

POR T AUTHORITY OF ALLEGHENY COUNTY

TRANSMITTAL MEMORANDUM

TO: All Holders of Bid Documents for the Subject Contract

SUBJECT: North Shore Connector
NSC Train Systems (System Wide)
Contract No. NSC-009

DATE: July 31, 2008

Please find enclosed the following:

- Addendum No. #1 dated July 31, 2008
 - Questions and Answers 1-31
 - NSC-009 Pre-Bid Conference and Site Tours Meeting Minutes dated July 15, 2008
-

The following signature acknowledges the receipt of this Transmittal.

Signature

Name of Company

Date

Please sign and return one (1) copy to:

Port Authority of Allegheny County
Purchasing and Materials Management Department
Heinz 57 Center
345 Sixth Avenue, Third Floor
Pittsburgh, PA 15222-2527
Attention: Ms. Toni Matessa

POR T AUTHORITY OF ALLEGHENY COUNTY

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Attention: Ms. Toni Matessa

Port Authority of Allegheny County

North Shore Connector

NSC Train Systems (System Wide)

Contract No. NSC-009

ADDENDUM NO. 1

July 31, 2008

This Addendum modifies Bid Documents for the subject Contract as set forth below. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Form of Proposal, Form B.

To identify revisions on the attached Contract Drawings, an irregular line joined by a diamond symbol with a number inside it appears at the revision location; and the diamond symbol with a number inside it, date and a description appear in the Revision Block.

To identify revisions on the attached pages, a vertical bar appears in the right margin at the revision location.

CHANGES TO TERMS AND CONDITIONS (VOLUME 1)

1. Section 00100, Bid Advertisement, Page 00100-3. Delete and replace with page 00100-3.
2. Section 00400, Bid/Award Forms, Form B, Page B-4. Delete and replace with page B-4.
3. Section 00400, Bid/Award Forms, Form B, Pages B-7 through B-8. Delete and replace with pages B-7 through B-8.
4. Section 00500, Agreement, Pages 00500-14 and 15. Delete and replace with pages 00500-14 and 15.
5. Section 00500, Agreement, Page 00500-17. Delete and replace with page 00500-17.
6. Section 00800, Prevailing Wage Rates, Davis Bacon Wages, Pages 1 through 13. Delete and replace with pages 1 through 13.

CHANGES TO TECHNICAL PROVISIONS (VOLUME 2)

1. Section 03630, Plinth Anchoring System, Page 03630-3. Delete and replace with page 03630-3.

2. Section 05520, Miscellaneous Metalwork, Page 05520-1. Delete and replace with page 05520-1.
3. Section 05520, Miscellaneous Metalwork, Page 05520-7. Delete and replace with page 05520-7.
4. Section 05520, Miscellaneous Metalwork, Pages 05520-10 through 05520-11. Delete and replace with pages 05520-10 through 05520-11.
5. Section 13570, Signal System Requirements, Page 13570-5. Delete and replace with page 13570-5.
6. Section 13576, Circuit Requirements, Page 13576-3. Delete and replace with page 13576-3.
7. Section 13579, Design Requirements, Page 13579-6. Delete and replace with page 13579-6.
8. Section 13587, Wire and Cable, Page 13587-4. Delete and replace with page 13587-4.

CHANGES TO TECHNICAL PROVISIONS (VOLUME 3)

1. Section 16602, General Requirements Overhead Contact System, Page 16602-5. Delete and replace with page 16602-5.
2. Section 16722, Radio System Expansion, Pages 16722-1 through 16722-28. Delete and replace with pages 16722-1 through 16722-32.

CHANGES TO NSC-009 CONTRACT DRAWINGS (VOLUME 1)

(Modified or Added Drawings are attached here to)

1. Drawing No. TN130, Sheet No. 54. Drawing Modified.
2. Drawing No. TN137, Sheet No. 61. Drawing Modified.
3. Drawing No. CV113, Sheet No. 92. Drawing Modified.
4. Drawing No. SG019, Sheet No. 345. Drawing Modified.
5. Drawing No. SG184, Sheet No. 422. Drawing Modified.
6. Drawing No. CR100, Sheet No. 563. Drawing Modified.
7. Drawing No. CR101, Sheet No. 564. Drawing Modified.
8. Drawing No. CR104, Sheet No. 567. Drawing Modified.
9. Drawing No. CR105, Sheet No. 568. Drawing Modified.

Enterprises have the maximum opportunity to participate in the performance of contracts and subcontracts financed, in whole or in part, with federal funds provided for this Project. In this regard, all Bidders shall take all necessary and reasonable steps in accordance with 49 C.F.R., Part 26, to ensure that DBEs have the maximum opportunity to compete for and perform contracts. Bidders shall not discriminate on the basis of race, color, national origin or sex in the award and performance of DOT-assisted contracts. It is a condition of this Contract that all Bidders shall follow the DBE required procedures as set forth in the Bid Documents. If aid is required to involve DBEs in the Work, Bidders are to contact the Port Authority DBE Representative, Edward Greene at (412) 566-5257.

The Bidder's attention is directed to the following contacts for Bidder's questions:

Procedural Questions Regarding Bidding:

Toni Matessa - Port Authority
(412) 566-5148

All other questions relating to the Bid Documents must be submitted by mail or facsimile to:

Port Authority of Allegheny County
Heinz 57 Center
345 Sixth Avenue, Third Floor
Pittsburgh, PA 15222-2527
Attn: Toni Matessa
Fax: (412) 566-5359

In addition, the Bidder's attention is directed to the following schedule of activities for preparation of its Bid:

9:00 a.m. July 15, 2008	Pre-Bid Conference Port Authority of Allegheny County Heinz 57 Center Fifth Floor, Board Room 345 Sixth Avenue Pittsburgh, PA 15222-2527 (Attendance is not mandatory, but strongly recommended)
10:45 a.m.-4:00 p.m. July 15, 2008	Pre-Bid Site Tour of Pitt Tower Facility (10:45 a.m. – 12:00 p.m.) & South Hills Village Operations Control Center (12:45 p.m. – 4:00 p.m.) [immediately following the Pre-Bid Conference] Participants should wear a safety vest Transportation to each facility will be provided by Authority Details available at Pre-Bid Conference
1:30 a.m. to 4:00 a.m. July 16, 2008	Authority Stage I Tunnel (Gateway and Wood Street Stations and Gateway Tunnel Loop) Site Tour. NOTE: <u>This is a night-time tour.</u> Meeting Place: Gateway Station entrance located on the corner of Liberty Ave. and Stanwix Street, Pittsburgh, PA Participants should wear a Hard Hat and Safety Vest and bring a flashlight
10:30 a.m.-12:30 p.m. August 8, 2008	Site Tour of NSC-003/006 Worksite Participants are required to wear a safety vest, hard hat, and boots. Participants will be required to walk up/down stair access into and out of the excavation pits. Participants are required to attend tunnel safety training which will be provided and will begin at 10:30 a.m.. Meeting Place: Mazeroski Way/ West General Robinson Street Intersection (Launch Pit located on the North Shore)
August 14, 2008	Bidders shall submit Potential Areas of Subcontracting (Form GV) to Port Authority.
1:30 p.m. August 27, 2008	Bids Due Purchasing and Materials Management Department

The Board of Port Authority of Allegheny County reserves the right to reject any or all Bids

POR T AUTHORITY OF ALLEGHENY COUNTY
 NORTH SHORE CONNECTOR
 NSC TRAIN SYSTEM (SYSTEM WIDE)
 CONTRACT NO. NSC-009

UNIT PRICE SCHEDULE

BID ITEM	DESCRIPTION	UNITS	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
02840.005	REMOVE EXISTING GUIDE RAIL (CONTRACTOR'S PROPERTY)	LF	1,100		
02843.001	BOLLARDS	EA	5		
02891.002	POST MOUNTED SIGNS, TYPE B MODIFIED	SF	50		
02891.020	OVERHEAD CLEARANCE BAR	EA	6		
03305.001	TRACTION POWER SUBSTATION PAD AND TRANSFORMER PADS	LS	1		
03630.001	PLINTH ANCHORAGE	TF	12,750		
04200.001	TEMPORARY TUNNEL CLOSURE WALL	LS	1		
04200.002	CONCRETE GROUND FACE BLOCK WALL, 10" CMU	SF	435		
04200.003	CONCRETE BLOCK WALL, 10" CMU	SF	340		
05520.001	MISCELLANEOUS FABRICATED STEEL ITEMS	LB	1,000		
05520.002	GRATING	SF	182		
05520.007	EMERGENCY WALKWAYS	LF	6,510		
05520.008	EMERGENCY WALKWAY CROSSOVERS	LF	685		
05520.009	LADDERS	EA	68		
05520.010	STAIRS	EA	18		
05520.011	12 FOOT CROSSOVER PLATFORM	SF	420		
05520.012	EMERGENCY STAND ALONE WALKWAYS	LF	114		
05520.013	ANCILIARY ROOM STAIRS	EA	1		
09900.003	PENETRATING SEALER	SY	4,000		
13570.001	ALLENTOWN AVENUE STATION INTERLOCKING AND THE ASSOCIATED AUTOMATIC BLOCK SIGNAL SYSTEM	LS	1		
13570.002	NORTH SIDE STATION AUTOMATIC BLOCK SIGNAL SYSTEM	LS	1		
13570.003	MODIFIED GATEWAY INTERLOCKING AND THE ASSOCIATED AUTOMATIC BLOCK SIGNAL SYSTEM	LS	1		
13570.004	MODIFIED WOOD STREET INTERLOCKING	LS	1		

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NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
CONTRACT NO. NSC-009

UNIT PRICE SCHEDULE

BID ITEM	DESCRIPTION	UNITS	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
16205.002	ALLEGHENY CIRCUIT BREAKER ROOM	LS	1	1	
16220.001	TRACTION POWER SUBSTATION 27 KV AC SWITCHGEAR	LS	1	1	
16221.001	TRACTION POWER SUBSTATION 27 KV INTERRUPTOR SWITCHES	EA	5	5	
16230.001	TRACTION POWER SUBSTATION TRANSFORMER - RECTIFIER UNITS	EA	2	2	
16235.001	TRACTION POWER SUBSTATION AUXILIARY POWER SYSTEM	LS	1	1	
16240.001	TRACTION POWER SUBSTATION METAL-ENCLOSED DC SWITCHGEAR	LS	1	1	
16250.001	TRACTION POWER SUBSTATION DRAINAGE AND NEGATIVE RETURN	LS	1	1	
SWITCHBOARD					
16270.001	TRACTION POWER SUBSTATION 125 VDC BATTERY SYSTEM	LS	1	1	
16280.001	TRACTION POWER SUBSTATION ENCLOSURE	LS	1	1	
16295.001	TRACTION POWER SUBSTATION WIRE AND CABLE	LF	2,100	2,100	
16300.001	TRACTION POWER SUBSTATION BUSWAYS	LS	1	1	
16310.001	TRACTION POWER SUBSTATION LOCAL ANNUNCIATOR PANEL	LS	1	1	
16340.001	MEDIUM VOLTAGE METAL-ENCLOSED LOAD INTERRUPTER	EA	4	4	
SWITCHGEAR					
16360.001	FIELD TESTING OF TRACTION POWER SUBSTATION TESTING	LS	1	1	
16360.002	ACCEPTANCE TESTING OF TRACTION POWER SUBSTATION TESTING	LS	1	1	
16430.001	LOW VOLTAGE CIRCUIT BREAKER SWITCHGEAR	EA	2	2	
16602.001	OCS POLE	EA	33	33	
16602.002	OCS PORTAL	EA	1	1	
16602.003	OCS CANTILEVER	EA	51	51	
16602.004	OCS WIRING	LF	14,202	14,202	
16602.005	BALANCE WEIGHT ANCHOR ASSEMBLY	EA	5	5	
16602.006	FIXED TERMINATION ASSEMBLY	EA	13	13	

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NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
CONTRACT NO. NSC-009

UNIT PRICE SCHEDULE

BID ITEM	DESCRIPTION	UNITS	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
16602.007	DOWN GUY ANCHOR	EA	6		
16602.008	SECTION INSULATOR	EA	15		
16602.009	DISCONNECT SWITCH	EA	13		
16602.010	SURGE ARRESTER	EA	2		
16602.011	TUNNEL SUPPORT	EA	150		
16602.012	HEADSPAN	EA	1		
16602.013	DEAD END BRACKET	EA	10		
16602.014	SIGNAGE	LS	1		
16602.015	OCS GROUNDING	LS	1		
16602.016	OCS ELECTRICAL TESTING, ACCEPTANCE AND REVENUE SUPPORT	LS	1		
16602.017	CONTACT WIRE HEATER SYSTEM	LS	1		
16701.001	FIBER OPTIC OUTSIDE PLANT	LS	1		
16702.001	COPPER OUTSIDE PLANT	LS	1		
16703.001	CARRIER TRANSMISSION SYSTEM	LS	1		
16705.001	COMMUNICATIONS SYSTEM POWER SUPPLY	LS	1		
16721.001	TELEPHONE SYSTEM	LS	1		
16722.002	RADIO SYSTEM AND RADIATING/COAXIAL CABLE ALLEGHENY	LS	1		
16722.003	RADIO SYSTEM AND RADIATING/COAXIAL CABLE NORTH SIDE	LS	1		
16722.004	RADIO SYSTEM AND RADIATING/COAXIAL CABLE GATEWAY	LS	1		
16741.001	VARIABLE MESSAGE SIGN/PA SYSTEM	LS	1		
16742.001	SCADA SYSTEM	LS	1		

plan including, but not limited to, work location map, description of the work, and schedule of work to John Green and to the Engineer for review prior to the allocation meeting.

1. Any items of the work to be transported into or out of the existing LRV tunnel will be transported by the Contractor to/from any of the following locations: 1st Ave Station or Penn Park. The Contractor shall designate intended location and shall arrange for any additional access approvals if required. Contractor shall handle all materials to be transported. Contractor shall not direct Authority personnel or operate Authority equipment. Coordination will occur through the Engineer.
2. Authority services will be tracked by Authority by use of Authority's Force Account tracking procedure and shall be based on actual billings from Authority personnel costs. Authority will require at a minimum an Authority supervisor costing approximately \$56.00 per hour respectively. If the Contractor requests access for any of its construction vehicles which requires special access to the LRV system, two additional Authority personnel will be required to facilitate the special access on and off the LRV system. Authority Force Account cost tracking begins when Authority mobilizes to the work area and ends when demobilization is complete. Force Account will also include all administrative time to track the Force Account information.
3. In addition, should the Contractor fail to properly cancel, in a timely manner, any Authority assistance previously requested, the Contractor shall reimburse Authority for the cost of all Authority personnel that report, or are scheduled to provide services.
4. Contractor shall pay the Authority's Force Account costs, at its own cost and expense, and shall not receive reimbursement from Authority for work provided by Authority personnel. As payment, the Force Account costs will be deducted from the Contractor's next successive pay estimate. The Contractor shall receive a copy of all Authority Force Account documentation for its records.
5. The Contractor shall be responsible for any damages to Authority facilities which may occur due to the Contractor's access or operation within the structures.

- P. Full, regular scheduled transit revenue operations will continue during performance of the Work within the existing Gateway Station Loop and existing Wood Street Station until LRT Revenue Service is converted to a dual turnback operation terminating LRV Service at the Wood Street Station. The minimum daily volume of Authority vehicles trips are in the order of magnitude of 200 vehicles per day, servicing approximately 5500 patron trips daily.
- Q. Revenue Service Suspensions, Operation Restrictions and Delays.

There will be no suspension, restriction or delay of scheduled LRT operations except as listed in the Contract Documents or approved by the Engineer and Authority. Service restrictions and suspensions shall be carefully coordinated in accordance with Section 01781, "Maintenance and Protection of Authority Traffic" and Section 00700, Article 13.14. Service suspensions and restrictions will not be permitted between November 15 and January 1, of any calendar years during which Contractor performs its Work or during scheduled public

events that result in increased transit patronage, including but not limited to all Steeler home games, major sporting events, St. Patrick's Day, First Night, Light-up Night, Three-Rivers Arts Festival, Independence Day and Three-Rivers Regatta. Approval of Service Suspensions and Restrictions will also be contingent on other Port Authority Service Requirements and suspensions and restrictions requested from other Authority contactors.

R. Non Revenue Periods

- 1) All Work which requires de-energizing the Overhead Contact System (OCS), access to the operating LRT trackway, or disruption to in-service signal and communication circuits must be performed in conjunction with the Service Suspensions and restrictions described in Article 2.1 Q of this Section or during non-revenue periods, defined as 1:30 am to 4:30 am daily. Any requests to de-energize the OCS, to occupy the trackway during non-revenue periods, or disrupt signal and communication circuits must be made two weeks in advance to the Engineer in accordance with the provisions of Article 2.1 Q of this Section and approved and scheduled at Authority's weekly Track Allocation meeting.
- 2) Contractor may request that the OCS be de-energized during non-revenue periods. Contractor shall be aware that the OCS is an uninsulated 650 volt DC electric line that is energized at all times, including non-revenue periods. Contractor shall also be aware that a 2400 volts AC uninsulated signal power line is part of this system and is also energized at all times.

S. The Contractor shall have access to the existing Gateway transformer room from the surface through the NSC-010/011/012 laydown area at Gateway Station to allow for the removal of the existing transformers and installation of the new transformers. The NSC-010/011/012 contractor shall provide adequate space for the Contractor to stage equipment for the execution of this work. The Contractor shall coordinate its requirements and schedule for the work through the Engineer and the request shall be made twenty-one (21) days prior to the requested access. Provide a plan showing requested access areas, equipment staging requirements, and schedule of the work with the request.

T. The Contractor shall install the temporary closure wall between the existing Gateway and Wood Street Stations prior to decommissioning of any emergency ventilation facilities located in existing Gateway Station and Loop and after the Wood Street Station turnback operation has been implemented.

U. Access to Authority OCC shall be closely coordinated through the Engineer and Authority staff. The Contractor shall be permitted access to the OCC facilities and systems to perform its work as scheduled through, and approved by Authority and the Engineer. Any Contractor operations which impact Revenue Services shall be preformed during Non-Revenue Service Periods and shall be closely coordinated and planned with the managers of the OCC and Engineer so no Revenue Service interruptions occur. Some Contractor operations may be accommodated by OCC during Non-Peak Revenue Service time frames if Authority's ability to route trains is not

Fans EM9 and EM10 must remain operational during Revenue Service, including during the shut down of Gateway Station. The fans are vital to smoke evacuation for the Wood Street Station and tunnel to remain in service.

- BB. The Contractor shall attend a pre-assembly inspection of the Advanced Rail System Procurement – Gateway Double Crossover – Contract #3002 contractor's assembly. Inspection will occur at manufacturer's facility. The Contractor will be required to inspect and approve the complete assembly. The manufacturing contractor shall notify the Contractor twenty one (21) days prior to the pre-assembly inspection date. All communications with the manufacturing contractor shall be through the Engineer. Delivery of the Advanced Rail System Procurement – Gateway Double Crossover – Contract #3002 is described in Section 01400, Article 4.5.
- CC. All Contractor equipment shall be fitted with exhaust scrubbers while operating within the cut-and-cover and bored tunnels, including existing Stage I tunnel. Authority rail gauge is 62-1/2". All Contractor equipment shall be compatible with the rail gauge.
- DD. Authority and the Engineer shall witness any/all Contractor connections to existing Authority equipment. Authority personnel will be provided at no cost to the Contractor at the time scheduled. Should the Contractor fail to properly cancel, in a timely manner, any Authority assistance previously requested, the Contractor shall reimburse Authority for the cost of all Authority personnel that report, or are scheduled to provide services in accordance with the requirements of Article O of this Section.
- EE. Existing Station and Tunnel ancillary rooms will be locked at all times during the Work. Should the Contractor require access to a room to perform work, the Contractor shall coordinate with Authority personnel to gain access to said room(s) to perform its work. Coordination with Authority personnel shall be through the Engineer. Once the Contractor's shift is complete, Authority shall secure the ancillary room until access is again requested by the Contractor. Should the Contractor fail to properly cancel, in a timely manner, any Authority assistance previously requested, the Contractor shall reimburse Authority for the cost of all Authority personnel that report, or are scheduled to provide services in accordance with the requirements of Article O of this Section.
- FF. The System Integration Testing will require participation of Authority staff and equipment. Authority personnel and equipment for System Integration Testing will be provided at no cost to the Contractor at the time(s) scheduled. The Contractor shall coordinate with Authority to perform the System Integration Testing work. Coordination with Authority personnel shall be through the Engineer. The Contractor shall attend the Authority's Monday morning track allocation meeting fourteen (14) days prior to the date of the Contractor's work which Authority assistance is requested. The Contractor shall follow Authority procedures described in the "Track Entry Training Program" manual and Section 00700, Article 13.14. Should the Contractor fail to properly cancel, in a timely manner, any Authority assistance previously requested, the Contractor shall reimburse Authority for the cost of all Authority personnel and equipment that report, or are scheduled to provide services in accordance with the requirements of Article O of this Section.

GENERAL DECISION: PA20080004 07/18/2008 PA4

Date: July 18, 2008
General Decision Number: PA20080004 07/18/2008

Superseded General Decision Number: PA20070004

State: Pennsylvania

Construction Types: Heavy and Highway

Counties: Allegheny, Armstrong, Beaver, Bedford, Blair, Butler, Cambria, Cameron, Centre, Clarion, Clearfield, Clinton, Crawford, Elk, Erie, Fayette, Forest, Franklin, Fulton, Greene, Huntingdon, Indiana, Jefferson, Lawrence, McKean, Mercer, Mifflin, Potter, Somerset, Venango, Warren, Washington and Westmoreland Counties in Pennsylvania.

HEAVY AND HIGHWAY CONSTRUCTION PROJECTS (excluding sewer grouting projects and excluding sewage and water treatment plant projects)

Modification Number	Publication Date
0	02/08/2008
1	02/22/2008
2	03/07/2008
3	03/21/2008
4	04/11/2008
5	05/30/2008
6	06/20/2008
7	06/27/2008
8	07/04/2008
9	07/18/2008

BOIL0013-005 09/30/2007

CENTRE, FRANKLIN, POTTER, CLINTON, FULTON, HUNTINGDON AND MIFFLIN COUNTIES

	Rates	Fringes
BOILERMAKER.....	\$ 36.86	23.81

BOIL0154-004 06/01/2008

ALLEGHENY, ARMSTRONG, BEAVER, BEDFORD, BLAIR, BUTLER, CAMBRIA, CAMERON, CLARION, CLEARFIELD, CRAWFORD, ELK, FAYETTE, FOREST, GREENE, INDIANA, JEFFERSON, LAWRENCE, MCKEAN, MERCER, SOMERSET, VENANGO, WARREN, WASHINGTON AND WESTMORELAND COUNTIES

	Rates	Fringes
BOILERMAKER.....	\$ 33.90	22.07

BOIL0744-003 07/01/2008

ERIE COUNTY

Rates Fringes
file:///C:/Documents and Settings/hainesd/Local Settings/Temporary Internet Files/OLK3... 7/18/2008

BOILERMAKER.....\$ 35.34 18.48

BRPA0009-023 06/01/2007

BEAVER COUNTY

	Rates	Fringes
BRICKLAYER.....	\$ 25.00	12.90

BRPA0009-024 06/01/2007

WASHINGTON (Cross Creek, Hanover, Jefferson, Mt Pleasant, Nottingham, Peters, Robinson, Smith, Union Twp) COUNTY

	Rates	Fringes
BRICKLAYER.....	\$ 26.93	12.52

BRPA0009-025 06/01/2007

BUTLER, LAWRENCE, AND MERCER COUNTIES

	Rates	Fringes
BRICKLAYER.....	\$ 25.00	12.78

BRPA0009-032 06/01/2007

FAYETTE (Jefferson & Washington Twp), GREENE (Except Cumberland, Dunkirk, Greene, Monongahelia Twp), INDIANA, AND WESTMORELAND (Rostraver Twp) COUNTIES

	Rates	Fringes
BRICKLAYER.....	\$ 25.85	12.94

BRPA0009-033 06/01/2007

ARMSTRONG, CLARION (Brady, Madison, Perry, Tobe, Porter, Redbank Twp), FAYETTE (Except Jefferson & Washington Twp), GREENE (Cumberland, Dunkirk, Greene, Monongahelia Twp), INDIANA, AND WESTMORELAND (Except Rostraver Twp) COUNTIES

	Rates	Fringes
BRICKLAYER.....	\$ 26.02	12.77

BRPA0009-034 05/01/2008

ERIE COUNTY

	Rates	Fringes
BRICKLAYER.....	\$ 24.85	12.76

CARP2235-005 01/01/2008

Rates	Fringes
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PILEDRIVERMAN

Piledriverman (welder).....	\$ 28.15	11.50
Piledriverman.....	\$ 27.85	11.50

CARP2235-006 01/01/2007

	Rates	Fringes
Diver.....	\$ 40.40	10.77
Tender.....	\$ 26.93	10.77

CARP2274-001 01/01/2008

	Rates	Fringes
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CARPENTER (ALLEGHENY,
ARMSTRONG, BEAVER, BUTLER,
ERIE, FAYETTE, GREENE,
LAWRENCE, MERCER, WASHINGTON,
AND WESTMORELAND COUNTIES)

Carpenter (Welders).....	\$ 27.37	11.52
Carpenters.....	\$ 26.67	11.52

CARPENTER (BEDFORD, BLAIR,
CAMBRIA, CAMERON, CENTRE,
CLARION, CLINTON, CLEARFIELD,
CRAWFORD, ELK, FOREST,
FRANKLIN, FULTON, HUNTINGDON,
INDIANA, JEFFERSON, MCKEAN,
MIFFLIN, POTTER, SOMERSET,
VENANGO, AND WARREN COUNTIES)

Carpenters (Welders).....	\$ 27.13	11.52
Carpenters.....	\$ 26.42	11.52

ELEC0005-006 12/21/2007

ALLEGHENY, ARMSTRONG, BEDFORD, BLAIR, BUTLER CAMBRIA, CAMERON,
CENTRE (Remainder), CLARION, CLEARFIELD, ELK, FAYETTE, FULTON,
GREENE, HUNTINGDON, INDIANA, JEFFERSON, MCKEAN, SOMERSET,
VENANGO, WASHINGTON, AND WESTMORELAND COUNTIES

	Rates	Fringes
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ELECTRICIAN.....\$ 29.38 17.59

ELEC0056-004 06/01/2006

ERIE, FOREST AND WARREN COUNTIES

	Rates	Fringes
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ELECTRICIAN.....\$ 23.90 15.09

ELEC0126-005 06/03/2007

ALLEGHENY, ARMSTRONG, BEAVER, BEDFORD, BLAIR, CAMBRIA, CENTRE,
CLARION, CLEARFIELD, FAYETTE, FULTON, GREENE, HUNTINGDON,
INDIANA, JEFFERSON, SOMERSET, WASHINGTON AND WESTMORELAND

	Rates	Fringes
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Line Construction:

Groundman.....	\$ 21.27	14.05
Lineman.....	\$ 35.46	14.05
Truck Driver.....	\$ 23.05	14.05
Winch Truck Operator.....	\$ 24.82	14.05

ELEC0126-007 06/03/2007

FRANKLIN AND MIFFLIN COUNTIES

Rates	Fringes
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Line Construction:

Groundman.....	\$ 19.28	13.26
Lineman.....	\$ 32.14	13.26
Truck Driver.....	\$ 20.89	13.26
Winch Truck Operator.....	\$ 22.50	13.26

ELEC0143-007 06/01/2007

FRANKLIN and MIFFLIN COUNTIES

Rates	Fringes
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ELECTRICIAN.....	\$ 26.50	12.72
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ELEC0712-003 12/24/2007

CRAWFORD, BEAVER, LAWRENCE AND MERCER COUNTIES

Rates	Fringes
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ELECTRICIAN.....	\$ 28.45	17.67
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ELEC0812-008 06/01/2007

CLINTON COUNTY

Rates	Fringes
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ELECTRICIAN.....	\$ 24.34	14.58
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ELEC0812-009 06/01/2007

POTTER COUNTY

Rates	Fringes
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ELECTRICIAN.....	\$ 25.35	14.61
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ELEC0812-011 06/01/2007

CENTRE COUNTY (Burnside, Curtin, Liberty, Howard, Marion,
Walker, Miles, Haines Townships)

Rates	Fringes
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ELECTRICIAN.....	\$ 25.35	14.61
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ELEC1319-004 08/29/2005

BUTLER, CAMERON, CLINTON, CRAWFORD, ELK, ERIE, FOREST,
 LAWRENCE, MCKEAN, MERCER, VENANGO, WARREN AND POTTER COUNTIES

	Rates	Fringes
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Line Construction:

Groundman.....	\$ 21.35	11.99
Lineman, Dynamite Man,		
Heavy Equipment Operator....	\$ 34.44	12.90
Truck Drivers.....	\$ 22.39	12.06
Winch Truck Operators.....	\$ 23.07	12.11

ENGI0066-016 01/31/2008

	Rates	Fringes
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Power equipment operators:

(ALLEGHENY, ARMSTRONG,
 BEAVER, BLAIR, BUTLER,
 CAMBRIA, CENTRE, CLARION,
 CLEARFIELD, CRAWFORD, ERIE,
 ELK, FAYETTE, GREENE,
 INDIANA, JEFFERSON, LAWRENCE,
 MCKEAN, MERCER, SOMERSET,
 VENANGO, WARREN, WASHINGTON,
 AND WESTMORELAND COUNTIES)

GROUP 1.....	\$ 25.58	13.74
GROUP 2.....	\$ 25.32	13.74
GROUP 3.....	\$ 21.67	13.74
GROUP 4.....	\$ 21.21	13.74
GROUP 5.....	\$ 20.96	13.74

Power equipment operators:

(BEDFORD, CAMERON, CLINTON,
 FOREST, FRANKLIN, FULTON,
 HUNTINGDON, MIFFLIN, AND
 POTTER COUNTIES)

GROUP 1.....	\$ 25.29	13.74
GROUP 2.....	\$ 25.01	13.74
GROUP 3.....	\$ 21.37	13.74
GROUP 4.....	\$ 20.88	13.74
GROUP 5.....	\$ 20.67	13.74

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1 - Asphalt Paving Machine (Spreader), Autograde (C.M.I. and similar); Backfiller, Compactor with Blade, Backhoe - 360 and 180 degree Swing; Cableway; Caisson Drill (similar to Hugh Williams), Central Mix Plant; Cooling Plant; Concrete Paving Mixer, Concrete Pump (self-propelled); Cranes; Cranes (boom or mast over 101ft. \$.50 per each additional 50 feet inclusive of jib), Cranes (Tower Stationary- Climbing Tower Crane); Derrick; Derrick Boat; Dozer(greater than 25,000 lbs.); Dragline; Dredge; Dredge Hydraulic; Elevating Grader; Franki Pile Machine; Gradall (remote control or otherwise), Grader (power-fine grade); Hlift (4 cy. and over); Hoist 2 Drums or more (in one unit); Hydraulic Boom Truck with pivotal cab (single motor-Pitman or similar), (Boom and Mast over 101 feet will

be paid an additional 50 feet inclusive of jib if used;) Kocal; Mechanic, Locomotive (std. Gauge); Metro-chip Harvester or similar; Milling Machine (Roto Mill or similar); Mix Mobile; Mix Mobile (with Self Loading Attachment), Mucking Machine (tunnel); Pile Driver Machine; Pipe Extrusion Machine; Prespliter Drill (self contained); Refrigeration Plant (soil Stabilization) Rough Terrain Crane (25 ton over) (Boom and Mast over 101 feet will be paid an additional 50 feet inclusive of jib if used); Rough Terrain Crane (under 25 ton), Scrapers; Shovel-Power; Slip form Paver (C.M.I. and similar); Trenching Machine (30,000 lbs. and over), Trenching Machine (under 30,000 lb.), Tunnell Machine (Mark XXI Jarva or similar), Vermeer Saw, Whirley, Mechanic, Pipe bursting machine, Slip Lining machine

GROUP 2: Asphalt plant operator; auger (tractor mtd.); auger (truck mtd.); belt loader (euclid or similar); boring machine; cable placer or layer; compactor with blade, concrete batch plant (electronically synchronized); concrete belt placer (C.M.I. and similar); concrete finishing machine and spreader, concrete mixer (over 1 cy.) concrete pump (stationary); core drill (truck or skid mtd. - similar to penn drill), dozer (25,000 lbs or less); Ditch Witch Saw, force feedloader; fork lift (lull or similar); grader - power; grease unit opertor (head); guard rail post driver (truck mounted) guard rail post driver (skid type); hilift (under 4 cy.); skid steer loader; hydraulic boom truck (non-pivotal cab); job work boat (powered), jumbo operator; locomotive (narrow guage); minor equipment operator (accumulative four units); mucking machine; multi-head saw (groover); overhead crane; roller -power-asphalt; ross carrier; side boom or tractor mounted boom; shuttle buggy (asphalt), stone crusher (screening-washing plants); stone spreader (self propelled) truck mounted drill (davey or similar); welder and repairman; well point pump operator.

