

GENERAL NOTES

GENERAL

1. THE DESIGN IS IN ACCORDANCE WITH THE PAAC LIGHT RAIL MANUAL OF DESIGN CRITERIA, AND THE AREMA MANUAL FOR RAILWAY ENGINEERING, EXCEPT AS MODIFIED BY PROJECT SPECIFICATIONS AND NORTH SHORE CONNECTOR DESIGN CRITERIA.
2. THE CONTRACTOR IS RESPONSIBLE FOR THE SUPPLY, FABRICATION AND INSTALLATION OF ALL OCS STRUCTURES AND COMPONENTS REQUIRED FOR THE GATEWAY LINE FROM GATEWAY STATION TO ALLEGHENY STATION, INCLUDING A DIAMOND CROSSOVER JUST SOUTH OF THE EXISTING WOOD STREET STATION WHERE AN EXISTING SINGLE TRACK CROSSOVER IS LOCATED.
3. ALL WORK TO BE PERFORMED ON THE OCS BETWEEN EXISTING AND NEW CONSTRUCTION WILL REQUIRE TRACK AND OCS OUTAGES. THE CONTRACTOR SHALL OBTAIN PERIODS AND TIMES FROM AUTHORITY, A MINIMUM OF 14 DAYS IN ADVANCE.
4. ALL WORK IN THE INTERFACE AREA MUST BE FULLY COORDINATED WITH AUTHORITY PRIOR TO COMMENCING ANY WORK.
5. THE CONTRACTOR SHALL OBTAIN ALL HEIGHTS AND STAGGERS OF EXISTING OCS PRIOR TO START OF WORK.
6. THE CONSTRUCTION STAGING OUTLINED WITHIN IS FOR GUIDANCE ONLY. THE CONTRACTOR MUST SUBMIT FOR APPROVAL, A DETAILED CONSTRUCTION SEQUENCING PLAN FOR THE AREA, OUTLINING THE PROPOSED STAGING THE WORK, EQUIPMENT TO BE USED, AND ANTICIPATED TIME FRAME FOR EACH STAGE.

STRUCTURES

1. ALL STRUCTURAL STEEL SHALL BE ASTM A-36, A-588, A-871, LATEST ISSUE OF ASCE, OR AS NOTED ON THE DRAWINGS.
2. HOT-DIP GALVANIZING SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF A-123 FOR STRUCTURAL STEEL ANSI ASTM A-153 FOR STEEL HARDWARE.
3. ALL FIELD CONNECTIONS SHALL BE BOLTED UNLESS OTHERWISE NOTED.
4. ALL DESIGN FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE PERFORMED IN ACCORDANCE WITH THE AISC MANUAL OF STEEL CONSTRUCTION, LATEST EDITION.
5. ALL WELDING SHALL CONFORM TO STRUCTURAL WELDING CODE AWS D.1.1.. LATEST EDITION. ELECTRODES SHALL BE E.70-XX.
6. ALL CONNECTION BOLTS SHALL BE ASTM A-325 HEXAGONAL HEAD COMPLETE WITH HEX NUT AND WASHER AND SHALL BE GALVANIZED IN ACCORDANCE WITH THE SPECIFICATIONS, UNLESS OTHERWISE NOTED.
7. SIZE OF THE BOLT HOLES TO BE $\frac{1}{16}$ " LARGER THAN BOLT DIAMETER, UNLESS OTHERWISE NOTED.
8. LOADS GENERATED BY THE ATTACHMENT OF FUTURE CATENARIES OR ANCILLARY WIRES TO THE STRUCTURES HAVE NOT BEEN CONSIDERED IN THE DESIGN, EXCEPT WHERE REQUESTED BY THE AUTHORITY.
9. ALL DIMENSIONS, DETAILS AND ELEVATIONS OF EXISTING ITEMS SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD PRIOR TO THE FABRICATION OF OCS STRUCTURES AND OTHER ASSOCIATED EQUIPMENT.
10. THE CONTRACTOR SHALL VERIFY THE LOCATION, OFFSET, ELEVATION AND FOUNDATION TYPES INCLUDING THE ANCHOR BOLT PATTERNS, PRIOR TO FINAL FABRICATION AND INSTALLATION OF POLES, GUYS AND HARDWARE.
11. ALL ANCHOR BOLTS ON AERIAL STRUCTURES AND FOUNDATIONS WILL BE INSTALLED BY OTHERS.

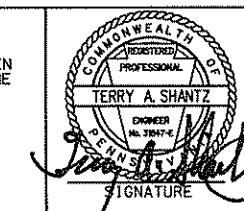
OVERHEAD CONTACT SYSTEM (OCS)

1. THE ASSEMBLIES AND COMPONENTS IN THE DESIGN DRAWING PACKAGE ARE INTENDED TO INDICATE TYPE AND QUALITY REQUIRED. SUPPLIERS MAY PROVIDE THEIR OWN STANDARD ASSEMBLIES AND COMPONENTS PROVIDED THEY MEET THE DIMENSIONAL PERFORMANCE AND SPECIFICATION REQUIREMENTS. SERVICE PROVEN HARDWARE SHALL BE FURNISHED. ALL OCS ASSEMBLIES SHALL CLEAR THE PANTOGRAPH DYNAMIC ENVELOPE.
2. OCS WIRE HEIGHTS ARE REFERENCED TO THE MEAN RAIL LEVEL OF THE TRACK AT EACH SUPPORT LOCATION.
3. THE INSTALLATION OF THE OCS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS THE CONTRACT DRAWINGS AND SPECIFICATIONS AS PER THE MANUFACTURER'S RECOMMENDATIONS, AND SHALL MEET THE RULES AND REQUIREMENTS OF ALL APPLICABLE FEDERAL, STATE, CITY AND LOCAL CODES.
4. ALONG TRACK STATIONING OF THE OCS POLE ANCHOR BOLT LOCATIONS FOR POLES AND DOWN GUY ANCHOR SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING WORK. DEVIATIONS FROM THE CONTRACT DRAWINGS SHALL BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE ENGINEER.
5. OCS POLE OFFSET DIMENSIONS ARE MEASURED FROM THE CENTERLINE OF TRACK TO CENTERLINE OF POLE AT TRACK LEVEL AND MUST BE VERIFIED PRIOR TO THE FABRICATION OF ANY OCS ASSEMBLIES.
6. THE OCS STRUCTURE LAYOUT AND STATIONING ARE BASED ON THE INDIVIDUAL ALIGNMENT PLAN AND PROFILE DRAWINGS.
7. ALL LOADS, UNIT LOADS & DIMENSIONS SHOWN ARE IN lb (POUNDS), lb/ft (POUNDS/FOOT) & in (INCH), UNLESS OTHERWISE NOTED.
8. OCS COMPONENTS SHALL HAVE THE FOLLOWING MINIMUM FACTOR OF SAFETY FOR THE WORST CASE CLIMATIC LOADING CONDITIONS CONDUCTORS - 2.00 HARDWARE - 2.50 (AGAINST FAILURE)
1.75 (AGAINST SLIPPAGE)
9. ACTUAL SPAN LENGTHS AND SYSTEM HEIGHTS SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO FABRICATION OF HANGERS.
10. ALL OCS ELECTRICAL GROUNDS SHALL ACHIEVE A RESISTANCE OF 25 OHMS OR LESS, UNLESS SHOWN/SPECIFIED OTHERWISE FOR SPECIAL ARRANGEMENTS.
11. THE LOADINGS SHOWN ON THE ASSEMBLY DRAWINGS ARE MAXIMUM WORKING LOADS. THE CONTRACTOR SHALL DETERMINE ACTUAL LOADING RANGES FOR THE HARDWARE AND ASSEMBLIES TO BE PROVIDED.

