

APPENDIX K

Lackawanna Cut-Off Restoration – Passenger Rail Study

CONCEPTUAL COST ESTIMATE

**CONCEPTUAL COST ESTIMATE
WATER GAP TO SLATEFORD PASSENGER RAIL STUDY**

WATER GAP RAIL STATION ALTERNATIVE 2				
CATEGORIES	QUANTITY	UNIT	UNIT PRICE	TOTAL
STRUCTURES (INCLUDES MECHANICAL, ELECTRICAL AND PLUMBING)				
Parking Garage	1	LUMP SUM	\$18,000,000.00	\$18,000,000
High Level Railway Platform w/ Canopy	1	LUMP SUM	\$2,115,000.00	\$2,115,000
GARAGE ENTRANCE/EXIT ROADWAYS				
Superpave WMA Wearing Course 1 1/2" Depth	5359	SY	\$13.00	\$69,667
Superpave WMA Binder Course 2 1/2" Depth	5359	SY	\$18.00	\$96,462
Superpave WMA Base Course 4" Depth	5359	SY	\$41.00	\$219,719
Subbase 6" Depth (No. 2A)	5359	SY	\$14.00	\$75,026
Bituminous Tack Coat	10718	SY	\$1.75	\$18,757
Excavation for Pavement	1861	CY	\$45.00	\$83,745
DRAINAGE (INCLUDING EXCAVATION)				
Drainage	1	LUMP SUM	\$120,000.00	\$120,000
ROADSIDE FEATURES				
Plain Cement Concrete Curb	450	LF	\$55.00	\$24,750
Cement Concrete Sidewalk	443	SY	\$138.00	\$61,200
E&S (INCLUDING SEEDING AND TOPSOIL)				
Erosion and Sediment Control BMP	1	LUMP SUM	\$20,000.00	\$20,000
SIGNING AND PAVEMENT MARKINGS				
Signing and Pavement Markings	1	LUMP SUM	\$10,000.00	\$10,000
MPT				
Maintenance & Protection of Traffic	1	LUMP SUM	\$80,000.00	\$80,000
MISCELLANEOUS				
Stormwater Management BMP	1	LUMP SUM	\$220,000.00	\$220,000
Mobilization	1	LUMP SUM	\$1,152,000.00	\$1,152,000
Excavation/Foreign Borrow	1	LUMP SUM	\$500,000.00	\$500,000
Unforeseen Water Pollution Control	1	LUMP SUM	\$5,000.00	\$5,000
Clearing and Grubbing	1	LUMP SUM	\$60,000.00	\$60,000
Construction Surveying	1	LUMP SUM	\$20,000.00	\$20,000
Utility Services and Appurtenances	1	LUMP SUM	\$310,000.00	\$310,000
Field Office	1	LUMP SUM	\$30,000.00	\$30,000
Landscaping	1	LUMP SUM	\$15,000.00	\$15,000
SUBTOTAL 1:				\$23,306,326
CONTINGENCIES (25% OF SUBTOTAL, EXCLUDING STRUCTURE ITEMS):				\$5,826,582
SUBTOTAL 2:				\$29,132,908
CONSTRUCTION MANAGEMENT/INSPECTION (12% OF SUBTOTAL 2):				\$3,495,949
*PRESENT YEAR CONSTRUCTION COST (2019):				\$32,630,000

* This cost estimate does not include costs associated with Engineering, Permitting or Property Acquisitions.



CONCEPTUAL TRACK ESTIMATE ALTERNATIVE 1				
(UPGRADE MAIN TO FRA CLASS 2)				
CATEGORIES	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONTRACT WORK				
Paving	80	SY	\$30.00	\$2,400
Railroad Subballast	3097	CY	\$65.00	\$201,305
Traffic Control	1	LUMP SUM	\$10,000.00	\$10,000
Utilities	1	LUMP SUM	\$10,000.00	\$10,000
Ditching	1000	CY	\$21.00	\$21,000
Other Drainage	1	LUMP SUM	\$50,000.00	\$50,000
Construct New Welded Track 136 RE	6889	TF	\$396.00	\$2,728,044
Construct New Welded TO No. 15	1	EACH	\$471,300.00	\$471,300
Remove Track	220	TF	\$19.00	\$4,180
Salvage	1	LUMP SUM	-\$1,452.00	-\$1,452
Additional Ballast	2323	CY	\$20.00	\$46,460
Line and Surface Track	20991	TF	\$28.00	\$587,748
Saw Cuts	8	EACH	\$125.00	\$1,000
Install Bonded Insulated Joints	2	EACH	\$5,624.00	\$11,248
Additional Field Welds	26	EACH	\$798.00	\$20,748
Additional Ties	4200	EACH	\$62.00	\$260,400
Additional OTM (Bars, Bolts, Plates)	1	LUMP SUM	\$30,000.00	\$30,000
Replace Grade Crossing	1	LUMP SUM	\$30,000.00	\$30,000
RR Construction Management (5%)	1	LUMP SUM	\$224,219.00	\$224,219
MISCELLANEOUS				
Insurance (5%)	1	LUMP SUM	\$235,430.00	\$235,430
Performance Bond (1.5%)	1	LUMP SUM	\$74,160.00	\$74,160
Payment Bond (1.5%)	1	LUMP SUM	\$74,160.00	\$74,160
Mobilization (5%)	1	LUMP SUM	\$235,430.00	\$235,430
Contingencies (25%)	1	LUMP SUM	\$1,065,556.00	\$1,065,556
*PRESENT YEAR CONSTRUCTION COST (2019):				\$6,400,000