GROUP 3: Broom Finisher (C.M.I. or similar); Compactors/Rollers (static or vibratory (Self-propelled) on dirt or stone; Curb Builder; Minor Equipment Opertor (two or three units); Multi-head Tie Tamper; Pavement Breaker (self-propelled or ridden); Soil Stablizer Machine; Tire Repairman; Tractor (snaking and hauling); Well Driller and Horizontal: Winch or "A" Frame Truck (when hoisting and lowering).

GROUP 4: Ballast Regulator; Compressor; Concrete Mixer (1 cy. & under with skip); Concrete Saw (Ridden or self-propelled); Conveyor; Elevator (Material hauling only); Fork-lift (Ridden or self-propelled); Form Line Machine; Generator; Groute Pump; Heater (Machinical); Hoist (single Drum); Ladavator, Light Plant; Mulching Machine; Personnel Boat (Powered), Pulverizer, Pumps, Seeding Machine, spray Cure Machine (powered Driven); Subgrader; Tie Puller; Tugger; Welding Machine (Gas or Diesel).

GROUP 5: Deck Hand; Farm Tractor; Fireman on Boiler; Oiler; Power Broom; Side Delivery Shoulder Spreader (attachment).

IRON0003-001 06/01/2008

ALLEGHENY, FAYETTE, WESTMORELAND, CAMBRIA, INDIANA, ARMSTRONG,
BUTLER, BEAVER, CLARION, AND WASHINGTON COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 29.43	19.45

IRON0207-002 06/01/2008

LAWRENCE, MERCER, AND VENANGO COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 26.31	16.03

IRON0348-002 06/01/2008

CRAWFORD, ERIE, FOREST, AND WARREN COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 25.33	18.55

IRON0404-008 07/01/2008

FRANKLIN (Remainder), HUNTINGDON (Remainder), AND MIFFLIN
COUNTIES

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 25.92	21.20

IRON0549-002 07/01/2006

GREENE COUNTY

	Rates	Fringes
IRONWORKER.....	\$ 24.07	10%+14.94

IRON0568-004 05/01/2008

BEDFORD, FRANKLIN (Southwest 1/3), FULTON, HUNTINGDON (Western
2/3), AND SOMERSET COUNTIES

	Rates	Fringes
Ironworkers:		
Sheeter, Bucker-Up.....	\$ 26.08	11.60
Structural, Ornamental,		
Reinforcing, Machinery		
Mover, Rigger & Machinery		
Erector, Welder, Fence		
Erector.....	\$ 25.83	11.60

IRON0772-001 06/01/2008

BLAIR, CAMERON, CENTRE, CLEARFIELD, CLINTON, ELK, JEFFERSON,
MCKEAN AND POTTER COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 24.53	18.55

A. HOLIDAYS

The following holidays shall be observed: New Years Day, Goodfriday, Memorial Day, Fourth of July, Labor Day, Veterans Day (Observed the day after Thanksgiving), Thanksgiving Day, Christmas Day.

Any holiday which occurs on Sunday shall be observed the following Monday.

LAB01058-001 01/01/2008

	Rates	Fringes
LABORER (BEDFORD, CAMERON, CENTRE, CLINTON, CRAWFORD, FOREST, FRANKLIN, FULTON, HUNTINGDON, JEFFERSON, MIFFLIN, AND POTTER COUNTIES)		
GROUP 1.....	\$ 22.50	11.85
GROUP 2.....	\$ 22.66	11.85
GROUP 3.....	\$ 23.15	11.85
GROUP 4.....	\$ 23.60	11.85
GROUP 5.....	\$ 24.01	11.85
GROUP 6.....	\$ 19.05	11.85
GROUP 7.....	\$ 20.85	11.85
GROUP 8.....	\$ 23.50	11.85
GROUP 9.....	\$ 25.00	11.85

Laborers: (ALLEGHENY,
ARMSTRONG, BEAVER, BLAIR,
BUTLER, CAMBRIA, CLARION,
CLEARFIELD, ELK, ERIE,
FAYETTE, GREENE, INDIANA,
LAWRENCE, MCKEAN, MERCER,
SOMERSET, VENANGO, WARREN,
WASHINGTON, AND WESTMORELAND
COUNTIES)

GROUP 1.....	\$ 22.60	11.85
GROUP 2.....	\$ 22.76	11.85
GROUP 3.....	\$ 23.15	11.85
GROUP 4.....	\$ 23.60	11.85
GROUP 5.....	\$ 24.01	11.85
GROUP 6.....	\$ 19.05	11.85
GROUP 7.....	\$ 20.85	11.85
GROUP 8.....	\$ 23.60	11.85
GROUP 9.....	\$ 25.10	11.85

LABORERS CLASSIFICATIONS

GROUP 1: Asphalt curb sealer; Asphalt tamper; Batcherman (weigh) Blaster, Boatman, Brakeman, Change house attendant, Cofferdam, Concrete curing pitman, Puddler, Drill Runner's helper (Includes Drill Mounted on Truck, Track, or similar and Davey Drill Spots, Clean up, helps to maintain), Electric Brush and or Grinder, Fence Construction

(Including Fence Machine Operator) Form stripper and Mover, Gabion (Erectors and Placers) Hydro jet blaster nozzleman; Landscape laborer, Manually moved emulsion sprayer, Radio actuated traffic control operator Rip rap work, scaffolds and Runways, Sheeters and Shorers (includes lagging) structural concrete Top Surfacer, Walk Behind Street Sweeper, and Wood Chipper

GROUP 2: Air tool operator (all types); Asphalt, batch & concrete plant operator (manually operated) Burner, Caisson; men (open air); Carryable pumps; Chain saw operator including attachments, Cribbing, (concrete or steel); Curb machine operator (asphalt or concrete walk behind); Diamond head Core Driller, Drill runner's helper (tunnel) Fork Lift, (walk behind), Form Setter (Road Forms Line man) Highway Slab reinforcement placers (including joint and Basket Setters) Hydraulic pipe pusher; Liner plates (Tile or Vitrified Clay) Mechanical compacting equipment operators, Mechanical joint sealer, Dope pot and Tar Kettle, Mortar mixer (hand or machine) Muckers, Brakemen & all other Labor, (Includes installation of utility lines) Pipe Layers /Fusion /Heating Iron (Regardless of materials) Portable Single Unit Conveyor, Post Hole Auger, (2 or 4 cycle hand operated) Power wheelbarrows and buggies, Rail porter or similar; Sand blaster; Signal Man, Vibrator operator, Crown Screed Adjuster, All RAILROAD TRACK WORK TO INCLUDE THE FOLLOWING: adzing machine, ballast Router, Bolting Machine, Power Jacks, Rail Drills, Railroad Brakeman, Rail Saws, Spike Drivers (Manually or hand held tool) Spike Pullers Tamping Machine, Thermitweld

GROUP 3: Asphalt Luteman/Raker, Blacksmith, Blaster, Brick, stone and block pavers and block cutters (wood, belgian and asphalt); Cement mortar lining car pusher; Cement mortar mixer (pipe relining); Cement mortar pipe reliners; concrete saw operator (walk behind); Curb cutters and setters; Elevated roadway drainage construction; erector of overhead signs, Form setter (road forms-lead man); Grout machine operator; Gunite or dry pack gun (nozzle and machine man); Manhole or catch basin builder (Brick block concrete or any prefabrication) Miners and drillers (including lining, supporting and form workmen, setting of shields, miscellaneous equipment and jumbos); Multi-plate pipe (aligning and securing); Placing wire mesh on gunite projects; Wagon drill operators (air track or similar); Walk behind ditching machine (trencher or similar)

GROUP 4: Reinforcing Steel Placer (Bending, aligning, and securing, Cadweld)

GROUP 5: High Burner, (Any burning not done from deck), Welder (Pipeline)

GROUP 6: Flagperson

GROUP 7: Certified Flag-person

Group 8: Toxic/Hazardous Waste Removal Laborer Levels C & D

GROUP 9: Toxic/Hazardous Waste Removal Laborer Levels A & B

PAIN0021-019 05/01/2008

CLINTON COUNTY

	Rates	Fringes
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Painters:

Bridge.....	\$ 24.85	11.45
Brush & Roller.....	\$ 23.90	11.45
Spray.....	\$ 24.90	11.45

PAIN0021-024 05/01/2008

FRANKLIN COUNTY

	Rates	Fringes
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PAINTER

Brush.....	\$ 23.65	8.30
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PAIN0057-014 06/01/2007

ALLEGHENY, FAYETTE, GREEN, WASHINGTON COUNTIES

	Rates	Fringes
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Painters:

Bridge.....	\$ 28.15	11.53
Brush & Roller.....	\$ 25.73	11.53
Spray.....	\$ 26.23	11.53

PAIN0057-015 06/01/2007

ARMSTRONG, BEAVER, BEDFORD, BLAIR, BUTLER, CAMBRIA, CENTRE,
CLARION, CLEARFIELD, ELK, FULTON, HUNTINGTON, INDIANA,
JEFFERSON, LAWRENCE, MERCER, MIFFLIN, SOMERSET, VENANGO AND
WESTMORELAND COUNTIES

	Rates	Fringes
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Painters:

Bridge.....	\$ 27.80	11.88
Brush and Roller.....	\$ 25.83	11.88
Spray.....	\$ 25.88	11.88

PAIN0057-022 05/01/2008

	Rates	Fringes
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Painters: (ERIE, McKEAN, AND
WARREN (Including Columbus
and Freehold twps) COUNTIES)

Bridges, Stacks, Towers.....	\$ 22.52	10.60
Brush and Roller.....	\$ 20.52	10.60
Spray and Sandblasting.....	\$ 21.27	10.60

PAIN0057-027 06/01/2007

CAMERON, CRAWFORD, POTTER, WARREN, (Excluding Columbus and Freehold twps)

	Rates	Fringes
PAINTER		
Brush and Roller.....\$ 20.66		11.03

PLAS0526-002 01/01/2008

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...\$ 25.72		12.47

* PLUM0027-001 06/01/2008

ALLEGHENY, ARMSTRONG, GREENE (Except extreme Eastern portion)
AND WASHINGTON (Except extreme Eastern portion) COUNTIES

	Rates	Fringes
Plumbers and Pipefitters (Bridge Drain Pipe).....\$ 32.70		15.02

PLUM0047-005 05/01/2008

BEAVER, BUTLER, MCKEAN, MERCER, VENANGO, CLARION, LAWRENCE,
FOREST, WARREN, CRAWFORD, AND ERIE COUNTIES

	Rates	Fringes
Plumbers and Pipefitters (Bridge Drain Pipe).....\$ 32.69		15.84

PLUM0354-005 07/01/2007

BEDFORD, BLAIR, CAMBRIA, CAMERON, CLEARFIELD, ELK, FAYETTE,
GREENE (Extreme Eastern portion), HUNTINGDON, INDIANA,
JEFFERSON, SOMERSE, WASHINGTON (Extreme Eastern portion), AND
WESTMORELAND COUNTIES

	Rates	Fringes
Plumbers and Pipefitters (Bridge Drain Pipe).....\$ 30.84		17.36

TEAM0040-001 01/01/2008

	Rates	Fringes
TRUCK DRIVER (ALLEGHENY, ARMSTRONG, BEAVER, BLAIR, BUTLER, CAMBRIA, CENTRE, CLARFIELD, CRAWFORD, ERIE, FAYETTE, GREENE, INDIANA, JEFFERSON, LAWRENCE, MCKEAN, MERCER, SOMERSET, VENANGO, WARREN, WASHINGTON, AND WESTMORELAND)		
GROUP 1.....\$ 23.53		10.64+ A+B

GROUP 2.....	\$ 23.68	10.71+ A+B
GROUP 3.....	\$ 24.21	10.95+ A+B
Truck drivers: (BEDFORD, CAMERON, CLAIRON, CLINTON, ELK, FOREST, FRANKLIN, FULTON, HUNTINGDON, MIFFLIN, AND POTTER COUNTIES)		
GROUP 1.....	\$ 23.34	10.56+ A+B
GROUP 2.....	\$ 23.53	10.64+ A+B
GROUP 3.....	\$ 24.05	10.88+ A+B

FOOTNOTES: A. Hazardous/toxic waste material/work level A & B receive additional \$2.50 per hour above classification rate

B. Hazardous/toxic waste materials/Work level C & D receive \$1.00 per hour above classification

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1 - Single Axle (2 axles including steering axle);
Includes partsman and warehoueman

GROUP 2 - Tandem - Tri-Axle - Semi-Tractor Trailer
(combination) (3 axles or more including steering axle)

GROUP 3 - Specialty Vehicles; Heavy equipment whose capacity exceeds that for which state licenses are issued specifically refers to units in excess of eight (8) feet width (such as Euclids, Atley Wagon, Payloader, Tournawagons, and similar equipment when not self loaded); Tar and Asphalt Distributors Trucks, Heavy Duty Trailer, such as Low Boy, High Boy

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination

- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

ARTICLE 2 PRODUCTS

2.01 MATERIALS

- A. #4 Reinforcement bar; refer to Section 03211 "Reinforcement Bars and Dowels".
- B. Epoxy shall be a two part hybrid adhesive mortar combining urethane methacrylate resin, hardener, cement and water with a fast curing time similar or equal to Hilti HIT HY 150 MAX Adhesive Anchor or approved equal. The epoxy shall be delivered through a mixing nozzle or equal. Base material application temperature range shall be between 14° F and 104° F.

ARTICLE 3 EXECUTION

3.01 GENERAL

- A. Layout the hole locations as per the typical sections and layout requirements shown in the Contract Drawings. Adjust the individual hole locations within the tolerances stated in these Specifications and the drawings to avoid existing rebar or other interferences.
 - 1. The NSC-003/006 contractor has installed threaded couplers within the track bed on both sides of the track alignment within the Open Boat section (approximately sta. R6049+00 to sta. R6051+94) and in the cut and cover tunnel (approximate sta. R6038+20 to R6038+60). Contractor shall account for these abandoned inserts in its drilling spacing layout.
- B. Drill the holes, place the reinforcement bars, and place the epoxy system in accordance with PENNDOT 408, Section 1002.3, the manufacturer's installation instructions and the Contract Documents. If one or more parameters conflict, use the more stringent parameter.

3.02 PLACEMENT OF REINFORCING BARS

- A. Contractor shall make field adjustments in accordance with PENNDOT 408, Section 1002.3(c).

3.03 PLACING AND FASTENING REINFORCING STEEL

- A. When placed in the Work, reinforcing steel shall be clean and free of dirt, heavy scale, paint, oil, grease, and other foreign matter that may reduce bond.
- B. Arrange and place reinforcement as shown on the Contract Drawings, approved Shop Drawings, and in accordance with the tolerances specified herein.
- C. Furnish and place the plinth anchor reinforcement bars in accordance with the Contract Drawings.

ARTICLE 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- A. Item 03630.001 – Plinth Anchorage shall be measured per track-foot, complete-in-place. For measurement purposes, the following set payment dimensions shall apply:

SECTION 05520
MISCELLANEOUS METALWORK

ARTICLE 1 GENERAL

1.01 SUMMARY

- A. The work of this Section includes, but is not limited to, providing all labor, materials, tools, equipment, and incidentals necessary for miscellaneous metalwork in accordance with the Contract Documents.
- B. The work of this Section includes, but is not limited to, the following activities:
 - 1. Supplying, fabricating, finishing, and installing miscellaneous steel items including embedded plates, assemblies, and angles.
 - 2. Elevator Casings including supplying, fabricating and finishing of casing pipe and end plate, and installation of casing including drilling and grouting.
 - 3. Grating
 - 4. Frames
 - 5. Safety nosings.
 - 6. Tunnel Emergency Walkways and Crossovers including, but not limited to: design, fabricate, construct, and coordinate the tunnel emergency walkways, crossovers, ladders, end barriers, stair assemblies, ancillary room stairs, and railings.
- C. The Contract Documents provide the performance parameters and design criteria to complete the Tunnel Emergency Walkways and Crossovers portion of the Work. The Contractor shall be responsible to provide a complete design for this portion of the Work.

1.02 RELATED SECTIONS

- A. Section 03305, "Cast-in-Place Concrete and Cement Concrete Structures"
- B. Section 16060, "Grounding and Bonding."

1.03 REFERENCE STANDARDS

- A. PENNDOT Publication 408
- B. PENNDOT Publication 19, PTM
- C. PENNDOT Publication 35 (Bulletin 15)
- D. AASHTO
- E. ASTM

- C. Do not span expansion joints of the super structure. Plan the walkway layout such that there is a one inch gap in the vicinity above the super structure expansion joint.
- D. The base slab is generally sloped beneath the foot of the walkway. The walkway base plate must fully bear on the base slab. The use of 1/2 inch grout beneath the base plate is allowed to provide full bearing. Shims may be used for installation where the base plate is to be grouted and shall have a minimum of one inch grout cover. The Contractor may dry pack grout under the base plate filling the entire void. The edge of grout, where used, shall have a 45 degree bevel. Grout strength shall be 4,000 psi minimum.
- E. The walkway may have a utility support attached to the under side by use of a hanger assembly no closer than 8 feet on center. The maximum allowable load shall be 50 pounds in the vertical direction only. The use of utility anchorages attaching to the walkway is prohibited unless specifically designed, modified as necessary, and furnished by the supplier of that utility.
- F. In the area of the bored tunnel or in areas along the running tunnels where there is a gap larger than 2 inches between the wall and the back edge of the walkway grating supply wire mesh, D20 minimum.
- G. The walkway edge along the track side shall maintain all clearance envelopes issued in the Contract Documents. See TK Series drawings for outline of train clearances.
- H. Metal work shall be grounded, see Article 3.11 below. End banding shall be used at all discontinuities and adjacent metalwork shall be individually supported and shall not share a common base plate or support frame.
- I. The stair in the Ancillary Room located at approximate station L6044+28, between the electrical room and storage room at the western end of North Side Station shall be 8 feet wide, rise of 4'-6", and have a center support with a hand rail on each side. The stair shall be designed using the parameters herein and shall be comprised of like construction.

3.08 EMERGENCY WALKWAY CROSSOVER INSTALLATION

- A. A pre-construction walk through is required for each linear foot of crossover to be installed. The Contractor shall incorporate findings into the Tunnel Walkway Pre-Construction Report for use in fabrication and installation of crossovers. The Tunnel Walkway Pre-Construction Report shall record as a minimum: the condition of the base slab, the condition of the adjacent wall, the existence of super elevated track rail, the presence of all appurtenances on the lower wall or base slab, and the approximate stationing of each occurrence. The Tunnel Walkway Pre-Construction Report information is only required in the area of the crossover footprint.
- B. Install crossover in accordance with the Contract Drawings maintaining a constant height, level with the track rail. The base slab generally varies in accordance with the super structure cross slope.
- C. The crossover base plate must fully bear on the base slab. The use of 1/2 inch grout beneath the base plate is allowed to provide full bearing. Shims may be used for installation where the base plate is to be grouted and shall have a minimum of one inch

ARTICLE 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- A. Item 05520.001- Miscellaneous Fabricated Steel Items shall be measured per pound, complete in place.
- B. Item 05520.002 - Grating shall be measured per square foot, complete in place.
- C. [NOT USED]
- D. [NOT USED]
- E. [NOT USED]
- F. [NOT USED]
- G. Item 05520.007 – Emergency Walkways shall be measured per linear foot, complete in place.
- H. Item 05520.008 – Emergency Walkway Crossovers shall be measured per linear foot, complete in place.
- I. Item 05520.009 – Ladders shall be measured per each, complete in place.
- J. Item 05520.010 – Stairs shall be measured per each, complete in place.
- K. Item 05520.011 – 12 Foot Crossover Platform shall be measured per square foot, complete in place.
- L. Item 05520.012 - Emergency Stand Alone Walkways shall be measured per linear foot, complete in place.
- M. Item 05520.013 – Ancillary Room Stairs shall be measured per each, complete in place

PAYMENT

- A. Item 05520.001- Miscellaneous Fabricated Steel Items will be paid at the unit price and shall include the cost of all related work specified in this Section.
- B. Item 05520.002 - Grating will be paid at the unit price and shall include the cost of all related work specified in this Section.
- C. [NOT USED]
- D. [NOT USED]
- E. [NOT USED]
- F. [NOT USED]

- G. Item 05520.007 – Emergency Walkways will be paid at the unit price, and shall include the cost of all related work specified in this Section.
- H. Item 05520.008 – Emergency Walkway Crossovers will be paid at the unit price, and shall include the cost of all related work specified in this Section.
- I. Item 05520.009 – Ladders will be paid at the unit price, and shall include the cost of all related work specified in this Section.
- J. Item 05520.010 – Stairs will be paid at the unit price, and shall include the cost of all related work specified in this Section.
- K. Item 05520.011 – 12 Foot Crossover Platform will be paid at the unit price, and shall include the cost of all related work specified in this Section.
- L. Item 05520.012 – Emergency Stand Alone Walkways will be paid at the unit price, and shall include the cost of all related work specified in this Section.
- M. Item 05520.013 –Ancillary Room Stairs will be paid at the unit price, and shall include the cost of all related work specified in this Section.

END OF SECTION

- indicated within the Contract Drawings.
- b. The Contractor is responsible to provide all required vital and non-vital software to interface to the new system as indicated in the Contract Documents.
15. Equipment to be supplied by the Contractor includes but is not limited to the following:
- a. Local vital and non-vital logic processors.
 - b. Non-vital processors/interface to OCC.
 - c. The non-vital processor used to interface to OCC may also be used to process the local non-vital logic.
 - d. Controlled Interlocking signals.
 - e. Automatic Block Signals.
 - f. Automatic Train Stops.
 - g. Switch Machines and Switch Layouts.
 - h. Snow Melter Control Cases and Snow Melter Layouts (at Allegheny).
 - i. Track circuits and track circuit equipment including impedance bonds.
 - j. Traction return and signal track bonding
 - k. Traction return crossbonding.
 - l. New TWC equipment as shown on the Contract Drawings.
 - m. Train Protection Strobe Light System.
16. Train to Wayside Communications System (TWC)
- a. The Contractor shall install new TWC equipment as shown on the Contract Drawings and described in Section 13580, "Train to Wayside Communications (TWC)."
 - b. The Contractor shall also provide all new application logic programming in the new vital and non-vital microprocessor control systems and the existing Genisys Non-Vital Microprocessor control systems necessary to implement the new TWC Routes to be provided by this Project. These requirements are further defined within Section 13580, "Train to Wayside Communications (TWC)."
17. Exterior Cable:
- a. The Contractor shall furnish and install all cables and interconnect wiring. These requirements are detailed in Section 13587, "Wire and Cable."
 - b. All cable shall be installed in conduit, cable trough, or duct bank. Direct burial cable is not permitted without the approval of the Engineer.
 - c. Spare conductors shall be provided as specified in Section 13587, "Wire and Cable", and shall terminate at all junction boxes.
 - d. Conduit:
 - 1) The Contractor shall furnish and install conduits and associated hardware required for cable installation as shown on the Contract Drawings.
 - e. Cable Trough:
 - 1) The Contractor shall furnish and install cable trough and associated hardware required for cable installation as shown on the Contract Drawings. The Contractor shall design, furnish, and install the connections between conduit, cable trough, and the pullboxes/manholes that are required for signal cables. The Contractor shall review the

a Code and Function Assignment sheet for each relay room.

- I. The Contractor shall submit a detailed design for all signaling equipment installed within the New Gateway Relay Room as described within Section 13570, "Signal System Requirements" and as shown within the Contract Drawings. Circuit submittals shall be organized within a circuit book for each location that includes all circuitry controlled out of the location. The Contractor shall submit wiring diagrams showing the exact routing and termination of all wires and cables in the North Side Station Relay Room. The Contractor shall include within the circuit book, a Code and Function Assignment sheet for each relay room.
- J. The Contractor shall submit a detailed design for all signaling equipment installed within the North Side Station Relay Room as described within Section 13570, "Signal System Requirements" and as shown within the Contract Drawings. Circuit submittals shall be organized within a circuit book for each location that includes all circuitry controlled out of the location. The Contractor shall submit wiring diagrams showing the exact routing and termination of all wires and cables in the new North Side Station Relay Room. The Contractor shall include within the circuit book, a Code and Function Assignment sheet for each relay room.
- K. The Contractor shall submit a detailed design for Allegheny Interlocking as described within Section 13570, "Signal System Requirements" and as shown within the Contract Drawings. Circuit submittals shall be organized within a circuit book for each location that includes all circuitry controlled out of the location. The circuit book shall include any temporary circuit changes associated with the staging of the Work. The Contractor shall provide all additional material and design associated with the construction staging. The Contractor shall submit wiring diagrams showing the exact routing and termination of all wires and cables in the new Allegheny Interlocking Relay Room. The Contractor shall include within the circuit book, a Code and Function Assignment sheet for each relay room.

1.05 DEFINITIONS

- A. the terms "restrictive" and "permissive" are used in connection with the binary outputs of two-position components or subsystems and denote such alternatives as: a lower speed and a higher speed; deceleration and acceleration; brakes applied and brakes released; actuation of alarm and no actuation of alarm; etc., respectively.