 Gannett Fleming
Transit & Rail Systems

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TERRY A. SHANTZ
OWNER
P.E., N.J. #394-P

SIGNATURE

Daniel P. Harrington 4/28/08
APPROVED DATE

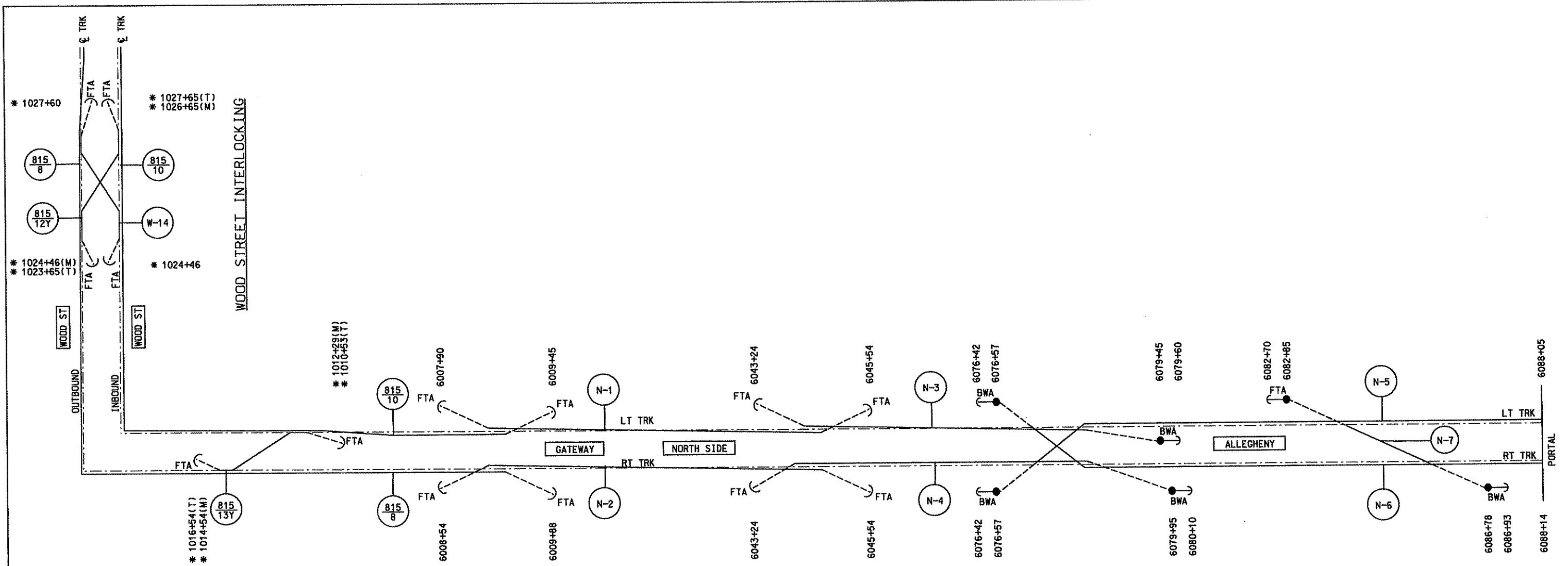
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PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH, PENNSYLVANIA		NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE) OVERHEAD CONTACT SYSTEM (OCS) GENERAL NOTES	

Port Authority

CONTRACT NO. NSC-009
DWG. NO. OC007 SHT. 174



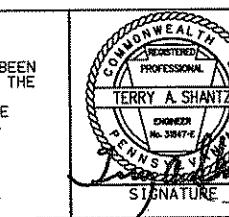
STATION EQUATION TABLE

WIRE RUN NO	TOTAL TENSION LENGTH (ft)
GATEWAY LINE	
N-1	3728
N-2	3848
N-3	1783
N-4	1831
N-5	1148
N-6	1157
N-7	393
STAGE I AREA	
815/10	EXISTING
815/8	EXISTING
815/13Y	EXISTING
815/12Y	EXISTING
W-14	314

(NOTE: THE LENGTHS SHOWN INCLUDE TRACK ALIGNMENT EQUATIONS)

NO.	DATE	DESCRIPTION	REVISIONS

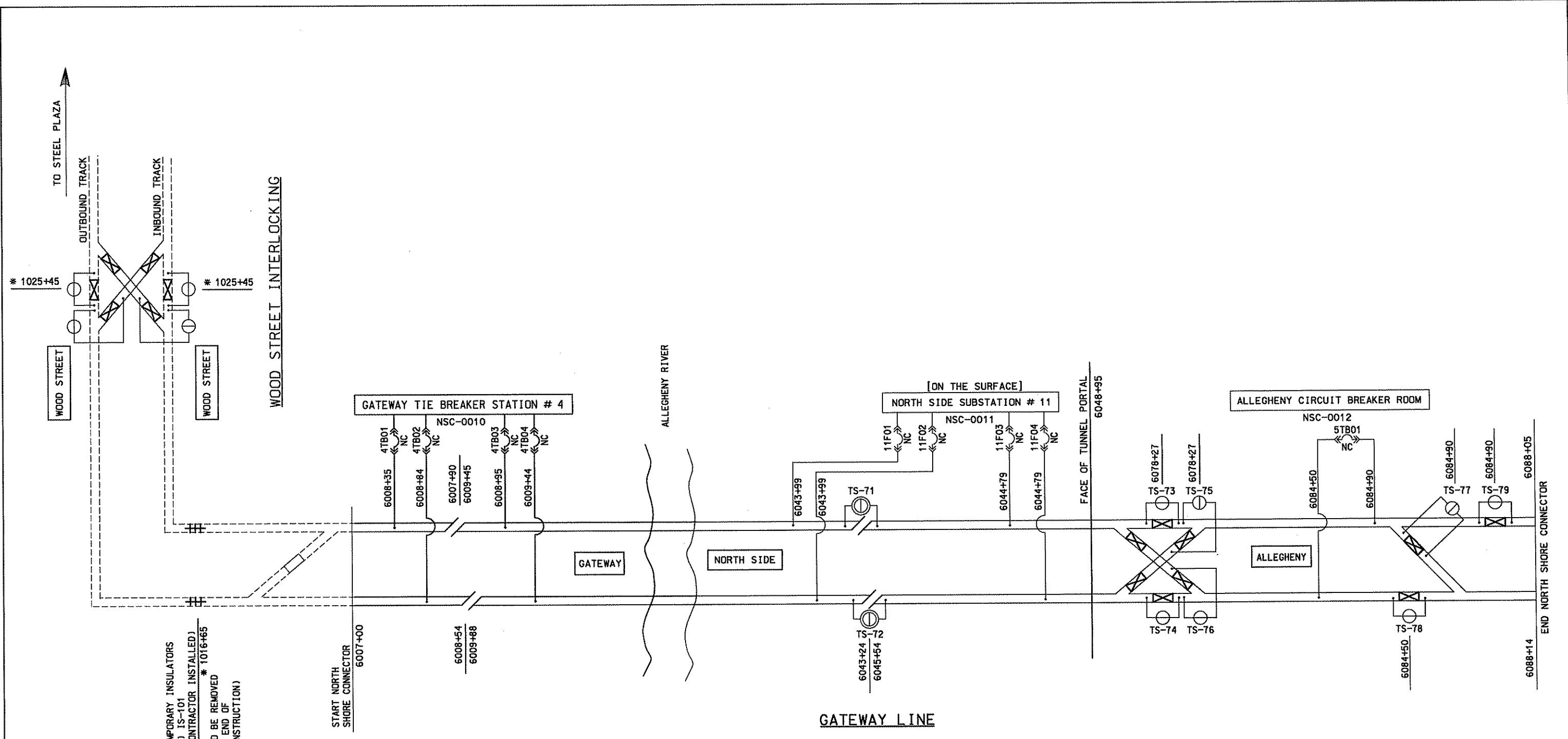
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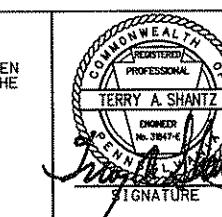
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PITTSTON
PORT AUTHORITY OF ALLEGHENY COUNTY
PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
SYSTEM TRACTION POWER & OCS
MASTER OVERLAP DIAGRAM
Port Authority
CONTRACT NO. NSC-008
DWG. NO. OC106
SHT. 175



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PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
SECTIONALIZING DIAGRAM
GATEWAY LINE

Port Authority	CONTRACT NO. NSC-009
	DWG. NO. OC110
	SHT. 176

DESIGN CRITERIA

1. CLIMATIC PARAMETERS

TEMPERATURE	OPEN ROUTE
NORMAL	68°F
MINIMUM	-22°F
MAXIMUM	167°F
ICE	OPEN ROUTE
OPERATING	CONTACT $\frac{1}{4}$ " $\frac{1}{2}$ "
NON OPERATING	$\frac{1}{2}$ " $\frac{1}{2}$ "
WIND	OPEN ROUTE
OPERATING (ICE)	39 mph
OPERATING (NO ICE)	56 mph
NON OPERATING (NO ICE)	79 mph

2. ELECTRICAL CLEARANCES

NORMAL	REDUCED (SEE NOTE 3)
STATIC PASSING	4" 3" 3" 3"