* This estimate does not include Environmental and Permitting Costs, Highway, Structures and foundations, or Railroad C&S Works.

** This estimate assumes that private contractors will perform all trackwork

*** This estimate is conceptual and has been developed without benefit of field survey, field inspection or detailed design.

CONCEPTUAL TRACK ESTIMATE ALTERNATIVE 2				
(UPGRADE MAIN TO FRA CLASS 4)				
CATEGORIES	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONTRACT WORK				
Paving	80	SY	\$30.00	\$2,400
Railroad Subballast	3097	CY	\$65.00	\$201,305
Traffic Control	1	LUMP SUM	\$10,000.00	\$10,000
Utilities	1	LUMP SUM	\$10,000.00	\$10,000
Ditching	1000	CY	\$21.00	\$21,000
Other Drainage	1	LUMP SUM	\$50,000.00	\$50,000
Construct New Welded Track 136 RE	25791	TF	\$396.00	\$10,213,236
Construct New Welded TO No. 15	1	EACH	\$628,409.00	\$628,409
Remove Track	18902	TF	\$19.00	\$359,138
Salvage	8	LUMP SUM	-\$124,753.00	-\$124,753
Saw Cuts	6	EACH	\$125.00	\$750
Install Bonded Insulated Joints	14	EACH	\$5,624.00	\$78,736
Additional Field Welds	54	EACH	\$798.00	\$43,092
Additional OTM (Bars, Bolts, Plates)	1	LUMP SUM	\$30,000.00	\$30,000
Replace Grade Crossing	1	LUMP SUM	\$30,000.00	\$30,000
RR Construction Management (5%)	1	LUMP SUM	\$562,930.00	\$562,930
MISCELLANEOUS				
Insurance (5%)	1	LUMP SUM	\$605,812.00	\$605,812
Performance Bond (1.5%)	1	LUMP SUM	\$190,831.00	\$190,831
Payment Bond (1.5%)	1	LUMP SUM	\$190,831.00	\$190,831
Mobilization (5%)	1	LUMP SUM	\$605,812.00	\$605,812
Contingencies (25%)	1	LUMP SUM	\$2,741,906.00	\$2,741,906
*PRESENT YEAR CONSTRUCTION COST (2019):				\$16,460,000

* This estimate does not include Environmental and Permitting Costs, Highway, Structures and foundations, or Railroad C&S Works.

** This estimate assumes that private contractors will perform all trackwork

*** This estimate is conceptual and has been developed without benefit of field survey, field inspection or detailed design.

CONCEPTUAL SIGNAL ESTIMATE - SIGNAL & PTC SYSTEM UPGRADE				
CATEGORIES	QUANTITY	UNIT	UNIT PRICE	TOTAL
MATERIAL				
Slateford Interlocking Signal Equipment	1	EACH	\$1,650,000.00	\$1,650,000
Water Gap CP Signal Equipment	1	EACH	\$550,000.00	\$550,000
River Road Grade Crossing Complete	1	EACH	\$400,000.00	\$400,000
PTC ACSES 8' X 8' Radio Instrument House Complete	2	EACH	\$150,000.00	\$300,000
ACSES Transponders	12	EACH	\$2,500.00	\$30,000
Armored Fiber Optic Cable, 48 Strand, Multimode	30000	EACH	\$0.90	\$27,000
Misc. NJT Spec Signal Cable (Control House to Field Apparatus)	1	EACH	\$80,000.00	\$80,000
Interoperability to IETMS (PTC) System	1	EACH	\$350,000.00	\$350,000
Radio coverage analysis	1	EACH	\$125,000.00	\$125,000
Construction Management (5%)	1	EACH	\$175,600.00	\$175,600
MISCELLANEOUS				
Force Account Field Labor	1	LUMP SUM	\$2,396,940.00	\$2,396,940
Commissioning (Force Account)	1	LUMP SUM	\$553,140.00	\$553,140
Mobilization (5%)	1	LUMP SUM	\$184,380.00	\$184,380
Contingencies (20%)	1	LUMP SUM	\$1,364,412.00	\$1,364,412
*PRESENT YEAR CONSTRUCTION COST (2019):				\$8,190,000