ARTICLE 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Circuit Design Requirements:

- 1. Train safety shall be the prime consideration in the design of the NSC Signal System and in the selection of its components including vital processors, relays and other

- j. Each circuit, the functioning of which affects safety or train operations, shall be kept free of any ground or combination of grounds which will permit a flow of current equal or in excess of 75 percent of the release value of any relay or other electromagnetic device in the circuit, except circuits which break signal control circuits using a grounded common, and alternating current power distribution circuits which are grounded in the interest of safety.
 - k. All vital relay circuits that leave or enter signal houses/rooms and instrument cases shall be double-break circuits.
4. Equipment failures and conditions which shall be considered in producing a fail-safe design include, but are not limited to the following:
- a. Vital relays: As specified in these Contract Documents.
 - b. Non-Vital Relays: Open coil, high contact resistance, shorted coil, armature sticking, contact sticking.
 - c. Transformers: Open primary, open secondary, shorted turns, primary-to-secondary shorts, and combinations of the foregoing.
 - d. Capacitors: Shorts, opens, and leakage.
 - e. Resistors: Shorts, opens, increase and decrease in resistance.
 - f. Transistors; Diodes: Shorts, opens, leakage.
 - g. Coils: Open and shorted turns.
 - h. Loss and degradation of power sources.
 - i. Abnormal signal levels, frequencies, and delays.
 - j. Effects of electrical interference.
 - k. Absent and abnormal input signals.
 - l. Opens and shorts in internal circuitry at inputs and outputs.
 - m. Mechanical vibration and shock including but not limited to train movement, switch operation, operation of heavy machinery, the passage of motor vehicles, and seismic activity.
 - n. Drift and instability of amplifiers, receivers, transmitters, oscillators switching circuits, and power supplies.
 - o. Deterioration of contacts, connectors, terminals, solder connections, printed circuits, and mechanical devices.

O. Layout

- 1. Rack arrangement: As specified in Section 13590, "Housings and Housing Equipment."
- 2. Equipment arrangement
 - a. Relays and equipment panels shall not be mounted higher than 6.5 feet or lower than 18 inches from the finished floor.
 - b. Terminal and connector panels and power distribution panels shall be mounted above all other apparatus mounted on rack. Power distribution panels shall house power connectors and filters for equipment rack power.
 - c. All equipment and components shall be accessible for testing or replacement without removal of other components.
 - d. Two or more points of adjustment required during the same operation shall be

A. General

1. Cable with insulating and jacketing materials capable of a 40-year average service life shall be provided.
2. Cable shall be suitable for installation at minus plus 5 degrees F.
3. Capacitance of cables shall be within the limits prescribed by the manufacturer of the equipment to which the cable is connected.
4. All interior and exterior cable and/or wire that is deployed in the tunnel, and cut-and-cover areas shall be provided with low smoke zero halogen jackets, and meet all of the Fire, Smoke and Smoke Toxicity requirements of this Section.

B. Minimum voltage rating for both AC and DC shall be as follows:

1. Track circuit cable: 2000 volts.
2. All snowmelter control case, switch heater element and switch rod heater unit wiring and cables: 1000 volts.
3. All other cables shall be rated for 600 volts minimum.

C. Conductors shall be sized to ensure operation of the equipment based on the equipment loads and operating parameters for the systems in accordance with the NEC and as specified herein. Coated conductors of annealed copper wire shall be in accordance with ASTM B33. Class B and Class C stranded conductors shall conform to ASTM B8, Table 2, and Class G stranded conductors shall conform to ASTM B173 as follows:

1. Equipment module, signal, and instrumentation external wiring: No. 20 AWG minimum, Class B.
2. Rack to rack: No. 20 AWG minimum, Class B (multi-conductor cable).
3. Rack to rack: 14 AWG minimum, Class B (single conductor).
4. Track circuits: No. 6 AWG minimum twisted, Class C.
5. Track switch machine, power: No. 9 AWG minimum, Class C.
6. Track switch machine, control and indication: No. 14 AWG minimum, Class B.
7. Wayside signal lighting circuits: No. 14 AWG minimum, Class C.
8. Power bonds: C type, 250 kcmil, Class G, bare.
9. Crossbonds and impedance bond connections: Class G.
10. Bond strand wire: No. 6 AWG minimum, Class H.
11. Signal bonds: C type, cadmium bronze, ASTM B105, Alloy 80, bare stranded rope lay with one center rope of 19 wires surrounded by six ropes of 19 wires each, using wires of 0.0125 inches with nominal cable diameter of 0.1875 inches.
12. All other circuits: No. 14 AWG minimum, Class B.

D. Interior Cables

1. To be used only for wiring inside signal relay rooms.
2. Certified for continuous operation at 239 degrees F in wet or dry locations.
3. Conductors
 - a. Stranded Conductors
 - 1) Conductors shall be tin plated, soft or annealed copper wire for electrical purposes, per the latest revision of ASTM B-33 and B-3.
 - 2) Strands and rope members shall be concentrically stranded using uni-lay

- B. Integrated Testing is the testing of the Light Rail Vehicle and the designed functioning of traction power substations, OCS, communications and signals, in operating and emergency simulation modes. Certain tests will be developed to analyze the performance of the OCS under varying conditions.
- C. Contractor shall support the Integrated Testing by operating their equipment in accordance with the Integrated Testing procedures and maintain the OCS at full performance.
- D. In the event of any malfunctions to the OCS, the Contractor shall quickly identify the problem, repair or adjust and replace necessary items of equipment.
- E. Pre-Revenue Service operations is the training runs of Authority's Operations and Maintenance personnel. All types of operational and emergency situations will be simulated. The Contractor shall support these tests and maintain the OCS at full performance.

3.03 SUPPORT DURING REVENUE SERVICE

- A. It is Authority's intent to perform long term maintenance with its own forces. During initial Revenue Service, Authority's maintenance forces are considered trainees; thus Contractor will be required to provide technical assistance in troubleshooting, repair and maintenance. Contractor shall observe Authority's maintenance personnel and advise and assist them with necessary actions to provide a high level of quality maintenance.
- B. Contractor shall provide up to 200 manhours of maintenance assistance to Authority during the six months following the opening of revenue service.

ARTICLE 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- A. Item 16602.001 - OCS Pole shall be measured per each, complete in place.
- B. Item 16602.002 - OCS Portal shall be measured per each, complete in place.
- C. Item 16602.003 - OCS Cantilever shall be measured per each, complete in place.
- D. Item 16602.004 - OCS Wiring shall be measured per linear foot, complete in place.
- E. Item 16602.005 - Balance Weight Anchor Assembly shall be measured per each, complete in place.
- F. Item 16602.006 – Fixed Termination Assembly shall be measured per each, complete in place.

SECTION 16722

RADIO SYSTEM EXPANSION

ARTICLE 1 GENERAL

1.01 SUMMARY

- A. The Work of this Section includes, but is not limited to, providing all labor, materials, tools, equipment, and incidentals necessary for the Radio System Expansion, in accordance with the Contract Documents.
- B. The work of this Section includes but is not limited to the following activities:
 1. Operations and Control Center Upgrade including final design, equipment, installation, optimization, programming, configuration, testing, documentation, and acceptance of new modules for the radio system
 2. Allegheny Station Site including final design, equipment, installation, optimization, programming, configuration, testing, documentation, and acceptance of the site for the radio system
 3. North Side Station Site including final design, equipment, installation, optimization, programming, configuration, testing, documentation, and acceptance of the site for the radio system
 4. Gateway Station Site including final design, equipment, installation, optimization, programming, configuration, testing, documentation, and acceptance of the site for the radio system
- C. The work of this Section includes but is not limited to the following equipment:
 1. Base Stations
 2. Antenna System
 3. RF on Fiber Optic System
 4. Bi Directional Amplifiers (BDA)
 5. Radiating Coaxial Cables
 6. Simulcast Delay Card
 7. Voter Channel Card
 8. All Interface Electronic Equipment

1.02 SCOPE OF WORK

- A. This Work shall consist of providing a complete Radio System for the North Shore Connector segment of the Light Rail Transit (LRT) system integrated into the existing Radio System. The Worksite consists of approximately three miles of dual tunnel, three multi-level transit rail passenger stations, and the OCC.
- B. The NSC Radio System shall provide radio communications for the 470 MHz LRT users integrated with the existing systems, for the NSC segment, both above ground and below ground. The NSC Radio System shall provide radio communications for the Transit Police, as well as several UHF-Band Support Agencies, users integrated with the existing systems, for the NSC segment, in the passenger stations and below ground. LRT and Support Agency radio services are provided by existing systems with above and below ground infrastructures.

The NSC Radio System will add one above ground base station site at Allegheny Station that will provide radio signal on the NSC above ground right of way and feed radio signal to the tunnel Bi-Directional Amplifiers through an RF-on-fiber transmission system. The NSC radio service area shall include the three NSC LRT stations; Allegheny, North Side and Gateway along with the interconnecting tunnels and above ground right of way.

- C. The Work of this Section consists of designing, furnishing, installing, testing, and commissioning improvements to Authority's existing radio system for Authority's Light Rail Transit (LRT) System, as described in the Contract Documents and as specified herein. The complete system responsibility shall include the following: pre-installation surveys, system provisioning, installation and construction, integration, optimization, acceptance testing and commissioning, spares, documentation, training, and warranty.
- D. The NSC Radio Communications System segment supplied under this Section shall be integrated into existing Authority's LRT Radio Communication System. This integration includes, but is not limited to, interfacing with the Operations Control Center (OCC) display and user consoles to provide control and operation of the LRT Radio System in the same manner as the existing radio sites.

1.03 RELATED SECTIONS

- A. Section 01910, Operations, Maintenance, and Repair Data
- B. Section 16700, Communication
- C. Section 16701, Fiber Outside Plant
- D. Section 16702, Copper Outside Plant
- E. Section 16703, Carrier Transmission System
- F. Section 16705, Communications Power Supply
- G. Section 16742, SCADA
- H. Section 16901, Communication System Inspection and Test
- I. Section 16950 Operations Control Center (OCC) System Upgrade

1.04 REFERENCED STANDARDS

- A. Code of Federal Regulations, Title 47 Part 90
- B. National Electrical Code (NEC)
- C. NFPA-130 Standard for Fixed Guideway Transit and Passenger Rail Systems (2007)
- D. EIA/TIA Standard 603

- E. NEMA Standard 250
- F. ANSI ICEA Standard S-80-576
- G. EIA Standard RS-359
- H. MIL-STD-810, "Environmental Test Methods and Engineering Guidelines"
- I. UL Standard 444 Communications Cables

1.05 SUBMITTALS

- A. Submit Theory of Operation Documents - including but not limited to a complete discussion of the control, indication, and interface requirements to operate each component.
- B. Submit Proposed RF Signal Level Test Predictions - provide coverage for the Allegheny, North Side and Gateway stations, below ground radiating coaxial antenna system designed to provide complete coverage in the tunnels, on platforms, in stations, at all mezzanines and within all other related station radio communications needs.
- C. Submit Functional Block Diagrams – for interface electronics located at the OCC, showing all interfaces to OCC, remote display, user consoles, the fiber optic transmission system and LRT and the NSC Radio System equipment located at the OCC.
- D. Submit Radio Coaxial Cable System Diagrams - for NSC tunnel and station areas, each base station, and BDA arrangement including but not limited to all component manufacturer and model numbers for the entire NSC Radio System Expansion include RF signal levels and RF loss figures.
- E. Submit product Data sheet/manual for each product and major component specified
- F. Submit Shop Drawings for each component and for the Radio System
- G. Submit hardware and software design plans, for approval by the Engineer
- H. Submit wiring diagrams, for approval by the Engineer
- I. Submit Product Certifications signed by the product manufacturers certifying compliance with the specifications
- J. Submit qualifications of installation and optimization personnel for approval
- K. Submit Installation Plan, for approval by the Engineer
- L. Submit Equipment Arrangement Plan, for approval by the Engineer
- M. Submit Cut-over Plan, for approval by the Engineer

- N. Submit Allocation and Provisioning Plan, for approval by the Engineer
- O. Submit Software and Firmware Plan, for approval by the Engineer
- P. Submit Inspection and Test Plan and Procedures in accordance with Section 16901, "Communication System Inspection and Test", for approval by the Engineer
- Q. Submit Test Reports, for approval by the Engineer
- R. Submit maintenance data, materials, products, and spare parts list
- S. Submit As-Built Drawings and As-Configured data and documentation, for approval by the Engineer
- T. Submit Operating and Maintenance Manuals

1.06 NSC RADIO SYSTEM EXISTING CONDITIONS

- A. The existing LRT Radio System provides communication throughout the entire Authority LRT System. The FCC licensed channels used in the NSC Radio System above and below ground are indicated in TABLE 16722- 1.

TABLE 16722- 1

Radio Channels	Transmit	Receive	Above Ground	Below Ground
LRT Operations	470.6625 MHz	473.6625 MHz	X	X
LRT Support	470.7375 MHz	473.7375 MHz	X	X
LRT Data	470.6125 MHz	473.6125 MHz	X	X
LRT Right of Way (ROW)	471.8125 MHz	474.8125 MHz	X	X
Transit Police	452.7750 MHz	457.7750 MHz		X
City of Pittsburgh Police	453.1000 MHz	458.1000 MHz		X
City of Pittsburgh Police	453.2500 MHz	458.2500 MHz		X
City of Pittsburgh EMS	462.9500 MHz	467.9500 MHz		X
City of Pittsburgh Fire Dept.	453.7000 MHz	458.7000 MHz		X

1.07 NSC RADIO SYSTEM RELIABILITY PERFORMANCE

- A. The NSC Radio Communications System shall provide two-way radio voice and data communications for the system frequencies as indicated in the above TABLE 16722- 1. The NSC Radio Systems shall provide above and below ground communications for Allegheny Station, North Side Station, Gateway Station, the NSC tunnel system, and within 500' of above ground right of way. The NSC Radio System shall provide radio communications,

over all of the right-of-way and station areas including the platform, mezzanines, walkways, ticket areas and associated NSC radio system elements. The NSC Radio System includes an above ground Base Station site feeding the NSC below ground system. The NSC Radio System shall communicate with mobile and portable radios.

- B. The Contractor shall provide minimum -97dBm RF signal from the OCC to a portable radio in a moving LRV. Successful talk-in or talk out for voice or data shall be possible 98 percent of the time in the NSC service area.
- C. The Contractor shall not desensitize the receivers more than 1dB with all base stations transmitting, Talk Around excepted. The Contractor shall either re-optimize the site RF filters or add additional filters to mitigate the condition if the RF site is degraded more than specified. Transmitter Carriers shall be attenuated at the radio receivers.
- D. The Contractor shall not degrade the noise floor more than 1dB of the radio receivers with all radios transmitting, Talk Around excepted. The Contractor shall either re-optimize the site RF filters or add additional filters to mitigate the condition if the RF site is degraded more than specified. Transmitter Noise shall be attenuated in the receiver pass band.

ARTICLE 2 NSC PRODUCTS

2.01 VOTER CHANNEL CARD

- A. Authority operates four Voter Comparators at OCC, one for each LRT channel (Operations, Support, Data, and ROW), Raytheon/JPS Model SNV-12. One additional Voter Channel Card or Module is required in each Voter Comparator to add the NSC site. The Model SNV-12 Control Processor Module firmware shall be upgraded if required for compatibility with the new Voter Module. The Voter Modules shall be furnished, installed, configured and programmed as required to include the North Shore Connector into the existing Voter Comparators. All necessary Voter Comparator components shall be incidental.
- B. Manufacturer: Raytheon/JPS
Model #: SVM-2 Site Voter Module.
- C. Approved Equal: None, due to existing system compatibility

2.02 SIMULCAST DELAY CARD

- A. Authority operates a Simulcast Equalization System at OCC for the LRT channels (Operations, Support, Data, and ROW) which equalizes and delays the audio signal to the existing LRT radio transmitter sites. The existing Simulcast Equalization System equipment shelf is Convex Model 2342. One four channel Simulcast Delay Card or Bulk Delay Module is required in the existing chassis to add the four LRT channels for the new NSC Base Station site. The Bulk Delay Module shall be furnished installed, configured, programmed, and simulcast optimized for both the Prime and Redundant audio paths on the NSC CTS as required to add the North Shore Connector into the existing Simulcast Equalization System. All necessary Simulcast Equalization System components shall be

incidental. The NSC CTS provides a Prime and Redundant audio path for audio distribution to the radio site. The Network Management System indicates when the Redundant NSC CTS path is in use through a contact closure. The bulk delay and equalization are different for the two paths. The Bulk Delay Module can store Prime and Redundant bulk delay and equalization parameters. The Simulcast Equalization System shall be programmed to use the Prime parameters when the Prime NSC CTS path is in use. It shall use the redundant parameters when the Redundant NSC CTS path is in use. The switch between the Prime and Redundant parameters shall be automatic based on the path indication contact closure from the Network Management System.

- B. Manufacturer: Convex
Model #: 2042 Bulk Delay Module 4 channel.
- C. Approved Equal: None, due to existing system compatibility

2.03 PENTA PCX VOICE MATRIX LINE CARD

- A. The Penta PCX Voice Matrix Line Card is specified in Section 16950, "Operations Control Center (OCC) System Upgrade".
- B. Manufacturer: Penta
Model #: PCx Voice Switch Line Card.
- C. Approved Equal: None, due to existing system compatibility

2.04 AGELESS GPS MASTER OSCILLATOR

- A. The NSC Radio System Expansion Simulcast Base Stations shall interface with the existing simulcast radio system which requires the compatible Ageless GPS Master Oscillator. Authority operates a simulcast radio system for the LRT (Operations, Support, Data, and ROW) and Transit Police channels which requires synchronized radios at each transmitter site. The Ageless GPS Master Oscillator shall be manufactured by Spectracom to provide the necessary synchronization for simulcast at the NSC base station site. The Ageless GPS Master Oscillator shall be furnished, installed, configured and programmed as required to include the North Shore Connector into the existing simulcast radio system. All necessary Master Oscillator components shall be incidental.
- B. Manufacturer: Spectracom
Model #: 8195B
Option 02: Internal Battery Backup
Option 14: CTCSS Outputs 1 and 2
- C. Approved Equal: None, due to existing system compatibility

2.05 CTCSS FILTER BOARD

- A. The NSC Radio System Expansion Simulcast Base Stations shall interface with the existing simulcast radio system which requires the compatible CTCSS Filter Board. Authority operates a simulcast radio system for the LRT (Operations, Support, Data, and ROW) and Transit Police channels which requires synchronized CTCSS and PTT. One CTCSS Filter Board is required for each simulcast channel at the new NSC transmitter site. The CTCSS Filter Board shall be manufactured by Spectracom . The CTCSS Filter Board shall be furnished, installed, configured and programmed as required to include the North Shore Connector into the existing simulcast radio system. All necessary CTCSS Filter Board components shall be incidental.
- B. Manufacturer: Spectracom
Model #: 1118-1
- C. Approved Equal: None, due to existing system compatibility

2.06 GPS ANTENNA

- A. The NSC Radio System Expansion Simulcast Base Stations shall interface with the existing simulcast radio system which requires the compatible GPS Antenna. Authority operates a simulcast radio system for the LRT (Operations, Support, Data, and ROW) and Transit Police channels which requires synchronized radios at each transmitter site. The GPS Antenna shall be manufactured by Spectracom. The GPS Antenna shall be furnished, installed, configured and programmed as required to include the North Shore Connector into the existing simulcast radio system. The coaxial cable between the GPS Antenna and the Ageless GPS Master Oscillator shall comply with all Spectracom requirements including the maximum allowed cable loss. All necessary GPS Antenna components shall be incidental.
- B. Manufacturer: Spectracom
Model #: 8225
- C. Approved Equal: None, due to existing system compatibility

2.07 GPS ANTENNA SURGE PROTECTOR

- A. The NSC Radio System Expansion Simulcast Base Stations shall interface with the existing simulcast radio system which requires the compatible GPS Antenna Surge Protector. Authority operates a simulcast radio system for the LRT (Operations, Support, Data, and ROW) and Transit Police channels which requires synchronized radios at each transmitter site. The GPS Antenna Surge Protector shall be manufactured by Spectracom. The GPS Antenna Surge Protector shall be furnished, installed, configured, and programmed as required to include the North Shore Connector into the existing simulcast radio system. All necessary GPS Antenna Surge Protector Components shall be incidental.
- B. Manufacturer: Spectracom
Model #: 8226 Surge Protector

Model #: 8226-0002-0600 Grounding Kit

- C. Approved Equal: None, due to existing system compatibility

2.08 LRT BASE STATIONS

- A. The NSC Radio System Expansion Simulcast Base Stations shall interface with the existing simulcast radio system which requires the compatible Base Stations. The simulcast LRT Base Station and non-simulcast LRT Talk-Around Base Station radios shall be M/A-COM. The radios shall be furnished, installed, configured, programmed, and simulcast optimized as required to include the North Shore Connector into the existing simulcast radio system. Note that one LRT Talk-Around Base Station is programmed for simplex operation and non-simulcast. All necessary radio components shall be incidental.

- B. Manufacturer: M/A-COM

Model #: SXVMCX - 470-494MHz Conventional Advanced Digital Capable Radio, 100 Watts
Model #: SXPS9R - Power Supply, 120VAC/ 60Hz, 1 per Station
Model #: SXSF1W - Voting Tone- 1950Hz Includes 4- Wire Audio
Model #: SXDP1B - Test Data printed Factory Test Results
Model #: MSEdit – Special Programming Software

- C. Approved Equal: None, due to existing system compatibility

2.09 TRANSIT POLICE AND SUPPORT SERVICES BASE STATIONS

- A. The NSC Radio System Expansion Simulcast Base Stations shall interface with the existing simulcast radio system which requires the compatible Base Stations. The simulcast Transit Police and non-simulcast Support Services Base Station radios shall be M/A-COM or approved equal. The radios shall be furnished, installed, configured, programmed, and optimized as required to include the North Shore Connector into the existing radio systems. Transit Police Base Station shall be simulcast and E&M keyed with 2100Hz voting tone. The Support Services Base Stations configuration shall be confirmed prior to order. All necessary radio components shall be incidental.

- B. Manufacturer: M/A-COM

Model #: SXUMCX - 450-470 MHz Conventional Advanced Digital Capable Radio, 100W
Model #: SXPS9R - Power Supply, 120VAC/ 60Hz, 1 per Station
Model #: SXSF1W - Voting Tone- 1950Hz Includes 4- Wire Audio
Model #: SXDP1B - Test Data printed Factory Test Results

- C. Approved Equal: None, due to existing system compatibility

2.10 RADIO COMMUNICATIONS CABINETS

- A. The Radio Communications Cabinets shall all necessary ventilation required for the radio equipment. The Radio Communications Cabinets shall be M/A-COM. The Radio Communications Cabinets shall be furnished, installed, and configured as required. All necessary Radio Communications Cabinets components shall be incidental.
- B. Manufacturer: M/A-COM
 - Model #: SXCA1U - 83" CABINET, as required
 - Model #: SXFNIA - 2 SPD FAN, 120 VAC as required by manufacturer
 - Model #: SXMN3Y - mounting hardware kit (1 per Cabinet)
 - Model #: SXMN9C - Cover, Screen, T/R Shelf, as required by manufacturer
 - Model #: SXMN9H - Cabinet Top CVR, 1 per Cabinet
- C. Approved Equal: None, cabinets are optimized by the radio manufacturer's equipment

2.11 BI-DIRECTIONAL SENSOR

- A. The Bi-Directional Sensor shall be dbSpectra. The Bi-Directional Sensors shall be furnished, installed, and configured with each Base Station as required to monitor forward and reflected power. All necessary Bi-Directional Sensor components shall be incidental.
- B. Manufacturer: dbSpectra
 - Model #: DB8882A-100
 - Frequency Range: 406-1000MHz
 - Phono Plug, Output: 0-5 VDC
 - Directivity, F/B Isolation: 20 dB
 - Insertion Loss: 0.1 dB or better
 - VSWR: 1.2:1 or better
 - Connectors: N-Female and N-Male
- C. Approved Equal: None, due to existing system compatibility

2.12 RF POWER METER

- A. The RF Power Meter shall be dbSpectra. The RF Power Meter shall be furnished, installed, and configured with each Base Station as required to monitor alarm forward and reflected power. All necessary RF Power Meter components shall be incidental. The RF Power Meter alarms shall be sent to the OCC via the Communications RTU for Talk-Around and LRT RF channel coordination at the Penta Console.
- B. Manufacturer: dbSpectra
 - Model #: DB8820A
 - Frequency Range: 30-1000 MHz
 - Max. Rated Power: 100 Watts
 - Power (AC converter supplied): 12 VDC @ approx. 100mA
 - Power Alarm Range: 0-350 Watts

SWR Alarm Range:	1.1 to 3.0
Analog Inputs:	Two, 0-5 volt range, 8 bits resolution (0-100, 0-350, and 0-1000)
Digital Inputs:	On, pull-to ground (100µA)
Relay Outputs:	2 amps N.O. or N.C.
Display:	6 digits (3+3) Red LED
Key Delay (adjustable):	0.5 to 2 seconds

C. Approved Equal: None, due to existing system compatibility

2.13 RECEIVER MULTICOUPLER

A. The Receiver Multicoupler shall distribute the common received RF signal to the Base Station receivers at the NSC Base Station Radio site. The Receiver Multicoupler shall be Kathrein. The Receiver Multicoupler shall be furnished, installed, configured, and programmed as required. All necessary radio components including power supply and termination loads for unused ports shall be incidental. All unused RF ports shall be terminated with a load.

B. Manufacturer: Kathrein

Model #:	727 622
Number of Input Ports:	1
Number of Output Ports:	16
Frequency Range:	350-550MHz
Gain (System):	1 dB +1.5/-1.5dB
Noise Figure:	< 4.3 dB+0.5/-1.0dB
Amplifier IP3 (output):	>12dBm (typical)
Isolation (Rx to Rx):	25dB (Min)
VSWR (Input/Output):	<1.4
Impedance:	50Ω
DC (Input Power):	+11 to +48 VDC 9Watts Maximum
Weight:	13 lbs
Connectors:	N-Female
Temperature Range:	-20° C to +55° C
Standard Mounting Hardware:	19" Rack Mountable

C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.14 HYBRID TX COMBINER

A. The Hybrid TX Combiner shall combine the LRT Base Station Transmitter RF outputs on to a common output port at the NSC Base Station Radio site. The Hybrid TX Combiner shall be Kathrein. The Hybrid TX Combiner shall be furnished, installed, and configured as required. The Hybrid TX Combiner where integrated with other RF combining equipment

shall be integrated, optimized, and tested by the manufacturer. All necessary Hybrid TX Combiner components shall be incidental.

B. Manufacturer: Kathrein

Model #:	784-10063
Number of Input Ports:	5
Number of Output Ports:	1
Frequency Range:	350-472MHz
Insertion Loss:	<8.3dB
RF Power per Input:	100 Watts Maximum
Minimum Frequency Separation:	'0 MHz
Isolation:	70 dB Minimum
Impedance:	50Ω
VSWR:	<1.2
Dual Isolators:	included
Loads:	included
Connectors:	N-Female
Standard Mounting Hardware:	19" Rack Mountable

C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.15 SINGLE CHANNEL RF FILTER

A. The Single Channel RF Filter shall pass only the desired RF frequency while attenuating all others at the NSC Base Station Radio site. The Single Channel RF Filter shall be Kathrein. The Single Channel RF Filter shall be furnished, installed, configured, and optimized as required. The Single Channel RF Filter where integrated with other RF combining equipment shall be integrated, optimized, and tested by the manufacturer. All necessary Single Channel RF Filter components including phase cables and connectors shall be incidental.

B. Manufacturer: Kathrein

Model #:	K6521251 D
Number of Input Ports:	1
Number of Output Ports:	1
Frequency Range:	380-470MHz
Insertion Loss:	<2.0 dB
VSWR at Pass Band:	<1.5
Impedance:	50Ω
Input RF Power per Channel:	200 Watts Maximum
Temperature Range:	-30° C to +60° C
Connectors:	N-Female
Tuning Curve:	D
Transmitter Noise Attenuation:	>30 dB at receive frequencies

- C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.16 BAND PASS RF FILTER

- A. The Band Pass RF Filter shall pass only the desired RF band while attenuating all other at the NSC Base Station Radio site. The Band Pass RF Filter shall be Kathrein. The Band Pass RF Filter shall be furnished, installed, configured, and optimized as required. The Band Pass RF Filter where integrated with other RF combining equipment shall be integrated, optimized, and tested by the manufacturer. All necessary Band Pass RF Filter components including phase cables and connectors shall be incidental.

- B. Manufacturer: Kathrein

Model #:	790 966 A
Number of Input Ports:	1
Number of Output Ports:	1
Frequency Range:	380-475MHz
Insertion Loss:	<1.0 dB
VSWR at Pass Band:	<1.3
Impedance:	50Ω
Input RF Power:	75 Watts Maximum
Temperature Range:	-30° C to +60° C
Connectors:	N-Female
Tuning Curve:	A
Transmitter Noise Attenuation:	>35 dB at receive frequencies

- C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.17 BAND STOP RF FILTER

- A. The Band Stop RF Filter shall stop the desired RF band while passing all other bands at the NSC Base Station Radio site. The Band Stop RF Filter shall be Kathrein. The Band Stop RF Filter shall be furnished, installed, configured, and optimized as required. The Band Stop RF Filter where integrated with other RF combining equipment, shall be integrated, optimized, and tested by the manufacturer. All necessary Band Stop RF Filter components including phase cables and connectors shall be incidental.

- B. Manufacturer: Kathrein

Model #:	653321
Number of Input Ports:	1
Number of Output Ports:	1
Frequency Range:	380-475MHz
Insertion Loss:	<1.0 dB
VSWR at Pass Band:	<1.3
Impedance:	50Ω

Input RF Power:	75 Watts Maximum
Temperature Range:	-30° C to +60° C
Connectors:	N-Female
Transmitter Noise Attenuation:	>50 dB at receive frequencies

- C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.18 DUAL ISOLATOR

- A. The Dual Isolator shall isolate the Base Station transmitter output port at the NSC Base Station Radio site. The Dual Circulator shall be Kathrein. The Dual Circulator shall be furnished, installed, and configured as required. The Dual Circulator where integrated with other RF combining equipment shall be integrated, optimized, and tested by the manufacturer. All necessary Dual Circulator components including loads, phase cables and connectors shall be incidental.