3. NEW CATENARY SYSTEM PARAMETERS

ITEM	UNITS	OPEN ROUTE (A/T)	TUNNEL (F/T)
WIRE SIZE: CONTACT MESSANGER	KCMIL KCMIL	350 500	350 500
TENSION AT DESIGN TEMP (68°F) CONTACT WIRE MESSANGER WIRE	lb lb	2925 4500	2925 4500
NORMAL CONTACT WIRE HEIGHT	ft	16	12'-9"
MAXIMUM CONTACT WIRE HEIGHT	ft	19	-
SYSTEM HEIGHT (NOMINAL)	in	48	18
MAXIMUM SPAN	ft	190	90
MAXIMUM STAGGER	in	12	12
MAXIMUM TENSION LENGTH	ft	5250	-
CONTACT WIRE MAXIMUM WEAR	PERCENT	30	30
POLE DEFLECTION (DYNAMIC-MAXIMUM)	PERCENT OF HEIGHT	2 $\frac{1}{2}$	-
POLE DEFLECTION AT CONTACT WIRE HEIGHT (STATIC)	in	2	-
CONTACT WIRE GRADIENT 20 mph 50 mph	PERCENT	1.0 MAX 0.4 MAX	1.0 MAX 0.4 MAX
CHANGE IN GRADIENT (MAXIMUM)	PERCENT	0.2 MAX	0.2 MAX

4. TOLERANCES AND RELATED INFORMATION

A. TRACK (GAUGE = 62 $\frac{1}{2}$ ")	OPEN ROUTE
VERTICAL	+/- .6"
HORIZONTAL	+/- .6"
CROSS LEVEL	+/- .83"
GAUGE	+ .6" / - 0"
B. VEHICLE (ARTICULATED)	
LATERAL MOVEMENT (EACH SIDE)	1 $\frac{3}{4}$ "
ROLL TO EACH SIDE-MAXIMUM	4.08° SEE NOTE 4
BOUNCE-MAXIMUM	2"
TRUCK CENTERS	29.36'
WIDTH (OVER SIDE SHEETS)	8.81'
LENGTH (OVER COUPLERS)	84.68'
TRUCK WHEELBASE	6.89'
TRUCK CENTER TO COUPLER FACE	12.98'
ROLL POINT (FROM TOP OF RAIL)	2'-1"

C. PANTOGRAPH	UNITS
OVERALL WIDTH	78"
CARBON WIDTH	54"
MAXIMUM CARBON WEAR	3 $\frac{1}{4}$ "
LOCKDOWN HEIGHT	12'- 0" ABOVE TOP OF RAIL
MINIMUM OPERATING HEIGHT	12'- 6" ABOVE TOP OF RAIL
MAXIMUM DEFLECTION RELATIVE TO CAR	2" TO EACH SIDE

D. CATENARY (INSTALLATION TOLERANCES)

STRUCTURE (FOUNDATION) LOCATION ALONG TRACK	UNITS
STRUCTURE (FOUNDATION) LOCATION ACROSS TRACK	
- OUTSIDE POLES	in +/- 2
- CENTER POLES	in +/- 2
FOUNDATION ELEVATION	in +/- 1
POLE BASEPLATE ELEVATION	in +/- 1
HANGER SPACING	in +/- 2
CONDUCTOR HEIGHT AT SUPPORTS (SEE NOTE 1)	
- OPEN ROUTE	in + 1/- 0
- TUNNEL	in + 1/- 0
STAGGER AT SUPPORTS	in +/- 1/2
MESSANGER & CONTACT WIRE STAGGER DIFFERENCE AT SUPPORTS	in +/- 1/2

5. EXISTING CATENARY SYSTEM PARAMETERS

(FOR INFORMATION ONLY)

ITEM	UNITS	OPEN ROUTE
WIRE SIZE: CONTACT MESSANGER	AWG KCMIL	4/0 1000
TENSION AT DESIGN TEMP (68°F) CONTACT WIRE MESSANGER WIRE	lb lb	3500 2400

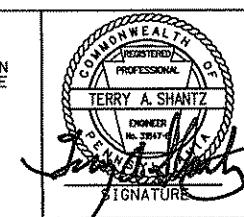
NOTES:

1. THE TOLERANCE GIVEN AT THE SUPPORTS FOR THE CONDUCTOR HEIGHT IS ONLY APPLICABLE PROVIDED THE CONDUCTOR GRADIENT IS ACCEPTABLE.
2. FOR PANTOGRAPH CLEARANCE ENVELOPE SEE DRAWING NO DC123
3. THE REDUCED ELECTRICAL CLEARANCES CAN ONLY BE USED WITH THE ENGINEER'S APPROVAL.
4. WITH FAILURE OF BOTH PRIMARY AND SECONDARY SUSPENSION, FROM STAGE II.

Gannett Fleming
Transit & Rail Systems

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Terry A. Shantz CD Jones APR. 28, 2008
Signature

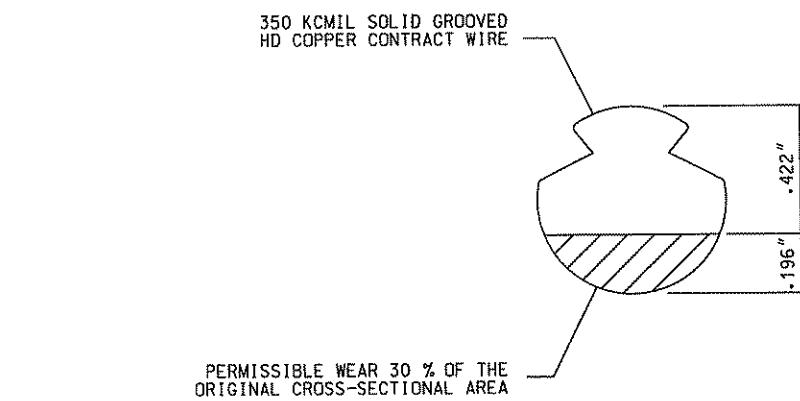
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PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
DESIGN CRITERIA
TOLERANCES
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC115 SHT. 177

		AT SIMPLE CATENARY		FT SIMPLE CATENARY	
DESIGN ITEM	UNITS	MESSENDER WIRE	CONTACT WIRE	MESSENDER WIRE	CONTACT WIRE
MAKE UP OF CONDUCTOR		500 KCMIL 37/.116" STRANDED	350 KCMIL SOLID GROOVED	500 KCMIL 37/.116" STRANDED	350 KCMIL SOLID GROOVED
MATERIAL		HARD DRAWN COPPER	HARD DRAWN COPPER	HARD DRAWN COPPER	HARD DRAWN COPPER
DIAMETER	in	0.813	0.620	0.813	0.620
CROSS SECTIONAL AREA	in ²	0.392	0.276	0.392	0.276
WEIGHT OF CONDUCTOR	lb/ft	1.544	1.063	1.544	1.063
WEIGHT OF CATENARY (INCL. HANGERS)	lb/ft		2.709		2.709
WEIGHT OF CATENARY WITH ICE (O)	lb/ft		3.79		3.79
WEIGHT OF CATENARY WITH ICE (NO)	lb/ft		4.19		4.19
BREAKING LOAD	lb	22500	11810	22500	11810
MAXIMUM SPAN/EQUIVALENT SPAN	ft		190 / 130		90 / 60
CONDUCTOR TENSION AT :					
+68°F NO WIND, NO ICE	lb	4500	2925	4500	2925
+77°F 56 mph WIND, NO ICE	lb	4500	2925	--	--
-4°F 39 mph WIND, ICE I (O)	lb	5652	4411	--	--
-4°F 39 mph WIND, ICE II (NO)	lb	5977	4740	--	--
+77°F 79 mph WIND, NO ICE (NO)	lb	4502	2925	--	--
-22°F 39 mph WIND, NO ICE	lb	5264	3910	--	--
+122°F NO WIND, NO ICE	lb	4500	2925	--	--
+167°F NO WIND, NO ICE	lb	3484	1395	--	--
+32°F NO WIND, ICE I	lb	4706	3207	--	--
+32°F NO WIND, ICE II	lb	5036	3595	--	--
+32°F NO WIND, NO ICE (TUNNEL)	lb	--	--	6560	4460
+90°F NO WIND, NO ICE (TUNNEL)	lb	--	--	3410	2065
MESSENDER SAGS ON 190' SPAN AT :				MESSENDER SAGS ON 90' SPAN AT :	
+68°F NO WIND, NO ICE	in		35		7.6
+122°F NO WIND, NO ICE	in		35		--
+167°F NO WIND, NO ICE	in		45		--
+32°F NO WIND, ICE I	in		47		--
+32°F NO WIND, ICE II	in		49		--
+32°F NO WIND, NO ICE (TUNNEL)	in		--		5.2
+90°F NO WIND, NO ICE (TUNNEL)	in		--		10.1
SYSTEM HEIGHT	in		48 (NORMAL)		18
CONTACT WIRE HT. @ SUPPORT - NOMINAL	ft		16'-0"		12'-9"
- MINIMUM	ft		12'-9"		12'-9"
- MAXIMUM	ft		19'-0"		12'-9"
UPPER/LOWER TEMPERATURE STOP	°F		+122/0		--
MODULUS OF ELASTICITY	lb/in ²	1.70 E+07	1.70 E+07	1.70 E+07	1.70 E+07
COEFFICIENT OF EXPANSION	/°F	9.40 E-06	9.40 E-06	9.40 E-06	9.40 E-06
MINIMUM FACTOR OF SAFETY		3.77	2.49	3.43	2.65