(1) All signal locations pre-wired houses with VPI Processors, Micro-WEU, Genercode II Track circuits, AC Power supply, rectifiers, DC batteries, Local Control Panel(LCP), lightning protection (surge protectors), fiber optic modems for communication (control & indication) from NJT ROCC, including PTC Safety Server.

(2) RIH to include modems for communication to CIL WEU, & ROCC PTC Safety Server, PTC 218 MH radio transmitter, radio fileter, rectifier, batteries, and antenna.

(3) Switch layout to be Alstom 5H dual operation switch.

(4) Construction to be performed by NJT signal force account personnel.

(5) Interoperability with PTC freight operations - IETMS - WSRs connection to PTC safety Server.

(6) Signal design to include block layout, safe braking analysis, interlocking circuit design, transponder layout design, and factory breakdown testing.



WATER GAP TO DELAWARE RIVER CORRIDOR DRAINAGE MAINTENANCE/ UPGRADES				
CATEGORIES	QUANTITY	UNIT	UNIT PRICE	TOTAL
MATERIAL				
Installation of Pipes 18"-48"	1	LUMP SUM	\$120,000.00	\$120,000
Standard Inlet Box	4	EACH	\$2,300.00	\$9,200
Earthwork for Pipe Trench	1	LUMP SUM	\$15,000.00	\$15,000
*PRESENT YEAR CONSTRUCTION COST (2019):				\$150,000

SLATEFORD CREEK CULVERT REPAIRS				
CATEGORIES	QUANTITY	UNIT	UNIT PRICE	TOTAL
CRITICAL / HIGH PRIORITY MAINTENANCE				
Repair Deteriorated Concrete	18	SF	\$260.00	\$4,680
Underpin Footing	10	CY	\$600.00	\$6,000
RECOMMENDED MAINTENANCE				
Class A Cement Concrete	4	CY	\$2,300.00	\$9,200
Repair Deteriorated Concrete	225	SF	\$260.00	\$58,500
Cement Concrete Paving for Stream Beds	42	CY	\$550.00	\$23,100
SUBTOTAL 1:				\$101,480
CONTINGENCIES (25% OF SUBTOTAL 1, EXCLUDING STRUCTURE ITEMS):				\$25,370
*PRESENT YEAR CONSTRUCTION COST (2019):				\$130,000

**This cost estimate does not include costs associated with Engineering, Permitting or Right-of-Way Acquisitions.*



SLATEFORD BRIDGE				
CATEGORIES	QUANTITY	UNIT	UNIT PRICE	TOTAL
EXCAVATION				
Class 1 Excavation	2242	CY	\$29.00	\$65,018
Class 1B Excavation	851	CY	\$33.00	\$28,083
PAVEMENT				
Superpave WMA Wearing Course 1 1/2" Depth	2773	SY	\$12.50	\$34,663
Superpave WMA Binder Course 2 1/2" Depth	2773	SY	\$14.00	\$38,822
Superpave WMA Wearing Course 4" Depth	2773	SY	\$18.00	\$49,914
Subbase 6" Depth (No. 2A)	2773	SY	\$13.00	\$36,049
Bituminous Tack Coat	5546	SY	\$0.75	\$4,160
BRIDGE				
Class 3 Excavation	1760	CY	\$30.00	\$52,800
Class AAAP Cement Concrete	66	CY	\$1,100.00	\$72,600
Class AA Cement Concrete	83	CY	\$800.00	\$66,400
Class A Concrete	862	CY	\$625.00	\$538,750
Prestressed Concrete Adjacent Box Beams 48"x21"	443	LF	\$321.00	\$142,203
Selected Borrow Excavation, Structure Backfill	5705	CY	\$45.00	\$256,725
Removal of Existing Bridge Structure	1	LUMP SUM	\$20,000.00	\$20,000
Membrane Waterproofing	89	SY	\$65.00	\$5,785
No. 57 Coarse Aggregate	10	CY	\$90.00	\$900
Reinforcement Bars, Epoxy Coated	97750	LBS	\$1.75	\$171,063
Protective Coating for Reinforced Concrete Surfaces	254	SY	\$7.00	\$1,778
Temporary Excavation Support System	1	LUMP SUM	\$236,250.00	\$236,250
DRAINAGE (INCLUDING EXCAVATION)				
Drainage	1	LUMP SUM	\$12,000.00	\$12,000
ROADSIDE FEATURES				
Guide Rail and Attenuators	1	LUMP SUM	\$32,000.00	\$32,000
E&S (INCLUDING SEEDING AND TOPSOIL)				
Erosion and Sediment Control BMP	1	LUMP SUM	\$20,000.00	\$20,000
SIGNING AND PAVEMENT MARKINGS				
Signing and Pavement Markings	1	LUMP SUM	\$10,000.00	\$10,000
MPT				
Maintenance & Protection of Traffic	1	LUMP SUM	\$123,000.00	\$123,000
MISCELLANEOUS				
Mobilization	1	LUMP SUM	\$181,000.00	\$181,000
Unforeseen Water Pollution Control	1	LUMP SUM	\$5,000.00	\$5,000
Clearing and Grubbing	1	LUMP SUM	\$20,213.81	\$20,214
Construction Surveying	1	LUMP SUM	\$20,000.00	\$20,000
Field Office	1	LUMP SUM	\$30,000.00	\$30,000
SUBTOTAL 1:				\$2,275,176
CONTINGENCIES (25% OF SUBTOTAL 1, EXCLUDING STRUCTURE ITEMS):				\$568,794
SUBTOTAL 2:				\$2,843,970
CONSTRUCTION MANAGEMENT/INSPECTION (12% OF SUBTOTAL 2):				\$341,277
*PRESENT YEAR CONSTRUCTION COST (2019):				\$3,190,000