- B. Manufacturer: Kathrein

Model #:	790 215
Frequency Range (MHz):	400-470MHz
Insertion Loss:	<0.5 dB
Isolation:	50 dB Minimum
VSWR:	<1.22
Impedance:	50Ω
Temperature Range:	-10° C to +55° C
Input RF Power:	100 Watts Maximum
Connectors:	N-Female

- C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.19 DECOUPLED POWER SPLITTER

- A. The Decoupled Power Splitter shall equally divide or equally combine four RF Ports to a single RF Port at the NSC Base Station Radio site. The Decoupled Power Splitter shall be Kathrein. The Decoupled Power Splitter shall be furnished, installed, and configured as required. The Decoupled Power Splitter where integrated with other RF combining equipment shall be integrated, optimized, and tested by the manufacturer. All necessary Decoupled Power Splitter components including loads, phase cables and connectors shall be incidental.

- B. Manufacturer: Kathrein

Model #:	725 871
Frequency Range (MHz):	400-475MHz
Power Ratio:	1:4
Insertion Loss:	<6.5 dB

Isolation:	30 dB Minimum
VSWR:	<1.2
Impedance:	50Ω
RF Power per Input:	100 Watts Maximum
Connectors:	N-Female

- C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.20 HYBRID DIRECTIONAL COUPLER (-10DB)

- A. The Hybrid Directional Coupler shall unequally divide or unequally combine two isolated RF Ports to two isolated RF Ports at the NSC Base Station Radio site. The Hybrid Directional Coupler shall be Kathrein. The Hybrid Directional Coupler shall be furnished, installed, and configured as required. The Hybrid Directional Coupler where integrated with other RF combining equipment shall be integrated, optimized, and tested by the manufacturer. All necessary Hybrid Directional Coupler components including loads, phase cables and connectors shall be incidental.

- B. Manufacturer: Kathrein

Model #:	720 297
Frequency Range (MHz):	400-475MHz
Attenuation (Port 1 to 3 or 4 to 2):	0.5 +0.2 dB
Attenuation (Port 1 to 2 or 4 to 3):	10.0 +0.5 dB
Directivity on Isolation Port:	>27 dB
VSWR:	<1.1
Impedance:	50Ω
RF Power:	500 Watts Maximum
Connectors:	N-Female

- C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.21 RF ATTENUATOR (-20DB)

- A. The RF Attenuator shall reduce all input levels by 20 dB at its output port where used at the NSC Base Station Radio site. The RF Attenuator shall be Kathrein. The RF Attenuator shall be furnished, installed, and configured as required. The RF Attenuator where integrated with other RF combining equipment shall be integrated, optimized, and tested by the manufacturer. All necessary RF Attenuator components including loads, phase cables and connectors shall be incidental.

- B. Manufacturer: Kathrein

Model #:	791 921
Frequency Range:	0-4000MHz
Attenuation:	20.0 ±0.5 dB

VSWR:	<1.12
Impedance:	50Ω
RF Power:	10 Watts Maximum
Connectors:	N-Female

- C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.22 RF ATTENUATOR (-10DB)

- A. The RF Attenuator shall reduce all input levels by 10 dB at its output port where used at the NSC Base Station Radio site. The RF Attenuator shall be Kathrein. The RF Attenuator shall be furnished, installed, and configured as required. The RF Attenuator where integrated with other RF combining equipment shall be integrated, optimized, and tested by the manufacturer. All necessary RF Attenuator components including loads, phase cables and connectors shall be incidental.

- B. Manufacturer: Kathrein

Model #:	791 920
Frequency Range:	0-4000MHz
Attenuation:	10.0 ±0.5 dB
VSWR:	<1.12
Impedance:	50Ω
RF Power:	10 Watts Maximum
Connectors:	N-Female

- C. Approved Equal: TX/RX, dbSpectra, Bird, Telewave products meeting the specifications and approved by the Engineer

2.23 ROOF ANTENNA:

- A. The Roof Antenna shall be the primary means to transmit and receive the LRT channels (Operations, Support, Data, and ROW) for the NSC right of way above ground. The Roof Antenna shall be Kathrein. The Roof Antenna shall be furnished, installed, and configured as required. All necessary Roof Antenna components including attachment mechanism and connectors shall be incidental.

- B. Manufacturer: Kathrein/Scala

Model #:	K733621
Type:	Panel Antenna
Frequency Range:	406-512 MHz
Gain:	9dBi
Impedance:	50 Ohm
VSWR:	< 1.4:1
Polarization:	Vertical
Front-to-back-ratio:	>17dB

Maximum input Power:	500 Watts
H-plane beamwidth:	63 degrees (half-power)
E-plane beamwidth:	63 degrees (half-power)
Connector:	N female
Weight:	13.2 lb

C. Approved Equal: None, Architectural Element

2.24 CEILING ANTENNA

- A. The Ceiling Antenna shall be the primary means to transmit and receive all channels for the NSC North Side site at the station. The Ceiling Antenna shall be MAXRAD or approved equal. The Ceiling Antenna shall be furnished, installed, and configured as required. All necessary Ceiling Antenna components including attachment mechanism and connectors shall be incidental.

B. Manufacturer: MAXRAD

Model #:	MLPC450
Frequency Range:	450-470 MHz
Gain:	Unity
Maximum Power Input:	150 Watts
Polarization:	Vertical, Linear
Nominal Impedance:	50 Ohms
VSWR:	< 2.0:1
Radiator Material:	Solid Brass Radiator
Mounting Method:	Off-white ceiling-mounted P.A. speaker baffle
Connector:	N- female

C. Approved Equal: None, Architectural Element

2.25 LIGHTNING PROTECTOR

- A. Authority requires a Lightning Protector above ground to limit damage conducted by the antenna and cables in the event of a lightning strike. The Lightning Protector shall be manufactured by PolyPhaser. The Lightning Protector shall be furnished and installed as required including all ground connections. All necessary Lightning Protector Components shall be incidental.

B. Manufacturer: PolyPhaser

Model #: IS-VU50HN Lightning Protector

C. Approved Equal: Products meeting the specifications and approved by the Engineer

2.26 CABLE HANGER

- A. The Authority will require the installation of leaky coax cable for the NSC both in stations and in tunnels. The Cable Hanger shall be manufactured by Eupen. The Cable Hanger shall

be furnished and installed with stainless steel anchor as required. The cable shall be secured to the hanger by the specified cable tie. All necessary Cable Hanger components shall be incidental.

B. Manufacturer: Eupen

Model #:	HKHG (Universal Hook Hanger)
Overall dimensions:	6.9 inches x 3.4 inches
Cable Diameter Range:	0.59 inches to 1.97 inches
Maximum Load:	220 lb force
Flame Retardant:	UL 94V0& Halogen Free
Color:	Black (RAL 9005)
Weight:	0.3 lbs
Mechanical:	Suitable for Ceiling or Wall Mount

C. Approved Equal: Products meeting the specifications and approved by the Engineer

2.27 CABLE TIE

A. The Authority will require the installation of leaky coax cable, specified hangers for the NSC both in stations and in tunnels secured by Cable Ties. The Cable Tie shall be manufactured by Thomas & Betts. The Cable Tie shall be furnished and installed per the manufacturer's instructions as required. All necessary Cable Tie components shall be incidental.

B. Manufacturer: Thomas & Betts

Model #:	TY275MX
Length:	18 inches
Width:	0.270 inches
Max. Wire Bundle Diameter:	5 inches
Locking Device:	Stainless Steel Tang
Material:	Nylon 6.6 Weather Resistant
Color:	Black
Tensile Strength:	120 lbs
Temperature Range:	-40° C to +85° C
Flammability Rating:	UL 94 V-2
Application Tools:	ERG297, WT197A

C. Approved Equal: Products meeting the specifications and approved by the Engineer

2.28 COAXIAL JUMPER CABLE 1/4"

A. The Authority will require the installation of Coaxial Jumper Cable for the NSC to feed the above ground antenna at the Base Station site. The Coaxial Jumper Cable shall be manufactured by Andrew. No Coaxial Jumper Cable shall exceed 3 foot in length to limit signal loss unless approved. The Coaxial Jumper Cable shall be furnished and installed with the cable manufacturer's connectors as required. All necessary Coaxial Jumper Cable components shall be incidental.

B. Manufacturer:	Andrew
Model #:	FSJ1RN-50B Superflex
Normal Size:	1/4"
Operating Frequency Band:	50-1800MHz
Cable Impedance:	50 Ohm
VSWR:	1.2
Peak Power:	6.4kWatt
Velocity of Propagation:	84%
Flexibility:	Super Flexible
Jacket Material:	Non-halogenated, fire retardant polyolefin
Dielectric Material:	Foam PE
Inner Conductor:	Copperclad aluminum wire
Outer Conductor Material:	Corrugated Copper
Installation Temperature:	-25 ° C to +60 ° C
Operating Temperature:	-30 ° C to +80 ° C
Storage Temperature:	-30 ° C to +80 ° C
Fire Retardancy Test Method:	IEC 60332-1, UL VW1/CATVX
Attenuation/100ft:	3.9 dB. @ 450MHz

C. Approved Equal: Products meeting the specifications and approved by the Engineer

2.29 COAXIAL FEED CABLE 7/8"

- A. The Authority will require the installation of Coaxial Feed Cable for the NSC to feed the above ground antenna at the Base Station site. The Coaxial Feed Cable shall be manufactured by Andrew. The Coaxial Feed Cable shall be furnished and installed with the cable manufacturer's connectors as required with the specified Cable Hanger. All necessary Coaxial Feed Cable components shall be incidental.

B. Manufacturer:	Andrew
Model #:	VXL5RN-50 7/8 Heliax
Normal Size:	7/8"
Operating Frequency Band:	1-5000MHz
Cable Impedance:	50 Ohm
VSWR:	1.2
Peak Power:	90 kWatt
Velocity of Propagation:	88%
Flexibility:	Very Flexible
Jacket Material:	Non-halogenated, fire retardant polyolefin
Dielectric Material:	Foam PE
Inner Conductor:	Corrugated Copper Tube
Outer Conductor Material:	Corrugated Copper
Installation Temperature:	-25 ° C to +60 ° C
Operating Temperature:	-30 ° C to +80 ° C
Storage Temperature:	-30 ° C to +80 ° C
Fire Retardancy Test Method:	IEC 60332-1, UL VW1/CATVX

Attenuation/100ft: 0.88 dB @ 450MHz

C. Approved Equal: Products meeting the specifications and approved by the Engineer

2.30 COAXIAL RADIATING CABLE 7/8"

A. The Authority will require the installation of Coaxial Radiating Cable 7/8" for the NSC both in stations and in tunnels. The Coaxial Radiating Cable shall be manufactured by Andrew Corporation. The Coaxial Radiating Cable shall be suitable for use in the UHF Band, the 700MHz Band, and the 800MHz Band. The Coaxial Radiating Cable shall be oriented for maximum radiation as indicated by the bump on the cable jacket. The Coaxial Radiating Cable shall be furnished and installed with the cable manufacturer's connectors as required with the specified Cable Hanger. All necessary Coaxial Radiating Cable components shall be incidental.

B. Manufacturer: Andrew Corporation

Model #:	RCT5-LTC-2A-RNT1
Normal Size:	7/8"
Operating Frequency Band:	50-1000MHz
Cable Impedance:	50 Ohm
VSWR:	1.3
Polarization:	Vertical
Peak Power:	91 KWatt
Velocity of Propagation:	89%
Jacket Material:	Non-halogenated, fire retardant polyolefin, Low Smoke and Fume, with single mica tape wrap
Dielectric Material:	Foam PE
Inner Conductor:	Copper Tube
Outer Conductor Material:	Copper Foil
Installation Temperature:	-30° C to +60° C
Operating Temperature:	-30° C to +80° C
Storage Temperature:	-30° C to +80° C
Fire Retardancy Test Method:	IEC 60332-1, UL VW1/CATVX, IEC 60332-3C-24, IEEE 383, UL 1685
Smoke Index Test Method:	IEC 61034
Toxicity Index Test Method:	IEC 60754-1, IEC 60754-2
Attenuation/100ft:	0.89 dB @ 450MHz
Coupling Loss (50%):	67 dB @6 feet
Attenuation Test Method:	IEC 61196-4
Coupling Test Method:	IEC 61196-4

C. Approved Equal: Products meeting the specifications and approved by the Engineer

2.31 COAXIAL RADIATING CABLE 1- 5/8"

- A. The Authority will require the installation of Coaxial Radiating Cable 1-5/8" for the NSC both in stations and in tunnels. The Coaxial Radiating Cable shall be manufactured by Andrew Corporation. The Coaxial Radiating Cable shall be suitable for use in the UHF Band, the 700MHz Band, and the 800MHz Band. The Coaxial Radiating Cable shall be oriented for maximum radiation as indicated by the bump on the cable jacket. The Coaxial Radiating Cable shall be furnished and installed with the cable manufacturer's connectors as required with the specified Cable Hanger. All necessary Coaxial Radiating Cable components shall be incidental.

- B. Manufacturer: Andrew Corporation

Model #:	RCT7-LTC-4A-RNT1
Normal Size:	1-5/8
Operating Frequency Band:	50-1000MHz
Cable Impedance:	50 Ohm
VSWR:	1.3
Polarization:	Vertical
Peak Power:	310kWatt
Velocity of Propagation:	89%
Jacket Material:	Non-halogenated, fire retardant polyolefin, Low Smoke and Fume, with single mica tape wrap
Dielectric Material:	Foam PE
Inner Conductor:	Corrugated Copper Tube
Outer Conductor Material:	Copper Foil
Installation Temperature:	-30° C to +60° C
Operating Temperature:	-30° C to +80° C
Storage Temperature:	-30° C to +80° C
Fire Retardancy Test Method:	IEC 60332-1, UL VW1/CATVX, IEC 60332-3C-24, IEEE 383, UL 1685, UL 1581/CATV
Smoke Index Test Method:	IEC 61034
Toxicity Index Test Method:	IEC 60754-1, IEC 60754-2
Attenuation/100ft:	0.49 dB @ 450MHz
Coupling Loss (50%):	68 dB @6 feet
Attenuation Test Method:	IEC 61196-4
Coupling Test Method:	IEC 61196-4

- C. Approved Equal: Products meeting the specifications and approved by the Engineer

2.32 FIBER OPTIC TRANSCEIVER

- A. The Authority will require the installation Fiber Optic Transceivers for the NSC Radio System to distribute RF signal below ground of fiber optic cable. The Fiber Optic Transceivers shall be furnished and installed as required. All necessary components shall be incidental.

B. Manufacturer: Axell Wireless Limited

Model #:	60-217801
Frequency Range:	70 – 3000MHz
FO TX:	4 x FO Transmitters
Connectors	4 x FC/APC
Attenuation adjust	0-20dB
Input	1 TX
FO RX:	4 x FO Receivers
Connectors	4 x FC/APC
Attenuation adjust	0-20dB
Output	1 RX
Redundant FO Switch:	The FO RX will switch automatically between when there is no light detected.
VSWR:	1.5:1
Impedance:	50 Ohms
Power Supply:	110VAC
Power Consumption:	< 100 Watts

ENVIRONMENTAL/MECHANICAL SPECIFICATION

Operating Temperature:	-20° to +55° C
Storage Temperature:	-30° to +70° C
Cooling:	Convection
Mechanical:	19" Tray
Dimensions:	7U
RF Connectors:	N-Type Female
Alarm Interfaces:	Local Alarm Dry Contact with LED Indication

Parameters Typical Performance

Temperature	+25 °C
Frequency Range (RF path)	70 - 3000 MHz
Frequency Range (Data path)	20 – 35 MHz
Available Link Gain (RF Path)	18 dB
Link Gain (DATA Path)	0 dB
Gain Flatness (entire frequency range)	±1.5 dB p-p
DGain vs. Temperature -20 to 70	3.5 dB
Gain adjustment range (RF Path)	30 dB
In/Out RL (RF path)	10 dB Min
Output IP3 @ max gain	* 37 dBm
In/Output IP3 @ 0dB Gain	* 33 dBm
RF impedance	50 Ohm
Noise Figure @ 0dBgain (400MHz)	36 dB
Optical Transmit Power	2.7±0.3 dBm
Optical return loss	>50 dB
Received Power Alarm Threshold	-10 dBm(optic)
Optical wavelength	1310 nm

DC Supply Voltage	10-12 Vdc
DC Supply Current	
20-005401	120 mA
20-005501	350 mA
20-005601	420 mA
Operating Temperature	-20 to 70
Storage Temperature	-30 to 85
RF Connector type	SMA
Fiber optic connector type	FC/APC

C. Approved Equal: Products meeting the specifications and approved by the Engineer

2.33 BI-DIRECTIONAL AMPLIFIER SYSTEM

A. The Authority will require the installation of Bi-Directional Amplifiers for the NSC North Side Station and Gateway Station to provide Radio System Coverage below ground. The Bi-Directional Amplifiers shall be furnished and installed as required. All necessary Bi-Directional Amplifiers components shall be incidental.

B. Manufacturer: Axell Wireless Limited

Model #:	50-257901
Downlink Frequency Range:	452.7750 - 453.7000 MHz 462.9500 MHz 470.6125 - 471.8125 MHz (Channelized)
Uplink Frequency Range:	457.7750 - 458.7000 MHz 467.9500 MHz 470.6125 - 471.8125 MHz (Channelized) 473.6125 - 474.8125 MHz
Passband Ripple:	+0.5dB
Downlink Power Amplifier:	40 Watts Linear @452-454MHz 10 Watts Linear @462.9500MHz 40 Watts Linear @470-472MHz
Downlink PA IP3:	>63dBm >50dBm >63dBm
Duplexer Output Power:	+30dBm per channel
Uplink LNA IP3:	>35dBm
Maximum Input Power:	+10dBm
Gain:	50dB Downlink 40dB Uplink
Gain Adjust:	0-15dB in 1dB steps (electronic)
Propagation Delay:	<5usec
VSWR:	1.5:1
Impedance:	50 Ohms
Uplink Noise Figure:	<6dB (at 40dB gain)
Uplink AGC:	30dB Dynamic Range

	Attack Time <5msec
AGC Output Threshold:	+10dBm \pm 1dBm
Sampling Ports:	-20dBm Resistive
Downlink RF Power Monitor:	0-5VDC, 5VDC Maximum
Power Supply:	110VAC
Power Consumption:	<400 Watts
Alarms Form C Relay:	Major Alarm Summary and Minor Alarm Summary High Temperature Pre- Amplifier Downlink Failure Power Amplifier Downlink Failure Pre Amplifier Uplink Failure Power amplifier Uplink Failure
Operating Temperature:	-24° C to +63° C
Storage Temperature:	-30° C to +70° C
Cooling:	Convection
Environmental Sealing:	19" Rack Mount or NEMA 4X
Humidity:	95%
Mechanical:	Aluminum
Dimensions:	36"X 36"X 10"
Weight:	< 150lb
RF Connectors:	N-type Female
AC Connection:	UL rated# 12 THHN

C. Approved Equal: Products meeting the specifications and approved by the Engineer

ARTICLE 3 EXECUTION

3.01 INSTALLERS' QUALIFICATIONS

- A. Communications equipment components shall be installed and optimized by qualified Radio System installation personnel. The Contractor shall provide objective evidence of project personnel's qualifications such as training and applicable field experience on similar systems and components. A minimum of five years of field equipment installation experience is required for, but not limited to base station, comparator, antennae, antenna feed system components, all types of RF coaxial cable connectors and telecommunications/electronics installation interface installation. At least one Radio System installer or tester must possess an FCC General Radio Telephone License or NABER certification while working at any Authority site at any one time. Manufacturer training is required for, but not limited to, bi-directional amplifier, and Fiber Optic Transceivers.

3.02 PRE-INSTALLATION SURVEY:

- A. The Contractor shall review the contract drawings and perform a comprehensive on-site survey of the subway tunnels, vent shafts, conduit feed stubs, and emergency stairways prior to finalizing the installation of the Radiating Coaxial Cable and feeder cable. Data for cable lengths may be compiled for the pre-engineered cable lengths. The cable routing, exact

placement of mountings hardware and other cable attachment points shall be determined without disturbance of the Beardon Mural. Personnel movement on tunnel emergency walkways, vent shafts, pumping stations and emergency stairways shall not be obstructed by cable installations. The Radiating Coaxial Cable and feeder cable shall be run in continuous lengths between BDA sites without inline connectors. All connectors to the equipment, i.e. antenna, BDA Fiber Transceivers shall be properly sealed to protect the connections from moisture, dirt etc.

- B. The Contractor shall survey the subway stations to include the platforms, mezzanines, emergency stairways, equipment rooms, TC&C, TPSS, substation, and access hallways. This survey will enable the Contractor to determine the final location requirements for the Radiating Coaxial Cable and antenna systems, RF distribution cable and miscellaneous couplers, splitters and cable taps. Any identified inadequacies and required modifications shall be identified prior to the commencement of installation work for approval of the Engineer.

3.03 INSTALLATION AND CUTOVER:

- A. The Contractor shall perform all site preparation. The Contractor shall install the NSC Radio System Expansion equipment while not disturbing operation of the existing Radio System. The Contractor shall submit an Installation and Cut-over Plan, which shall be used to systematically merge the NSC Radio System Expansion with the existing Radio System. Installation Plan and Cut-over Plan shall be submitted for approval of the Engineer
- B. The Radiating Coaxial Cable may be provided in bulk reels or may be ordered in pre-engineered lengths for each cable span as determined during the site survey and other field investigations. No connectors or splices between spans are to be utilized. If a specific situation develops where connectors or splices are required, approval by the Engineer will be required. No installation activities are to proceed until Engineer approval. Precautions shall be taken not to kink, nick or cause any deformities to the cable. If any damage is identified, that span of cable shall be replaced in total. The Contractor shall maintain accurate accounting of cable reels such that the appropriate reel is loaded for the corresponding work section. The cost of cable waste due to mishandling or installation of cable at incorrect work sections shall be solely borne by the Contractor.
- C. Installation of all cable mounting hardware shall be in accordance with the manufacturer's specification, nominally at four foot intervals. RF connectors shall be installed on the tunnel wall within 12 inches of exits from tunnel area. The Radiating Coaxial Cable and feeder cable RF connectors shall be weatherproof in accordance with the connector manufacturer's recommended means and materials. The cable mounting hardware placement shall be identified in the Installation Plan and shop drawings.
- D. Transit Stations: The antenna, feeder cable, and Radiating Coaxial Cable shall be placed to achieve RF coverage as well as be aesthetically acceptable particularly with respect to the Beardon Mural. Proposed arrangement for antenna and distribution cable shall be included in the Installation Plan.

3.04 SPECIAL REQUIREMENTS

- A. The Contractor shall test all the Radiating Coaxial Cable, feeder cable, jumpers, antenna systems, and paths that are installed for the NSC Radio System Expansion. The Contractor shall develop a Test Procedure, subject to approval of the Engineer which describes the measurement of the cable performance. The Contractor shall use a Time Domain Reflectometer to measure the condition of the cable, connectors, terminations, and devices. The documentation shall fully describe the cable, the location, the direction, the length, connectors, and devices along with the measured values and discrepancies. The Contractor shall identify, repair, and retest all discrepancies as required by the Engineer.
- B. The Contractor shall verify all the Optical Cables used for the NSC Radio System Expansion. The Contractor shall develop a Test Procedure, subject to approval of the Engineer which describes the measurement of the Optical Cable performance. The Contractor shall use an Optical Time Domain Reflectometer to measure the condition of the Optical Cables. The documentation shall fully describe the cable, the location, the direction, the length, connectors, and devices along with the measured values and discrepancies. The Contractor shall identify all discrepancies as required by the Engineer.
- C. The Contractor shall perform the final design, furnishing, installation, and testing of the NSC Radio System Expansion. Certain tasks such as equipment cut-over or tunnel equipment installation may require Work during non-revenue hours. The Contractor shall coordinate the Work with the Engineer and Authority's Rail Operations at least two weeks in advance. Coordination is done at the Right of Way Allocation meeting where all construction and maintenance activities are scheduled.

3.05 SEQUENCING OF OPERATIONS

- A. Contractor shall coordinate the sequencing of the design, installation, furnishing, and testing efforts to complete the Contract efficiently, safely, and in accordance with project specific and industry recognized procedures. Contractor shall include the planned Work sequencing in the Installation Plan submittal and also reflect the Work sequencing in the Work Schedule submittal.

3.06 SOUTH HILLS VILLAGE (OPERATIONS CONTROL CENTER)

- A. The Contractor shall furnish, install, and configure the Penta Line Cards and any necessary equipment identified in Section 16950, "Operations Control Center (OCC) System Upgrade". The Contractor shall interface the NSC Radio System Expansion with the existing Penta PCX Switch and consoles at the OCC. The interface is at the audio and control level requiring that certain equipment is augmented with additional modules and the Penta PCX Switch is reprogrammed to add the required functionality of the Radio System Expansion. The Operations personnel, Movement Directors, control the existing radio system along with the NSC Allegheny Station base stations through the Penta PCX Switch at the OCC. Control function tones and control signals are sent from the OCC to the existing radio system and to the NSC Allegheny Station to control the base stations. Received audio

signals are sent from the existing radio system and from the NSC Allegheny Station to the voting system equipment for presentation to the Movement Directors at the OCC.

- B. The Contractor shall furnish, install, and adjust an additional Voter Comparator Module for each of the four existing Voter Comparators. The new modules shall be programmed to process NSC Allegheny Station audio. The existing firmware of the Voter Comparator shall be upgraded for compatibility with the new card.
- C. The Contractor shall furnish, install, and adjust an additional Bulk Delay Module to the existing simulcast equipment. The new module shall be programmed for the NSC Allegheny Station downlink audio signal delays. The delay is calculated for each direction of the CTS primary and fallback loop. The fallback delay shall be configured in the simulcast equipment and used when the CTS loop reverses direction. The network management system will provide a contact closure to indicate the path direction on the loop. The existing simulcast equipment is configured to automatically select the correct delay based on loop direction as indicated. The entire Authority LRT simulcast system will require optimization to accommodate the NSC Radio System Expansion. The Primary delay and Fallback delay times shall be determined by the Contractor. All adjustments shall be made to optimize the simulcast performance in accordance with the equipment manufacturer's procedures. The system bulk delay and audio phasing shall be adjusted to compensate for the additional station location. All adjustments shall be documented on test forms witnessed by the Authority's field representative and approved by the Engineer.
- D. The Penta PCX Switch controls the Talk Around inhibit for the Talk Around base station at Allegheny Station exactly as the other sites. The Talk Around functionality shall be duplicated in the Penta PCX Switch for the NSC Allegheny Station site. All required control and status inputs from Allegheny Station shall be integrated into the Penta PCX Switch. Additional Penta Line Cards and any necessary equipment are identified and provided in Section 16950, "Operations Control Center (OCC) System Upgrade".

3.07 ALLEGHENY STATION SITE

- A. The Contractor shall furnish and install the cabinets, base stations, and other site equipment at Allegheny Station. The base stations and other equipment shall be installed in accordance with the manufacturer's instructions, NEC, NFPA-130, and other applicable codes and regulations. The base stations and equipment shall be programmed and configured identical to the base stations equipment at the existing Authority radio sites. The base stations shall interface at the audio and control level with the NSC CTS. The equipment shall be installed according to the approved Site Arrangement Plans. Power receptacles will be provided under a separate section of the NSC. The Site Arrangement Plans are subject to the approval of the Engineer.
- B. The Contractor shall furnish, install, and test Cable Mounting Hardware, RF jumper Cables, Radiating Coaxial Cable, RF Connectors, RF Feeder Cable, Lightning Arrestors, Antennae, and other system components that support the Radio System Expansion. All components shall be installed and tested according to the approved Installation Plans and Test Plans.

- C. The Contractor shall furnish, install, and test the Redundant RF Fiber Optic Transmitters and Receivers at Allegheny Station. The Prime and Backup RF Fiber Optic Transmitters shall always transmit. The RF Fiber Optic Receivers shall be configured as Prime and Backup. The Prime Receiver shall disable the Backup Receiver while the Prime Receiver is operational. The Prime Receiver shall enable the Backup Receiver while the Prime Receiver is failed or powered off. The Fiber Optic Transmitters and Receivers distribute the RF signal between Allegheny Station, North Side Station, and Gateway Station. The Fiber Optic Transmitters and Receivers shall be optimized to preserve dynamic range, minimize system noise, and maintain signal sensitivity. The Contractor shall furnish and install the Fiber Optic jumper cables required to interface the Fiber Optic Transmitters and Receivers with the associated NSC equipment and CTS. All components shall be installed and tested according to the approved Installation Plans and Test Plans.
- D. The Contractor shall optimize the overall performance of the Allegheny site Audio, RF, and Optical Transmitters and Receivers and all associated equipment related to the functionality of the overall radio system. . The Contractor shall properly program, adjust, verify and test the radio control tone function levels, the transmitter modulation and receive audio levels, base station receiver line levels, voter tone levels, transmit RF power output levels at the radio base station, at the output of the Hybrid Combiner, at both input and output of the couplers in line to the fixed antenna and the output of the attenuators feeding the RF power input levels to the Fiber Optic transmitters; predicted receive signals levels in dBm to shall be inserted to simulate the receive function to the fiber optical receiver throughout the transmission distribution paths. The RF feeds to the fixed antennae shall be terminated by an appropriately sized 50 ohm load. All testing shall be documented and verified prior to ANY active on air testing. The noise floor at the receiver multicoupler shall be measured and documented with Transmitters active and inactive. Once the “static” testing is complete on-air RF testing shall take place to include but not limited to RF signal coverage, phasing and overlap testing shall be performed in accordance with the Radio Coverage Test Plan. All adjustments shall be documented on test forms witnessed by the Authority’s field representative and approved by the Engineer.

