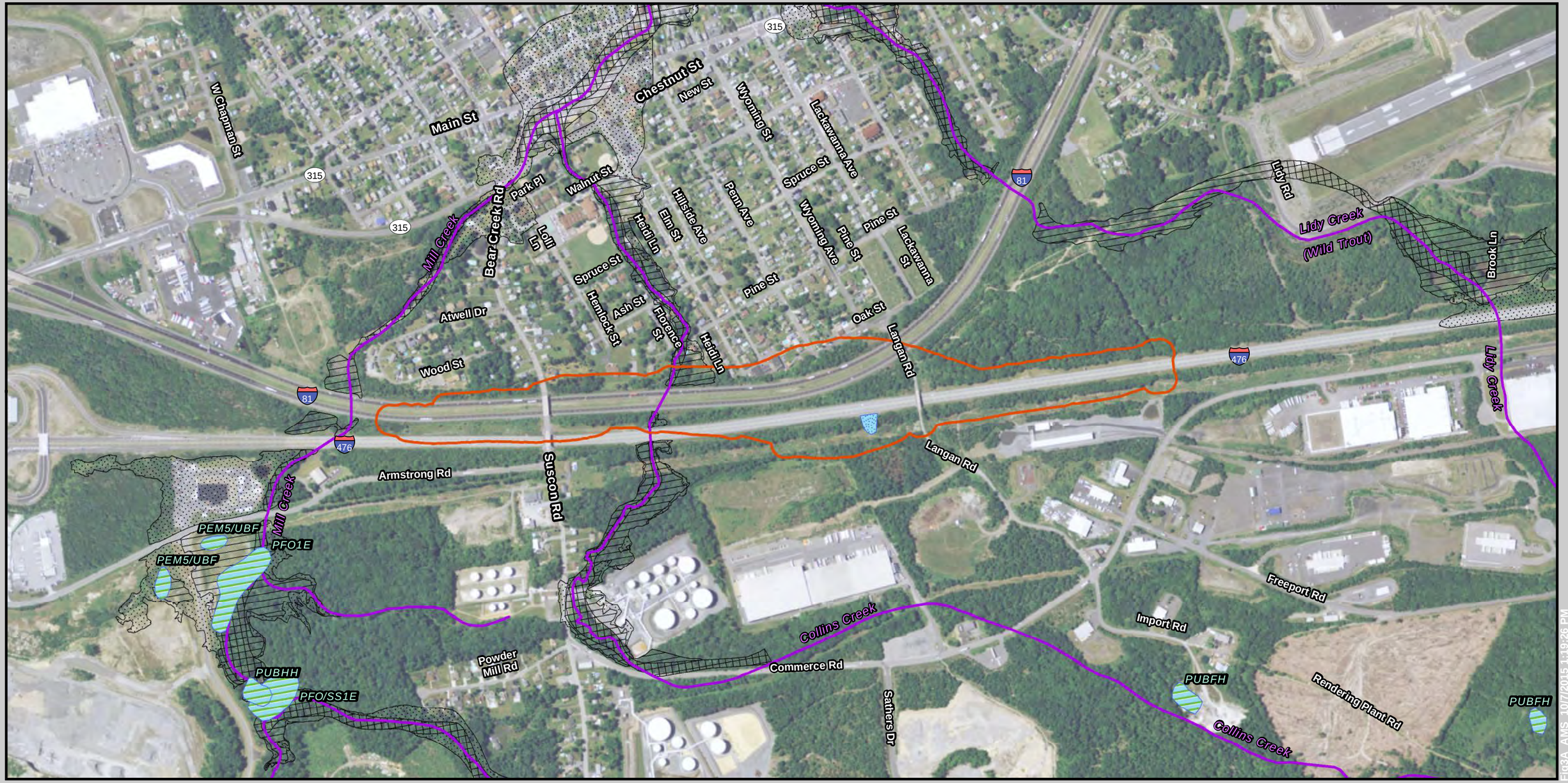
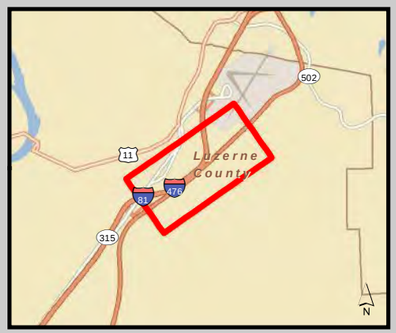


Project Limit
NWI Wetlands
Potential Wetland Area
Cold Water Fish, Migratory Fish (CWF,MF)
Floodway
100 Year Floodplain
500 Year Floodplain

N

0 350 700 1,400 Feet



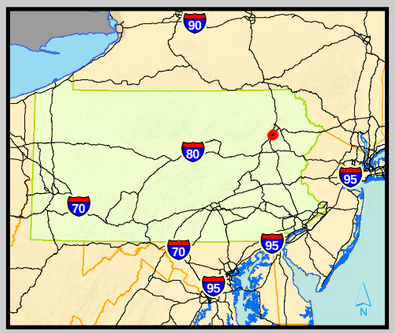


Figure 3a - Hydrology

Pennsylvania Turnpike Commission

Scranton Beltway Project - Wyoming Valley Study Area (MP A-115 to MP A-116.2)

Dupont Borough and Pittston Township Luzerne County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05427_hb_PTCScrantonBeltway_11x17_Fig3A_AMS_10/7/2015 1:19:26 PM

Project Location
NWI Wetlands
Potential Wetland Area
Cold Water Fish, Migratory Fish (CWF,MF)
FEMA Zone A
FEMA Zone AE

N

0 350 700 1,400 Feet

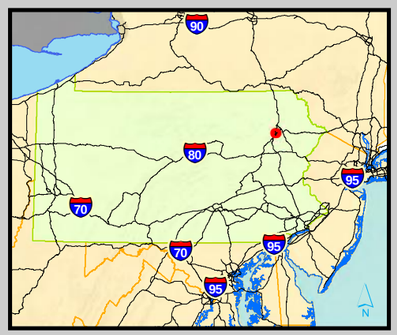


Figure 3b - Hydrology

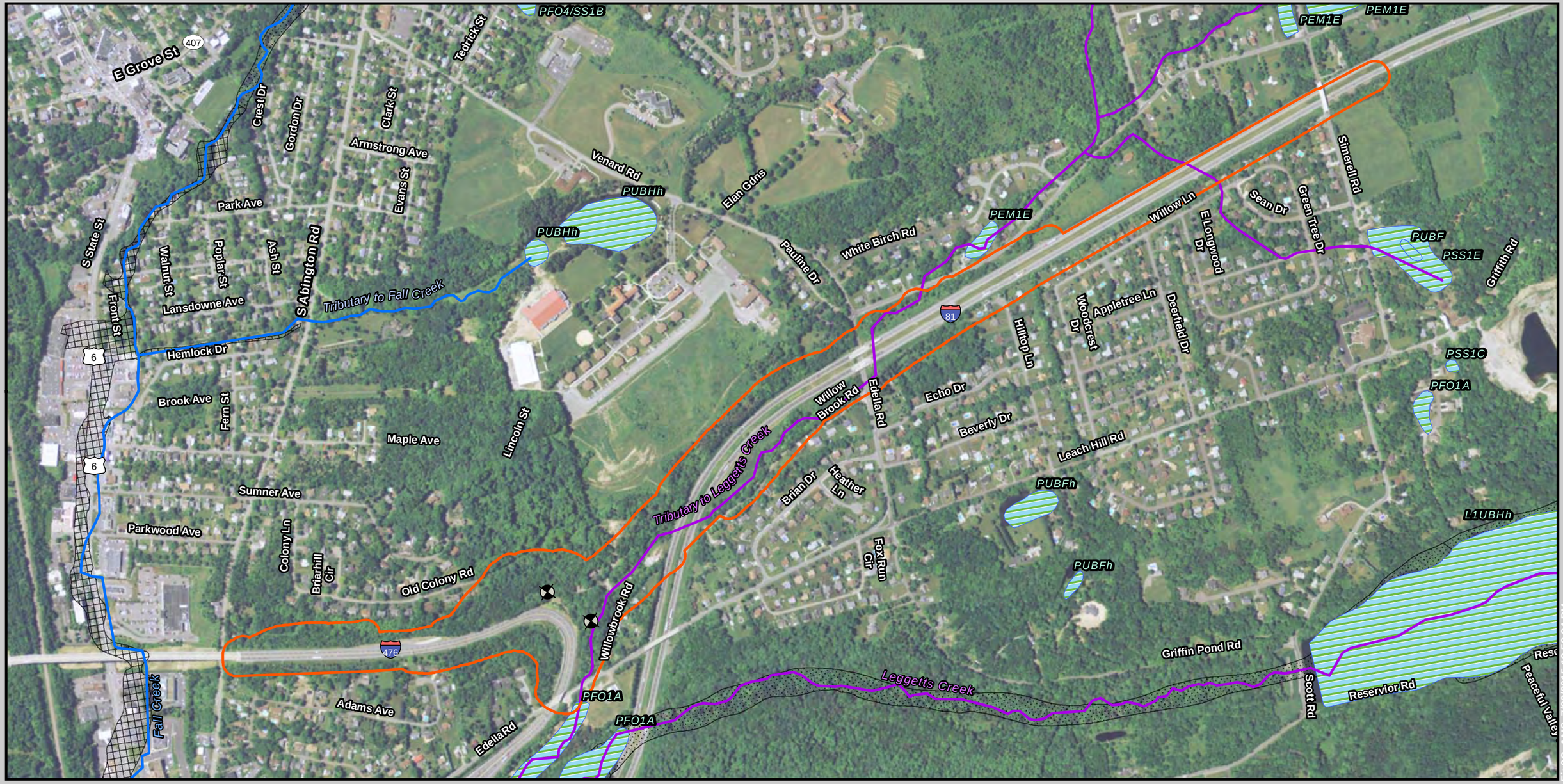
Pennsylvania Turnpike Commission

Scranton Beltway Project - Moosic Study Area
(MP A-118.7 to MP A-119.7)

Moosic Borough
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05427_hb PTCScrantonBeltway 11x17 Fig3B AMS 7/20/2015 4:19:36 PM



Project Location

NWI Wetlands

FEMA Zone A

FEMA Zone AE

Inactive Wells (within project area)

Cold Water Fish, Migratory Fish (CWF,MF)

Trout Stocking Fish, Migratory Fish (TSF,MF)