* This cost estimate does not include costs associated with Engineering, Permitting or Right-of-Way Acquisitions.



Paulinskill Viaduct Rehabilitation				
CATEGORIES	QUANTITY	UNIT	UNIT PRICE	TOTAL
SITE WORK				
Remove Vegetation & Debris	1.0	ACRE	\$25,000.00	\$25,000
Remove Ballast	5704.0	CY	\$50.00	\$285,200
Place Selective Fill over Structure	3422.0	CY	\$50.00	\$171,100
Ballast Rails and Ties over Structure	1300.0	CY	\$1,000.00	\$1,300,000
Construct Open JT. Drainage	1100.0	LF/TRACK	\$100.00	\$110,000
Rip Rap at Piers	900.0	CY LF	\$160.00	\$144,000
Embankment Excavation	5000.0	CY	\$100.00	\$500,000
Restore Embankment	5000.0	CY	\$100.00	\$500,000
DEMOLITION				
Demo Riling Pillars	65.0	CY	\$100.00	\$6,500
Demo refuge	400.0	CY	\$100.00	\$40,000
Demo End Spans (2)	0.0	CY	\$100.00	\$0
Demo Ballast Trough	0.0	CY	\$100.00	\$0
Selectively Demo Spandrel Walls	0.0	CY	\$100.00	\$0
SPALL REPAIRS				
Arch Barrel Spall Repairs	8400.0	SF	\$200.00	\$1,680,000
Ballast Trough Spall Repairs	9350.0	SF	\$200.00	\$1,870,000
Pier Spall Repairs	3000.0	SF	\$200.00	\$600,000
Spandrel Wall Spall Repairs	5405.0	SF	\$200.00	\$1,081,000
RECONSTRUCTION				
Partially Reconstruct Spandrel Walls	0.0	CY	\$2,000.00	\$0
Reconstruct Ballast Trough	0.0	CY	\$2,000.00	\$0
Reconstruct Drainage Outlets	16.0	EA	\$5,000.00	\$80,000
Reconstruct Refuge	400.0	CY	\$2,000.00	\$800,000
Reconstruct Pillars	65.0	CY	\$2,000.00	\$130,000
Reconstruct End Spans	0.0	CY	\$2,000.00	\$0
Install Railing	2200.0	LF/TRACK	\$425.00	\$935,000
Waterproof Tub	4644.0	SY	\$80.00	\$371,520
Anti-Graffiti Coating	14933.3	SY	\$5.00	\$74,667
SUBTOTAL 1:				\$10,703,987
CONTINGENCIES (20% OF SUBTOTAL 1, EXCLUDING STRUCTURE ITEMS):				\$2,140,798
CONSTRUCTION MANAGEMENT/INSPECTION (12% OF SUBTOTAL 2):				\$3,211,196
*PRESENT YEAR CONSTRUCTION COST (2019):				\$16,000,000