3.08 NORTH SIDE STATION SITE

- A. The Contractor shall furnish and install the Bi Directional Amplifier (BDA) at North Side Station to provide radio coverage at the station and in the tunnels for all the channels. The BDA and other equipment shall be installed in accordance with the manufacturer's instructions, NEC, NFPA-130, and other applicable codes and regulations. The BDA equipment shall be programmed and configured as required to communicate with the LRT radio system. RF Power output and receiver input levels of the BDA are to be tested, verified and documented. The BDA alarms shall interface with the NSC CTS RTU. The equipment shall be installed according to the approved Site Arrangement Plans. Power receptacles will be provided under a separate section of the NSC. The Site Arrangement Plans are subject to the approval of the Engineer.
- B. The Contractor shall furnish, install, and test Cable Mounting Hardware, RF jumper Cables, Radiating Coaxial Cable, RF Connectors, RF Feeder Cable, Lightning Arrestors, Antennae,

and other system components that support the Radio System Expansion. All components shall be installed and tested according to the approved Installation Plans and Test Plans.

- C. The Contractor shall furnish, install, and test the Redundant RF Fiber Optic Transmitters and Receivers at North Side Station. The Prime and Backup RF Fiber Optic Transmitters shall always transmit. The RF Fiber Optic Receivers shall be configured as Prime and Backup. The Prime Receiver shall disable the Backup Receiver while the Prime Receiver is operational. The Prime Receiver shall enable the Backup Receiver while the Prime Receiver is failed or powered off. The Fiber Optic Transmitters and Receivers distribute the RF signal between Allegheny Station and North Side Station. The Fiber Optic Transmitters and Receivers shall be optimized to preserve dynamic range, minimize system noise, and maintain signal sensitivity. The Contractor shall furnish and install the Fiber Optic jumper cables required to interface the Fiber Optic Transmitters and Receivers with the associated NSC equipment and CTS. All components shall be installed and tested according to the approved Installation Plans and Test Plans.
- D. The Contractor shall optimize the overall performance of the North Side Station RF and Optical Transmitters and Receivers and all associated equipment related to the functionality of the overall radio system. The Contractor shall properly program, adjust, verify and test the overall functionality of the radio system. The RF Power output and receiver input levels of the BDA are to be tested, verified and documented. The BDA alarm and input/outputs shall interface with the NSC RTU. RF input levels to the Fiber Optic transmitters shall be tested and documented; predicted receive signals levels in dBm shall be inserted to the fiber optical receiver to simulate the receive function throughout the transmission distribution paths transmission distribution paths; the overall BDA system functionality shall be documented. All testing shall be documented and verified prior to ANY active on air testing. Once the "static" testing is complete on-air RF testing shall take place to include but not limited to RF signal coverage, phasing and overlap testing shall be performed in accordance with the Radio Coverage Test Plan. All adjustments shall be documented on test forms witnessed by the Authority's field representative and approved by the Engineer.

3.09 GATEWAY STATION SITE

- A. The Contractor shall furnish and install the Bi Directional Amplifier (BDA) at Gateway Station to provide radio coverage at the station and in the tunnels for all the channels. The BDA and other equipment shall be installed in accordance with the manufacturer's instructions, NEC, NFPA-130, and other applicable codes and regulations. The BDA equipment shall be programmed and configured as required to communicate with the LRT radio system. RF Power output and receiver input levels of the BDA are to be tested, verified and documented. The BDA alarms shall interface with the NSC CTS RTU. The equipment shall be installed according to the approved Site Arrangement Plans. Power receptacles will be provided under a separate section of the NSC. The Site Arrangement Plans are subject to the approval of the Engineer.
- B. The Contractor shall furnish, install, and test Cable Mounting Hardware, RF jumper Cables, Radiating Coaxial Cable, RF Connectors, RF Feeder Cable, Lightning Arrestors, Antennae,

and other system components that support the Radio System Expansion. All components shall be installed and tested according to the approved Installation Plans and Test Plans.

- C. The Contractor shall furnish, install, and test the Redundant RF Fiber Optic Transmitters and Receivers at Gateway Station. The Prime and Backup RF Fiber Optic Transmitters shall always transmit. The RF Fiber Optic Receivers shall be configured as Prime and Backup. The Prime Receiver shall disable the Backup Receiver while the Prime Receiver is operational. The Prime Receiver shall enable the Backup Receiver while the Prime Receiver is failed or powered off. The Fiber Optic Transmitters and Receivers distribute the RF signal between Allegheny Station and Gateway Station. The Fiber Optic Transmitters and Receivers shall be optimized to preserve dynamic range, minimize system noise, and maintain signal sensitivity. The Contractor shall furnish and install the Fiber Optic jumper cables required to interface the Fiber Optic Transmitters and Receivers with the associated NSC equipment and CTS. All components shall be installed and tested according to the approved Installation Plans and Test Plans.
- D. The Contractor shall optimize the overall performance of the Gateway Station RF and Optical Transmitters and Receivers and all associated equipment related to the functionality of the overall radio system. The Contractor shall properly program, adjust, verify and test the overall functionality of the radio system. The RF Power output and receiver input levels of the BDA are to be tested, verified and documented. The BDA alarm and input/outputs shall interface with the NSC RTU. RF input levels to the Fiber Optic transmitters shall be tested and documented; predicted receive signals levels in dBm shall be inserted to the fiber optical receiver to simulate the receive function throughout the transmission distribution paths transmission distribution paths; the overall BDA system functionality shall be documented. All testing shall be documented and verified prior to ANY active on air testing. Once the “static” testing is complete on-air RF testing shall take place to include but not limited to RF signal coverage, phasing and overlap testing shall be performed in accordance with the Radio Coverage Test Plan. All adjustments shall be documented on test forms witnessed by the Authority’s field representative and approved by the Engineer.

3.10 NSC RADIO COVERAGE TESTING

- A. The Contractor shall submit the Radio Coverage Test Plan subject to the approval of the Engineer. The Contractor shall test the NSC Radio System Expansion on a site by site basis followed by testing the system as a whole. The Contractor shall measure the uplink and downlink RF signal level to calibrated test equipment. The Contractor shall demonstrate Delivered Audio Quality of 3.5 both uplink and downlink. The Contractor shall include all RF channels in testing. Coverage testing spaces include station areas, within 500 feet of the track Right of Way, inside a moving LRV (portable), on a moving LRV (mobile), and along all NSC track.
- B. The Contractor shall test each site for both RF signal level and Delivered Audio Quality performance, Uplink and Downlink. Below ground coverage shall be tested on a Radiating Coaxial Cable span basis with coverage testing to extend from the BDA under test completely along the span to the adjacent BDA, in each direction in each tunnel, with the

adjacent BDA turned off. Above ground coverage shall be tested within 500 feet of the NSC Right of Way.

- C. Quantitative talk-out field tests shall be conducted, at the NSC stations, in the tunnels, and on the ROW using an omni-directional 0dB gain antenna mounted on the top of an LRV and attached to either an RF field strength meter or a spectrum analyzer, subject to the approval of the Engineer. Either measurement device shall have an NTSB traceable calibration certificate that the Engineer may request to see. The measurements shall be conducted using a continuous wave transmitted signal without audio. The measurement bandwidth shall be that of a single audio channel and the configuration of the measurement device shall be subject to the approval of the Engineer. The quantitative talk-out field tests, for a portable unit, shall utilize the same measurement device but may use a device-mounted omni-directional 0dB gain antenna, with the appropriate attenuator to reflect the inefficiency of a portable and the attenuation of the signal penetrating the LRV vehicle to a portable unit with the radio and antenna at the hip level, in the LRV, furthest away from the radiating coaxial antenna system. At all NSC Radio System Expansion locations, the minimum measured talk-out signal strength shall be - 97dBm. At 90 percent of the NSC locations, the minimum measured talk-out signal strength shall be -87dBm.
- D. Qualitative talk-out talk-in field test shall be conducted, at the NSC stations, in the tunnels, and on the ROW using a portable radio and LRV mobile with an omni-directional 0dB gain antenna mounted on the top of an LRV. The Contractor shall demonstrate the quality of the two-way radio uplink and downlink communications between the OCC, the mobile, and the portable radio worn at hip level at any location on the NSC above ground Right of Way, all tunnel areas, station related service areas, station mezzanine, platform areas, equipment rooms, and specific locations identified by the Engineer. Coverage shall also be possible in escalator, hallway or staircase. Successful talk-in or talk out for voice shall be possible 98 percent of the time. The Contractor shall attempt no less than a combination of 100 voice communication events at different locations to determine this success rate for an LRV application. All readings shall be documented on test forms witnessed by the Authority's field representative and approved by the Engineer.
- E. Allegheny Station
 - 1. The Contractor shall measure the RF signal level at Allegheny Station. The Contractor shall measure and document the RF level with calibrated test equipment in all areas on the station platform, mezzanine level and street level within 500 feet from the station entrance. The Contractor shall measure the Delivered Audio Quality to a portable radio at the user's hip in areas on the station platform, mezzanine level and street level within 500 feet from the station entrance.
 - 2. The Contractor shall measure the RF signal level for the above ground Right of Way. The Contractor shall measure and document the RF level with calibrated test equipment within 500 feet of the track. The Contractor shall measure the Delivered Audio Quality to a portable radio at the user's hip within 500 feet of the track.

3. The Contractor shall measure the RF signal level inside the LRV on the above ground track. The Contractor shall measure and document the RF level with calibrated test equipment while in motion. The Contractor shall measure the Delivered Audio Quality to a portable radio at the user's hip inside the LRV while in motion.

F. North Side Station

1. The Contractor shall measure the RF signal level at North Side Station. The Contractor shall measure and document the RF level with calibrated test equipment in all areas on the station platform, mezzanine level and street level within 500 feet from the station entrance. The Contractor shall measure the Delivered Audio Quality to a portable radio at the user's hip in areas on the station platform, mezzanine level and street level within 500 feet from the station entrance.
2. The Contractor shall measure the RF signal level in the tunnel. The Contractor shall measure and document the RF level with calibrated test equipment. The Contractor shall measure the Delivered Audio Quality to a portable radio at the user's hip in the tunnel on the safety walk.
3. The Contractor shall measure the RF signal level inside the LRV in the tunnel. The Contractor shall measure and document the RF level with calibrated test equipment while in motion. The Contractor shall measure the Delivered Audio Quality to a portable radio at the user's hip inside the LRV while in motion.

G. Gateway Station

1. The Contractor shall measure the RF signal level at Gateway Station. The Contractor shall measure and document the RF level with calibrated test equipment in all areas on the station platform, mezzanine level and street level within 500 feet from the station entrance. The Contractor shall measure the Delivered Audio Quality to a portable radio at the user's hip in areas on the station platform, mezzanine level and street level within 500 feet from the station entrance.
2. The Contractor shall measure the RF signal level in the tunnel. The Contractor shall measure and document the RF level with calibrated test equipment. The Contractor shall measure the Delivered Audio Quality to a portable radio at the user's hip in the tunnel on the safety walk.
3. The Contractor shall measure the RF signal level inside the LRV in the tunnel. The Contractor shall measure and document the RF level with calibrated test equipment while in motion. The Contractor shall measure the Delivered Audio Quality to a portable radio at the user's hip inside the LRV while in motion.

3.11 INADEQUATE RF COVERAGE MITIGATION VERIFICATION

- A. Contractor shall demonstrate, subject to the approval of the Engineer, that the above coverage requirements have been met by establishing voice and data communication for the NSC radio system. Contractor shall establish voice communications links within and to any public station or stop platform, mezzanine, escalator, hallway and staircase. Engineer will

- designate which specific sites to be demonstrated. Any failure to establish a communications link within the above coverage requirements shall be cause for the Engineer to declare the installation incomplete.
- B. The Contractor shall perform all modifications to existing equipment and/or licenses and/or shall add new NSC Radio System equipment as necessary to meet the coverage requirements if the Engineer declares the installation incomplete because of inadequate coverage.

ARTICLE 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- A. [NOT USED]
- B. Item 16722.002 – Allegheny Station Site shall be measured in a lump sum unit, complete in place.
- C. Item 16722.003 – North Side Station Site shall be measured in a lump sum unit, complete in place.
- D. Item 16722.004 – Gateway Station Site shall be measured in a lump sum unit, complete in place.

4.02 PAYMENT

- A. [NOT USED]
- B. Item 16722.002 – Allegheny Station Site will be paid at the lump sum price and shall include the cost of all related work specified in this Section.
- C. Item 16722.003 – North Side Station Site will be paid at the lump sum price and shall include the cost of all related work specified in this Section.
- D. Item 16722.004 – Gateway Station Site will be paid at the lump sum price and shall include the cost of all related work specified in this Section.

**POR T AUTHORITY OF ALLEGHENY COUNTY
NORTH SHORE CONNECTOR PROJECT**

CONTRACT NO. NSC-009

The following Questions and Answers Summary shall not be construed to modify or change the Bid Documents. The Bidder shall submit its Bid based upon the Bid Documents. The Bid Documents may only be changed through the use of explicitly identified changes to the Bid Document, and any necessary change to the Bid Documents will be explicitly identified as such in an Addendum that would be issued by Port Authority.

Question 1: Hollow Metal Door Requirements (Ref. Dwg. TN201, Sht. 76). Are the two (2) doors shown in the temporary closure wall for construction and emergency access the only door requirements for NSC-009?

Response 1: Yes. These doors are mainly for emergency egress between the construction zone and the active tunnel and must remain closed in case emergency ventilation fans are activated to permit proper smoke evacuation operation.

Question 2: Wood Street Crossover – What access will be made available? What area will be made available for lay down? Is it possible to utilize any of the emergency egress and ventilation openings for access?

Response 2: The Contractor's main point of access for the material transport into the existing Stage I tunnel is by way of 1st Ave. Station or Penn Park as described in Section 00500, Article 2.1.O.i. Additional access through Wood Street and Gateway Station entrances, support shafts, and emergency access facilities will only be considered during non-revenue periods and may be granted by Authority on a case by case basis. Contractor shall submit access requirements in accordance with Section 00500, Article 2.1.O.

Question 3: Bored and Cut and Cover Tunnel Access – will NSC-009 have excuse construction access once plinth anchorage is started?

Response 3: Contract access dates are provided in Section 00500, Article 2.1.I.

Question 4: Safety Training – Will the PAAC conduct and or require contractors to attend rail & tunnel safe training?

Response 4: Rail safety training shall be in accordance with Section 01781, "Maintenance and Protection of Authority Traffic." and Section 00700, Article 13.14. Tunnel safety will be in accordance with OSHA, specifically Part 1926.800. The Contractor is responsible for safety training through its Safety Program described in Section 00700, Article 13.

Question 5: What are the restrictions on the types of construction equipment utilized in both existing and new subway tunnels? (Rail gauge adjustments required for 62-1/2" gauge)

Response 5: See Section 00500, Article 2.1.CC.

Question 6: Temporary power (ref. Sec. 01787). Is an index available of the current equipment to be transferred to the Follow-On Contractor?

Response 6: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.

Question 7: What is the anticipated NTP?

Response 7: Bids are due on August 27, 2008. Port Authority anticipates going to either the September or October Board. After Board Approval and all contractor paperwork has been received, Port Authority plans to issue NTP.

Question 8: Drawing SG109, Sht. 345 @ Signal 2S statement "(see note 4)". There is only two (2) notes on the drawing.

Response 8: Note to be removed not required, see Addendum 1

Question 9: There are 4 different types of DF track shown on the bid sheets. Type I DF track has no strap guard, Type II DF track has single strap guard, Type III DF track has dual strap guard and Type IV DF track has dual emergency guard. The contract drawings show a detail with strap on one side and emergency guard on the opposite side and another detail shows emergency guard on one side only.

Even though Type I DF does not have strap guard, will it have emergency guard on one side? Type II has strap guard on one side. Will this type of DF track have emergency guard on the opposite side? Please clarify the 4 types of DF track.

- Response 9: No joint bars are required to join sections of emergency guard.
- Question 10: Am I correct in saying that the emergency guard rail will not require any type of plate to connect 2 sections of emergency guard in the k? The detail drawing, TK128, says to leave gaps between the sections of emergency guard rail.
- Response 10: The typical sections shown on TK 131 and TK132 show and callout notes/ dimensions / spacing / sizes, etc for the track items required in general. Per Specification section 02452 – Direct Fixation track Construction, Article 1, 1.01B; Type I has no strap guard and no emergency guard, Type II has a single strap guard only and no emergency guard, Type III has dual strap guard and no emergency guard, and Type IV has no strap guard and dual emergency guard.
- Question 11: Regarding the US&S proprietary code for the Central Office work. In order to level the playing field and avoid creating a competitive disadvantage for other contractors, will the PAAC consider creating a separate contract to US&S or provide an allowance for this portion of the work?
- Response 11: Authority will not consider a separate contract or allowance for the OCC work. The OCC software expansion to include the North Shore Connector does not require revision to the source code. All modifications can be performed using the following tools as described in the Technical Provision:
- 1) System Configuration Tool (SCT) – permits the off-line modifications of the configuration database files via a graphical user interface
 - 2) Form – a form based user interface
 - 3) Flat File – files modified and created through the use of a commercial text editor
 - 4) Xdesigner – a COTS tool used to define layouts of user interface forms
- This will allow bidders other than Union Switch and Signal to bid and complete the work at OCC.
- Question 12: Regarding equipment that is already in service on PAAC property. Must the contractor submit detailed equipment data for this equipment?

- Response 12: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.
- Question 13: Section 13577-16, paragraph 13 specifies Spares are to be 10% of I/O used Section 13517-21 paragraph G.9 states that 10% of I/O Spares are to be provided by card file. Please clarify.
- Response 13: Section 13577-16, paragraph 13 specifies spare requirement for vital interlocking control system. Section 13517-21 paragraph G.9 states the spare requirement of the non-vital system.
- Question 14: Section 13581-2, 2.01.A specifies only new LCP to be provided for Allegheny Interlocking. However, contract drawing 442 shows LCP in North Station relay room. Please clarify.
- Response 14: No local control panel is required in the North Station relay room. See Addendum 1.
- Question 15: 13570, 1.01.B. 11 states that the Contract drawings represent required circuit modification for Gateway interlocking RR. We found the Wood Street Interlocking drawings, but where are the Gateway Interlocking drawings?
- Response 15: The signal block plan and control lines in the Contract Drawings for the existing Gateway interlocking indicates the design parameters that need to be satisfied by the final circuit design. Final design shall be performed by the Contractor. The Gateway circuit drawings will be provided in electronic format to the successful bidder in accordance with Section 01700, Article 1.1.
- Question 16: 13570, 1.01.B. 16 states, "Contractor shall also provide all new application logic, programming in existing Microlok Vital Microprocessor control systems..." Please specify which locations require modifications to the existing vital microprocessors.
- Response 16: The Contractor shall provide all new application logic programming in the new vital and non-vital microprocessor control system. No modifications are required in the existing vital microprocessor. See Addendum 1.
- Question 17: 13574 1 .04.A.3 states "... factory test procedures ... prior to the factory testing of the switch machine mechanisms" Does this apply to

manufacturing test procedures for M3 machines for Wood interlocking only in order to test on the assembly site?

Response 17: No, this applies to the M3 switch machines for Wood Street and the switch machines provided for the interlocking at Allegheny.

Question 18: 13576 1.04 Paragraphs I and J identify North Station Relay Room twice, but no New Gateway RR mentioned. Please clarify

Response 18: Paragraph I has been changed to read New Gateway Relay Room. See Addendum 1.

Question 19: 13577 paragraph 2.02.C.18.b requires compiler upgrade for 10 years after final acceptance. Is retesting required and who is responsible for the retesting?

Response 19: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.

Question 20: 13579 2.01 N.4.b, "Non-Vital relays: Open coil, high contact resistance..." Should it read "contact resistance"?

Response 20: Yes, see Addendum 1

Question 21: 13579 2.01 P.11 states "A minimum of 20 percent spare terminals and spare wires in multi-conductor cables (6 minimum) shall be provided.." Does this apply to express cables only?

Response 21: This applies to all cables with more than six conductors.

Question 22: Circuits and cable plan show the wire size for signal lighting to be #14. Section 13587 of the specifications, (Wire and Cable) Article 2 Products (2.01 Signal Wire and Cable), item C, 7, requires a #9 minimum be used. Please clarify which is correct.

Response 22: Signal Lighting cables shall be #14AWG, see Addendum 1.

Question 23: There is a double crossover being added at Wood Street but no revised control lines for signals 6S and 10S that might be effected by reverse move over switch 3. Please, clarify.

- Response 23: See route and locking chart (sheet 485) for Wood Street Interlocking routing requirements over switch #3.
- Question 24: Ref Section 0500, Article 2.1.O – Please clarify the intent of this section. Is it the Authority's intent to charge the contractor \$56.00/hr for escort services for all track occupancy? Is the escort required for the full duration of track occupancy or only to gain occupancy? Is this requirement for only revenue track? Would the Authority consider creating a PDA Bid Line item for this?
- Response 24: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.
- Question 25: Will the Authority conduct a site tour of the new North Shore construction and bored tunnel prior to bid.
- Response 25: See Addendum 1
- Question 26: Spec page/Section 15887-3, 1.04 G, Testing requirements spec asks for “recent testing” What’s the definition of recent? 1 – Year, 5-years?
- Response 26: Testing in the recent 5 years is acceptable provided that the test was performed by a recognized testing facility on the exact equipment model to be proposed by the Contractor, and that alteration/modification to the design has not taken place since the date of the test.
- Question 27: Section 15887-3 Corrosion Protection for Fans and Dampers. Is there a protection method defined acceptable? Are there underground temperatures and humidity levels specified?
- Response 27: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.
- Question 28: Table 15888-1 silencer insertion losses are not defined. Does this mean the contractor must have a sound consultant to test final sound levels once installed?
- Response 28: Port Authority is reviewing this question and if a change to the Bid Documents is required it will be issued as an addendum.
- Question 29: 15889-12 what are the acceptable vibration limits on the tunnel ventilation fans?

Response 29: Fan vibration limits are normally defined by the manufacturer depending on the type and size of fan. The Contractor shall obtain this from the fan manufacturer once the fan selection process is completed. In any case, the vibration shall not exceed 0.197 inch/second (5 mm/second).

Question 30: Is there a buy American clause?

Response 30: See Section 00200, Article 2.13

Question 31: If a fan manufacture has an improved design for field adjustment of blades. Can that be proposed? Considered

Response 31: Yes, the new design may be submitted to the Engineer for consideration and approval as long as it meets the requirements of the Contract Documents.

**PORT AUTHORITY OF ALLEGHENY COUNTY
MEETING MINUTES**

Project: North Shore Connector
FTA Project No. PA 03-0315

Purpose: Pre Bid Conference and Site Tours
North Shore Connector
NSC-009 NSC Train Systems (System Wide)

Date/Time: July 15, 2008 / 9:00 am
Place: PAAC Offices, 345 Sixth Avenue
5th Floor, Board Room
Pittsburgh, PA 15222-2527

Attachment A: Pre-bid Conference Agenda
Attachment B: List of Attendees – Pre Bid Meeting
Attachment C: Questions and Answers
Attachment D: Morning Site Tour Attendees – Pitt Tower
Attachment E: Afternoon Site Tour Attendees - South Hills Village Operations Control Center
Attachment F: July 16, 2008/1:30am Site Tour Attendees - Gateway Loop and Wood Crossover

Please note that none of the discussions from today's meeting, any meeting minutes of today's meeting, and communications with the contacts referenced during today's meeting, nor any summaries of Questions and Answers that may be issued by Port Authority through the Bid Period shall be construed to modify, in any manner, the Bid Documents. The Bid Documents may only be changed through the use of explicitly identified changes to the Bid Documents, and any necessary change to the Bid Documents will be explicitly identified as such in any Addenda that may be issued by Port Authority.

1. Welcome and introductions by Nancy Vandling,

Nancy Vandling, Port Authority, Purchasing, Manager of Contract Administration

Ed Greene, Port Authority, DBE Compliance Officer

Gary Meinen, Marsh, Owner Controlled Insurance Program

Robert Breisinger, Port Authority,

Toni Matessa, Purchasing, Associate Contract Administrator

Dwight Cheuning, TriGold, Program Manager

Gareth Rees, TriGold, Resident Construction Manager

Craig Jones, Gannett Fleming Engineering Consultant

Dave Haines, DMJM

Cathy Frye, Port Authority, Insurance Administrator

Meeting Minutes
NSC-009 NSC Train Systems (System Wide)
Pre-Bid Meeting and Site Tour
July 15, 2008, 9:00 AM

2. **Vandllng:** Bids must be received by 1:30 p.m. on August 27th, 2008 at this building to the office of the Director of Purchasing and Materials Management. Please make sure to make allowances for the weather, construction, traffic conditions, and security process at the lobby of this building.
3. **Vandllng:** Award of the contract will occur at an upcoming Port Authority Board of Directors meeting.
4. **Vandllng: Proposal Forms:** The Bidder must submit one set of executed forms per Section 00200, Article 2.7:
 - 4.1. Form B (Form of Bid);
 - 4.2. Form C (Certification of Bidder, submit the appropriate form.);
 - 4.3. Form D (Buy America Certificate.);
 - 4.4. Form E (Certification Regarding Lobbying.);
 - 4.5. Form F (Disclosure of Lobbying Activities, shall be submitted, if required, pursuant to Bidder's completion of Section E);
 - 4.6. Form G-VI is the Bidder/Subcontractor Data Form, which is submitted for the Bidder and any subcontractors that it is currently considering. This does not obligate the bidder to use the identified firms. This is strictly data that the FTA requires the Port Authority to collect at the time of receipt of bids.
 - 4.7. A Bid Guaranty in the amount of TEN PERCENT (10%) of the Total Bid must be provided on one of the following forms: 1) Bidder's Bond, Form H; 2) Certified Check; or 3) Cashier's Check.. Please refer to Section 00200, Article 2.10
5. **Vandllng:** In addition to the forms that are required to be submitted with your bid, potential bidders are requested to submit Form GV Potential Areas of Subcontracting to the Port Authority by August 14th, 2008. This is used to enable Port Authority to assist you in identifying DBEs that may be able to participate in the identified areas of work.
6. **Vandllng: TELEPHONE CONTACTS FOR BIDDERS:** The following are the only individuals that any interested party should contact for the applicable issue in preparing to submit bids on this contract:
 - 6.1. For Disadvantaged Business Enterprise (DBE) program, please contact Edward Greene- (412) 566-5257
 - 6.2. For Procedural Questions, please contact Toni Matessa at (412) 566-5148
 - 6.3. For Technical questions, please contact Toni Matessa, Fax (412) 566-5359
 - 6.4. For Reference Documents, contact Jonna Balco at (412) 497-6265
 - 6.5. Additional contacts are identified to enable Bidders to review reference documents for this contract. These inspections are by appointment ONLY. Please recognize that the

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closer we get to bid time the greater the likelihood that available appointment times to examine these materials may quickly disappear. We cannot guarantee that you will be able to get in to examine the materials if available time slots get filled. Your contacts for these reviews, and applicable Bid Document references, are as follows:

- 6.5.1. **Section 00200, Article 2.6. D & E identifies contacting Jonna Balco at (412) 497-6265 to schedule an appointment to review the reference materials listed in this Section. A copy of the form to be used to purchase any such materials is at the sign in table. Purchasers should anticipate at least 5 working days for the reproduction of any such requested materials after receipt of a written request and payment.**
7. Vandling: Nothing said at this Pre-Bid meeting, during the walk through, or during the bid period will modify the contract unless it is put in an addendum. The Port Authority does not have an Addendum to issue at this time, however addendum No. 1 is anticipated to be released in two weeks.
8. Greene: DBE PROGRAM: Provided an overview of the DBE program; Section 200 Article 3
 - 8.1. The Port Authority is a member of the Pennsylvania Unified Certification Program (PAUCP). The PAUCP maintains a consolidated database of firms that have been certified as DBEs by the PAUCP participating agencies. Any firm in this database will be accepted by all of the PAUCP participating agencies as a DBE for such agency's contracts. For more information about the DBE program, and to view firms in the PAUCP database, see the PAUCP's web site at <http://www.paucp.com>.
 - 8.2. DBE firms in attendance were given the opportunity to introduce themselves. The following firms introduced themselves:
 - 8.2.1. Integrity Wire: Ron Clay indicated they supply electrical equipment, cable and wire including overhead contact systems materials.
 - 8.2.2. Rebecca Bowman: Rebecca Bowman indicated her firm was available for civil engineering and land acquisition tasks.
 - 8.2.3. G.W. Peoples: Ralph Golick stated Peoples is a track work contractor.
 - 8.2.4. CFI Associates: Harshad Boskan said CFI supplies electrical equipment and provides engineering services.
 - 8.3. Contract has a 15% goal based on total dollar value
 - 8.4. Subcontracting forms are due August 14th.
 - 8.5. Refer to bid documents regarding for DBE suppliers.
 - 8.6. I am available to assist bidders in identifying potential DBE firms that can provide subcontract services to bidders.
9. Vandling: Port Authority has implemented an Owner Controlled Insurance Program for the North Shore Connector Project. Specific details of the OCIP are further enumerated in Section 00700, Article 7 of the Bid Documents. As part of the OCIP, Port Authority has acquired certain specific insurance coverages for the Project which will cover the Work of

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this Contract, the Contractor and its Subcontractors, and the Contractor will still be required to secure and maintain other specific coverages for the term of the Contract. The Bidders are reminded to understand the nature of the OCIP to ensure that they do not cause their Bids to be unduly inflated by including costs for coverage that will be provided by the OCIP and, by submitting their Bids, acknowledge that they have not included such costs in their bids. To provide a brief overview of the OCIP, and what it will mean to you as both the successful Contractor as well as if you are a Subcontractor, I will turn this over to Mr. Gary Meinen of Marsh, Port Authority's OCIP administrator.