N

0 350 700 1,400 Feet

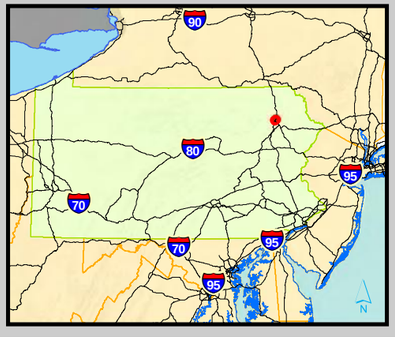


Figure 3c - Hydrology

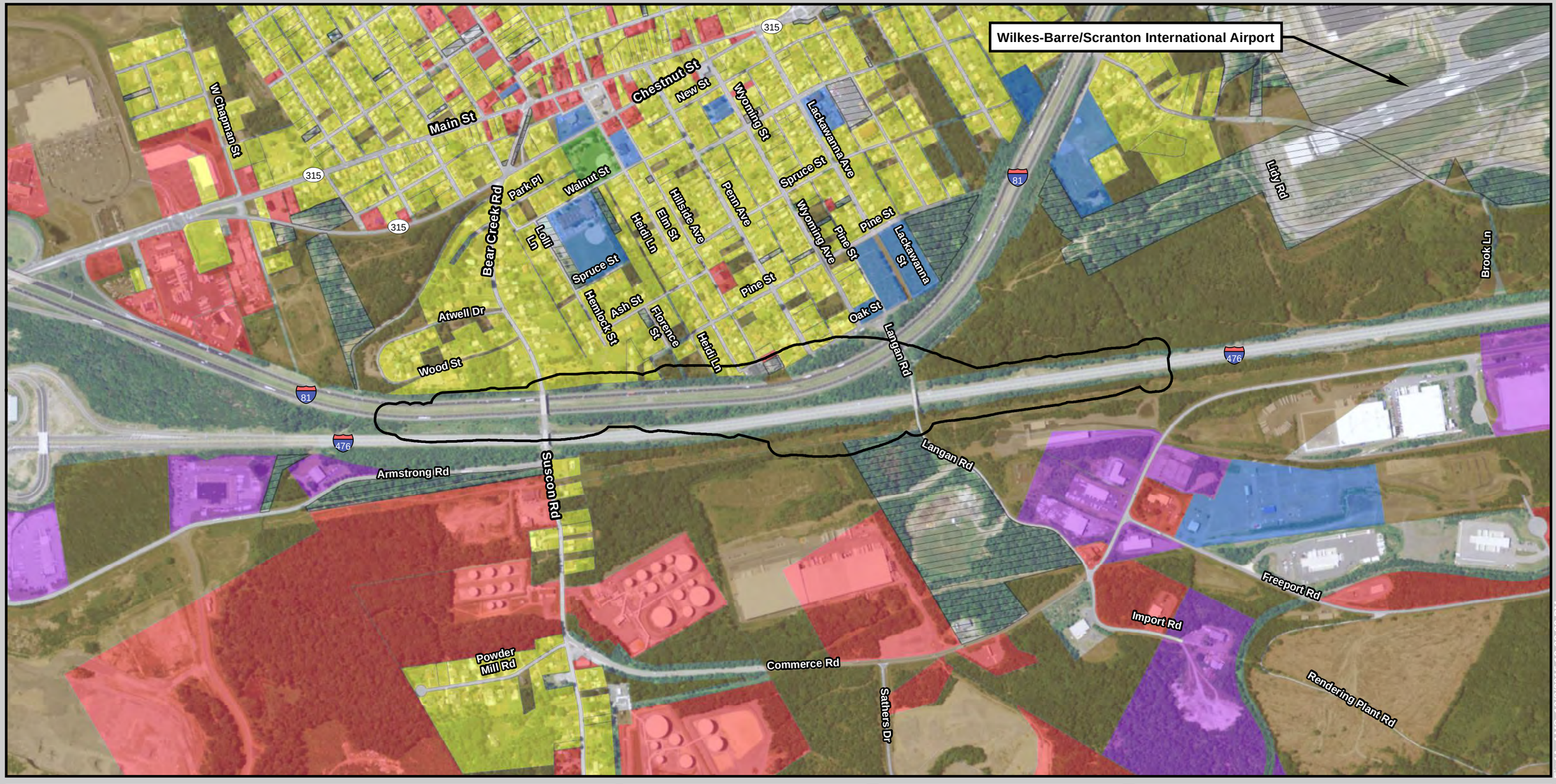
Pennsylvania Turnpike Commission

Scranton Beltway Project - Clarks Summit Study Area (MP A-129.8 to MP A-130.4)

South Abington Township
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05427 hb PTCScrantonBeltway 11x17 Fig3C AMS 7/22/2015 12:58:24 PM

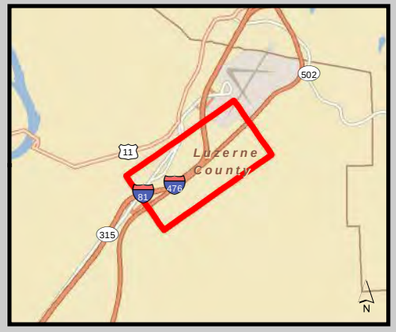


Project Limit
Unknown Land Use
Agricultural & Vacant
Commercial
Institutional
Recreational
Industrial
Residential
Land Use Determined During Field View

Land Use Source:
Luzerne Parcel Data, May 2008

0 350 700 1,400 Feet

N



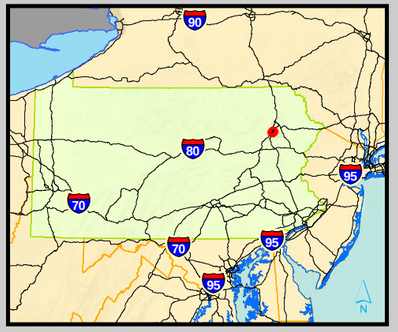


Figure 4a - Land Use

Pennsylvania Turnpike Commission

Scranton Beltway Project - Wyoming Valley Study Area (MP A-115 to MP A-116.2)

Dupont Borough and Pittston Township
Luzerne County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05428_hb_PTCScrantonBeltway_11x17_Fig4A_AMS_10/8/2015 12:08:39 PM

RESIDENTIAL

UNDEVELOPED
FORMERLY MINED

UNDEVELOPED

Project Location
Unknown Land Use
Agricultural & Vacant
Commercial
Institutional
Protected Open Space
Quarry/Mine/Landfill
Residential

Land Use Determined During Field View

Land Use Source:
Lackawanna Parcel Data, May 2008

N

0 350 700 1,400 Feet

Figure 4b - Land Use

Pennsylvania Turnpike Commission

Scranton Beltway Project - Moosic Study Area
(MP A-118.7 to MP A-119.7)

Moosic Borough
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05428 hb PTCScrantonBeltway 11x17 Fig4B AWS 7/20/2015 4:24:35 PM

UNDEVELOPED

RESIDENTIAL

E Grove St
407
Crest Dr
Gordon Dr
Clark St
Tedrick St
Armstrong Ave
Venard Rd
Elan Gdns
Evans St
Park Ave
S State St
Walnut St
Poplar St
Ash St
S Abington Rd
Pauline Dr
White Birch Rd
Front St
Lansdowne Ave
Hemlock Dr
6
Brook Ave
Fern St
Maple Ave
Lincoln St
Sumner Ave
Parkwood Ave
Colony Ln
Briarhill Cir
Old Colony Rd
476
Willowbrook Rd
Adams Ave
Edella Rd
Willow Ln
81
Willow Brook Rd
Edella Rd
Echo Dr
Beverly Dr
Hilltop Ln
Woodcrest Dr
Appletree Ln
Deerfield Dr
E Longwood Dr
Sean Dr
Green Tree Dr
Sinnerell Rd
Griffith Rd
Leach Hill Rd
Brian Dr
Heather Ln
Fox Run Cir
Griffin Pond Rd
Scott Rd
Reservior Rd
Peaceful Valley

Project Location
Unknown Land Use
Agricultural & Vacant
Commercial
Institutional
Protected Open Space
Quarry/Mine/Landfill
Residential
Forested Private Land Enrolled in Cooperative Forest Program with PGC
Land Use Determined During Field View

Land Use Source:
Lackawanna Parcel Data, May 2008

0 350 700 1,400 Feet

N

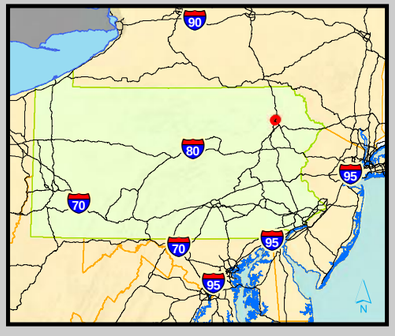


Figure 4c - Land Use

Pennsylvania Turnpike Commission

Scranton Beltway Project - Clarks Summit Study Area (MP A-129.8 to MP A-130.4)

South Abington Township
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05428 hb PTCScrantonBeltway 11x17 Fig4C AMS 7/20/2015 4:35:10 PM

Project Limit
Prime Farmland Soils
Farmland of Statewide Importance Soils
Soils Boundary
Parcels

N

0 350 700 1,400 Feet

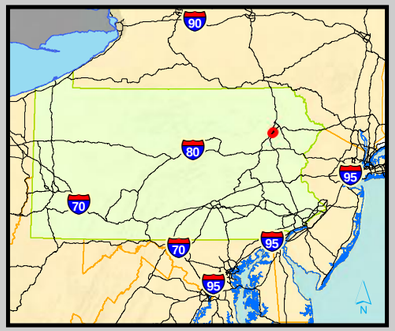


Figure 5a - Agricultural Resources

Pennsylvania Turnpike Commission

Scranton Beltway Project - Wyoming Valley Study Area (MP A-115 to MP A-116.2)

Dupont Borough and Pittston Township Luzerne County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05491_hb PTCScrantonBeltway 11x17 FigSA AMS 7/20/2015 4:36:59 PM

Project Location
Prime Farmland Soils
Farmland of Statewide Importance Soils
Soils Boundary
Parcels