AUTO-TENSIONED SIMPLE CATENARY (30% WEAR)

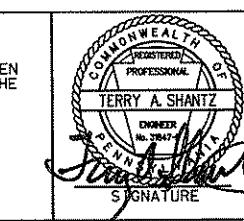
PERMISSIBLE WEAR	% OF AREA	-	30	-	30
WEIGHT OF CATENARY (INCL. HANGERS)	lb/ft		2.39		2.39
WEIGHT OF CATENARY WITH ICE (O)	lb/ft		6.12		--
WEIGHT OF CATENARY WITH ICE (NO)	lb/ft		3.81		--
CONDUCTOR TENSION AT:					
-4°F 39 mph WIND, ICE II (NO)	lb	--	4003		--
CONDUCTOR BREAKING LOAD	lb	--	8267		8267
MINIMUM FACTOR OF SAFETY	lb	--	2.07		2.28



NOTES:

- CATENARY WEIGHTS SHOWN ARE DESIGN ASSUMPTIONS BASED ON A HANGER WEIGHT OF .103 lb/ft OF SPAN LENGTH.
- ICE I = 1/4" RADIAL ICE ON BOTH MESSENDER WIRE AND CONTACT WIRE. - OPERATING CONDITION (O)
ICE II = 1/2" RADIAL ICE ON BOTH MESSENDER WIRE AND CONTACT WIRE.
- NON-OPERATING CONDITION (NO)
- DESIGN BASIS FOR AUTO-TENSION (AT) SIMPLE CATENARY IS STAGE II.

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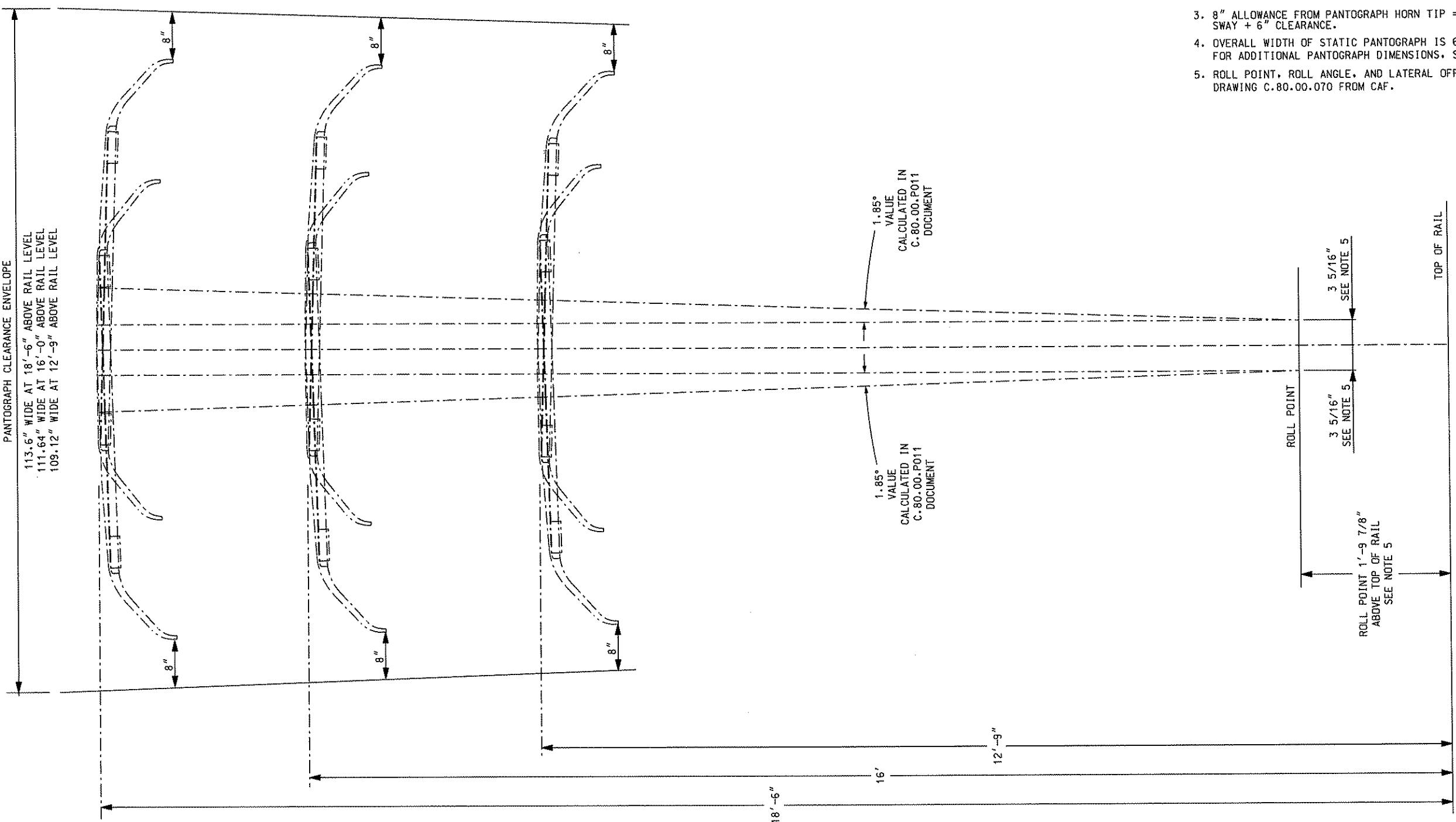


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S. J. HARRIS
Signature

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SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
Pittsburgh
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
CONDUCTOR PARTICULARS
Port Authority
Contract No. NSC-009
DWG. NO. OC117 SHT. 178