10. Melnen: Overview of the Owner Controlled Insurance Program (OCIP)

- 10.1. PAAC has implemented an OCIP for the project. Marsh USA, Inc. is the Designated OCIP Broker. I am the Insurance & Administration Contact Denny Gresco is the Primary Field Contact
- 10.2. Highlights of Section 0700 Article 7.1 - OCIP provided insurance 7.1:
 - 10.2.1. Workers' Compensation Insurance with Employer's Liability Insurance
 - 10.2.2. Commercial General Liability
 - 10.2.3. Excess Liability
 - 10.2.4. Builder's Risk
 - 10.2.5. Included: General Contractor and Sub-contractors
 - 10.2.6. Excluded: Suppliers, vendors, truckers, material dealers, guard service, professional services, etc.
 - 10.2.7. OCIP coverage is for work at all sites specified in the Contract.
- 10.3. Contractor deductibles:
 - 10.3.1. General Liability Deductible Fund w/ PDA in unit price schedule
 - 10.3.2. Bonus to you if fund is not exhausted
- 10.4. Administration:
 - 10.4.1. Submit IPW and certificate prior to enrollment
 - 10.4.2. Payroll reports monthly for each enrolled contractor/sub
 - 10.4.3. There is a \$50,000 PDA in the Contract for the deductibles.
- 10.5. Other Insurance Comments:
 - 10.5.1. Bid w/o insurance costs in pricing
 - 10.5.2. Contractors must warrant that they have excluded the appropriate insurance costs from bid
 - 10.5.3. All contractors must be enrolled prior to work onsite

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- 10.5.4. OCIP is project specific. Not covered: If offsite for other work or personal business; Asbestos abatement and hazardous waste remediation excluded from OCIP.
- 10.6. Claims: Contractor must have a designated person that reports all OCIP claims for the project – including subcontractor claims. Losses will be reporting to the appropriate insurance rating bureau – effects your EMR. OCIP requires the contractor to provide a Return to Work program.
- 10.7. Safety (Article 13): Contractor must provide a dedicated Site Safety Representative - criteria in the Bid Documents. Written Safety Program must be submitted within 10 days of award; see the Contract provisions for details. Drug and Alcohol testing required (Article 14).
11. Chowning: OVERVIEW OF THE PROGRAM: Provided an overview of the NSC program;
 - 11.1. NSC-009 is an addition to the current light rail system. The North Shore Connector will connect to the existing light rail system at Gateway Station. This will be an underground station. It will cross under the Allegheny River in two separate bored tunnels. The first of these tunnels has been completed with the second to commence shortly. The line will have an underground station at the proposed North Side Station (contract NSC-011). The line will continue in a cut and cover tunnel and boat section then transition to an aerial structure. The aerial structure will continue west toward Heinz Field where Allegheny Station (contract NSC-012) will be located. The status of the other contracts necessary to construct the NSC are:
 - 11.1.1. NSC-004 R Gateway Station Shell – Has been awarded
 - 11.1.2. NSC-003/006 North Side Tunnels and Station Shell under construction presently
 - 11.1.3. NSC-007 Aerial Structure and Demolition of the Miller Print Building – to be awarded.
 - 11.1.4. NSG-010, 011, 012 Station Finishes – 2009 advertisement
 - 11.1.5. NSC-015 Elevators and Escalators – summer 2008 advertisement
 - 11.2. The work under NSC-009 is not restricted to the extended LRT system described above but will also include modifications, reconfiguration, replacements and additions to the existing system at the following locations:
 - 11.2.1. Wood Street interlocking that includes the installation of a new double crossover and modifications and reconfiguration of the signal equipment at Wood Street.
 - 11.2.2. Additions and reconfiguration of the CCTV system and UPS at Pitt Tower
 - 11.2.3. Modifications to the operations control center at South Hills Village to integrate the proposed NSC into the overall LRT system

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12. Jones: NSC-009 CONTRACT OVERVIEW: Provided an overview of the DBE program;
- 12.1. The trackwork bid under this contract is direct fixation in the tunnel and elevated structures. It has a total alignment length of 12,750 feet. Additionally all special trackwork materials and installation are to be included in this contract with the exception of the proposed No. 6 double crossover at Wood Street. The Authority will provide the contractor with materials for the Wood Crossover. Installation of the crossover will be under NSC-009 including the modifications and additions to the signal system. Wood interlocking must be in place and operational to allow the closure of the existing Gateway Station and its reconfiguration.
- 12.2. Signals and train control work associated with this project consists of a single processor signalling system, AC lighting, relay interfaces with track circuits and switch machines, fiber optic communication and local control panels. The track circuit will be single rail within interlockings and double rail between interlockings. Switch machine operating voltage will be 120VDC. TWC functionality will include automatic route selection and train ID.
- 12.3. Communications and radio systems are also included as part of this contract:
- 12.3.1. There will be a new Sonet and Gigabit network ring installed.
- 12.3.2. A new Internet protocol digital CCTV system and its interfaces will be included in this contract. This system will include fixed and PTZ cameras and will require integration with the existing analog CCTV system.
- 12.3.3. Upgrades will be made to the equipment at Pitt Tower. The upgrades will include new monitors, consoles, video recorders and uninterruptible power systems (UPS).
- 12.3.4. Portal surveillance and detection will be provided as part of this contract.
- 12.3.5. The existing PBX and UPS, located at the OCC, will be replaced with systems with increased capacity. The replacement cutover must occur at night so operations are not disrupted.
- 12.4. Radio system additions and modifications will be made as part of this contract. Coordination with the City of Pittsburgh EMS will be required. The existing radio system will be expanded. Above and below ground coverage will be provided for NSC. Base stations will be located at Allegheny Station. BDA's will be located at Northside and Gateways stations. Leaky coax will be utilized underground. Above ground antennas will be located at Allegheny.
- 12.5. The OCC will need to be modified to incorporate the NSC. The additions will include modifications to the train control and SCADA system, the voice communications system, the PABX, the video management system, the COTS software package, the VMS/PA system and the digital wall manager software. Additional software modifications include database configurations to modify the displays, new code system interfaces, fan sequences must be programmed, Source code modifications are not necessary.

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- 12.6. The OCS/Traction power portion of this project consists of a new traction power substation and associated utility feed, station power supply, a new circuit breaker house at Allegheny Station, catenary support structures, catenary wiring, new feeders, rail return circuits and negative return cables.
 - 12.7. Fire and life safety elements included in this contract are emergency ventilation made up of jet fans, dampers, tunnel ventilation fans, motor control centers, EM9 and EM10. Sump pumps, tunnel lighting and stand pipes are also included.
 - 12.8. Locating systems elements will be difficult. Space constraints in the tunnels, aerial structures and stations exist.
 - 12.9. Contract interfaces are important. They include; cable and conduit routing and openings, station power lay down areas and temporary facility turnover, communication device locations and conduits, catenary foundations in the open boat and aerial line sections, tunnel and station availability dates, mechanical rooms and Authority Operations/ PITT Tower and OCC. Close coordination with the Authority, other NSC contracts and third parties will be required. Coordination will be required with Heinz Field and PNC Park events, NSC-009 lay down and work areas, utility companies, the City of Pittsburgh, Authority Operations, existing gateway station demolition as well as other Authority contracts.
13. **Vandling: QUESTIONS AND ANSWERS:** If you wish to submit questions in writing today there is a form attached to your agenda. Please give the form to Toni Matessa. Please note that none of the discussions of the Questions raised today shall be construed as modifying, in any manner, the Bid Documents. The Bid Documents may only be changed through the use of explicitly identified changes to the Bid Documents, as such changes will be explicitly identified in any Addenda that may be issued by Port Authority.
- See Attachment C for questions and answers.
14. **Vandling: Closing Procurement Comments:**
- 14.1. A form for the purchase of reference documents was made available to the contractors after the meeting at the sign-in table.
 - 14.2. Contractor questions are due at least ten (10) days prior to the bid.
 - 14.3. CD's of the Specs were available at the sign-in table.
 - 14.4. Complete sets of the bid documents are available for purchase on the third floor of the PAAC's office.
15. **Breisinger: Site Tour Overview:** Provided an overview of the site tours;
- 15.1. After this meeting we will take a 15 minute break and the site tour will begin from here. I will conduct the tour. The Intent of this site tour is to provide you with an opportunity to see general conditions that may affect your implementation of the Work. Questions that you may have during the site tour should be put in writing and submitted to Port Authority for response. No conversations which occur during the Site Tour should be

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construed or interpreted as modifying the Bid Documents. Two site tours are scheduled for today and an early morning tour scheduled for 07-16-08.

- 15.1.1. Pitt Tower – 10:45 AM to 12:00 PM
 - 15.1.2. OCC-SHV – 12:45 PM to 4:00 PM
 - 15.1.3. Gateway Loop – 1:30 AM to 4:00 AM

Equipment required for the site tour tonight includes hard hats, safety vests, and flashlights.

16. Vending: Significant dates/durations:

- 16.1. Bid due date August 27, 2008
16.2. NSC-009 Contract Duration 32.5 months
16.3. ROD date June 30, 2011

Bids must be received by August 27th, 2008:
Port Authority of Allegheny County
Purchasing and Materials Management Department
345 Sixth Avenue, 3rd Floor
Pittsburgh, PA 15222-2527
Bids will be opened and read immediately thereafter.
THANK YOU FOR ATTENDING

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ATTACHMENT A
PRE-BID CONFERENCE AGENDA

Meeting Minutes
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PORT AUTHORITY OF ALLEGHENY COUNTY
Pre-Bid Conference Agenda

Contract No. NSC-009, NSC TRAIN SYSTEMS (SYSTEM WIDE)

DATE: July 15, 2008 TIME: 9:00 a.m.

SEQUENCE:

Port Authority

- A. Introductions
- B. Review Proposal Forms
- C. Telephone Contacts for Bidder's Questions:
Disadvantaged Business Enterprise Questions:
Edward Greene - Port Authority (412) 566-6267

Procedural Questions Regarding Bidding:

Tori Matosca - Port Authority (412) 566-5148

Questions Relating to Schedule of Activities and Technical Questions:

Must be in writing (please use forms furnished) and must be submitted by mail or facsimile to:

Port Authority of Allegheny County
345 Sixth Avenue, 3rd Floor
Pittsburgh, PA 15222-2527
Attn: Ms. Tori Matosca
Fax: (412) 566-5259

- D. DBE
- E. Insurance
- F. Intro/Overview of Project
- G. Overview of Contract
- H. Questions and Answers (in writing - use forms furnished)
- I. Info on SiteTour
- J. Wrap Up Meeting
- L. Conduct Site Tour

**Meeting Minutes
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**ATTACHMENT B
LIST OF ATTENDEES – PRE BID MEETING**

PUBLIC UTILITY OF ALLEGHENY COUNTY
PREFILED CONFERENCE

Conf. No.	Conf. Name	Conf. System	System No.	Date	Page
None	None	NSC Trans System	None	07/15/03	0
John Fisher	MASS ELECTRIC	168 Progress Dr. West Mifflin PA 15125	PO BOX 98100 PNX PA 15237	Phone: 412-461-5559 Fax: E-mail: JFisher@masselectric.com	
Don Stark	MURKILL CORD	4839 Campbell's Run Rd. Pittsburgh, PA 15205	4839 Campbell's Run Rd. Pittsburgh, PA 15205	Phone: 412-963-0055 Fax: 412-789-1169 E-mail: don.stark@mositecom	
David Aul	Mosites	503 Market St. Pittsburgh PA 15222	503 Market St. Pittsburgh PA 15222	Phone: 412-246-0325 Fax: E-mail: David.Aul@mositecom	
Pat Zerk	NSC			Phone: 412-589-5336 Fax: E-mail:	
Joe Bressler	JET TEC				

**PUBLIC AUTHORITY OF ALLEGHENY COUNTY
PRIVATE BID CONFERENCE**

Contract Number	Contract Name	Company	Mailing Address	Phone/Fax Numbers
000	Contract Name NSC Train System (System wide)			Date 07/15/08
Dave Harmon	GP Spawler	4391 Chambers Hill Rd Huntingburg Pa 17441		Phone: 717-703-3808 Fax: 3807 E-mail: dave.laramade@prestigeplastics.com
Rick Gordon	Miss. Electric Construction Co.	8619 Ritterhouse Circle Cheswick Pa 152270		Phone: 201-832-0854 Fax: E-mail: rick.gordon@flicanet.com
Phil Brackenridge	Howden Buffalo	330 So. Broadway New York NY 10011 446 3		Phone: 330-368-7007 Fax: E-mail: PBrackenridge@howdenbuffalo.com
Mike Heber	Thielen	3 Genderay Center		Phone: 412-147-6252 Fax: E-mail: MikeHeber@hotmail.com
Terry Jackson	Chapman's	331 South Main St Wheatfield Pa		Phone: 724-232-2245 Fax: E-mail: Terry.jackson@chapmans.com

**PONTIAC COUNTY OR ALLEGHENY COUNTY
PRE-HELD CONFERENCE**

Contract Name: NSC Train Systems (SOMA) Date: 01-15-08
Contract No.: NSC-000

Supplier Name	Mailing Address	Phone#	Fax#	E-mail
David A. West - Kroy Electric Inc.	105 Montezuma Dr. Alma, MI 48601	724-772-1820	724-772-2227	DWest@Kroy Electric.com
Michael L. Pentrack - Siemens Transportation Systems	100 Southpoint Blvd Suite 101 Canonsburg, PA 15317	412-327-9851	724-743-5917	mlpentrack@ siemens.com
Andy Hollasch - GE Power Generation	404 Chambers Blvd #1 Hickory, NC 28461	704-703-3307	704-703-3307	Andy.Hollasch@gepower.com
Robert Williams - Mass Electric Constr. Co.	2440 Fern Ridge Dr. Conyers, GA 30013	770-662-4480		RW.M.Williams@MassElec.co
Jeff Smith - Houston Bustech Inc.	838 S. Boundary New Philadelphia, OH 44663		330-308-7057	JeffSmith@houstonbustech.com

PUBLIC AUTHORITY OF ALLEGHENY COUNTY
PRE-BID CONFERENCE

Contact No.	Contact Name	Bidder Address	Phone/Fax Number	Date
Contract No. NSC-009	NSC Train System Solutions	4 Gateway Center Pittsburgh, PA	Phone 412-314-3155 Fax: E-mail: PFED.MS@NSC.PROMPT.COM	07/15/08
FED M. YANG	PAAC	PAAC	Phone: Fax: E-mail:	
JESSE MARINEL	PAAC	PAAC	Phone: Fax: E-mail:	
Dennis Kelly	J. Duncle Kelly Suite 108 Pgh Pa 15211	3636 Washington Rd	Phone: Fax: E-mail:	
Bob Frey	G. W. Peoples Eighth - Four, PA 15330	1024 Ft E 519	Phone: 724 223 7807 Fax: 724 223 6941 E-mail: bfrey@peoples.com	

**PORT AUTHORITY OF ALLEGHENY COUNTY
REBID CONFERENCE**

Contact Name	Company	Address	Phone/Fax Number	E-mail
Connie Nichols	Transwest Systemwide	3 Cottontail Condos 15th Floor Pittsburgh, PA 15222	Phone 412-721-5350 Fax: E-mail	DEB Connie.Nichols@transwest.com
Tom Dolberg	Tri-Gold	4074 Butler St. Pitt, PA 15201	Phone 412-687-6820 Fax: E-mail	Brian.Williams@TriGold.com
Jon Oldfield	Stantec	3505 Butler St Pittsburgh, PA 15201	Phone 412-687-6820 Fax: E-mail	Jon.Oldfield@Stantec.com
Dwight Cheatum	TRI600	36 Emergency Center 15th Floor Pittsburgh, PA	Phone 412-997-6259 Fax: E-mail	dwcheatum@tri600.com
Craig Fournier	PAP		Phone: Fax: E-mail	

**POLYGRAPHY OF ALLEGED CONSPIRACY
PRE-BID CONFERENCE**

Contract No.: NSC-001	Contact Name: ASC Trans Systems (System 300)	Date: 07/15/08	Page: 0
Business Name:	Company Address:	Phone/Fax/E-mail:	
Bill Goodwork	Vawalt 425 Commerce Drivt Weston, PA 19050	Phone: 610-626-1200 Fax: 610-626-3400 Email: 6goodwork@vawalt.com	
Naomi Nason	PAAC 345 6½ Ave Pitts, PA	Phone: 412-281-6367 Fax: Email:	
Scott Winters	Wellpoint Power Corp 40th & Butler Sts Pgh, PA 15201	Phone: 412-681-0103 Fax: Email:	
CARIE WEBBER	STANTEC Pgh, PA 15201	Phone: 412-687-6820 Fax: 412-687-6821 Email: CARIWEBBER@STANTEC.COM	
Bonnie	HDR 507 N Ave, 15th Fl NY, NY 10013	Phone: 212-545-5431 Fax: Email: Robert.mchugh@HDR.com	

POINT AUTHORITY OF ALLEGHENY COUNTY
PRE-BID CONFERENCE

Contact Name: NSC 109	Page: 00
Date: 07/15/08	

Representative	Company	Mailing Address	Phone/Fax Number
Andrea Kukushkin	Steantec	3505 Butler St. Pittsburgh, PA 15201	Phone: 412-687-6820 Fax: 412-687-6821 E-mail: andrea.kukushkin@steantec.com
Toni Mullaney	PAAC	345 Sixth Ave.	Phone: 412-566-5359 Fax: 412-566-5359 E-mail: tonim@paac.org
Mary Mullaney		345 Sixth Ave.	Phone: 412-566-5295 Fax: 412-566-5295 E-mail:
Cathy Fure	PAAC	345 Sixth Ave	Phone: 212-545-5437 Fax:
Gretta Rees	PAAC	500 7th Ave N.Y.C.	E-mail:

PORT AUTHORITY OF ALLEGHENY COUNTY
FREE BID CONFERENCE

Contact Name	Address	Phone	Fax	E-mail
John P. Nesci	3220 Smallman St. Pgh PA 15201	412-281-3001	412-688-2556	NJVEREKA@ZAWACKINC.COM
Ken Bozzolo	1006 Technology Dr. PGH PA 15237	412-688-21784	412-688-2556	KBOZZOLA@ZAWACK.COM
Loren Gold	Rox Box 384776 Pittsburgh PA 15236	335-387-1211	335-387-1053	L.GOLD@PA.RI.WI.ER.COM
Bob Wetzell	4951 Chambers Hall Rd. Mifflinburg PA 17847	724-344-3076	—	—
Rick Vales	100 Mifflin Rd. Pgh PA 15207	412-280-5812	412-531-4489	RVAKES@PERSONAL.COM

**PORT AUTHORITY OF ALLEGHENY COUNTY
FREE BID CONFERENCE**

Contact Name: Lisa Fuller

Date: 07/15/08

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Business Name	Company	Mailing Address	Phone/Fax Numbers
Robert BREISIN & Son	Port Authority	3455 Station Ave Pitt PA 15222	Phone: 412-566-5372 Fax: 412-566-5356 E-mail: Rbreisin@PortAuthority.org
Mike Lyle	Gannett Fleming	610 Rogers Ave Aurora PA	Phone: 610 301-4214 Fax: E-mail:
Rebecca Beaman	Belvedere Associates, Esq., P.E.	114 Astor Ct McMurray PA 15317	Phone: 724 941 1532 Fax: 3934 E-mail: rbeaman@belvedere.com
Richard Heller	Van Hattum Construction	425 Commerce Drive Landon PA 19050	Phone: 610-626-1200 Fax: 610-626-3400 E-mail: Rheller@VHattum.com
Liza Fuller	PAAC	345 Station Ave Pittsburgh PA 15222	Phone: 412 566 5371 Fax: E-mail:

PUBLIC AUTHORITY OF ALLEGHENY COUNTY
FREE BID CONFERENCE

Contact No.	Contact Name	Company	Mailing Address	Phone#	Fax#	E-mail	Date of 07/15/08
NSC 009	Karen Johnson	ATLAS Railroad	101 5th Street E. Shady Fork Pa. 15332	724 228 4500 724 228 3123		125 ATLAS@aol.com	
	Lee Williams	Baltow Brothers Rail	100 Gilliam Dr Elkton MD 21801 15332	410 552-5289 410 552-5499	410 552-2348 410 552-2488	l201shans@libri.com	
	Gary Meinen	Marsh USA	6 MPG Place, Suite 400 Pgh, PA 15222-5406			gary.mainen@marsh.org	
	David Luram	Railroad Constructors Inc	703 Main St Ave Dunkirk, NJ 08064	423-9385 866-423-9386		dluram@raclns.com	
	Michael Hart	Lk Constock	5300 Oakdale Parkway Norwalk Ct. 30093	740-566-7039 michael@outlook.com			

**PORT AUTHORITY OF ALLEGHENY COUNTY
BID CONFERENCE**

Contact Name	Phone Number	Date
Contractor NSC 009	NSC Trans System, Stephen White	07/15/08
Representative	Company	Phone/Fax Number
Greg Westeller	Delta IP East	Phone: 446-992-2397 Fax: 446-992-1311 E-mail: gwestelle@delta.com
Ron Clay	Integrity Wire	Phone: 304-525-9300 Fax: 304-525-0400 E-mail: ron@integritywire.com
Don McMillion	HKC Inc	Phone: 724-327-0347 Fax: 724-327-0369 E-mail: RMcMillion@hkcinc.com
Harold Barker	GFI Associates	Phone: 424-624-1491 Fax: 424-266-9109 E-mail: hbarker@gmail.com
Kevin Smith	BALL works	Phone: 516-965-7258 Fax: E-mail: KSmith@BALLworks.com

PUBLIC AUTHORITY OF ALLEGHENY COUNTY
FREE BID CONFERENCE

Contact No./NSC#	Contact Name	Company	Address	Phone/Fax Numbers	Date: 07/15/06
	Chas Jones	GF	C D Jones & Gravett.com	Phone: 610 304 4214 Fax: 610 650 8108 E-mail:	
	Ker Lockton	PAAC	Kloss Leaton & Postan Holley, Inc.	Phone: 412 - 477 - 2059 Fax: E-mail:	
	Dave S. Moran	CFI	dak.sull @earthlink.net	Phone: 724 - 815 - 9461 Fax: 724 - 262 - 9109 E-mail:	
	Asstek G. Dewart	CFI	205 E. 4th St. Pittsburgh PA 15202	Phone: 724 - 624 - 1191 Fax: 724 - 266 - 9109 E-mail: ANG.Dewart @hotmag.com	
	Dave Faines	Dawn Harris	4 Gateway Center 20th Floor Pgh PA 15222	Phone: Fax: E-mail: david.faines@yahoohomes.com	

PUBLIC AUTHORITY OF ALLEGHENY COUNTY
TRI-AREA CONFERENCE

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Contact Name: NSC/Region 1 System Admin Date: 0-15-08

Company	Mailing Address	Phone/Fax Numbers	E-mail
Randy McNeil Powell	8967 PLEASANTWOOD DR NORTH CANTON, OH 44720	330 966 1750 N8 Fax: 330 966 1787 E-mail: RANDY.MCNEIL@POWERED.COM	Phone: Fax: E-mail:
John Mirek Constructors	P.O. Box 9910 PITTSBURGH, PA 15222	412-747-5400 Fax: 412-747-5400 E-mail: JMOIRAY@TRINICOLLION.COM	Phone: Fax: E-mail:
Ralph L. Galt & Galt, Rayles	1224 Route 51A South Rd. "Kenney Mills" Egmont Ferry PA 15330	724-288-2830 E-mail: RALPH.L.GALT@GALT.COM	Phone: Fax: E-mail:
			Phone: Fax: E-mail:
			Phone: Fax: E-mail:

PUBLIC VOTING TERRITORY OF ALLEGHENY COUNTY
RE-ELECTED ANTHONY J. FRANCIS

**Meeting Minutes
NSC-009 Train Systems (Systemwide)
Pre-Bid Meeting and Site Tour
July 15, 2008, 9:00 AM**

**ATTACHMENT C
QUESTIONS & ANSWERS**

Meeting Minutes
NSC-009 Train Systems (Systemwide)
Pre-Bid Meeting and Site Tour
July 15, 2008, 9:00 AM

Questions and Answers

1. Question: Signal System: Union Switch is shown as the supplier of the existing signal system. The NSC-009 Contract requires new work to be compatible with the existing system. The Contract Documents do not provide details of the existing system. Can you provide details of the existing system?

Answer: Yes, it will be provided

2. Question: Radio System: Has a radio coverage survey been done?

Answer: Yes, the radio survey was done.

3. Question: How much is design build? For example, Spec Section 13579 in the pay items has several pay items for conceptual design review requirements.

Answer: Section 13579 is the Signal System and the Contract includes a performance spec on the signal system. Final design of the signal systems is the Contractor's responsibility based on what signal equipment he intends to use. The catenary system is a complete design. Contractor design is not required. Substation and fire life safety systems are performance specification and contractor design is required.

4. Question: Telephone systems who provides the phone enclosures:

Answer: Contractor provides the phone enclosures.

5. Question: How many telephone sets are in the existing system?

Answer: A drawing in the contract documents indicates the number of phones to be provided and a list of conduit runs for the phones.

6. Question: The Contract requires that the "trip stops" must be compatible with the existing system, but the specifications and drawings do not spell out what trip stops are used in the existing system.

Answer: Please submit this question in writing and an answer will be provided.

7. Question: Norm Purkey was asked to provide an overview of his company and DBE status.

Meeting Minutes
NSC-009 Train Systems (Systemwide)
Pre-Bid Meeting and Site Tour
July 15, 2008, 9:00 AM

Answer: Zavala, Inc., Certified MBE Contractor Completed utility work on the NSC-003/006 Contract.

8. Question: Are contractors required to provide special insurance for track work?

Answer: All special insurance requirements are described in the contract documents.

9. Question: The final design calls for maximum sound limits on the ventilation fans, but the specifications do not spell out the requirements for the loss of sound.

Answer: Please submit this question in writing.

**Meeting Minutes
NSC-009 Train Systems (Systemwide)
Pre-Bid Meeting and Site Tour
July 15, 2008, 9:00 AM**

**ATTACHMENT D
MORNING SITE TOUR ATTENDEES – PITT TOWER**

PORT AUTHORITY OF ALLEGHENY COUNTY

SITE VISIT - PITT TOWER

SUBJECT: NORTH SHORE CONNECTOR - NSC TRAIN SYSTEMS (SYSTEM WIDE)

CONTRACT NO.: NSC-009

DATE: TUESDAY, JULY 15, 2008 - AM TOUR (late morning)

ATTENDANCE SHEET

Representative	Company	Mailing Address	Phone/Fax
Mark Flory	Port Authority	345 State Ave Pittsburgh PA 15222	412-566-5372
Mike Smith	RAILWORKS LLC	2317 University Ave.	412-965-7258
Andrea Kirschner	Stantec	3500 Butler St., Pittsburgh PA 15222	412-687-6821
Carrie Wester	STANTEC	3500 Butler St. Pittsburgh PA 15222	412-687-6821
Darrell Hartman	TRISAC	Garrison One Pittsburgh PA 15201	412-457-8259
Chris McCollum	TRISAC	12375 Penn Ave Pittsburgh PA 15223	412-376-7116
John G. Scott	Baltimore Balti-T	12375 Penn Ave Pittsburgh PA 15223	412-376-7116
			7260
Craig Morris	GANNT Film Inc.	1010 William Penn Place Pittsburgh PA 15203	412-655-0773
Mike Heber	TRISAC	2000 University Park Pittsburgh PA 15261	412-497-6657
Bullockworth	WANT	40 Commerce Drive Pittsburgh PA 15222	412-686-1206
David A. Maseres	NSC	4839 Commerce Run Rd. Pittsburgh PA 15222	412-965-7258

PORT AUTHORITY OF ALLEGHENY COUNTY

SITE VISIT - PITTSBURGH TOWER

SUBJECT: NORTH SHORE CONNECTOR - NSC TRAIN SYSTEMS (SYSTEM WIDE)

CONTRACT NO: NSC-009

DATE: TUESDAY, JULY 15, 2008 - AM TOUR (late morning)

ATTENDANCE SHEET

Representative	Company	Mailing Address	Phone/Fax
Ronald Heile	Vincent Eber Construction	4125 Commonwealth Tubular Products 1000 Braddock Rd.	724-610-3100-1200 724-626-3100
Bob Rennick Jr.	Westmoreland Project	1000 Braddock Rd. Pittsburgh, PA 15222	(42) 081-0103 724-621-0980
Bry McPherson	UDR	400 Braddock Rd. New York, NY 10013	712-345-5343
Don Clegg	Schenk & Associates	503 Braddock St. Pittsburgh, PA 15222	324-595-9700 724-595-9700
John Fisher	MASS Transit	1055 University Dr. Seattle, WA 98103	425-467-8559
Bob Williams	n/a	3416 Federal Building & Post Office Columbus, OH 43215	716-460-3480
Rich Connor	n/a	8619 Riverhouse Circle Charlotte, NC 28270	201-832-8854
Michael Penkack	Siemens Transportation	1010 Southpointe Pkwy Suite 100 Pittsburgh, PA 15217	412-322-9851
Loren Smith	Co. 1 Inc.	Pittsburgh, PA 15217	305-537-1211
Frank Key	General Research	604 Adams Avenue Pittsburgh, PA	816-650-4730
Norm Dueker	Zimmer, Inc.	3220 Smallman St.	412-281-3801

Meeting Minutes
NSC-009 Train Systems (Systemwide)
Pre-Bid Meeting and Site Tour
July 15, 2008, 9:00 AM

ATTACHMENT E

**AFTERNOON SITE TOUR ATTENDEES – SOUTH HILLS
VILLAGE OPERATIONS CONTROL CENTER**

PORT AUTHORITY OF ALLEGHENY COUNTY

SITE VISIT - SOUTH HILLS VILLAGE OPERATIONS CONTROL CENTER

SUBJECT:

NORTH SHORE CONNECTOR - NSC TRAIN SYSTEMS (SYSTEM WIDE)

CONTRACT NO.