N

0 350 700 1,400 Feet

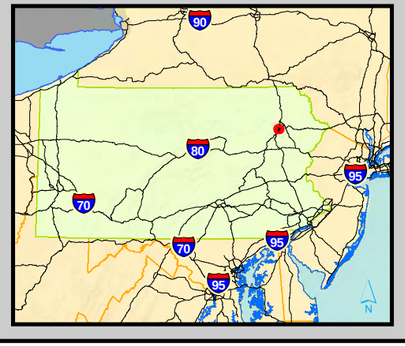


Figure 5b - Agricultural Resources

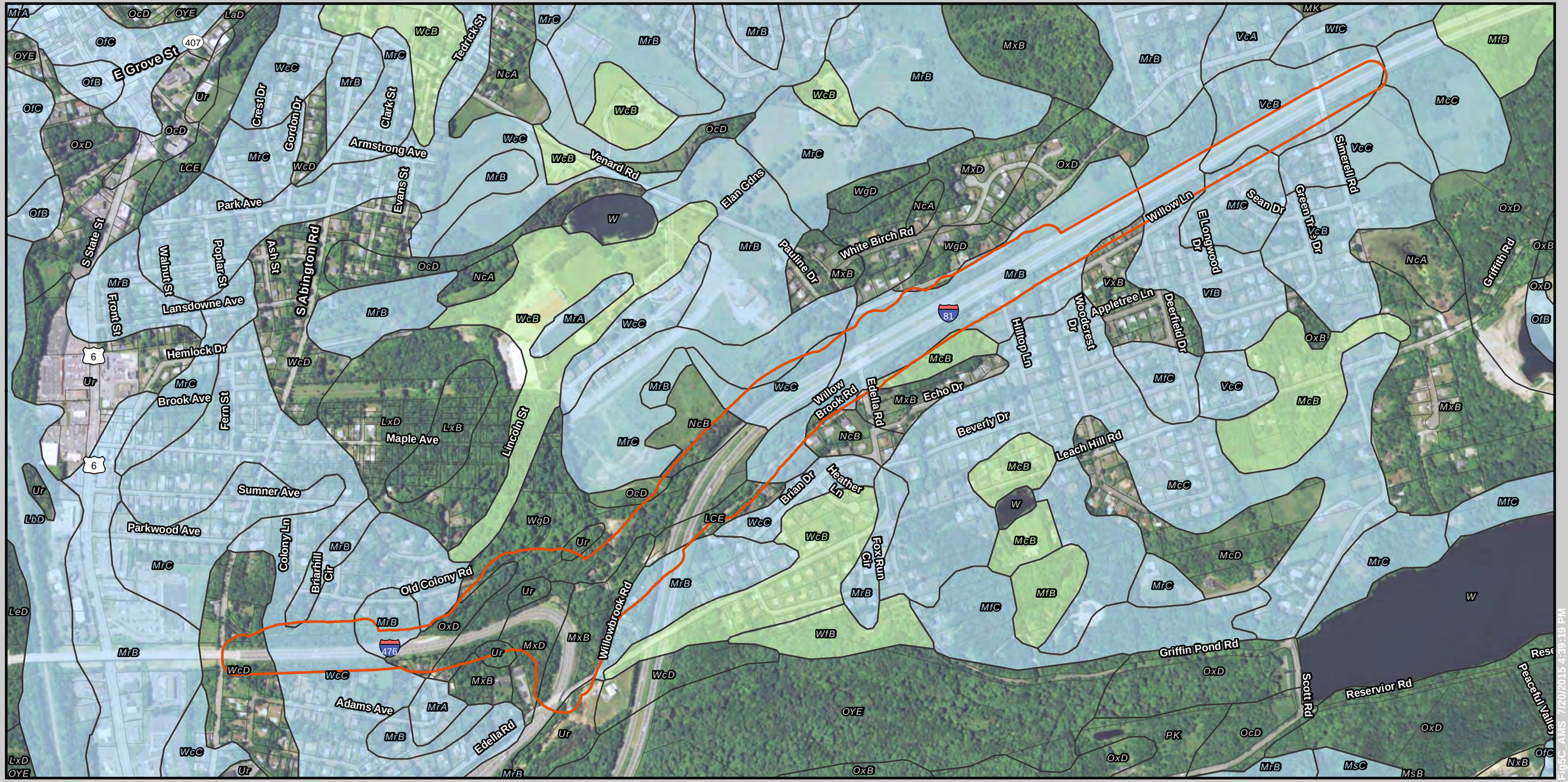
Pennsylvania Turnpike Commission

Scranton Beltway Project - Moosic Study Area
(MP A-118.7 to MP A-119.7)

Moosic Borough
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05491_hb_PTCScrantonBeltway_11x17__FigSB_AMS_7/20/2015 4:37:49 PM



Project Limit

Prime Farmland Soils

Farmland of Statewide Importance Soils

Soils Boundary

Parcels

N

0 350 700 1,400 Feet

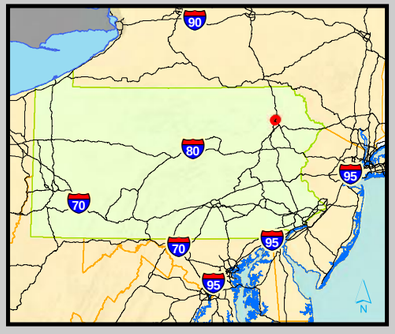


Figure 5c - Agricultural Resources

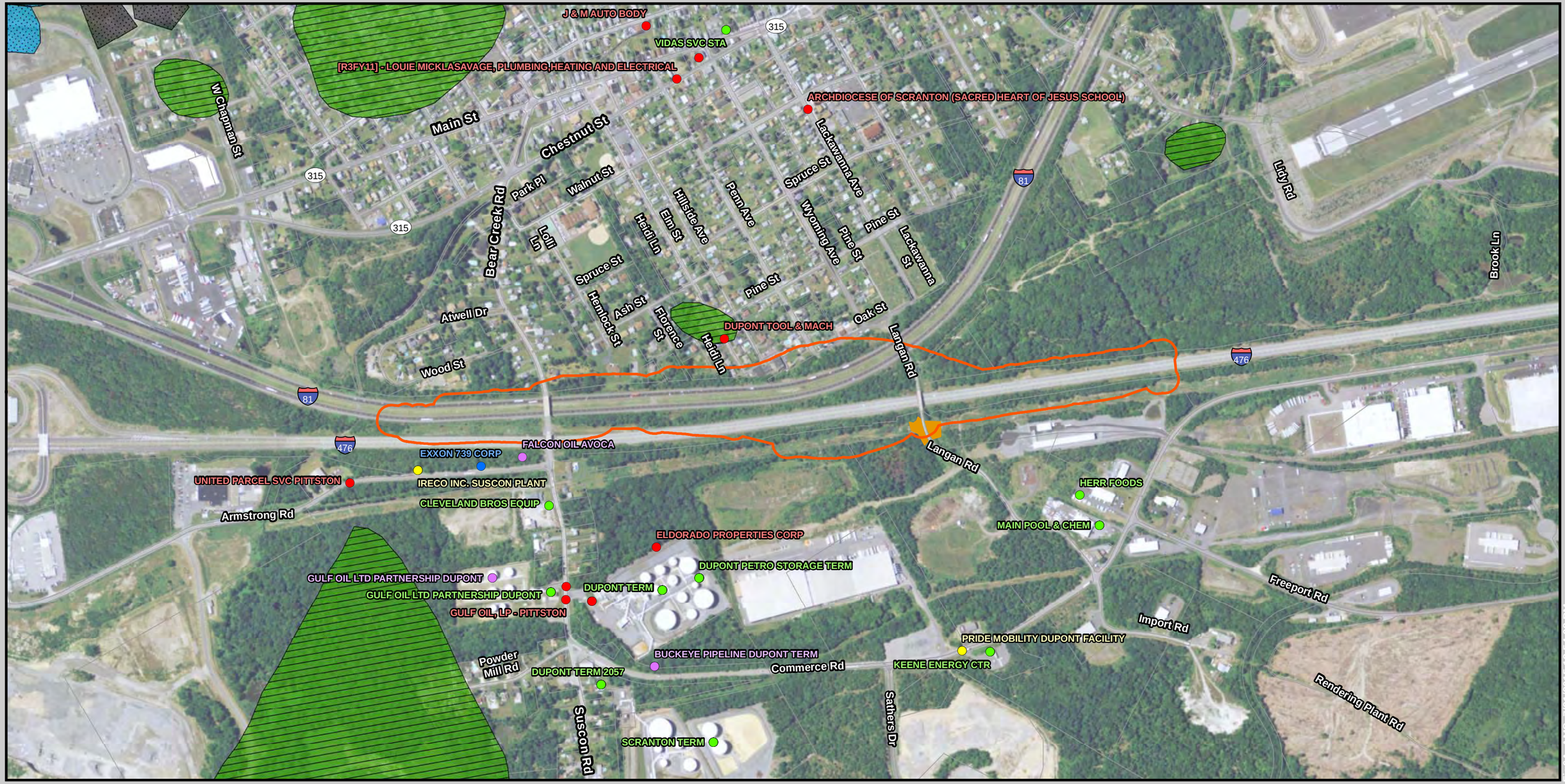
Pennsylvania Turnpike Commission

Scranton Beltway Project - Clarks Summit Study Area (MP A-129.8 to MP A-130.4)

South Abington Township
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05491_hb PTCScrantonBeltway 11x17 Fig5C AMS 7/20/2015 4:39:19 PM



Project Limit

PA DEP Environment Facility Application Compliance Tracking System (eFACTS)

- Land Recycling Cleanup Location
- Storage Tank Location
- Toxic Release Inventory Facility
- EPA Enviro Facts Facility
- Water Pollution Control Facility

Abandoned Mine Land Problem Areas

- Coal Surface Mine
- Refuse Pile
- Spoil Area
- Subsidence Area
- Abandoned
- Reclamation Complete

Source: PA DEP Abandoned Mine Land Problem Areas Oct. 2014

Field Observed Dumping Area

N

0 350 700 1,400 Feet

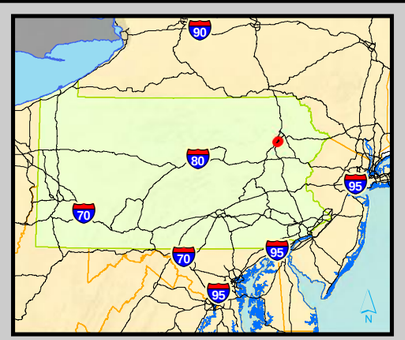


Figure 6a - Potential Waste Sites and Mines

Pennsylvania Turnpike Commission

Scranton Beltway Project - Wyoming Valley Study Area (MP A-115 to MP A-116.2)