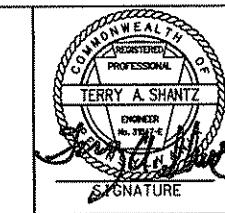
PANTOGRAPH CLEARANCE ENVELOPE



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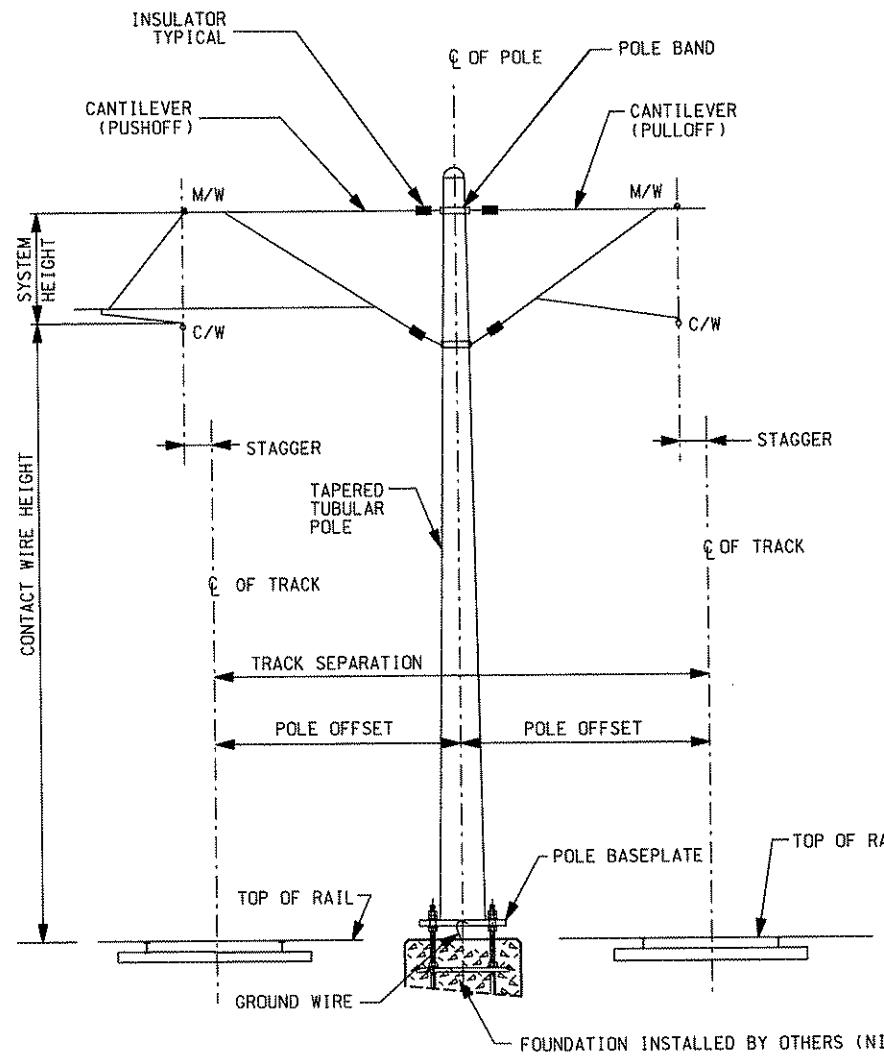
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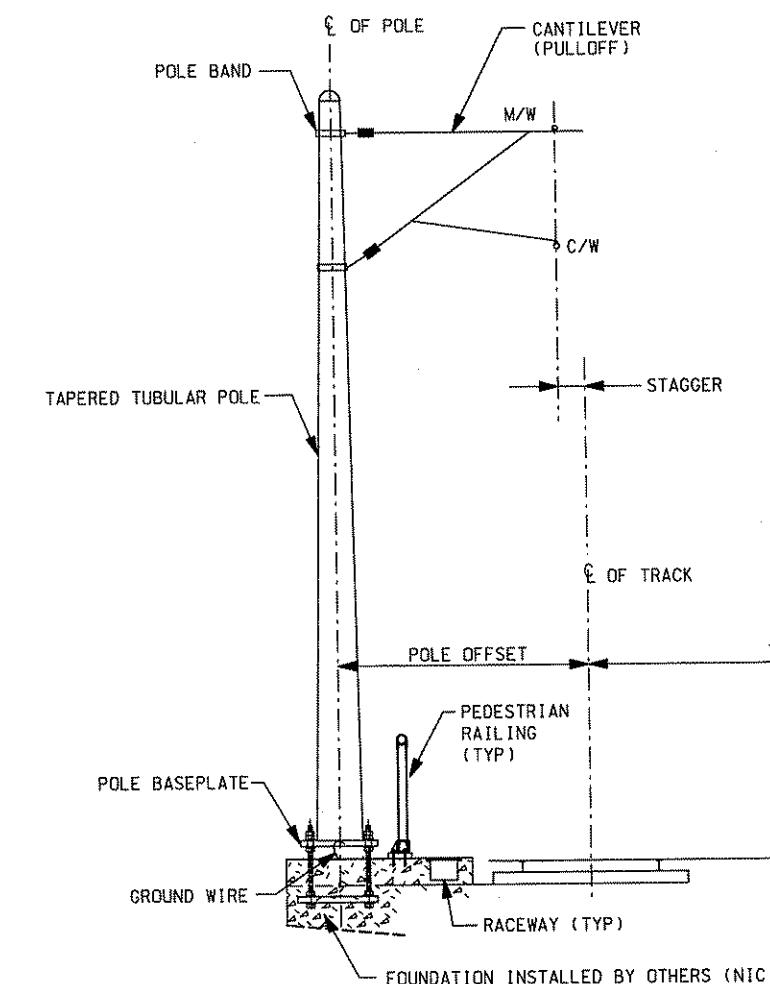
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APPROVED: *David J. Henry 4/28/08*
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PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
DYNAMIC PANTOGRAPH OUTLINE
AND CLEARANCE ENVELOPE
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC123 SHT. 179



TYPICAL CENTER POLE ARRANGEMENT



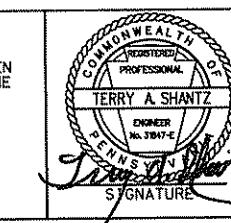
TYPICAL SIDE POLE ARRANGEMENT

NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES.
SEE DRAWINGS GN203, GN310 AND OC007
2. FOR CATEINARY DETAILS AT EACH STRUCTURE LOCATION
SEE OCS LAYOUT AND PROFILE DRAWINGS.
3. FOR GROUNDING DETAILS, SEE DRAWING OC187.

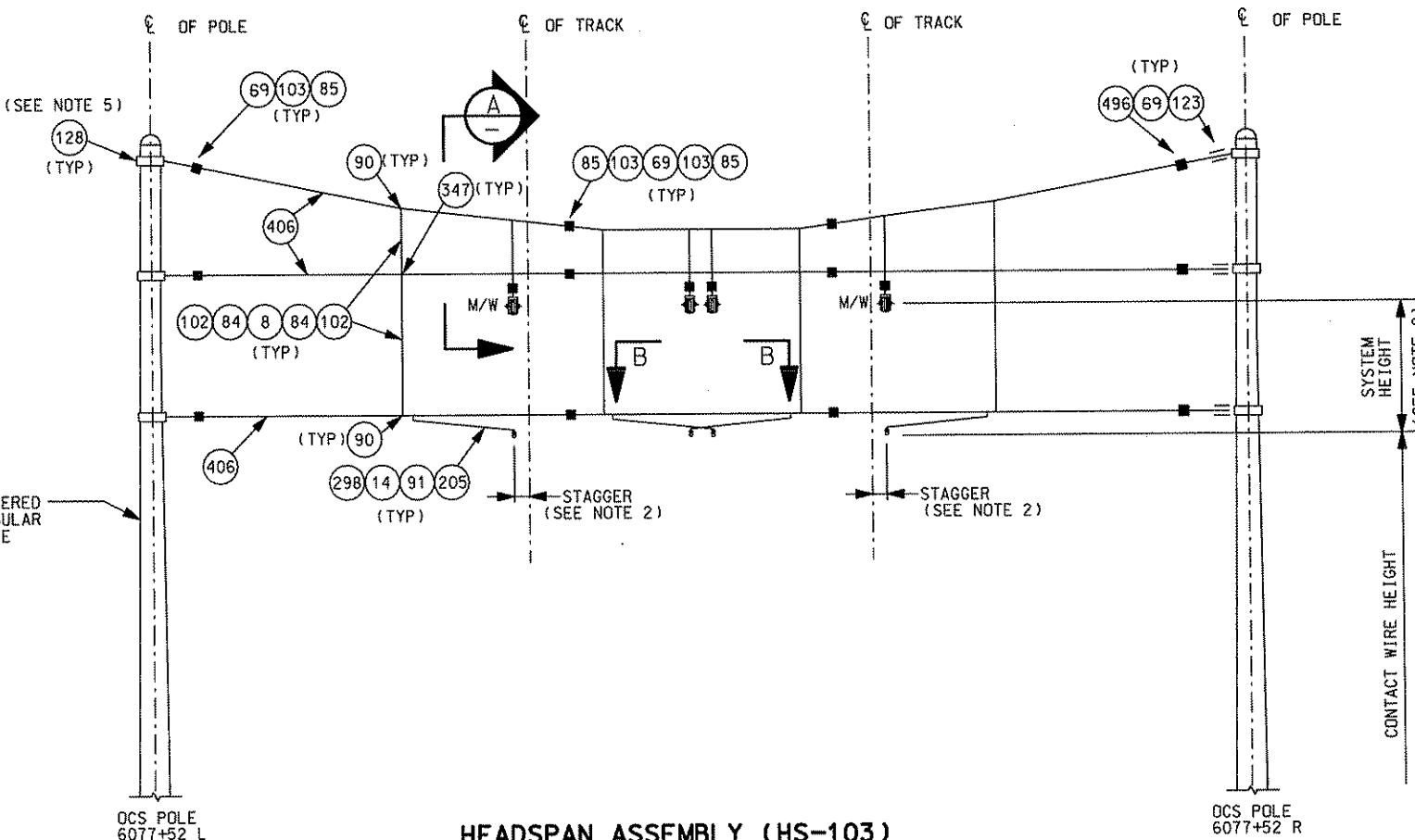
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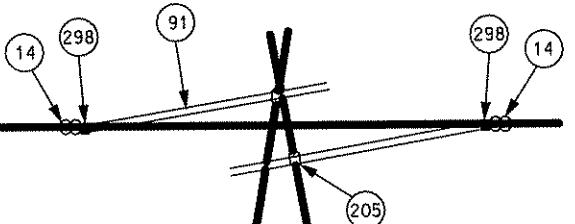
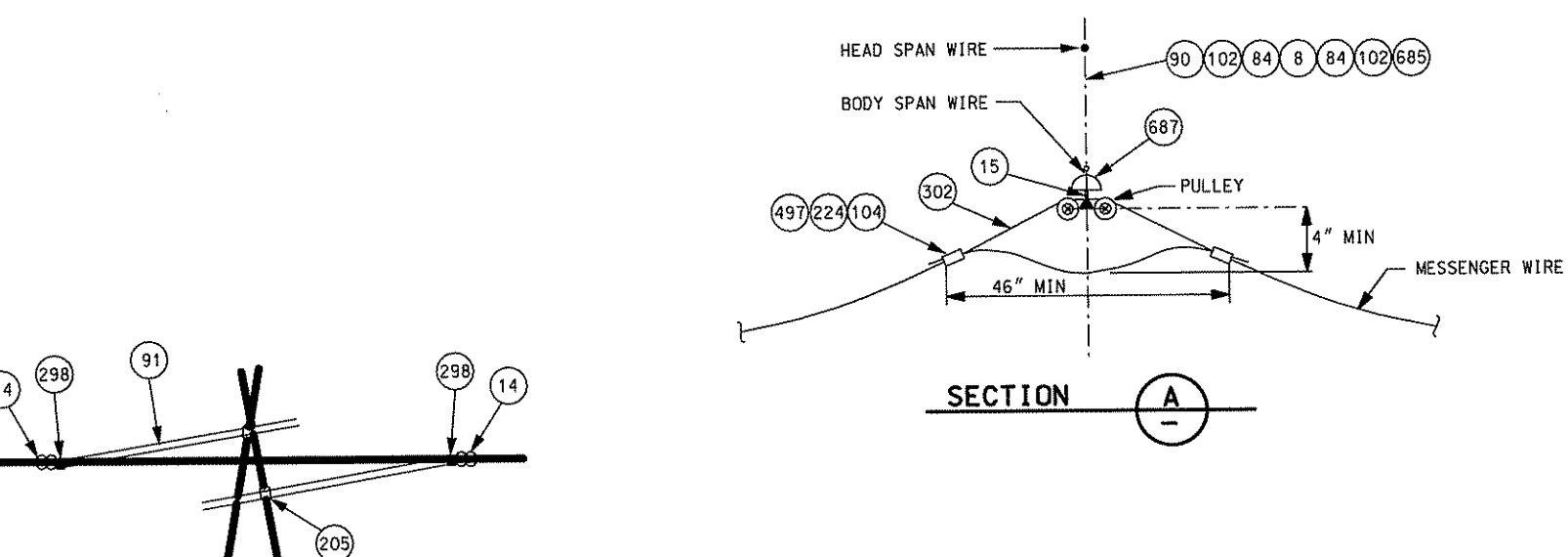