NSC-008

DATE:

TUESDAY, JULY 15, 2008 - PM TOUR (afternoon)

ATTENDANCE SHEET

Representative	Company	Mailing Address	Phone / Fax
Adam Pursey	ZIMMER, INC		
Chris Estelle	PAK KAR KEE		
Rich Gordon	Mass Electric Constr		
Bob Williams	Mass Elect. Const		
Dave Holmes	Domin Harris		
Steve Lipp	GIGANTEK TECH INC		
Bill Gochowik	VIAWALT		
Ronald Heller			
Robin Clay	Longevity Inc.		
Catherine Webster	Stafftec	35505	
Andrea Lukuskin			

PORT AUTHORITY OF ALLEGHENY COUNTY

SITE VISIT - SOUTH HILLS VILLAGE OPERATIONS CONTROL CENTER

SUBJECT: NORTH SHORE CONNECTOR - NSC TRAIN SYSTEMS (SYSTEM WIDE)

CONTRACT NO.: NSC-009

DATE: TUESDAY, JULY 15, 2008 - PM TOUR (afternoon)

ATTENDANCE SHEET

Representative	Company	Mailing Address	Phone/Fax
Robert Shryock	Port Authority		
Mike McPhee	PAC		
Bob Pennington	WELLSFED BANK		
John Fisher	TRANS ELECTRIC		
Kevin Smith	RAILWORKS INC		
Bob McPherson	UPK		
Tony Mazzoni	PLA		
Chris Jones	6F		
John G. Scott	Bolton & Ford Trucks		
Charles Flores	H.D.A.		
Michael Pintalk	Signons		

Meeting Minutes
NSC-009 Train Systems (Systemwide)
Pre-Bid Meeting and Site Tour
July 15, 2008, 9:00 AM

ATTACHMENT F

**MORNING SITE TOUR ATTENDEES – GATEWAY LOOP AND
WOOD CROSSOVER**

PORT AUTHORITY OF ALLEGHENY COUNTY

SITE VISIT - GATEWAY AND WOOD STREET STATIONS AND GATEWAY TUNNEL LOOP

SUBJECT: NORTH SHORE CONNECTOR- NSC TRAIN SYSTEMS (SYSTEM WIDE)

CONTRACT NO. NSC-009

DATE: WEDNESDAY, JULY 16, 2008 - AM TOUR (right time/early morning)

ATTENDANCE SHEET

Representative	Company	Mailing Address	Phone/FAX
Loren Galt	Rosinworks	P.O. Box 260776 Miami, FL 33126	305-576-1211 or 887-1053
GARTH RICE	TRIGARD	500 7 th Ave. New York	(212) 545-5637.
Mike Hart	LLC Contractors	3300 Old Bridge Rd., Bronx, NY	716-806-7004
Ashley Kafkaschuk	Stantec	3505 Butler St. Pgh PA 15217	412-687-6820
Scott Whittlesey	Westinghouse Corp	4000 Fisher St. Pitt, PA 15222	412-681-0181
Norm Bernstein	Appetec		
Dave Haines	Diamond Harris		
Craig Jones	GFTRS	403 Commerce Drive	
Bill Goodover Jr.	VANACT	4030 S. Woodlawn Rd. PA 19050	610-626-1200 or 3800
John G. Seck	Bulfan Brothers Inc.	12276 San Jose Blvd. Suite 3000 Tampa, FL 33623	813-373-7260 Fax 904-373-7260 Fax
Eric Macco	Port Authority		

PORT AUTHORITY OF ALLEGHENY COUNTY

SITE VISIT - GATEWAY AND WOOD STREET STATIONS AND GATEWAY TUNNEL LOOP

SUBJECT: NORTH SHORE CONNECTOR - NSC TRAIN SYSTEMS (SYSTEM WIDE)

CONTRACT NO.: NSC-009

DATE: WEDNESDAY, JULY 16, 2008 - AM TOUR (night time/early morning)

ATTENDANCE SHEET:

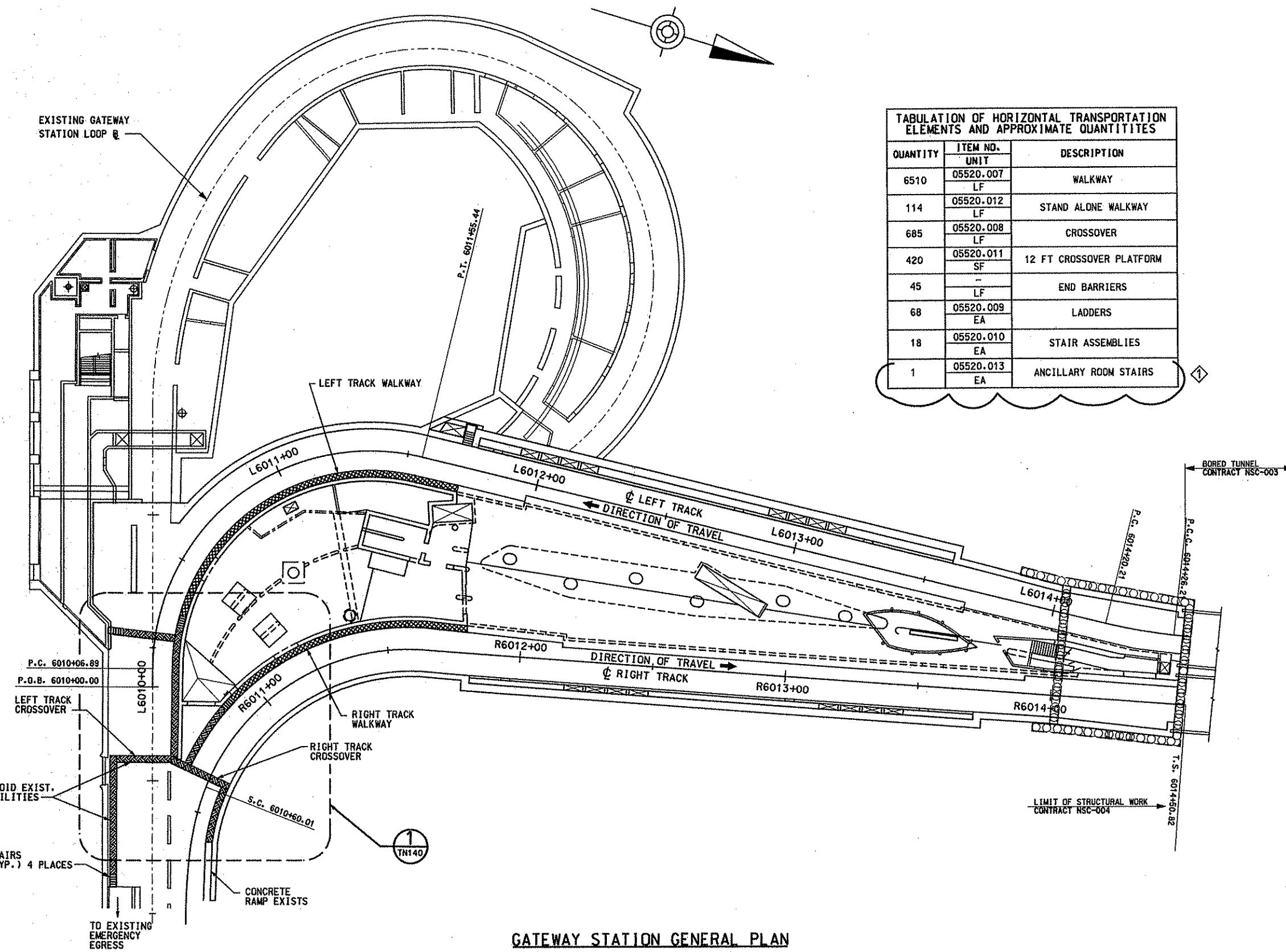
Representative	Company	Mailing Address	Phone/Fax
Robert J. Frey	Pittsburgh Port Authority	345 Gateway Pl Pittsburg, PA 15222	412-576-5372
Robert Wollens	Mass Transit	3420 Federal Ridge St Pittsburgh, PA 15205	412-576-5366
Frank Lott	Gatwick Transair	6100 Roberts Ave. Robinson Pa	412-650-7730
Lee Schneiders	Boston Beatty Rail	1024 Braddock Rd, Pittsburgh, PA 15222	412-232-2480 / 2432
Bob J. Golub	C. W. Peper	519 5th Ave Pittsburgh, PA 15222	412-232-2480 / 2432
Bee Frey	G.W. Peper	1024 Braddock Rd, Pittsburgh, PA 15222	412-232-2480 / 2432
Richard Gordon	Mississippic Concrete Co.	8619 Renaissance Circle Pittsburgh, PA 15278	412-223-0961
Georg Westerheide	Deltaplano Const.	2648 West Prospekt Austria, Austria 4604	412-223-0854
BBB REINFORCED	WELLINGTON TOWER	40700 Burleigh St. Edmonton, AB T5J 1C1	412-990-2997
WADSWORTH FARMING	Statute	3535 Broken St Pittsburgh, PA 15201	412-681-0103
Row McNaull	H&K Inc	5225 Beechwood Rd Munehouse, PA 15222	412-687-6820
Bob Michelson	HDK	500 Franklin Ave Pittsburgh, PA 15219	412-345-5431

GENERAL NOTES:

1. TN DRAWINGS TO BE READ IN CONJUNCTION WITH CONTRACT DRAWINGS FOR CAST IN PLACE TUNNEL SECTIONS FOR CONTRACTS 003, 004, AND 006.
2. ALL STEEL RELATED TO WALKWAYS AND CROSSOVERS SHALL BE AASHTO M270 (ASTM A709, GR36) HOT DIPPED GALVANIZED.
3. ALL STEEL NUTS, BOLTS & SCREWS RELATED TO WALKWAYS AND CROSSOVERS TO BE SPUN GALVANIZED EXCEPT WHERE NOTED. ALL WASHERS TO BE SPLIT WASHERS IN HARDENED STEEL AND GALVANIZED.
4. THE HEIGHT OF THE WALKWAY IN RELATION TO THE TUNNEL BASE SLAB VARIES WITH SUPERELEVATION.
5. ANCHOR BOLTS TO BE GALVANIZED HILTI HDI DROP-IN ANCHORS OR APPROVED EQUAL.
6. STRUCTURAL BOLTS TO BE TO ASTM A325 WITH MINIMUM TENSILE STRENGTH = 120 KSI.
7. GRATING MANUFACTURER APPROVED NOSING TO BE USED ON GRATING ON STAIRS AND AT THE HEAD OF THE LADDER.
8. SPACING OF LADDERS SHALL BE 100 FEET MAXIMUM.

TABULATION OF HORIZONTAL TRANSPORTATION ELEMENTS AND APPROXIMATE QUANTITIES		
QUANTITY	ITEM NO. UNIT	DESCRIPTION
6510	05520.007 LF	WALKWAY
114	05520.012 LF	STAND ALONE WALKWAY
685	05520.008 LF	CROSSOVER
420	05520.011 SF	12 FT CROSSOVER PLATFORM
45	- LF	END BARRIERS
68	05520.009 EA	LADDERS
18	05520.010 EA	STAIR ASSEMBLIES
1	05520.013 EA	ANCILLARY ROOM STAIRS

LEGEND:

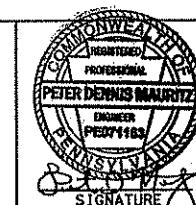


GATEWAY STATION GENERAL PLAN
STA L6010+00 TO STA L6014+00

#FILE#
#DATE#

7/31/08	ADDENDUM 1 - DRAWING MODIFIED	
NO. DATE	DESCRIPTION	
	REVISIONS	

THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.



DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
DRAFTED BY: [Signature]
CHECKED BY: [Signature]
IN CHARGE DPH: [Signature]
DATE APRIL 21, 2008
SCALE: 1'-0"-0"
20' 10' 0' 20'
APPROVED BY: [Signature]
DATE: 7/31/08

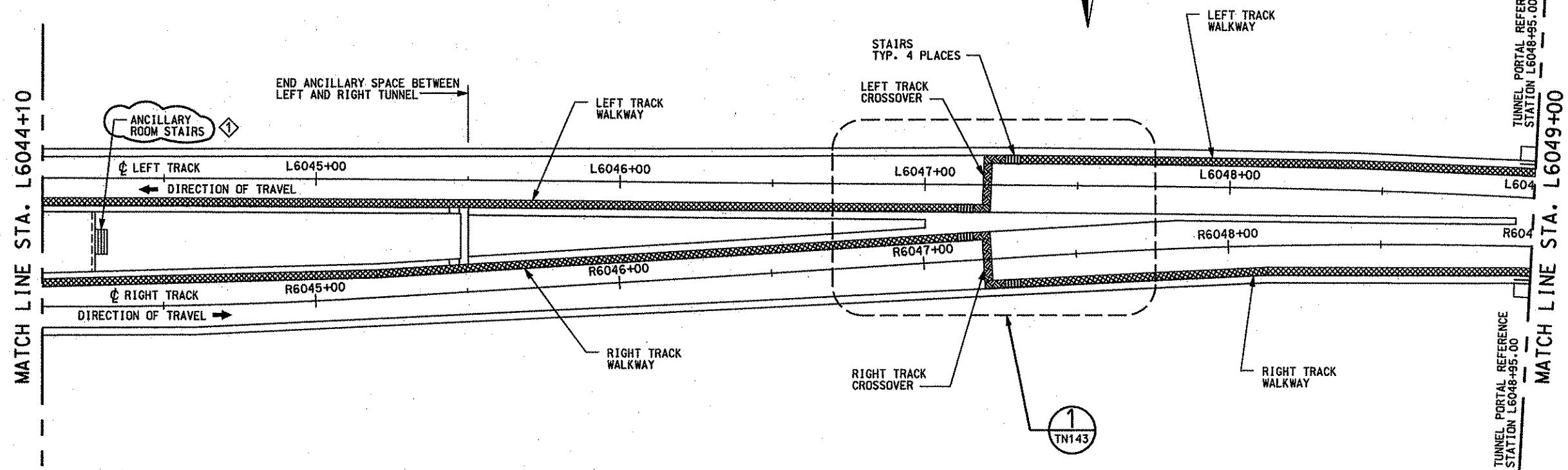
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
PA
NORTH SHORE CONNECTOR
NCS TRAIN SYSTEMS (SYSTEM WIDE)
GATEWAY STATION GENERAL WALKWAY PLAN
STA L6010+00 TO STA L6014+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. TN130
SHT. 54

NOTES:

1. FOR GENERAL NOTES, SEE DRAWING TN130.

LEGEND:

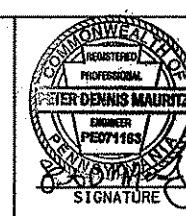
	WALKWAY
	CROSSOVER

**NORTH SIDE STATION GENERAL PLAN**

STA. L6044+10 TO STA. L6049+00

NO.	DATE	DESCRIPTION
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		REVISIONS

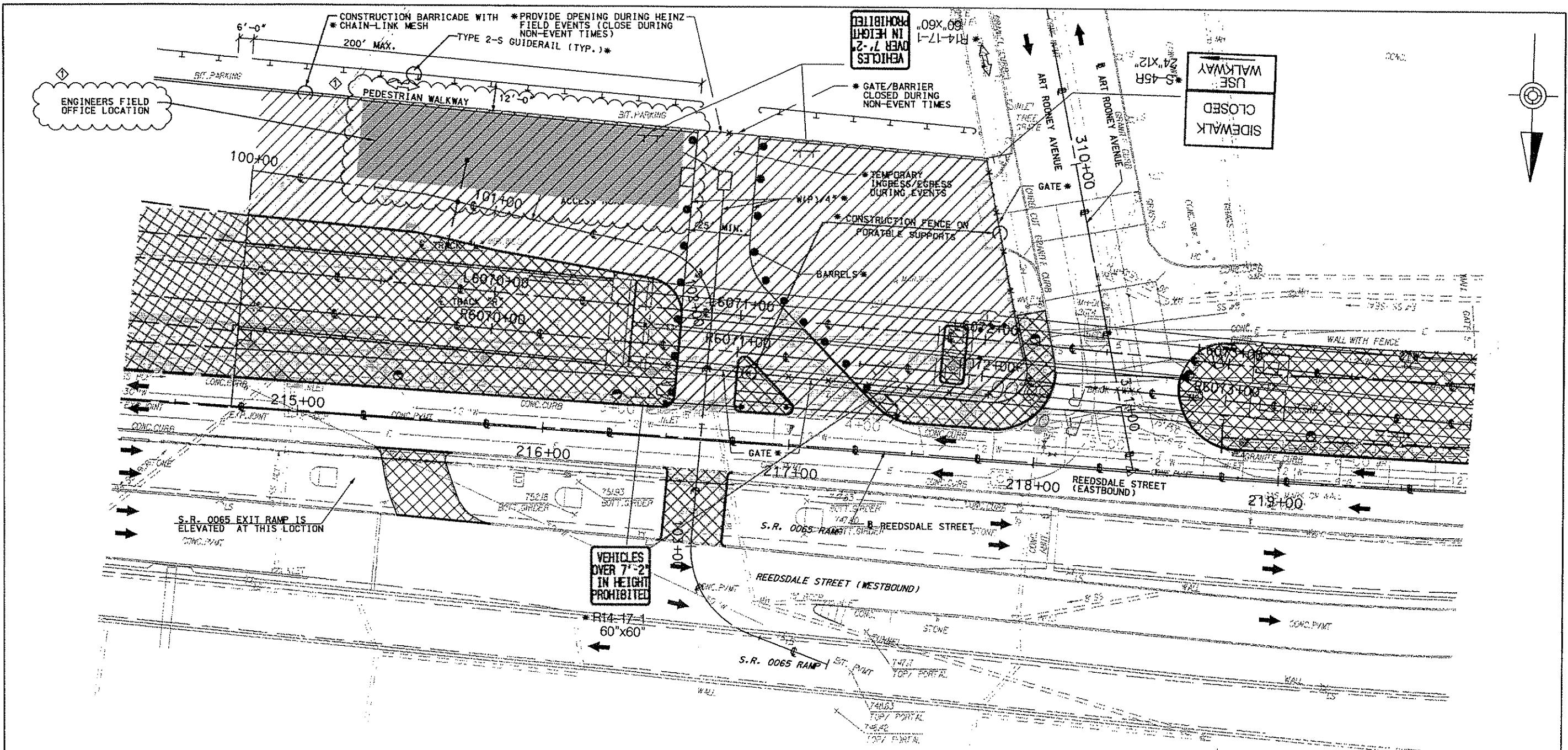
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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Daryl P. Dyer
APPROVED 7/31/08
SIGNATURE

DESIGNED BY RJS
DRAWN BY NPD
CHECKED BY WBT
IN CHARGE DPH
DATE APRIL 21, 2008
SCALE 1'-0" = 20'-0"
20' 10' 0 20'

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH, PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEMS (SYSTEM WIDE)
NORTH SIDE STATION GENERAL WALKWAY PLAN
STA. L6044+10 TO STA. L6049+00
Port Authority
CONTRACT NO. NSC-009
Dwg. No. TN137 Sht. 61



* TEMPORARY FACILITIES TRANSFERRED FROM NSC-007

- LEGEND**
- CONSTRUCTION WORK AREA
 - ADJACENT CONSTRUCTION WORK AREAS
 - TEMPORARY PROTECTIVE FENCE
 - TEMPORARY SIGN, TYPE III BARRICADE
 - CHANNELIZING DEVICE
 - TRAFFIC FLOW
 - W(P)/4" TEMPORARY WHITE LINE (PAINT) /WIDTH

20'15" 10' 5' 0 20'
SCALE

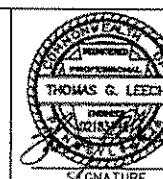
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DESIGNED	SKN	CONTRACT NO.	NSC-009
DRAWN	SKN	DWG. NO.	CV113
CHECKED	KCD	SHT.	92
IN CHARGE	TGL		
DATE	4/21/08		
SCALE	AS SHOWN	Port Authority	



GANNETT FLEMING, INC.
601 Ross Drive
Foster Plaza III
Suite 200
Pittsburgh, PA 15220

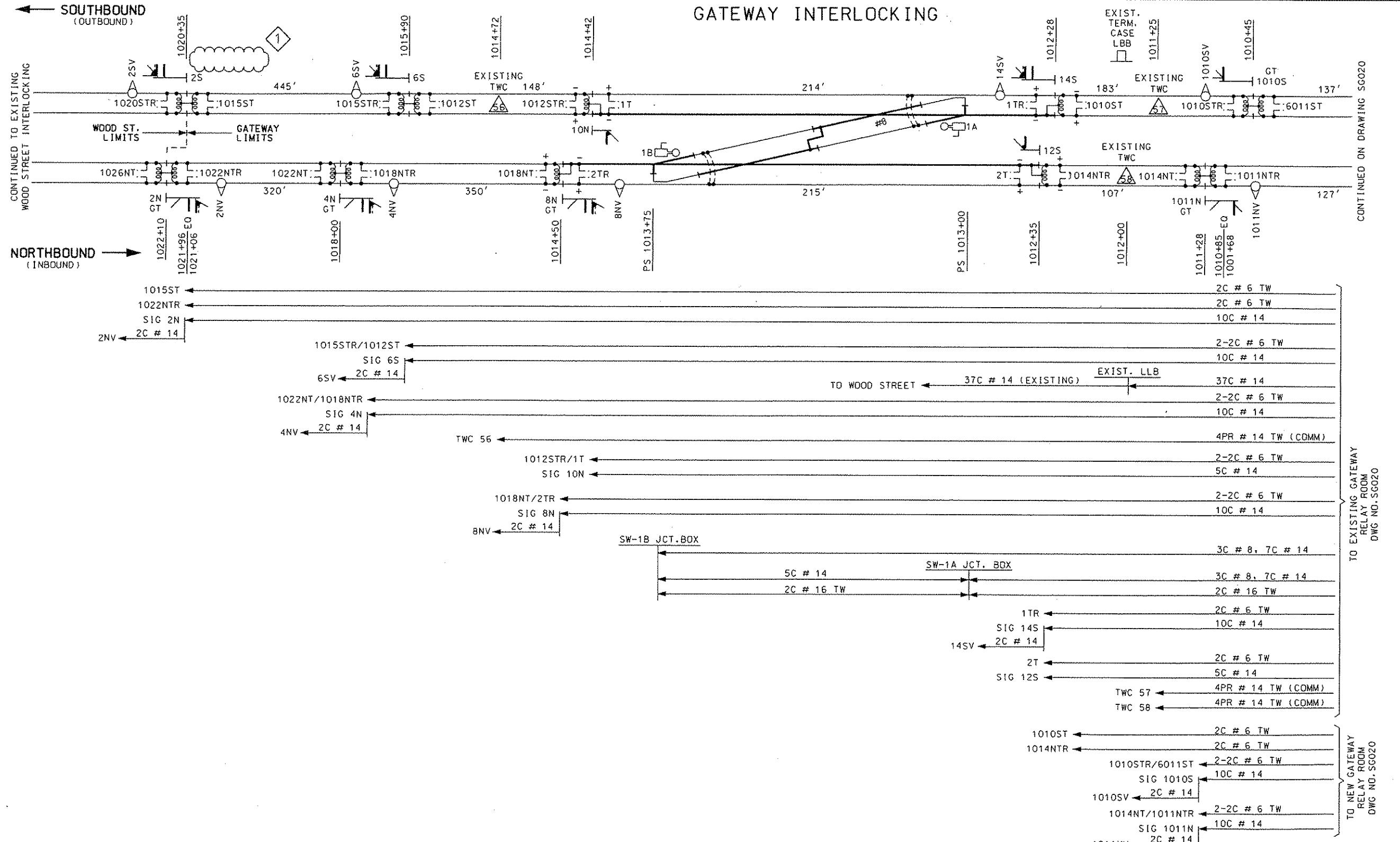
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NO. DATE	DESCRIPTION
	REVISIONS

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THOMAS G. LEECH
Project Manager
4/21/08
APPROVED
DATE 4/21/08
SIGNATURE

GATEWAY INTERLOCKING

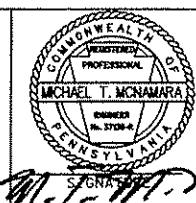


NOTES

1. SIGNAL 2S, TRAIN STOP 2SV, TRACK CIRCUITS 1020STR & 1026NT ARE CONTROLLED AND WIRED TO WOOD STREET. THEY ARE NOT PART OF CONTRACT NSC-009.
 2. CONTRACTOR TO MODIFY SIGNALS 2N, 4N & 8N TO INCLUDE LUNAR WHITE SIGNAL HEAD.