Dupont Borough and Pittston Township Luzerne County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05492_hb_PTCScrantonBeltway_11x17_Fig6A_AMS_7/21/2015 12:54:08 PM

CTL TRANSP
NORTHEAST CHRYSLER PLYMOUTH
JACK WILLIAMS TIRE
SUN BUICK
FED EXPRESS
J & J SNACK FOODS CORP
ERTLEY CHRYSLER
NORTHEAST CHRYSLER PLYMOUTH DEALERSHIP
DUNMORE OIL CO. INC./DUNMORE OIL MOBIL
Moosic Rd
Louis Industrial Dr
1st St
2Nd St
3Rd St
Main St
4Th St
5Th St
6Th St
8Th St
Gleason Dr
WINGFOOT COMMERCIAL TIRE SYS
H. WILSON AUTO
MOOSIC BODY SHOP
JACKS BODY SHOP
Rocky Glen Rd
MACTAC SCRANTON FAC
Main St
Birney Ave
Water St
MOOSIC BORO LACKAWANNA CNTY
LANES CRANE SVC
Springbrook Ave
MOOSIC BORO LACKAWANNA CNTY
EDDYLEON CHOCOLATE MFG
NICHOLAS TRUCKING
MESKO GLASS & MIRROR
476
81
11
502

Project Location

PA DEP Environment Facility Application Compliance Tracking System (eFACTS)

- Land Recycling Cleanup Location
- Storage Tank Location
- Water Pollution Control Facility
- EPA Enviro Facts Facility

Abandoned Mine Land Problem Areas

- Coal Surface Mine
- Refuse Pile
- Spoil Area
- Subsidence Area
- Abandoned
- Reclamation Complete

Source: PA DEP Abandoned Mine Land Problem Areas Oct. 2014

Field Observed Potential Former Gas Station

N

0 350 700 1,400 Feet

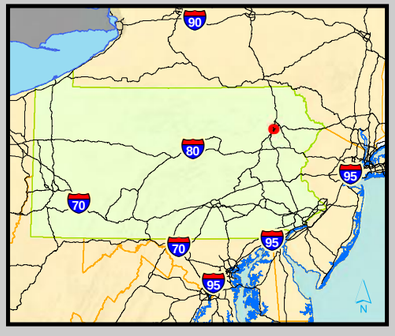


Figure 6b - Potential Waste Sites and Mines

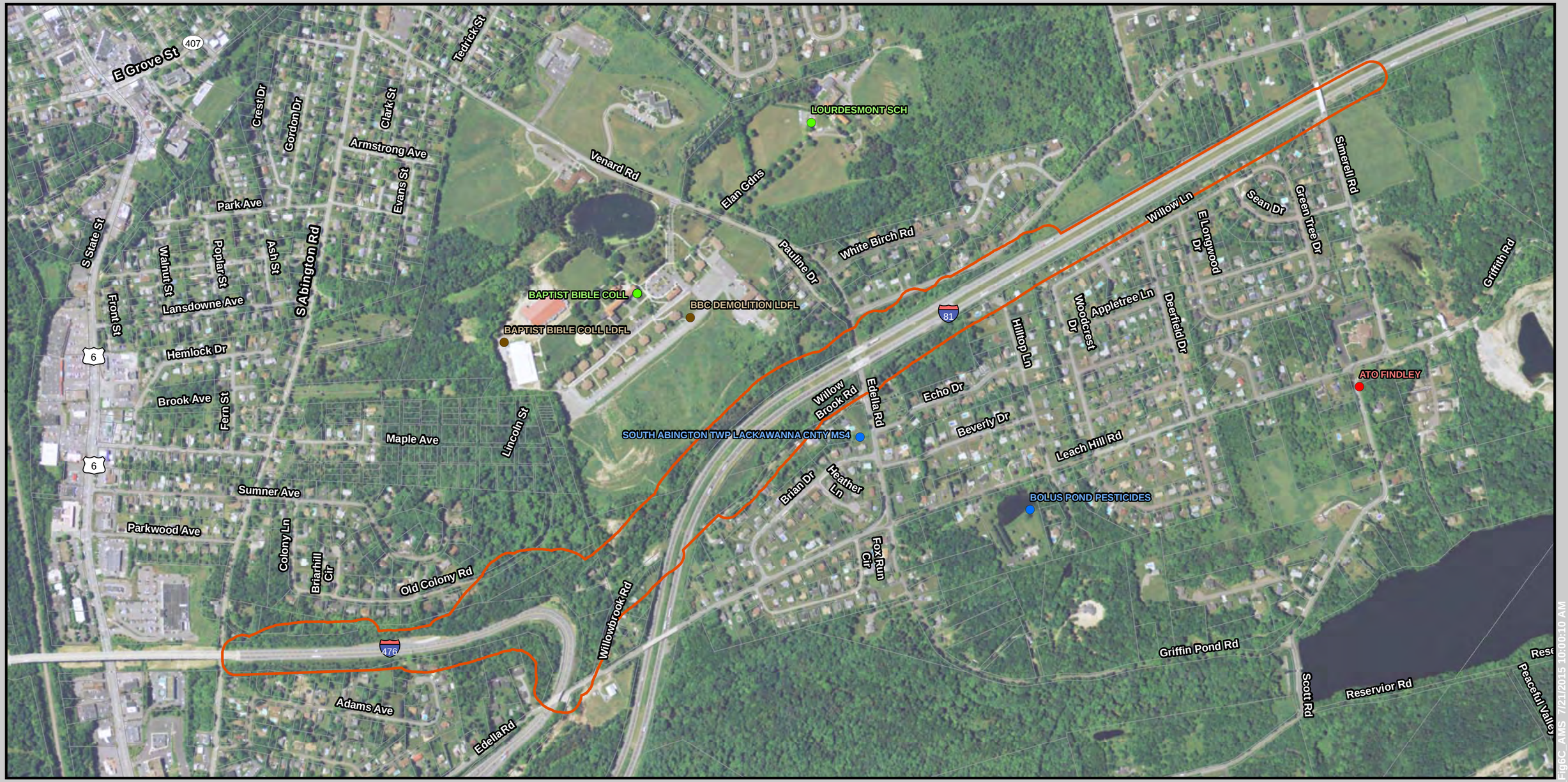
Pennsylvania Turnpike Commission

Scranton Beltway Project - Moosic Study Area (MP A-118.7 to MP A-119.7)

Moosic Borough
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05492_hb_PTCScrantonBeltway_11x17_Fig6B_AMS_7/21/2015 10:00:39 AM



Project Limit

PA DEP Environment Facility Application Compliance Tracking System (eFACTS)

- Municipal Waste Operation Landfill
- Storage Tank Location
- Water Pollution Control Facility
- EPA Enviro Facts Facility

Abandoned Mine Land Problem Areas

- Coal Surface Mine
- Refuse Pile
- Spoil Area
- Subsidence Area
- Abandoned
- Reclamation Complete

Source: PA DEP Abandoned Mine Land Problem Areas Oct. 2014

N

0 350 700 1,400 Feet

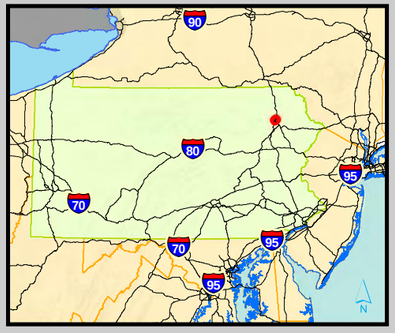


Figure 6c - Potential Waste Sites and Mines

Pennsylvania Turnpike Commission

Scranton Beltway Project - Clarks Summit Study Area (MP A-129.8 to MP A-130.4)

South Abington Township
Lackawanna County, PA

Aerial Source: Esri & DigitalGlobe, 2013

05492_hb_PTCScrantonBeltway_11x17_Fig6C_AMS_7/21/2015 10:00:10 AM

Appendix B
Photographs

Preliminary Environmental Inventory Report
Scranton Beltway Project

Scranton Beltway Project Preliminary Environmental Inventory Report Photographs

Photograph 1: At bottom of slope to the east of I-81, UNT to Leggetts Creek and residential development beyond within Clarks Summit study area.

Photograph 2: Western side of culvert carrying UNT to Leggetts Creek under I-81, looking north, within Clarks Summit study area.

Photograph 3: Potential wetland area continuing toward I-476 within Wyoming Valley study area.

Photograph 4: Potential wetland and stream draining towards I-476 in the Moosic study area.

Scranton Beltway Project Preliminary Environmental Inventory Report Photographs

Photograph 5: New residential development within Moosic study area.

Photograph 6: Proposed improvement area of Clarks Summit interchange, looking southeast along I-81.

Photograph 7: Proposed improvement area of Clarks Summit interchange, looking northwest along I-81.

Photograph 8: Residential waste dumping area adjacent to I-476 within Wyoming Valley study area.

Scranton Beltway Project Preliminary Environmental Inventory Report Photographs

Photograph 9: Potential former fueling station along Route 11 within the Moosic study area.

Photograph 10: Undisturbed area of archaeological potential located north and west of I-476 access ramp curve and south of I-81, within the Clarks Summit study area.

Photograph 11: PA American Water pipeline markers in between I-476 and I-81 within the Wyoming Valley study area.

Photograph 12: Natural gas pipeline crossing I-476, within the Moosic study area.

Appendix C
County and Municipal Coordination for Agricultural Resources

Lackawanna County Agricultural Land Preservation
1038 Montdale Road, Suite 109
Scott Township, PA 18447
(570) 382-3086

December 5, 2014

McCormick Taylor., INC
Attn: Angela Schreffler, PWS, CE
5 Capital Drive, Suite 400
Harrisburg, PA 17110

RE: Pennsylvania Turnpike Commission; Scranton Beltway Project
Location of Agricultural Security Areas, Preserved Farms, Conservation Easements, parcels zoned agricultural, and farmlands enrolled in preferential tax assessment programs

Dear Ms. Schreffler,

I have received your inquiry regarding any Agricultural Security Areas (ASA's) and/or preserved farms in the project area for the Pennsylvania Turnpike Commission. Please be advised that, to date, there is currently no ASA recorded for South Abington Township that we are aware of and the Lackawanna County Agricultural Land Preservation Program holds no easements in South Abington Township. The nearest areas with ASA's and/or preserved farms in Lackawanna County are North Abington Township and Scott Township. These areas are far enough away from the proposed project area that the regions were not depicted in the scale of your map, which I have enclosed to return to you.