DMJM HARRIS AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
[Signature]
APPROVED DATE
APR. 28, 2008

PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH	
NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE) TYPICAL STANDARD CENTER AND SIDE POLES	
Port Authority	CONTRACT NO. NSC-009
DWG. NO. OC146	SHT. 180



HEADSPAN ASSEMBLY (HS-103)



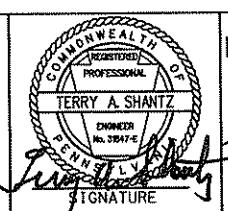
VIEW B-B

SUPPORT TYPE	MAXIMUM LOADING (LBS)				
	RM	RC	WC	WM	PM+PC
LIGHT	120	60	400	560	1000

MAXIMUM WORKING LOADS

LOADING TABLE

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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
[Signature]
APPROVED DATE
APR. 28, 2008

DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
HEADSPAN ARRANGEMENT
CONTRACT NO. NSC-009
DWG. NO. OC149 SHT. 181

Gannett Fleming
Transit & Rail Systems

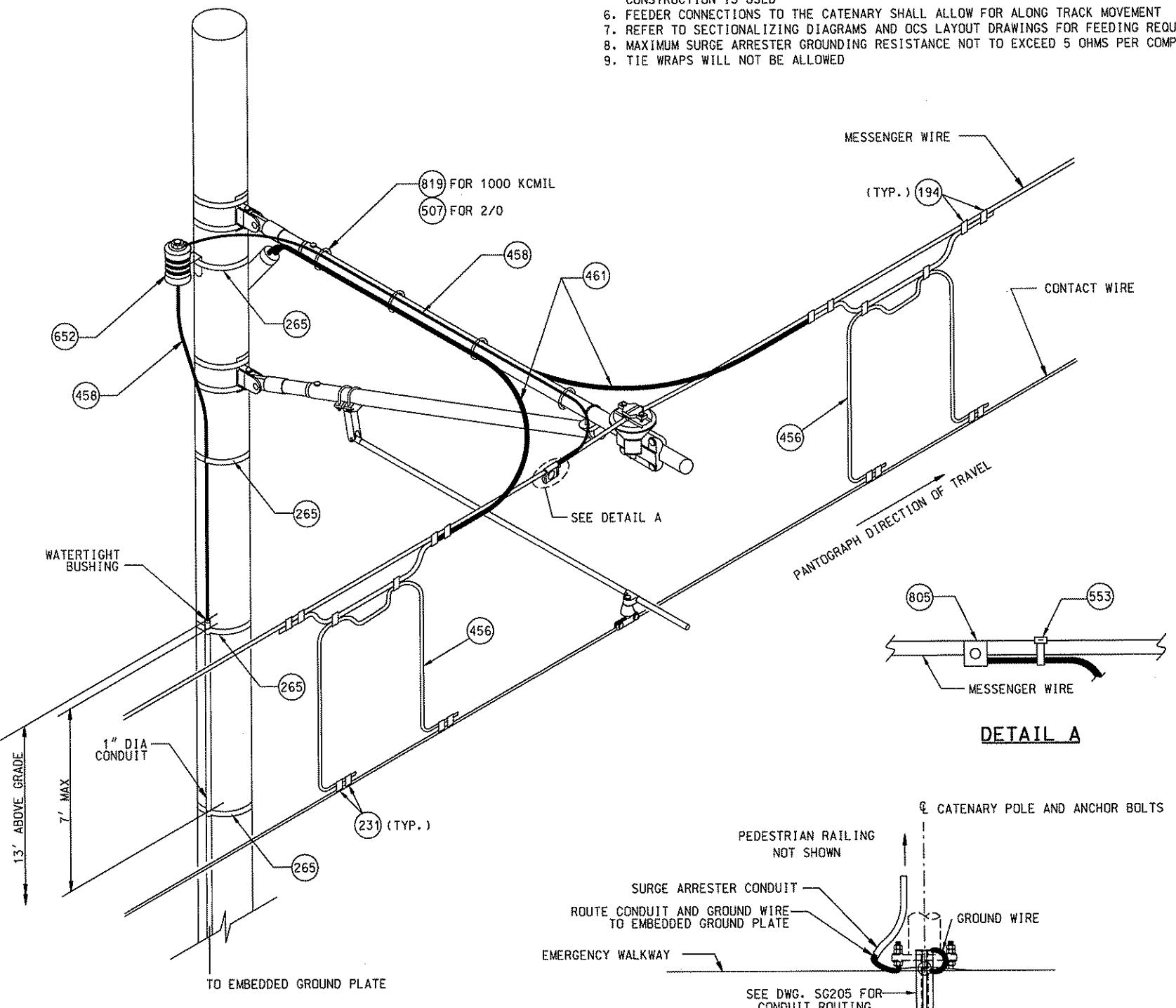
NO. DATE DESCRIPTION
REVISIONS

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
8	ROPE - 0.25" STAINLESS STEEL	IMPULSE NC	00028-433	*
14	CLAMP, STRAIN EYE 1/0-500	IMPULSE NC	10571-200	4
15	PULLEY - SUSPENSION 2 ROLLER	IMPULSE NC	056052-3001	4
69	TRANS*LITE, INSULATOR, 0.63, E/E CHAIN	IMPULSE NC	055263-6132	12
84	SLEEVE - 0.25" COMPRESSION	IMPULSE NC	056088-4002	24
85	SLEEVE - 0.38" COMPRESSION	IMPULSE NC	056088-4002	15
90	SUPPORT - SPAN SINGLE EYE	IMPULSE NC	056358-3001	12
91	STEADY 1" LIGHT DUTY	IMPULSE NC	75026-806	4
102	THIMBLE - 0.25" (OPEN)	IMPULSE NC	056626-4001	24
103	THIMBLE - 0.38" (OPEN)	IMPULSE NC	056626-4003	15
104	THIMBLE - 0.50" (OPEN)	IMPULSE NC	056626-4004	8
123	TURNBUCKLE, 0.63" x 6.0" J/E	IMPULSE NC	095683-3008	3
128	BAND, POLE SINGLE CLEVIS	IMPULSE NC	057234-3001	6
205	CLAMP-SWIVEL INSUL 4 DEG	IMPULSE NC	0674999	4
224	CLAMP - STRAIN 500 (OFFSET)	IMPULSE NC	015332-2000	8
298	CONNECTOR, C/C 90 DEG. 0.50"	IMPULSE NC	67497	4
302	ROPE, 0.50" STAINLESS STEEL	IMPULSE NC	57464-400	*
347	SUPPORT, SPAN DOUBLE EYE	IMPULSE NC	056358-3002	4
406	ROPE - 0.38" STAINLESS STEEL	IMPULSE NC	00028-433	*
496	SOCKET - WEDGE, 0.38" WIRE ROPE	IMPULSE NC	059971-3001	3
497	SLEEVE - 0.50" COMPRESSION	IMPULSE NC	056088-4005	8
685	CLAMP - STRAIN	IMPULSE NC	0679446	4
687	INSULATOR - STRAIN C/E 90 DEG.	IMPULSE NC	024499-3002	4

* = QUANTITY AS REQUIRED.