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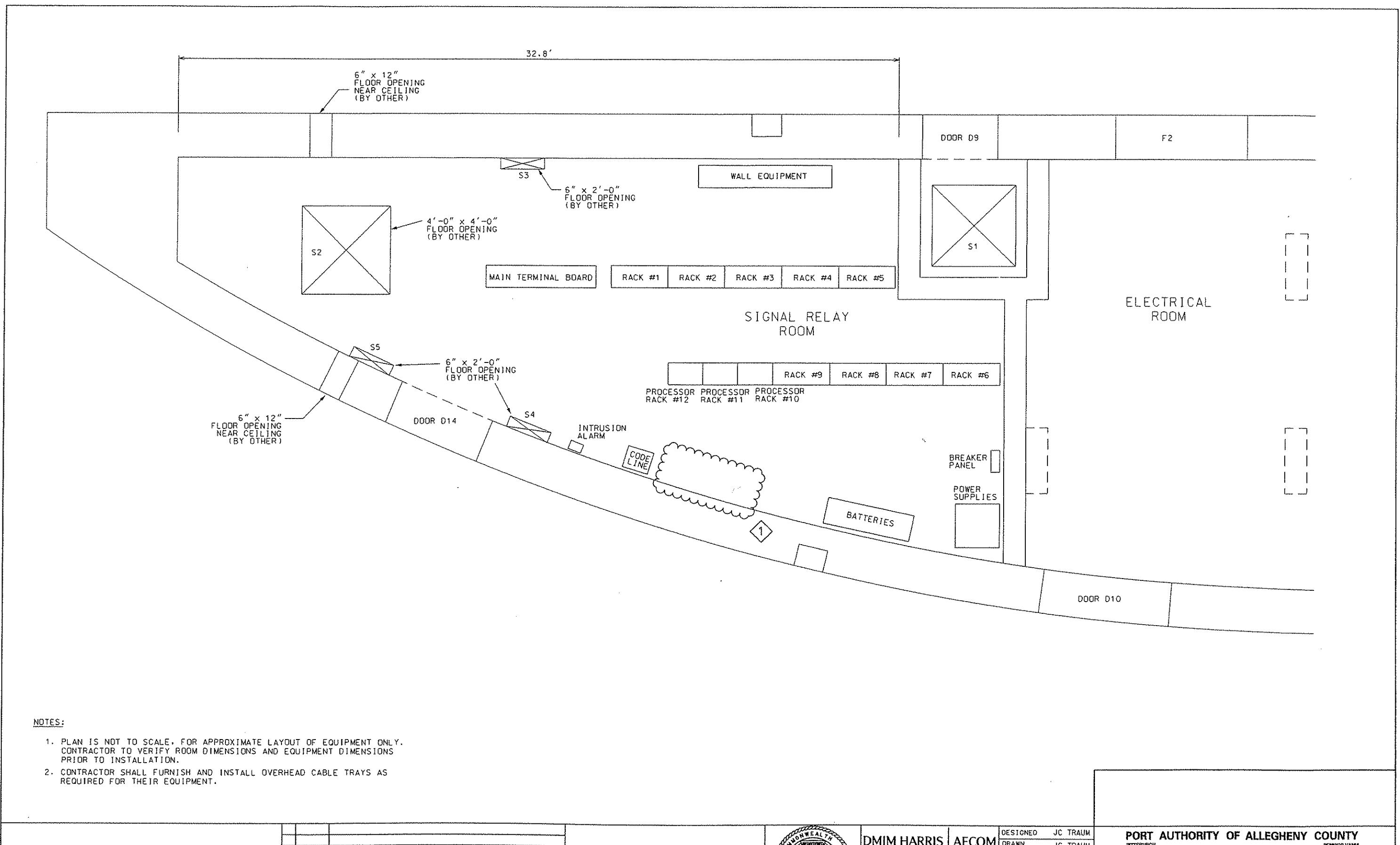
DMJM HARRIS | AECOM

PITTSBURGH

PENNSYLVANIA

**NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
GATEWAY TO ALLEGHENY
CABLE LINE TRACK & SIGNAL CABLE PLAN**

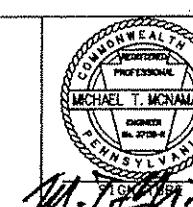
	CONTRACT NO.	NSC-009
	DWG. NO.	SG019



Gannett Fleming
Transit & Rail Systems

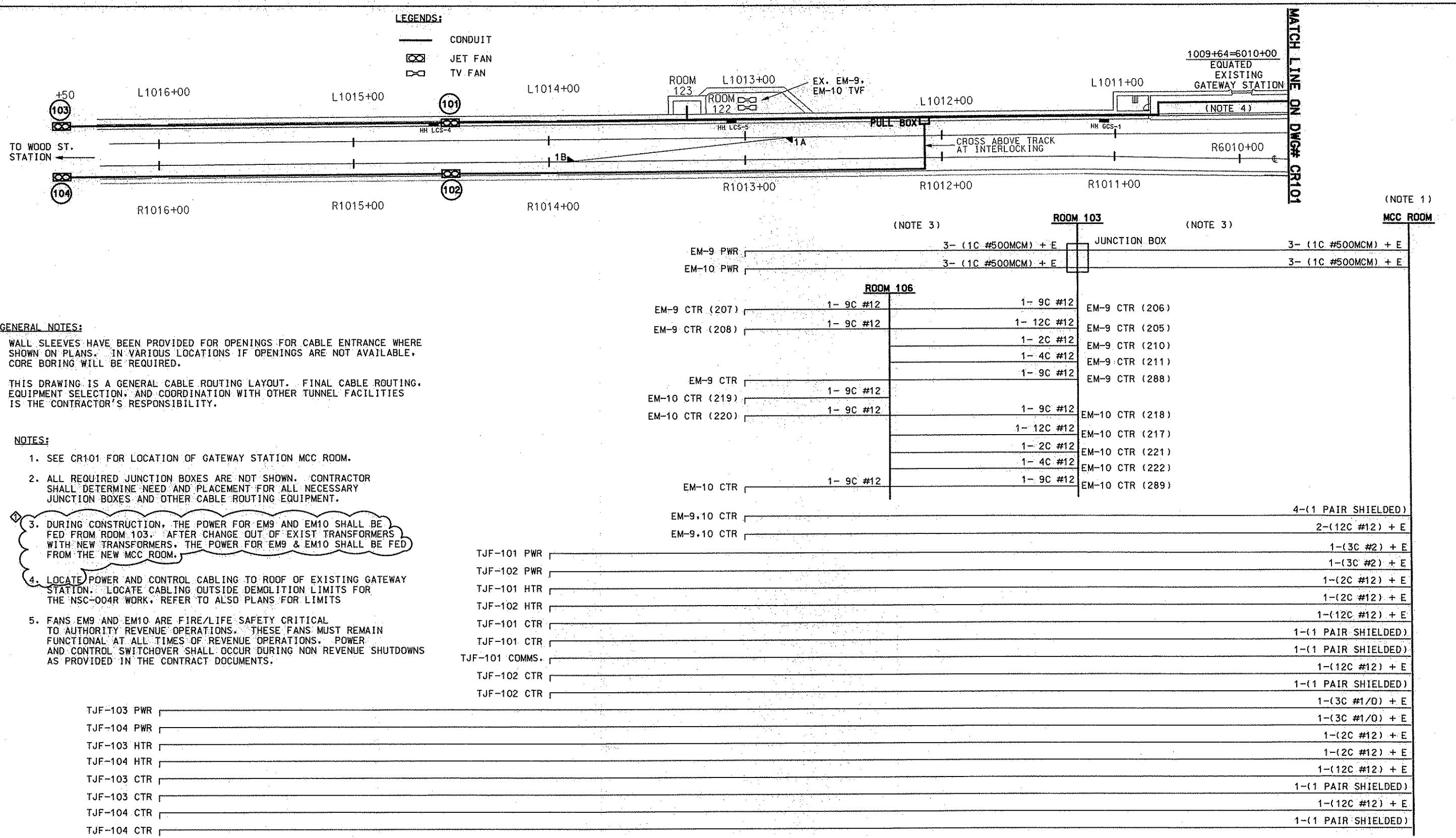
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NO.	DATE	DESCRIPTION
		REVISIONS

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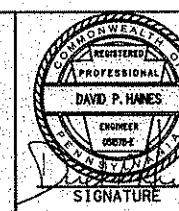


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
[Handwritten signatures]
APPROVED 11/30/08
DATE

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH, PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
SIGNAL RELAY ROOM LAYOUT
NORTHSIDE STATION
Port Authority
CONTRACT NO. NSC-009
DWG. NO. SG184 SHT. 422



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DEPARTMENT OF TRANSPORTATION, UNDER THE
URBAN MASS TRANSPORTATION ACT OF 1964,
AS AMENDED, FOR THE PORT AUTHORITY OF
ALLEGHENY COUNTY, PENNSYLVANIA.



DMJM HARRIS / AECOM

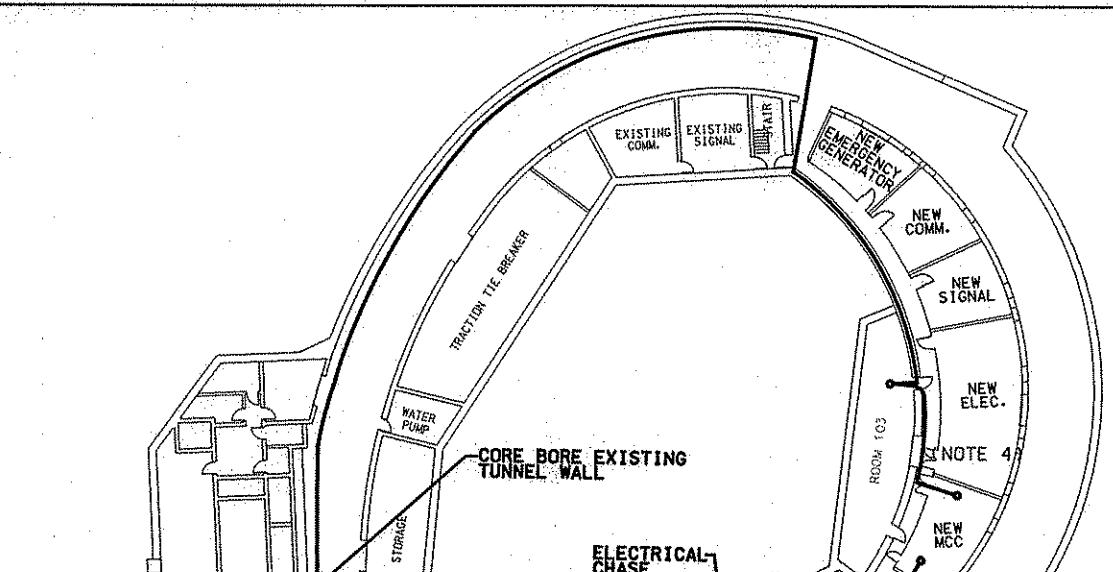
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

Dan Reine APPROVED 7/30/08 DATE

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH, PENNSYLVANIA

**NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
ELECTRICAL CABLE ROUTING PLAN
GATEWAY STATION**

SCALE NTS Port Authority CONTRACT NO. NSC-309



(NOTE 3)

MCC ROOM	
VENT. FAN CONTROL	1- 12C #12 + E 101 & 102 1- 12C #12 + E 3- (2-1C 1/0) + E 3- (2C #4) + E
TVF-101	6- (1C #350MCM) + 2E 3- (2C #4) + E
TVF-102	6- (1C #350MCM) + 2E CTR 1- 12C #12 + E
TVD-101	CTR 1- 12C #12 + E GTR 1- 12C #12 + E
TVD-102	CTR 1- 12C #12 + E GTR 1- 12C #12 + E
TVD-103	CTR 1- 12C #12 + E 1- (12C #12) + E 1- 3C #6 + E TVD-104 ⑥ 1- 3C #6 + E TVD-105 ⑦ 1- 3C #6 + E TVD-106 ⑧ 1- 3C #6 + E TVD-107 ⑨ 1- 3C #6 + E TVD-108 ⑩ 1- 3C #6 + E TVD-109 ⑪ 1- 3C #6 + E TVD-110 ⑫ 1- 3C #6 + E TVD-111 ⑬ 1- 3C #6 + E TVD-112 ⑭ 1- 3C #6 + E TVD-113 ⑮

CONTINUE ON DWG# CR100

TVF-101 CTR	1- 1 PAIR #14 SHIELDED	TVD-108 ⑩
TVF-101 COMMS.	1- 1 PAIR #14 SHIELDED	TVD-109 ⑪
TVF-101 HTR	1- 2C #12 + E	TVD-110 ⑫
TVF-102 CTR	1- 1 PAIR #14 SHIELDED	TVD-111 ⑬
TVF-102 HTR	1- 2C #12 + E	TVD-112 ⑭
TVD-101 PWR	1- 3C #6 + E	TVD-113 ⑮
TVD-102 PWR	1- 3C #6 + E	TVD-106 CTR
TVD-103 PWR	1- 3C #6 + E	TVD-107 CTR
		TVD-108 CTR
		TVD-109 CTR
		TVD-110 CTR
		TVD-111 CTR
	1- 12C #12 + E	TVD-112 CTR
	1- 12C #12 + E	TVD-113 CTR
	1 TVD-104 CTR	
	1 TVD-105 CTR	

NOTES:

1. ALL REQUIRED JUNCTION BOXES ARE NOT SHOWN. CONTRACTOR SHALL DETERMINE NEED AND PLACEMENT FOR ALL NECESSARY JUNCTION BOXES AND OTHER CABLE ROUTING EQUIPMENT.
 2. DURING CONSTRUCTION, THE POWER FOR EM9 AND EM10 SHALL BE FED FROM ROOM 103. AFTER CHANGE OUT OF EXISTING TRANSFORMERS WITH NEW TRANSFORMERS, THE POWER FOR EM9 & EM10 SHALL BE FED FROM THE MCC ROOM.
 3. LOCATE POWER AND CONTROL CABLING TO ROOF OF EXISTING GATEWAY STATION. LOCATE CABLING OUTSIDE DEMOLITION LIMITS FOR THE NSC-004R WORK. REFER TO ALSO PLANS FOR LIMITS
 4. FANS EM9 AND EM10 ARE FIRE / LIFE SAFETY CRITICAL TO AUTHORITY REVENUE OPERATIONS. THESE FANS MUST REMAIN FUNCTIONAL AT ALL TIMES OF REVENUE OPERATIONS. POWER AND CONTROL SWITCHOVER SHALL OCCUR DURING NON-REVENUE SHUTDOWNS AS PROVIDED IN THE CONTRACT DOCUMENTS.
 5. NEW CABLES DISTRIBUTED FROM NEW MCC ROOM TO NEW GATEWAY STATION AND BORED TUNNELS SHALL RUN IN CONDUIT OUT OF THE MCC ROOM ALONG CEILING AND DROP DOWN INTO THE ELECTRICAL CHASE. THE CONDUIT SHALL RUN THROUGH THE CHASE IN THE DESIGNATED AREA AS SHOWN IN THE NSC-004R CONDUIT PLANS (SEE ALSO PLANS).
- A) TVF 101 AND 102, TVD 101-103 SHALL BE FED THROUGH TWO EMBEDDED DUCT BANKS TO PULL BOXES (009) LOCATED IN THE FAN ROOM.
 - B) TVD 104-107 SHALL BE FED THROUGH EMBEDDED DUCT BANK TO PULL BOX(009) LOCATED UNDER THE PLATFORM NEAR STA R6012+10. ROUTE TVD POWER AND CONTROL TO TVD UNDER PLATFORM AS SHOWN.
 - C) TVD 108-111 SHALL BE FED THROUGH EMBEDDED DUCT BANK TO 2 PULL BOXES(009) LOCATED WITHIN VERTICAL PLENUM.
 - D) TK LIGHTING SHALL BE FED THROUGH EMBEDDED DUCT BANK TO 2 EXIST. PULL BOXES LOCATED ON TUNNEL WALL AT BORED TUNNEL INTERFACE. FROM PULL BOX, CABLES AND CONDUIT SHALL BE ATTACHED TO TUNNEL WALLS AND AS SHOWN IN THE CONTRACT DOCUMENTS.
 - E) TVD 112-113 AND SUMP PUMPS 101-102 SHALL BE FED THROUGH EMBEDDED DUCT BANK TO EXIST. PULL BOX LOCATED NEAR SUMP ROOM LOCATED AT THE NORTHERN END OF THE STATION.

CONTINUE ON DWG# CR102

L.TK LIGHT MAINTENANCE PHASE A, B, C
L.TK LIGHT UPS PHASE A, B, C
R.TK LIGHT MAINTENANCE PHASE A, B, C
R.TK LIGHT UPS PHASE A, B, C

GENERAL NOTE
WALL SLEEVES HAVE BEEN PROVIDED FOR OPENINGS FOR CABLE ENTRANCE WHERE SHOWN ON PLANS. IN VARIOUS LOCATIONS IF OPENINGS ARE NOT AVAILABLE, CORE BORING WILL BE REQUIRED.

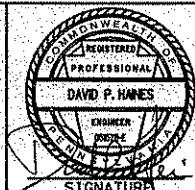
THIS DRAWING IS A GENERAL CABLE ROUTING LAYOUT. FINAL CABLE ROUTING, EQUIPMENT SELECTION, AND COORDINATION WITH OTHER TUNNEL FACILITIES IS THE CONTRACTOR'S RESPONSIBILITY.

LEGEND

- EMBEDDED CONDUIT PROVIDED BY NSC-004 R
- CONDUIT
- PULL BOX
- EXISTING PULL BOX PROVIDED BY NSC-004 R

7/31/08 ADDENDUM 1 - DRAWING MODIFIED			
NO. DATE	DESCRIPTION		
	REVISIONS		

THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.



DMJM HARRIS | AECOM

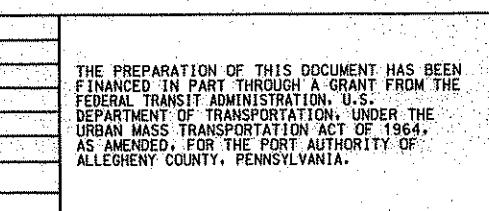
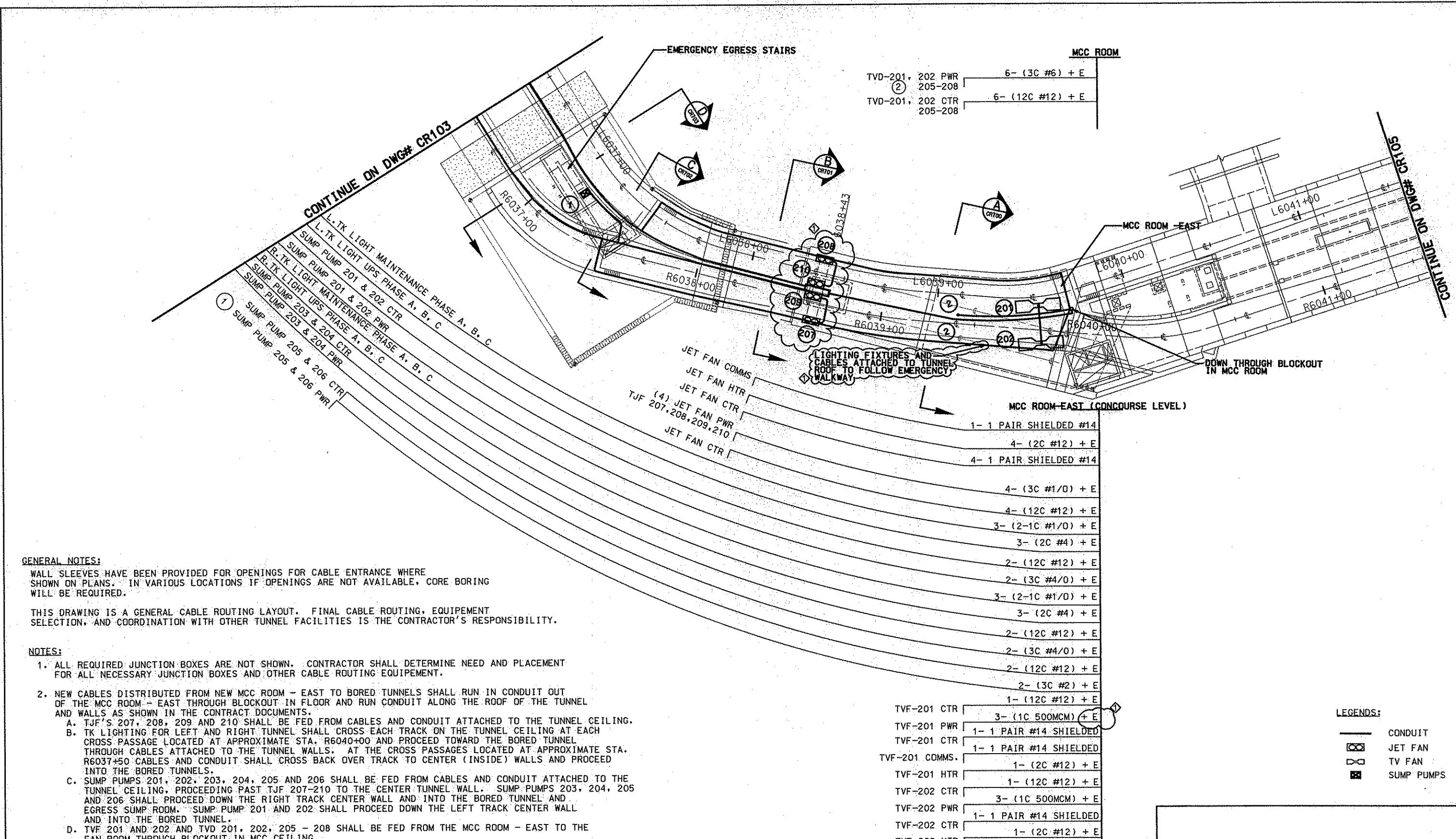
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

DAVID P. HANES
ENGINEER
SUPERVISOR
SPECIALIST
APPROVED
DATE: 7/31/08

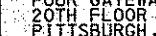
PORT AUTHORITY OF ALLEGHENY COUNTY
PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
ELECTRICAL CABLE ROUTING PLAN
GATEWAY STATION TO TUNNEL

Contract No. NSC-009
DWG. No. CR101 Sht. 564



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DMJM HARRIS AECOM		DESIGNED MAUNSELL
		DRAWN GFTR
		CHECKED DPH
		IN CHARGE DPH
		DATE APR. 28, 2008
		SCALE NTS
 APPROVED		713-108 DATE

PORT AUTHORITY OF ALLEGHENY COUNTY
 PITTSBURGH, PENNSYLVANIA

NORTH SHORE CONNECTOR
 NSC TRAIN SYSTEM (SYSTEM WIDE)
 ELECTRICAL CABLE ROUTING PLAN
 NORTH SIDE STATION

LEGENDS:

CONDUIT

JET FAN

TV FAN :

SUMP PUMPS

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**NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
ELECTRICAL CABLE ROUTING PLAN
NORTH SIDE STATION**

NSC-009

CONTINUE ON DWG# CR104

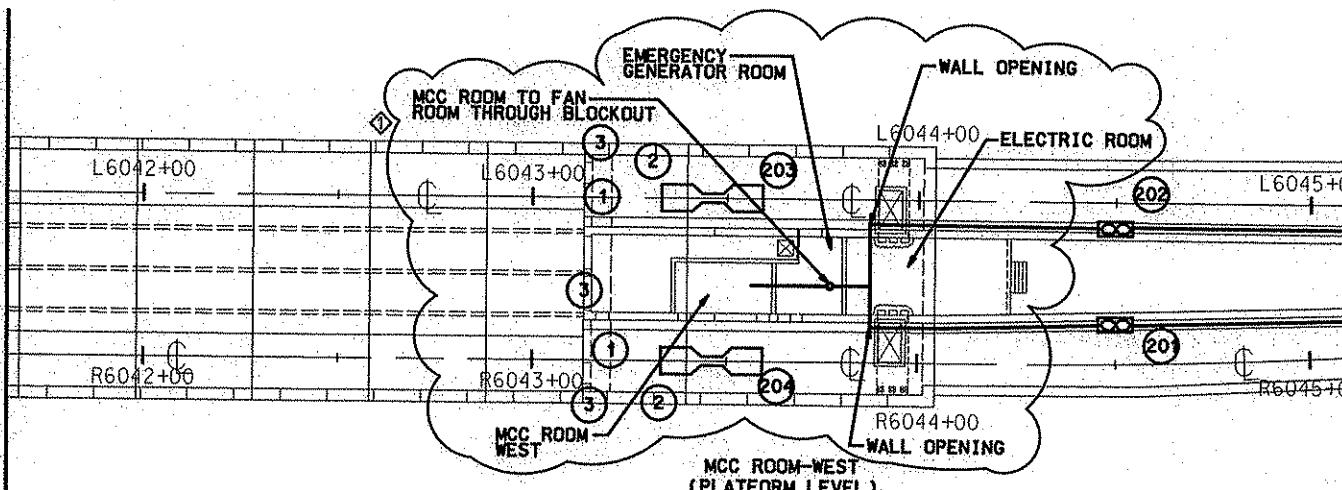
LEGENDS:

- CONDUIT
- EMBEDDED CONDUIT
- ☒ JET FAN
- ☒ TV FAN
- ☒ SUMP PUMPS

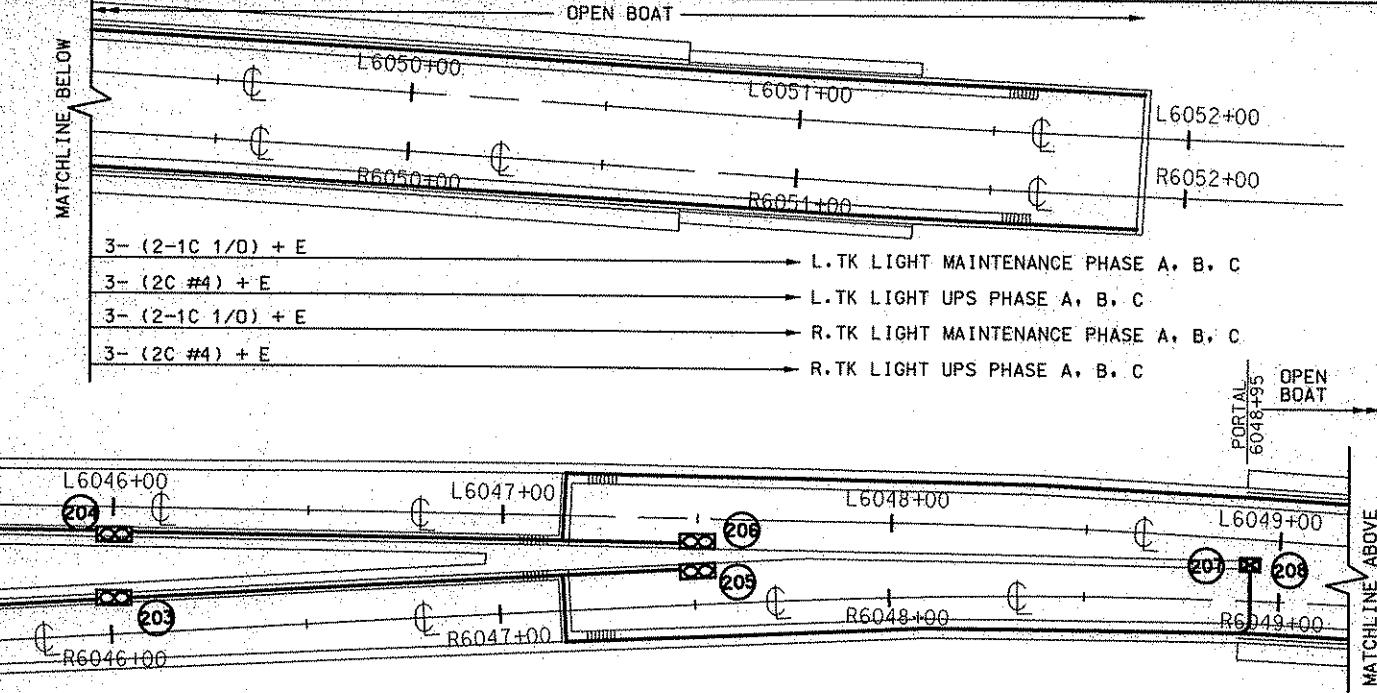
GENERAL NOTES:

WALL SLEEVES HAVE BEEN PROVIDED FOR OPENINGS FOR CABLE ENTRANCE WHERE SHOWN ON PLANS. IN VARIOUS LOCATIONS IF OPENINGS ARE NOT AVAILABLE, CORE BORING WILL BE REQUIRED.

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TVF 203	3- (1C 500MCM) + 2E	3- (2-1C 1/0) + E	L.TK LIGHT MAINTENANCE PHASE A, B, C
TVF 204	3- (1C 500MCM) + 2E	3- (2C #4) + E	L.TK LIGHT UPS PHASE A, B, C
TVF 203 CTR	1- 12C #12 + E	3- (2-1C 1/0) + E	R.TK LIGHT MAINTENANCE PHASE A, B, C
TVF 203 CTR	1- 1 PAIR #14 SHIELDED	3- (2C #4) + E	R.TK LIGHT MAINTENANCE PHASE A, B, C
TVF 203 COMMS.	1- 1 PAIR #14 SHIELDED	2- (3C #2) + E	R.TK LIGHT UPS PHASE A, B, C
TVF 203 HTR	1- 2C #12 + E	TJF 201, 202 PWR	
		TJF 201, 202 CTR	
		TJF 201, 202 CTR	
		TJF 201, 202 HTR	
		TJF 201 COMMS.	
		TJF 203, 204 PWR	
		TJF 203, 204 CTR	
		TJF 203, 204 CTR	
		TJF 203, 204 HTR	
TVF 204 CTR	1- 12C #12 + E	TJF 203, 204 PWR	
TVF 204 CTR	1- 1 PAIR #14 SHIELDED	TJF 205, 206 CTR	
TVF 204 HTR	1- 2C #12 + E	TJF 205, 206 CTR	
① TVD 212, 213 PWR	2- 3C #2 + E	TJF 205, 206 HTR	
TVD 212, 213 CTR	2- 12C #12 + E	SSP 207 PWR	
		SSP 207 CTR	
② TVD 203, 204 PWR	5- 3C #6 + E	SSP 208 PWR	
③ 209- 211		SSP 208 CTR	
TVD 203, 204 CTR	5- 12C #12 + E		
209- 211			



NOTES:

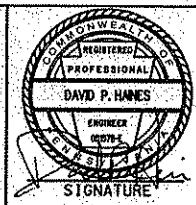
1. ALL REQUIRED JUNCTION BOXES ARE NOT SHOWN. CONTRACTOR SHALL DETERMINE NEED AND PLACEMENT FOR ALL NECESSARY JUNCTION BOXES AND OTHER CABLE ROUTING EQUIPMENT.
2. NEW CABLES DISTRIBUTED FROM NEW MCC ROOM - WEST TO THE TUNNEL AND BOAT SECTION SHALL RUN IN CONDUIT OUT OF THE MCC ROOM THROUGH THE EMERGENCY GENERATOR ROOM AND ELECTRICAL ROOM, OUT THE WALL OPENINGS ON EITHER SIDE OF THE ELECTRICAL ROOM WALLS, OUT INTO THE TUNNEL ALONG TUNNEL CEILING AND WALLS TO SERVICE THE TK LIGHTING. TJF 201, 202, 203, 204, 205 AND 206, SUMP PUMPS 207 AND 208. A. TK LIGHTING AND SUMP PUMP SERVICE SHALL CROSS FROM INSIDE TUNNEL WALLS TO OUTSIDE TUNNEL WALLS AT THE WALKWAY CROSS PASSAGES LOCATED AT APPROXIMATE STA. L6047+10 AND R6047+10.
3. NEW CABLES DISTRIBUTED FROM MCC ROOM - WEST TO TVF 203 AND 204 AND TVD 203, 204, 209 - 213 SHALL RUN THROUGH BLOCKOUT PROVIDED BETWEEN EMERGENCY GENERATOR ROOM AND FAN ROOM.

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7/31/08 ADDENDUM 1 - DRAWING MODIFIED

NO. DATE DESCRIPTION

REVISIONS



DMJM HARRIS | AECOM

FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

APPROVED *David P. Hanes* DATE 7/30/08

DESIGNED MAUNSELL
DRAWN GFTR

CHECKED DPH
IN CHARGE DPH

DATE APR. 28, 2008

SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
ELECTRICAL CABLE ROUTING PLAN
NORTH SIDE TO ALLEGHENY STATION

Port Authority
CONTRACT NO. NSC-009
DWG. NO. CR105
SHT. 668