Delaware River Viaduct Rehabilitation				
CATEGORIES	QUANTITY	UNIT	UNIT PRICE	TOTAL
SITE WORK				
Remove Vegetation & Debris	2.0	ACRE	\$25,000.00	\$50,000
Remove Ballast	7518.5	CY	\$50.00	\$375,926
Place Selective Fill over Structure	4511.1	CY	\$50.00	\$225,556
Ballast Rails and Ties over Structure	1650.0	CY	\$1,000.00	\$1,650,000
Construct Open JT. Drainage	1450.0	LF/TRACK	\$100.00	\$145,000
Rip Rap at Piers	4500.0	CY LF	\$160.00	\$720,000
Embankment Excavation	5000.0	CY	\$100.00	\$500,000
Restore Embankment	5000.0	CY	\$100.00	\$500,000
DEMOLITION				
Demo Riling Pillars	90.7	CY	\$100.00	\$9,067
Demo refuge	360.0	CY	\$100.00	\$36,000
Demo End Spans (2)	3000.0	CY	\$100.00	\$300,000
Demo Ballast Trough	5800.0	CY	\$100.00	\$580,000
Selectively Demo Spandrel Walls	336.0	CY	\$100.00	\$33,600
SPALL REPAIRS				
Arch Barrel Spall Repairs	28560.0	SF	\$200.00	\$5,712,000
Pier Spall Repairs	4800.0	SF	\$200.00	\$960,000
Spandrel Wall Spall Repairs	14280.0	SF	\$200.00	\$2,856,000
RECONSTRUCTION				
Partially Reconstruct Spandrel Walls	336.0	CY	\$2,000.00	\$672,000
Reconstruct Ballast Trough	5800.0	CY	\$2,000.00	\$11,600,000
Reconstruct Drainage Outlets	22.0	EA	\$5,000.00	\$110,000
Reconstruct Refuge	360.0	CY	\$2,000.00	\$720,000
Reconstruct Pillars	90.7	CY	\$2,000.00	\$181,334
Reconstruct End Spans	3000.0	CY	\$2,000.00	\$6,000,000
Install Railing	2900.0	LF/TRACK	\$425.00	\$1,232,500
Waterproof Tub	6122.2	SY	\$80.00	\$489,778
Anti-Graffiti Coating	14933.3	SY	\$5.00	\$74,667
SUBTOTAL 1:				\$35,733,427
CONTINGENCIES (20% OF SUBTOTAL 1, EXCLUDING STRUCTURE ITEMS):				\$7,146,686
CONSTRUCTION MANAGEMENT/INSPECTION (12% OF SUBTOTAL 2):				\$10,720,028
*PRESENT YEAR CONSTRUCTION COST (2019):				\$54,000,000

Lackawanna Cutoff - Conceptual Construction Costs	
CONSTRUCTION ITEM	TOTAL
Water Gap Rail Station (1)	\$32,630,000
Right of Way Acquisition, Delaware Water Gap Rail Station	\$1,500,000
Slateford Bridge Construction and nearby Culvert Repairs (1)	\$3,320,000
Signals and Positive Train Control (2)	\$8,190,000
PA Track Restoration (2)	\$16,610,000
NJ Track Restoration - Andover NJ to Delaware River Bridge (3)	\$112,600,000
Delaware River Viaduct Rehabilitation	\$54,000,000
Paulinskill Viaduct Rehabilitation	\$16,000,000
Design, Environmental and Engineering Costs (4)	\$44,080,000
Preliminary Total:	\$288,930,000

Notes:

(1) Construction Management/Construction Inspection included at 12% of Conceptual Construction Costs

(2) Track and Signal estimates based on desktop study. Additional field verification of existing conditions recommended to refine estimate. Estimate includes drainage and maintenance upgrades along track corridor.

(3) Estimate includes conceptual costs for restoration of the 20 mile segment in NJ from Andover to the Delaware River crossing, excluding major structure rehabilitations, based on the following:

- * A 2016 NJ Transit estimate of cost to complete the 7.3 mile segment from Port Morris to Andover, NJ was \$61.6m which includes the \$24m Roseville Tunnel rehabilitation

- * Inflation factor from 2016 to 2019 @ 3% per year = 9.3%

- * Conceptual track restoration cost per mile (not including major structures) = (\$61.6m-\$24.0m)*1.093/7.3 mile = \$5.63 million/mile

- * Note that track restoration costs may vary depending on proposed operational concepts

(4) Conceptual Soft Costs estimated as follows:

- * Environmental Clearance/Public Involvement/Permitting @8% of Construction cost

- * Preliminary Design/Final Design @10% of Construction cost

(5) Conceptual Estimates in 2019 dollars