NOTES:

1. PROVIDE WATERTIGHT SEALING BUSHING ON ALL SPOUTS
2. ARRANGEMENTS SHOW GENERAL PRINCIPALS. FURNISH DETAILED ARRANGEMENT FOR EACH FEEDER LOCATION
3. ALL FEEDER TAP ARRANGEMENTS ARE TO BE PROTECTED BY SURGE ARRESTERS
4. ALL SURGE ARRESTERS SHALL BE PROVIDED WITH A GROUNDING ARRANGEMENT AND SPECIFIED RESISTANCE IN ACCORDANCE WITH THE ARRESTER MANUFACTURER'S RECOMMENDATIONS (SEE DRAWING OC187 FOR GROUNDING DETAILS)
5. INSULATED CROSS TRACK FEEDER CABLES MAY BE INSTALLED ON CROSS SPAN WIRES WHERE HEADSPAN CONSTRUCTION IS USED
6. FEEDER CONNECTIONS TO THE CATENARY SHALL ALLOW FOR ALONG TRACK MOVEMENT
7. REFER TO SECTIONALIZING DIAGRAMS AND OCS LAYOUT DRAWINGS FOR FEEDING REQUIREMENTS
8. MAXIMUM SURGE ARRESTOR GROUNDING RESISTANCE NOT TO EXCEED 5 OHMS PER COMPLETE INSTALLATION
9. TIE WRAPS WILL NOT BE ALLOWED



FEEDER TAP ARRANGEMENT (FT-100)

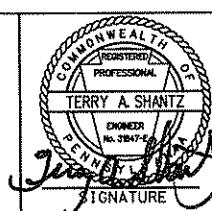
SURGE ARRESTER ARRANGEMENT (SA-100)

FEEDER & SURGE ARRESTOR CONDUIT DETAIL

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS

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REGISTERED
PROFESSIONAL
TERRY A. SHANTZ
EXAMINER
NO. 31847-50
PENNSYLVANIA
SIGNATURE

DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
[Handwritten Signature]
APPROVED
DATE

DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

PITTSTON
PORT AUTHORITY OF ALLEGHENY COUNTY
PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
FEEDER TAP ARRANGEMENT
AND SURGE ARRESTOR
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC151 SHT. 182

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
				FT-100 SA-100
194	CLAMP, UNIVERSAL FEEDER (2BOLT)	IMPULSE NC	18988-300	12 -
231	CLAMP, DUPLEX 0.81" - 1.19"	IMPULSE NC	13853-300	8 -
265	BAND, POLE (SINGLE STRAP)	IMPULSE NC	57180-300	* *
456	CABLE, 500 KCMIL COPPER (CLASS D) SUPER FLEX	-	-	* -
458	CABLE, 2/0 INSULATED, 2KV	-	-	- *
461	CABLE, 1000 KCMIL INSULATED 2KV	-	-	* -
507	SUPPORT, FEED-IN INSULATOR 2" PIPE	IMPULSE NC	4463-2000	- 3
553	STAINLESS STEEL BAND-IT MATERIAL	-	-	* *
652	ARRESTOR, 1280 VOLT DC	IMPULSE NC	0690956	- 1
805	CONNECTOR, 500 KCMIL TO 2/0	IMPULSE NC	060432-4001	- 1
819	STAINLESS STEEL MINERALLAC CLAMPS	-	-	* -
-	WATERTIGHT SEALING BUSHING	OZ GEDNEY	TYPE CSBE	1 1

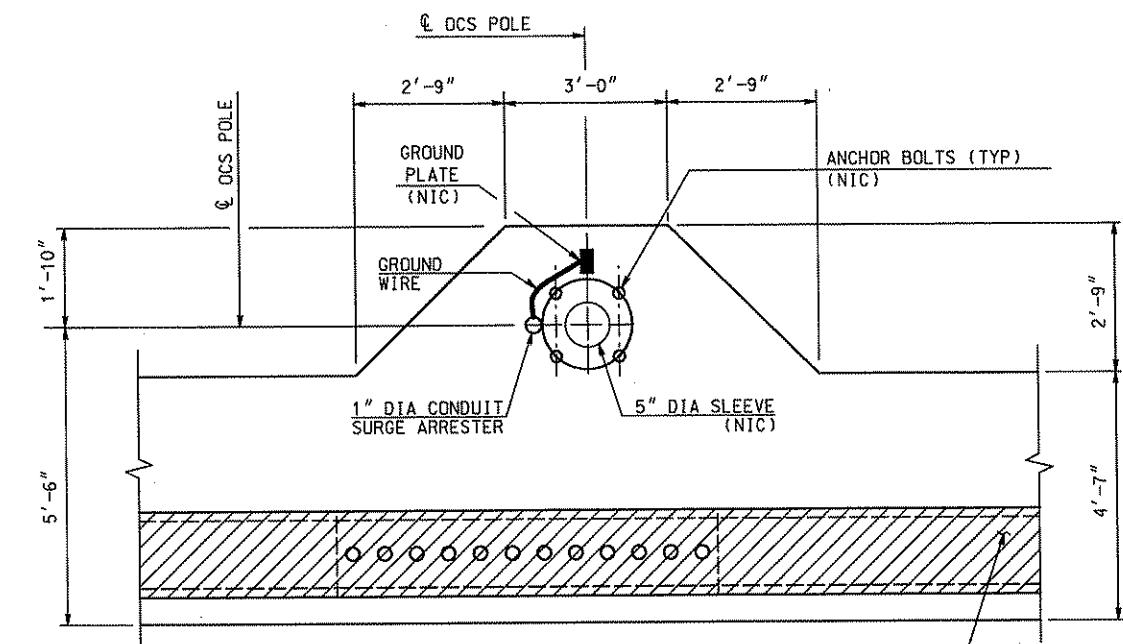
* = QUANTITY AS REQUIRED.

FT-100 LOCATIONS

- 6084+50 RT
- 6084+89.85 LT

SA-100 LOCATIONS

- 6078+27 RT
- 6084+50 RT
- 6084+89.85 LT



CONDUIT DETAIL AT BUMP OUT LOCATION

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
265	BAND, POLE (SINGLE STRAP)	IMPULSE NC	57180-300	*
458	CABLE, 2/0 INSULATED, 2KV	-	-	*
507	SUPPORT, FEED-IN INSULATOR 2" PIPE	IMPULSE NC	4463-200	6
553	STAINLESS STEEL BAND-IT MATERIAL	-	-	*
805	CONNECTOR, 500 KCMIL TO 2/0	IMPULSE NC	060432-4001	1
-	WATERTIGHT SEALING BUSHING	OZ GEDNEY	TYPE CSBE	1

* = QUANTITY AS REQUIRED.

HT-100 LOCATIONS (SEE DRAWING SG023)

- 6078+27 RT
- 6084+50 RT

NOTES:

1. ARRANGEMENTS SHOW GENERAL PRINCIPALS. FURNISH DETAILED ARRANGEMENT FOR EACH LOCATION
2. ALL SWITCH HEATER TAP ARRANGEMENTS ARE TO BE PROTECTED BY SURGE ARRESTERS
3. ALL SURGE ARRESTERS SHALL BE PROVIDED WITH A GROUNDING ARRANGEMENT AND SPECIFIED RESISTANCE IN ACCORDANCE WITH THE ARRESTER MANUFACTURER'S RECOMMENDATIONS (SEE DRAWING OC187 FOR GROUNDING DETAILS)
4. INSULATED CROSS TRACK FEEDER CABLES MAY BE INSTALLED ON CROSS SPAN WIRES WHERE HEADSPAN CONSTRUCTION IS USED
5. CONNECTIONS TO THE CATEINARY SHALL ALLOW FOR LONG TRACK MOVEMENT
6. MAXIMUM SURGE ARRESTER GROUNDING RESISTANCE NOT TO EXCEED 5 OHMS PER COMPLETE INSTALLATION
7. TIE WRAPS WILL NOT BE ALLOWED

MESSENER WIRE
CONTACT WIRE
507
458
SEE DWG DC151 FOR SURGE ARRESTER DETAIL
458
SEE DETAIL A
265
FOR SWITCH HEATER DISC. SEE DWG. SG190
WATERTIGHT BUSHING
1" DIA CONDUIT
13' ABOVE GRADE
7' MAX
TO SWITCH HEATER
TO EMBEDDED GROUND PLATE