If you have any questions, or need any further information from me, please let me know.

Sincerely,

Eric Johnson
Administrator
Lackawanna County Farmland Preservation Program

Schreffler, Angela M.

From: Snee, Nancy <Nancy.Snee@luzernecounty.org>
Sent: Friday, December 05, 2014 11:55 AM
To: Schreffler, Angela M.
Subject: Request for Information

Angela,
I received your request for information regarding the Pennsylvania Turnpike project in Dupont Borough and Pittston Township.

There are no agricultural areas, no Agricultural Security Areas, and no preserved farms in either of those municipalities.

To find out if there are any other types of preserved land, you should contact the North Branch Land Trust at 570-696-5545.

For zoning information, we need PIN numbers for specific parcels in Dupont Borough. We do not administer the zoning ordinance for Pittston Township.

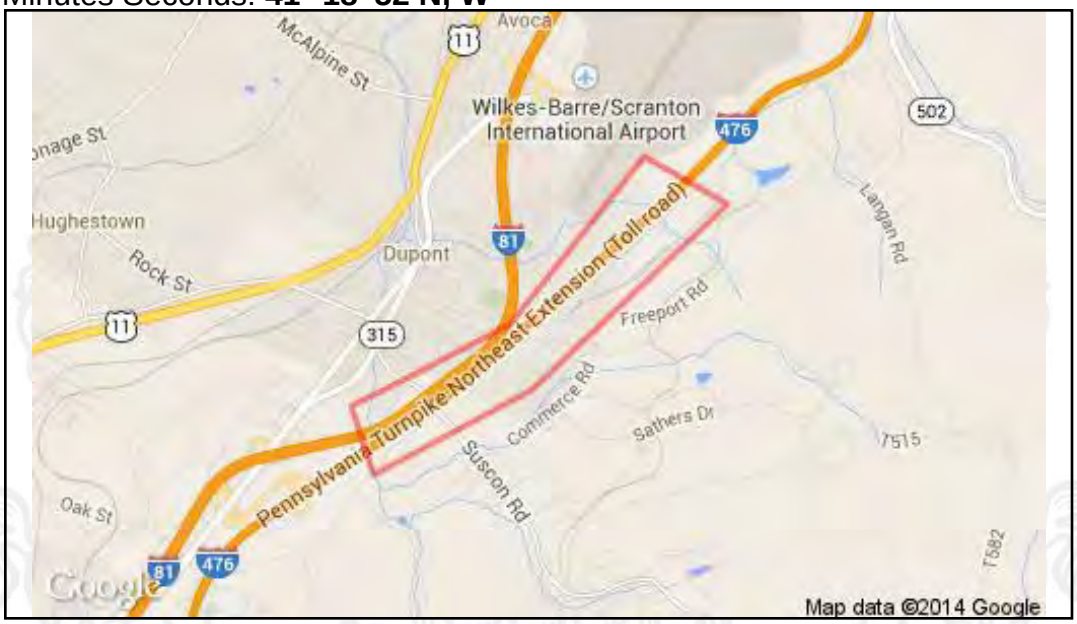
Nancy Snee, Interim Executive Director
Luzerne County Planning Commission

Appendix D
PNDI Environmental Review Receipts

Preliminary Environmental Inventory Report
Scranton Beltway Project

1. PROJECT INFORMATION

Project Name: **Wyoming Valley Proposed PTC Interchange**
Date of review: **9/30/2014 2:35:17 PM**
Project Category: **Transportation,Roads,Widening, adding lanes with disturbance beyond existing shoulders WITH drainage pipe replacements**
Project Area: **383.5** acres
County: **Luzerne** Township/Municipality: **Pittston Twp,Dupont**
Quadrangle Name: **AVOCA** ~ ZIP Code: **18640,18641**
Decimal Degrees: **41.314560 N, -75.740771 W**
Degrees Minutes Seconds: **41° 18' 52 N, W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE: No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.* is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at http://www.naturalheritage.state.pa.us.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA. 17105-8552
Fax:(717) 772-0271

U.S. Fish and Wildlife Service

Endangered Species Section
315 South Allen Street, Suite 322, State College, PA. 16801-4851
NO Faxes Please.

PA Fish and Boat Commission

Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax:(717) 787-6957

7. PROJECT CONTACT INFORMATION

Name:_____
Company/Business Name:_____
Address:_____
City, State, Zip:_____
Phone:(_____)_____Fax:(_____)_____
Email:_____

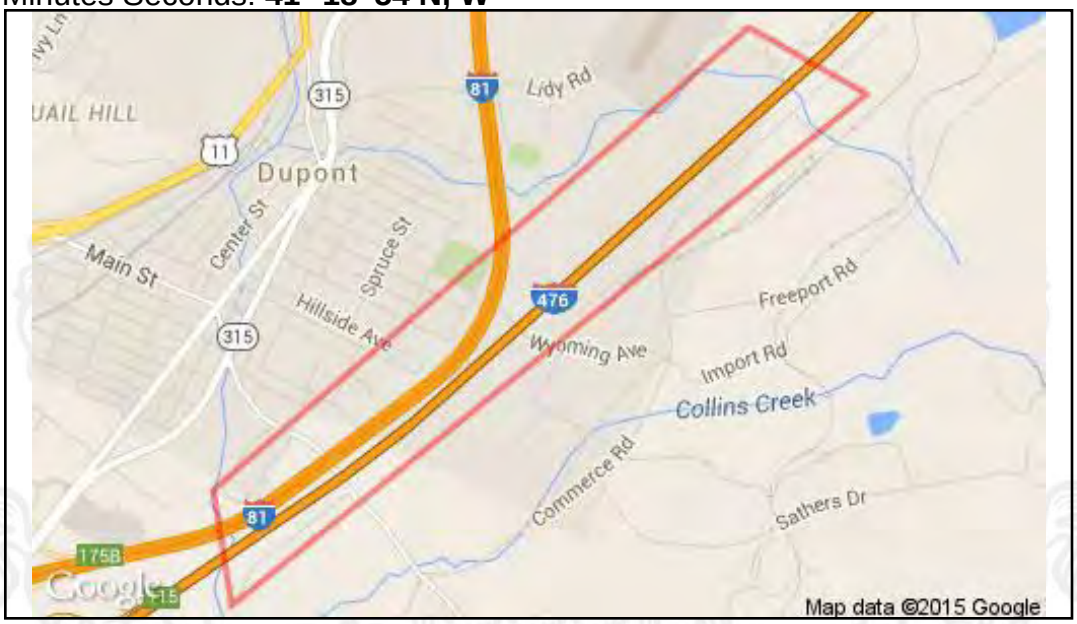
8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

_____ _____
applicant/project proponent signature date

1. PROJECT INFORMATION

Project Name: **Wyoming Valley PTC New Connection Study Area**
Date of review: **5/14/2015 1:50:54 PM**
Project Category: **Transportation,Roads,Widening, adding lanes with disturbance beyond existing shoulders WITH drainage pipe replacements**
Project Area: **267.2** acres
County: **Luzerne** Township/Municipality: **Dupont,Pittston Twp**
Quadrangle Name: **AVOCA** ~ ZIP Code: **18640,18641**
Decimal Degrees: **41.315099 N, -75.742680 W**
Degrees Minutes Seconds: **41° 18' 54 N, W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

RESPONSE TO QUESTION(S) ASKED

Q1: The proposed project is in the range of the Indiana bat. Describe how the project will affect potential Indiana bat habitat (forests, woodlots and trees) and indicate what measures will be taken in consideration of this.
Your answer is: **2. The project will affect 1 to 19 acres of forests, woodlots and trees.**

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE: No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.* is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application

should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at http://www.naturalheritage.state.pa.us.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA. 17105-8552
Fax:(717) 772-0271

U.S. Fish and Wildlife Service

Pennsylvania Field Office
110 Radnor Rd; Suite 101, State College, PA 16801
NO Faxes Please.

PA Fish and Boat Commission

Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax:(717) 787-6957

7. PROJECT CONTACT INFORMATION

Name:_____
Company/Business Name:_____
Address:_____
City, State, Zip:_____
Phone:(_____)_____Fax:(_____)_____
Email:_____

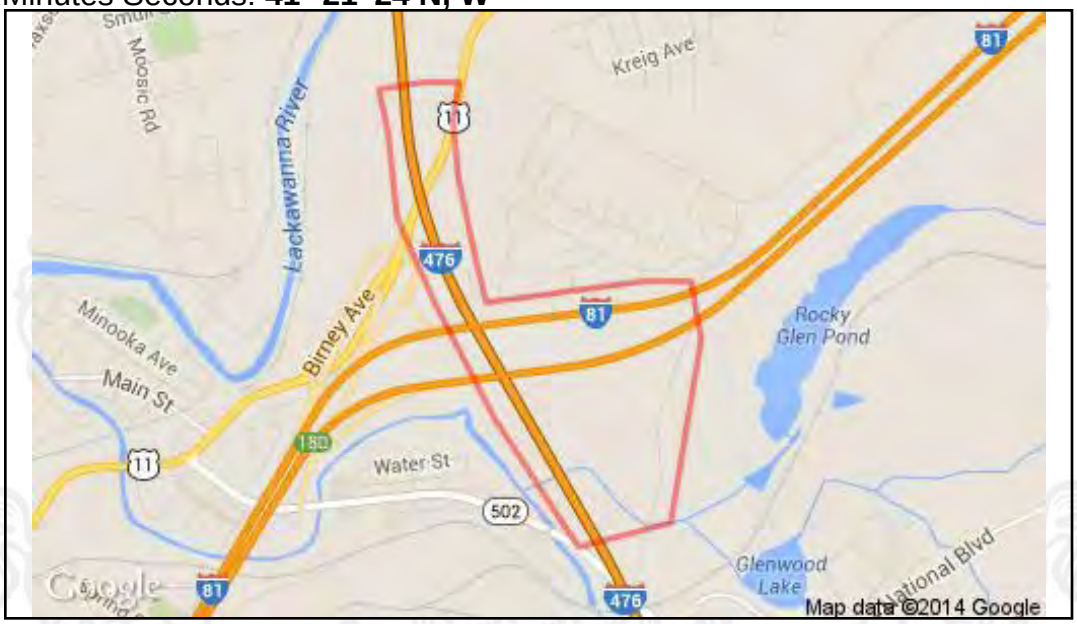
8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

_____ _____
applicant/project proponent signature date

1. PROJECT INFORMATION

Project Name: **Moosic Proposed PTC Interchange**
Date of review: **9/30/2014 2:51:11 PM**
Project Category: **Transportation,Roads,Widening, adding lanes with disturbance beyond existing shoulders WITH drainage pipe replacements**
Project Area: **187.8** acres
County: **Lackawanna** Township/Municipality: **Moosic**
Quadrangle Name: **AVOCA** ~ ZIP Code: **18641,18507**
Decimal Degrees: **41.356761 N, -75.716696 W**
Degrees Minutes Seconds: **41° 21' 24 N, W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

RESPONSE TO QUESTION(S) ASKED

Q1: "Will the entire project area (including any discharge), plus a 300 feet buffer around the project area, all occur in or on an existing building, parking lot, driveway, road, road shoulder, street, runway, paved area, railroad bed, maintained (periodically mown) lawn, crop agriculture field or maintained orchard?"
Your answer is: **2. No**

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE: Further review of this project is necessary to resolve the potential impacts(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: http://www.gis.dcnr.state.pa.us/hgis-er/PNDI_DCNR.aspx.)
Scientific Name: Amelanchier obovalis
Common Name: Coastal Juneberry
Current Status: Special Concern Species*
Proposed Status: Endangered

Scientific Name: Minuartia glabra
Common Name: Appalachian Sandwort
Current Status: Threatened
Proposed Status: Threatened

PA Fish and Boat Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE: No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.* is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictinal agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, send the following information to the agency(s) seeking this information (see AGENCY CONTACT INFORMATION).

Check-list of *Minimum* Materials to be submitted:

____**SIGNED** copy of this Project Environmental Review Receipt
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____Project location information (name of USGS Quadrangle, Township/Mu?icipality, and County)
____USGS 7.5-minute Quadrangle with project boundary clearly indicated, and quad name on the map

The inclusion of the following information may expedite the review process.
____A basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special

concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at http://www.naturalheritage.state.pa.us.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA. 17105-8552
Fax:(717) 772-0271

U.S. Fish and Wildlife Service

Endangered Species Section
315 South Allen Street, Suite 322, State College, PA. 16801-4851
NO Faxes Please.

PA Fish and Boat Commission

Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax:(717) 787-6957

7. PROJECT CONTACT INFORMATION

Name:_____
Company/Business Name:_____
Address:_____
City, State, Zip:_____
Phone:(_____)_____Fax:(_____)_____
Email:_____

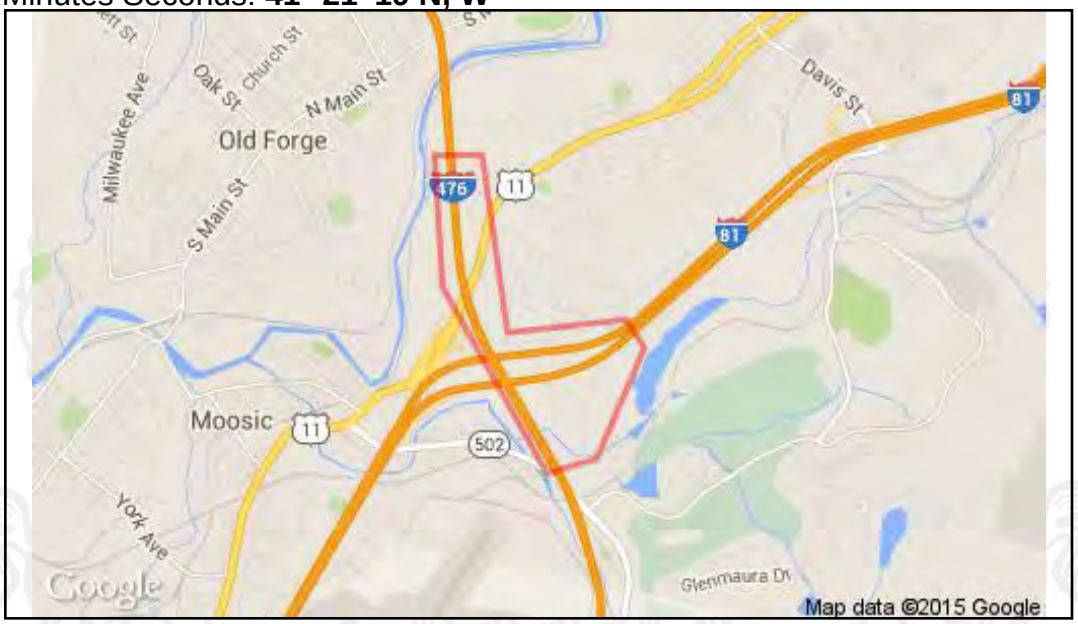
8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

_____ _____
applicant/project proponent signature date

1. PROJECT INFORMATION

Project Name: **Moosic Proposed New PTC Connections Study Area**
Date of review: **5/14/2015 1:55:42 PM**
Project Category: **Transportation,Roads,Widening, adding lanes with disturbance beyond existing shoulders WITH drainage pipe replacements**
Project Area: **315.2** acres
County: **Lackawanna** Township/Municipality: **Moosic**
Quadrangle Name: **AVOCA** ~ ZIP Code: **18641,18507**
Decimal Degrees: **41.355512 N, -75.705988 W**
Degrees Minutes Seconds: **41° 21' 19 N, W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

RESPONSE TO QUESTION(S) ASKED

Q1: "Accurately describe what is known about wetland presence in the project area or on the land parcel by selecting ONE of the following. ""Project"" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur ."
Your answer is: **"2. The project area (or land parcel) has not been investigated by someone qualified to identify and delineate wetlands, or it is currently unknown if the project or project activities will affect wetlands."**

Q2: The proposed project is in the range of the Indiana bat. Describe how the project will affect potential Indiana bat habitat (forests, woodlots and trees) and indicate what measures will be taken in consideration of this.
Your answer is: **2. The project will affect 1 to 19 acres of forests, woodlots and trees.**

Q3: Accurately describe what is known about wetland presence in the project area or on the land parcel. "Project" includes all features of the project (including buildings, roads, utility lines, outfall and intake structures, wells, stormwater retention/detention basins, parking lots, driveways, lawns, etc.), as well as all associated impacts (e.g., temporary staging areas, work areas, temporary road crossings, areas subject to grading or clearing, etc.). Include all areas that will be permanently or temporarily affected -- either directly or indirectly -- by any type of disturbance (e.g., land clearing, grading, tree removal, flooding, etc.). Land parcel = the lot(s) on which some type of project(s) or activity(s) are proposed to occur .
Your answer is: **2. The project area (or land parcel) has not been investigated by someone qualified to identify and delineate wetlands, or it is currently unknown if the project or project activities will affect wetlands.**

Q4: "Will the entire project area (including any discharge), plus a 300 feet buffer around the project area, all occur in or on an existing building, parking lot, driveway, road, road shoulder, street, runway, paved area, railroad bed, maintained (periodically mown) lawn, crop agriculture field or maintained orchard?"
Your answer is: **2. No**

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern

species and resources.

PA Department of Conservation and Natural Resources

RESPONSE: Further review of this project is necessary to resolve the potential impacts(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: http://www.gis.dcnr.state.pa.us/hgis-er/PNDI_DCNR.aspx.)
Scientific Name: Amelanchier obovalis
Common Name: Coastal Juneberry
Current Status: Special Concern Species*
Proposed Status: Endangered

Scientific Name: Minuartia glabra
Common Name: Appalachian Sandwort
Current Status: Threatened
Proposed Status: Threatened

Scientific Name: Oryzopsis pungens
Common Name: Slender Mountain-ricegrass
Current Status: Endangered
Proposed Status: Endangered

Scientific Name: Sensitive Species**
Common Name:
Current Status: Endangered
Proposed Status: Threatened

PA Fish and Boat Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE: Further review of this project is necessary to resolve the potential impacts(s). Please send project information to this agency for review (see WHAT TO SEND).

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictinal agency as collectible, having economic value, or

being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, send the following information to the agency(s) seeking this information (see AGENCY CONTACT INFORMATION).

Check-list of *Minimum* Materials to be submitted:

____**SIGNED** copy of this Project Environmental Review Receipt
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____Project location information (name of USGS Quadrangle, Township/Municipality, and County)
____USGS 7.5-minute Quadrangle with project boundary clearly indicated, and quad name on the map

The inclusion of the following information may expedite the review process.
____A basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams

4. DEP INFORMATION

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5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA. 17105-8552
Fax:(717) 772-0271

U.S. Fish and Wildlife Service

Pennsylvania Field Office
110 Radnor Rd; Suite 101, State College, PA 16801
NO Faxes Please.

PA Fish and Boat Commission

Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax:(717) 787-6957

7. PROJECT CONTACT INFORMATION

Name:_____
Company/Business Name:_____
Address:_____
City, State, Zip:_____
Phone:(_____)_____Fax:(_____)_____
Email:_____

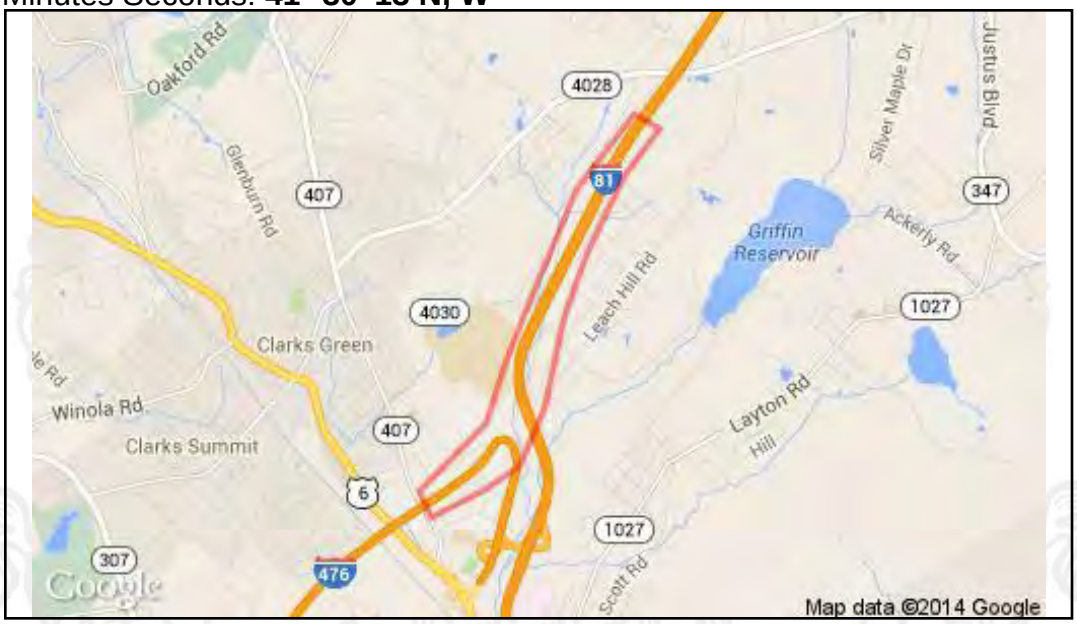
8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

_____ _____
applicant/project proponent signature date

1. PROJECT INFORMATION

Project Name: **Clarks Summit Proposed PTC Interchange**
Date of review: **9/30/2014 3:18:48 PM**
Project Category: **Transportation,Roads,Widening, adding lanes with disturbance beyond existing shoulders WITH drainage pipe replacements**
Project Area: **221.4** acres
County: **Lackawanna** Township/Municipality: **South Abington**
Quadrangle Name: **DALTON** ~ ZIP Code: **18411**
Decimal Degrees: **41.503774 N, -75.674725 W**
Degrees Minutes Seconds: **41° 30' 13 N, W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	No Known Impact	No Further Review Required
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate no known impacts to threatened and endangered species and/or special concern species and resources within the project area. Therefore, based on the information you provided, no further coordination is required with the jurisdictional agencies. This response does not reflect potential agency concerns regarding impacts to other ecological resources, such as wetlands.

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Fish and Boat Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE: No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.* is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at http://www.naturalheritage.state.pa.us.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA. 17105-8552
Fax:(717) 772-0271

U.S. Fish and Wildlife Service

Endangered Species Section
315 South Allen Street, Suite 322, State College, PA. 16801-4851
NO Faxes Please.

PA Fish and Boat Commission

Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax:(717) 787-6957

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City, State, Zip:_____
Phone:(_____)_____Fax:(_____)_____
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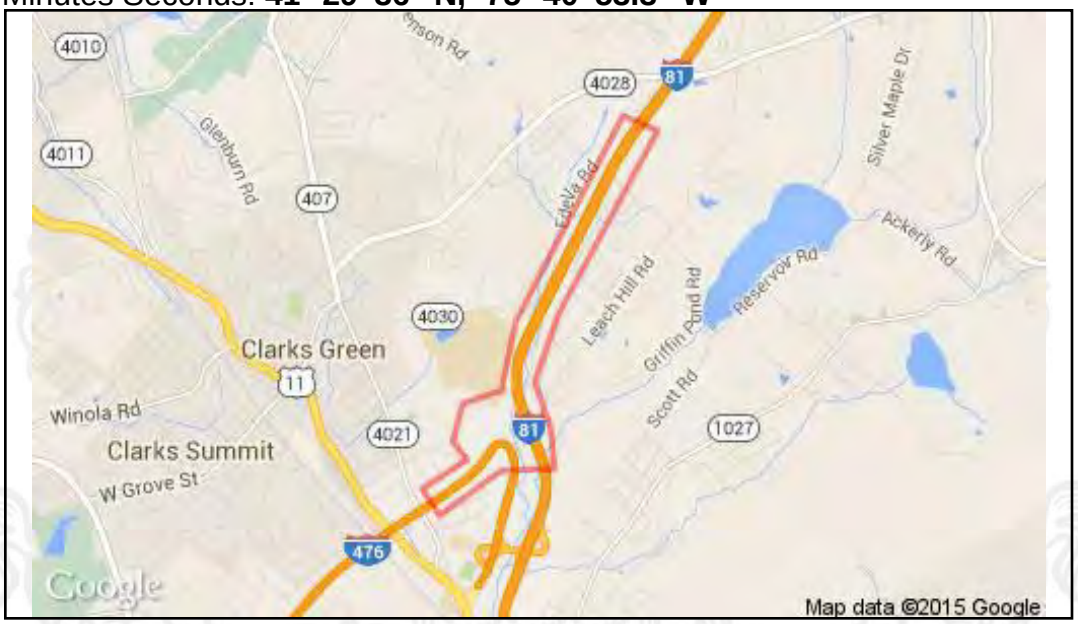
_____ _____
applicant/project proponent signature date

1. PROJECT INFORMATION

Project Name: **Clarks Summit Proposed New PTC Connections Study Area**
Date of review: **5/14/2015 2:19:49 PM**
Project Category: **Transportation,Roads,Widening, adding lanes with disturbance beyond existing shoulders WITH drainage pipe replacements**
Project Area: **234.2** acres
County: **Lackawanna** Township/Municipality: **South Abington**
Quadrangle Name: **DALTON** ~ ZIP Code: **18411**
Decimal Degrees: **41.493327 N, -75.681473 W**
Degrees Minutes Seconds: **41° 29' 36" N, -75° 40' 53.3" W**



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7. PROJECT CONTACT INFORMATION

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Address:_____
City, State, Zip:_____
Phone:(_____)_____Fax:(_____)_____
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_____ _____
applicant/project proponent signature date

Appendix E
Utility Logs

Preliminary Environmental Inventory Report
Scranton Beltway Project

Utility	MP	Station	Facility Type	Twp/Munic	CR Feature	Narrative
VERIZON PA F/ BELL ATLANTIC PA	A-114.6349	0885+50	COMM LINE	PITTSTON	WYOMING VAL I/C	U CA IN COND THRU BRDG UNDER RP-A (0074+50 ON RP AB)
GREATER PITTSTON CHAMBER OF COMMERCE	A-115.0233	0906+00	SEWER LINE	PITTSTON		12" SEWER LINE ENCAS IN CONC
FAA	A-115.30	0922+80	POWER LINE	PITTSTON	PVT	PPL POLE ON PTC SURPLUS PARCEL - NO AGREEMENT, POWER TO MIDDLE MARKER AT AIRPORT
NORTHEASTERN PA TV CABLE CO	A-115.3214	0921+74	CATV	PITTSTON	BEAR CREEK RD	CA 1/2" IN DIA WITH A COPPER CLAD CENTER CONDUCTOR CARRYING 60 V
PPL ELECTRIC UTILITES CORPORATION F/ PP&L, Inc.	A-115.3214	0921+74	POWER LINE	PITTSTON	SR 2035	4 W/12 KV DIST (TR 215) ALSO A FAA MANDATED LINE TO MIDDLE MARKER, POLE ON PTC R/W NO AGMT.
LEVEL 3 COMMUNICATIONS	A-115.3214	0921+74	COMM LINE	PITTSTON	SR 2035	
VERIZON PA F/ BELL ATLANTIC PA	A-115.3214	0921+74	COMM LINE	PITTSTON	SR 2035	FIBER OPTIC ATTCHD TO EXISTING POLES
COMCAST	A-115.3214	0921+74	COMM LINE	PITTSTON	SR 2035	
PA AMERICAN WATER CO	A-115.4675	0929+45	WATER LINE	DUPONT BOROUGH	COLLINS CREEK	14" CI WATER MAIN ENCAS IN CONC THRU CULV
PA GAS & WATER CO	A-115.8377	0949+00	GAS LINE	DUPONT BOROUGH	WYOMING AVE	4" GAS PIPE IN 6" STL CAS ON BRDG - ABANDONED OR REMOVED 04/2015
PPL ELECTRIC UTILITES CORPORATION F/ PP&L, Inc.	A-115.8472	0949+50	POWER LINE	DUPONT BOROUGH	WYOMING AVE	3 W/12 KV DIST
VERIZON PA F/ BELL ATLANTIC PA	A-115.9381	0954+30	COMM LINE	DUPONT BOROUGH	PVT	6 PR AERIAL CA
UGI PENN NATURAL F/ PG ENERGY	A-116.1000	0966+33	GAS LINE	DUPONT BOROUGH		CROSSING WAS BORED UNDER ROADWAY, HIT RUBBLE, BOULDERS , THEN WAS TRENCHED
CNTY BOARD LUZERNE & LACKAWANNA CO	A-116.1656	0966+31	WATER LINE		PVT	12" WATER LINE ENCAS IN 30" STEEL CAS
LOWER LACKAWANNA SEWER AUTH	A-116.1675	0966+41	SEWER LINE		PVT	12" SEWER LINE ENC IN 30" STL PIPE
WILKES-BARRE SCRANTON AIRPORT	A-116.9101	1005+62	POWER LINE		PVT	U POWER CA IN 4" COND & 1 SPARE COND TO SERVE SIGNAL LIGHT ON S SIDE

Utility	MP	Station	Facility Type	Twp/Munic	CR Feature	Narrative
VERIZON PA F/ BELL ATLANTIC PA	A-118.6734	0040+95	COMM LINE		PVT	U CA IN COND
LACKAWANNA & WYOMING VA RR CO	A-118.8135	0048+35	RAILRD		PVT	SINGLE TRK RR THRU BRDG (ABANDONED)
PPL ELECTRIC UTILITES CORPORATION F/ PP&L, Inc.	A-118.8258	0049+00	POWER LINE	BOROUGH OF MOOSIC		69 KV TRANS OVERHEAD UNDER BRDG
PPL ELECTRIC UTILITES CORP.	A-118.8258	0049+00	COMM LINE	BOROUGH OF MOOSIC	PVT	FIBER OPTIC CABLE ATTACHED TO EXISTING PPL POLES
PPL ELECTRIC UTILITES CORPORATION F/ PP&L, Inc.	A-119.0532	0061+00	POWER LINE		PVT	4 W/66 KV TRANS ON WOOD POLES
PENNA DEPT OF HWYS	A-119.1001	0063+48			I-81	2 BRDGS N & S BOUND INTERSTATE I-81
BUCKEYE P-L CO	A-119.1725	0067+30	OIL LINE			14" OIL LINE PARALLEL TO TPKE R/W
BUCKEYE P-L CO	A-119.2160	0069+60	OIL LINE			8" OIL LINE PARALLEL TO & WITHIN TPKE R/W
VERIZON PA F/ BELL ATLANTIC PA	A-119.5153	0085+40	COMM LINE		SR 0011	AERIAL CA THRU BRDG (TR 11)
VERTO CATV	A-119.5270	0086+50	CATV	BOROUGH OF MOOSIC	RTE 11	7 STRAND 1/4" 6M SUSPENSION CA 60 V
VERIZON PA F/ BELL ATLANTIC PA	A-119.5361	0086+50	COMM LINE		SR 0011	U CA IN COND THRU BRDG (TR 11)
PVT WATER LINE	A-119.5371	0086+55	WATER LINE		SR 0011	PVT 2" WATER LINE TO REST THRU BRDG (TR 11)
PPL ELECTRIC UTILITES CORPORATION F/ PP&L, Inc.	A-119.5401	0086+71.1	POWER LINE		SR 0011	3 W/23 KV TRANS & 4 W/4 KV DIST (TR 11)
VERTO CATV	A-119.5401	0086+71.1	CATV		SR 0502	ONE CA ? (TR 502)
SCRANTON SPRING BROOK WATER SERV	A-119.5456	0087+00	WATER LINE	BOROUGH OF MOOSIC	SR 0011	NOW PA GAS & WATER CO
PPL ELECTRIC UTILITES CORPORATION F/ PP&L, Inc.	A-119.6878	0094+51	POWER LINE		PVT	3 W/12 KV DIST
NORTHERN P-L CO	A-119.7331	0097+00	OIL LINE		PVT	R/W FOR RELOC 14" OIL LINE OVERLAPS TPKE R/W LINE OUTSIDE FENCED TPKE R/W
BUCKEYE P-L CO	A-119.7351	0097+10	OIL LINE		PVT	16" OIL LINE WITHIN R/W OUTSIDE R/W FENCE
NORTHERN P-L CO	A-119.8657	0104+00	OIL LINE		PVT	R/W FOR RELOV 14" OIL LINE OVERLAPS TPKE R/W LINE OUTSIDE FENCED TPKE R/W

Utility	MP	Station	Facility Type	Twp/Munic	CR Feature	Narrative
BORO OF CLARKS SUMMIT	A-129.7699	0627+05	SEWER LINE	S. ABINGTON	HGWY 611	18" PIPE ENCASED IN CONCRETE
COMMONWEALTH TEL CO	A-129.7936	0088+30	COMM LINE		RP AB	2 AERIAL CA OVER RPS AT STA 88+30, 1-600 S CA ADDED
COMMONWEALTH TEL CO	A-129.8306	0630+25	COMM LINE		SR 4021	2 AERIAL CA THRU VIADUCT
NORTH CHINCHILLA COMM WATER SERV	A-129.8315	0630+30	WATER LINE		SR 4021	4" WATER LINE THRU VIADUCT
PA GAS & WATER CO	A-129.8440	0096+00	WATER LINE	S. ABINGTON	US RTE 6 & 11	12" WATER PIPELINE
NORTH CHINCHILLA COMM WATER SERV	A-129.8609	0631+85	WATER LINE		SR 4021	4" WATER LINE THRU VIADUCT
NORTH CHINCHILLA COMM WATER SERV	A-129.8769	0632+70	WATER LINE	S. ABINGTON	SR 4021	4" WATER LINE THRU VIADUCT UNDER, PARALLEL TO & WITHIN NORTHERN TPKE R/W
PA GAS & WATER CO	A-130.2235	0651+00	WATER LINE			12" DICL WATER MAIN
PPL ELECTRIC UTILITES CORPORATION F/ PP&L, Inc.	A-130.23	0058+75	POWER LINE	S ABINGTON		12 KV
CLARKS SUMMIT WATER CO	A-130.3057	0655+34	WATER LINE	S. ABINGTON		8" CI PIPE WITH 4' OF COVER THRU SP #815 NOT THRU TPKE
AMERICAN WATER WORKS SERVICES CO INC	A-130.3057	0655+34	WATER LINE	S. ABINGTON		8" CI PIPE WITH 4' OF COVER CONNECTED TO A WELL
P T C (I) CLARKS SUMMIT	A-130.4	0655+25	SERV LINE	S. ABINGTON		POWER- PP & L; SEWER- ON-SITE TREATMENT; WATER- WELL
PENNA DEPT OF HWYS	A-130.4000	0010+26			RP AB OVER CD	BRDG OCC SCRANTON I/C RP AB OVER RAMP CD-ENERGY FOR SIGN STR

Appendix C

To: Joe Sutor, PTC Capital Planning Manager
Systemwide Planning WO#2 – Project Manager

From: Melody A. Matter, P.E., PTOE

Date: December 11, 2015

Subject: Systemwide Planning WO#2, Scranton Beltway Feasibility – Benefits of Direct Connections

CC: Larry Bankert

The Pennsylvania Turnpike Commission, under their Systemwide Transportation Planning contract, set forth the Scranton Beltway Feasibility Study to explore the achievability to optimize the use of the Turnpike's Northeastern Extension (I-476) and PennDOT's I-81 in Luzerne and Lackawanna Counties. The intent is to optimize the utilization of both corridors and essentially create a beltway system around Scranton.

The Northeastern Extension provides an alternative route to I-81 from Wyoming Valley (Interchange 115) to Clarks Summit (Interchange 131) but is under-utilized while I-81 frequently operates at or near capacity. Adequate connections at the Wyoming Valley and Clarks Summit interchanges, particularly north to north and south to south, will be essential to increasing the utilization of I-476 and relieving congestion on I-81.

The key benefits of the beltway system are expected to be:

- Congestion relief to I-81; especially during peak periods
- Increased utilization of existing highway assets

In addition to the key benefits, there are other anticipated benefits:

- Incident management
  - Three years of PennDOT's Road Condition Reporting System (RCRS) incident data (9/02/12 to 9/02/15) were reviewed. During this period, 23 incidents lead to closures on I-81 impacting traffic for an average 3.3 hours during each incident. Better connections between I-81 and I-476 would allow I-476 to be better utilized as an incident detour/congestion relief route.
  - Cost savings to motorists using I-476 as an incident detour/congestion relief route could be substantial. For example, an incident closes one lane of traffic on I-81 NB near Exit 182 for three hours during the PM peak period. Using existing volumes and assuming 10% of traffic is diverted to I-476 during the incident; a savings to motorists of approximately $33,000 was calculated (calculated with PennDOT's Road User Liquidated Damages Worksheet and assuming the diverted traffic paid the toll).
- Alternative route during construction
  - Currently on I-81, resurfacing, bridge reconstruction, and interchange reconfiguration projects are being performed and increasing delays on the roadway. Three improvement projects (69210, 87736, 104472) are planned over the next 12 years on the mainline and ramps of I-81 within the Scranton Beltway region. Based on current experience, the reduced roadway performance during construction activities will cause additional delays and backlogs. In addition, three projects (69172, 95435, 102095) are also planned over the next 12 years on nearby roadways, including US 11 and PA 315, which could divert traffic to I-81. These nearby projects could further increase volume and congestion on the interstate. The direct connections would allow I-476 to be better utilized as alternative route during construction both on I-81 and on adjacent roadways.
- Congestion relief during events
  - The Scranton area has several venues and events that attract additional traffic volume to the area. These venues and events include Montage Mountain & Pavilion (outdoor concerts,

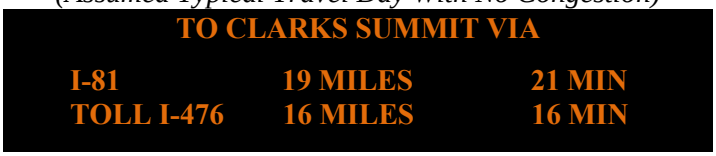
festivals), PNC Field (baseball games), La Fest Italiana, St. Patrick's Day, and New Year's Eve. Both Montage Mountain & Pavilion and PNC Field use Exit 182. Based on correspondence with PennDOT District 4-0, when events overlap at the facilities congestion around Exit 182 is considerable, causing significant delay. Increasing the utilization of I-476 by providing direct connections between I-81 and I-476 would divert through traffic from I-81 and provide some relief to I-81 during these events.

- Provide more direct access to future development and land use
  - Providing the direct connections would provide congestion relief on I-81 as a portion of the through traffic on the roadway would be diverted to I-476. Reducing travel times and delays will attract future economic development as commercial and industrial companies would be able to efficiently and safely move their products through the area.
  - Providing the direct connections would increase utilization of I-476 which could spur residential, commercial and industrial development near the Keyser Avenue Interchange between Old Forge and Taylor Borough, and in the western suburbs of Scranton as the travel time to reach this area improves.
  - Currently, at some point along the entire stretch of the I-81 corridor, 12% of the nation's economy travels on the roadway. Overall truck freight is expected to increase 72% by 2040 Statewide. Locally, truck traffic is anticipated to account for 90% of trips by tonnage in the Scranton Beltway region by 2040. Also, freight movement from south central Pennsylvania to the Lackawanna/Luzerne region is expected to increase by 110% during the same time period. Improved utilization of I-476 could disperse truck traffic, mitigating impact to any single roadway.
- Could minimize need for future improvements to the transportation network
  - With the direct connections providing better utilization of I-476, the potential exists to defer future I-81 widening projects. This includes Project 87736 – Widening of I-81 from Moosic to Central Scranton Expressway which is programmed for $357M. Please note, the direct connections have the greatest potential to divert through traffic from I-81 to I-476. As I-81 still provides vital connections to I-84 and local interchanges and there is latent demand that will use the freed capacity on I-81, an additional study would need to be completed to determine how much of a deferment would be feasible.
  - As the direct connections will provide additional capacity to I-81 through the diversion of traffic to I-476, the latent demand on adjacent roadways such as Pittston Ave, Cedar Ave, S. Main St and Keyser Ave will shift from these roadways and utilize the freed capacity on I-81. Projects to address issues with congestion on these roadways and other local roads may be able to be deferred. Again, additional studies would need to be completed to determine how the change in traffic patterns would affect the local road network.

Other Actions (could be independent of the Scranton Beltway Project)

- To further enhance the utilization of the connections and I-476, ITS devices displaying route options with travel times to major destinations such as Clarks Summit and improved static signage on the I-81 corridor could be used to educate motorists of their options and encourage the use I-476 to avoid delays on I-81 during construction, incidents and events.

Example ITS Board Message
(Assumed Typical Travel Day With No Congestion)



- Updating existing and providing additional signage could further enhance the utilization of the connections and I-476. In addition, formalizing the Beltway by providing a dual designation (i.e. I-476/I-381) to notify motorists that I-476 provides an alternate route to I-81 could further increase utilization.