© OCS POLE AND ANCHOR BOLTS
PEDESTRIAN RAILING NOT SHOWN
SURGE ARRESTER CONDUIT
ROUTE CONDUIT AND GROUND WIRE TO EMBEDDED GROUND PLATE
EMERGENCY WALKWAY
© OCS POLE AND SNOW METER CASE
ANCHOR BOLTS (TYP) (NIC)
GROUND PLATE (NIC)
GROUND WIRE
CONDUIT TO SNOW MELTER CASE
1" DIA CONDUIT SURGE ARRESTER
RACEWAY W/ ANTI-SKID PLATE
1 - 2" PVC CONDUIT
4 - 2" PVC CONDUITS
© SNOW METER CASE
© OCS POLE AND MESSENER WIRE
553
805
MESSENER WIRE

SWITCH HEATER/SURGE ARRESTER CONDUIT DETAIL

SWITCH HEATER (SNOW MELTER) TAP ARRANGEMENT (HT-100)

CONDUIT DETAIL AT BUMP OUT LOCATION

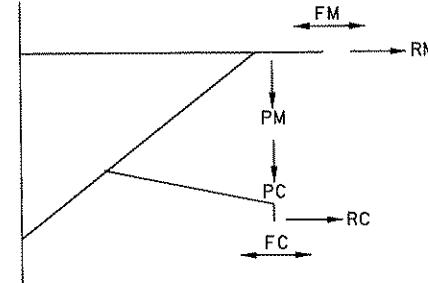
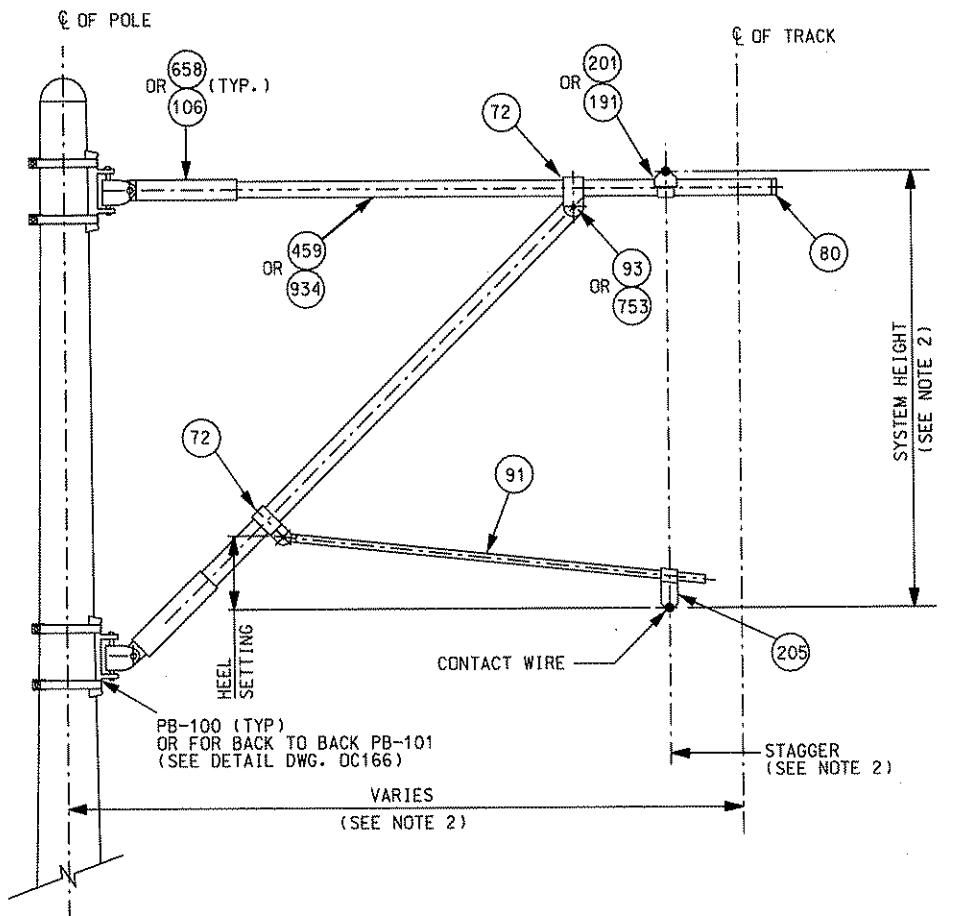
Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS
SIGNATURE *[Signature]* APPROVED *[Signature]* DATE *[Signature]*

PORT AUTHORITY OF ALLEGHENY COUNTY
Pittsburgh
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
SWITCH HEATER TAP ARRANGEMENT
Port Authority
Contract No. NSC-009
DWG. NO. OC156 SIT. 183



LOADING DIAGRAM

BILL OF MATERIAL						
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.		
				CA-11L	CA-11M	CA-11H
72	CLAMP - 2" PIPE CLEVIS	IMPULSE NC	055375-3001	2	2	2
80	CAP - 2" PIPE	IMPULSE NC	056030-4001	1	1	1
91	STEADY 1" LIGHT DUTY	IMPULSE NC	75026-8060	1	-	-
93	EYE - 2" PIPE SCHEDULE 40 PIPE	IMPULSE NC	056463-3002	1	1	-
106	INSULATOR - STRUT	IMPULSE NC	056909-3002	2	2	-
152	Y - CLEVIS EYE ASSEMBLY	IMPULSE NC	059687-3001	-	-	1
191	SADDLE INSULATOR - DBL. HORZ MESSENGER	IMPULSE NC	057217-3001	-	-	1
201	SADDLE INSULATOR - 2" HRZ MESSENGER	IMPULSE NC	057183-3003	1	1	-
204	ARM - UNINSULATED STEADY	IMPULSE NC	057823-8060	--	1	2
205	CLAMP - INSULATED SWIVEL	IMPULSE NC	0674999	1	1	2
459	PIPE - 2" SCHEDULE 40 (HDG) ASTM A500 STEEL, GRADE C	-	-	*	*	-
658	INSULATOR - TRANSLITE	IMPULSE NC	056909-3005	-	-	2
753	EYE - 2" PIPE SCHEDULE 80	IMPULSE NC	056463-3004	-	-	1
934	PIPE - 2" SCHEDULE 80 (HDG) ASTM A500 STEEL, GRADE C	-	-	-	-	*

* = QUANTITY AS REQUIRED.

LIGHT PULL-OFF ASSEMBLY (CA-11L)

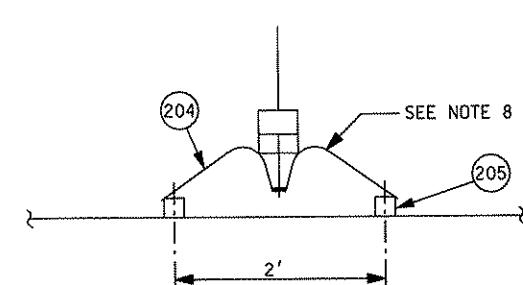
LOADING TABLE

CANTILEVER TYPE	MAXIMUM LOADING (LBS)		
	FC+RC	FM+RM	PM+PC
CA-11L	390	480	770
CA-11M	750	1000	830
CA-11H	1215	1560	450

MAXIMUM WORKING LOADS

MEDIUM PULL-OFF ASSEMBLY (CA-11M)

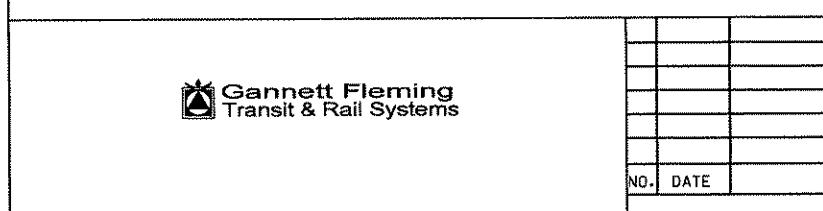
HEAVY PULL-OFF ASSEMBLY (CA-11H)



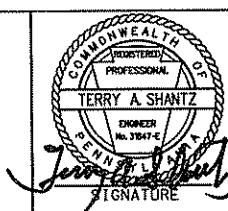
SECTION

NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
 2. FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS.
FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS.
 3. POLE RAKE, STEADY ARM LENGTH, PIPE SIZES & HEEL SETTING TO BE DETERMINED BY CONTRACTOR
 4. CONTRACTOR TO ENSURE THE CANTILEVER DESIGN CATERS FOR PANTOGRAPH DYNAMIC CLEARANCE ENVELOPE
 5. CONTRACTOR TO COORDINATE PANTOGRAPH PROFILE WITH THE AUTHORITY
 6. CONTRACTOR TO DESIGN CANTILEVERS BASED ON ACTUAL LOADING CONDITIONS
 7. CANTILEVERS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSENGER AND CONTACT WIRES
 8. USE TWO STEADY ARMS FOR HEAVY LOAD CONDITIONS



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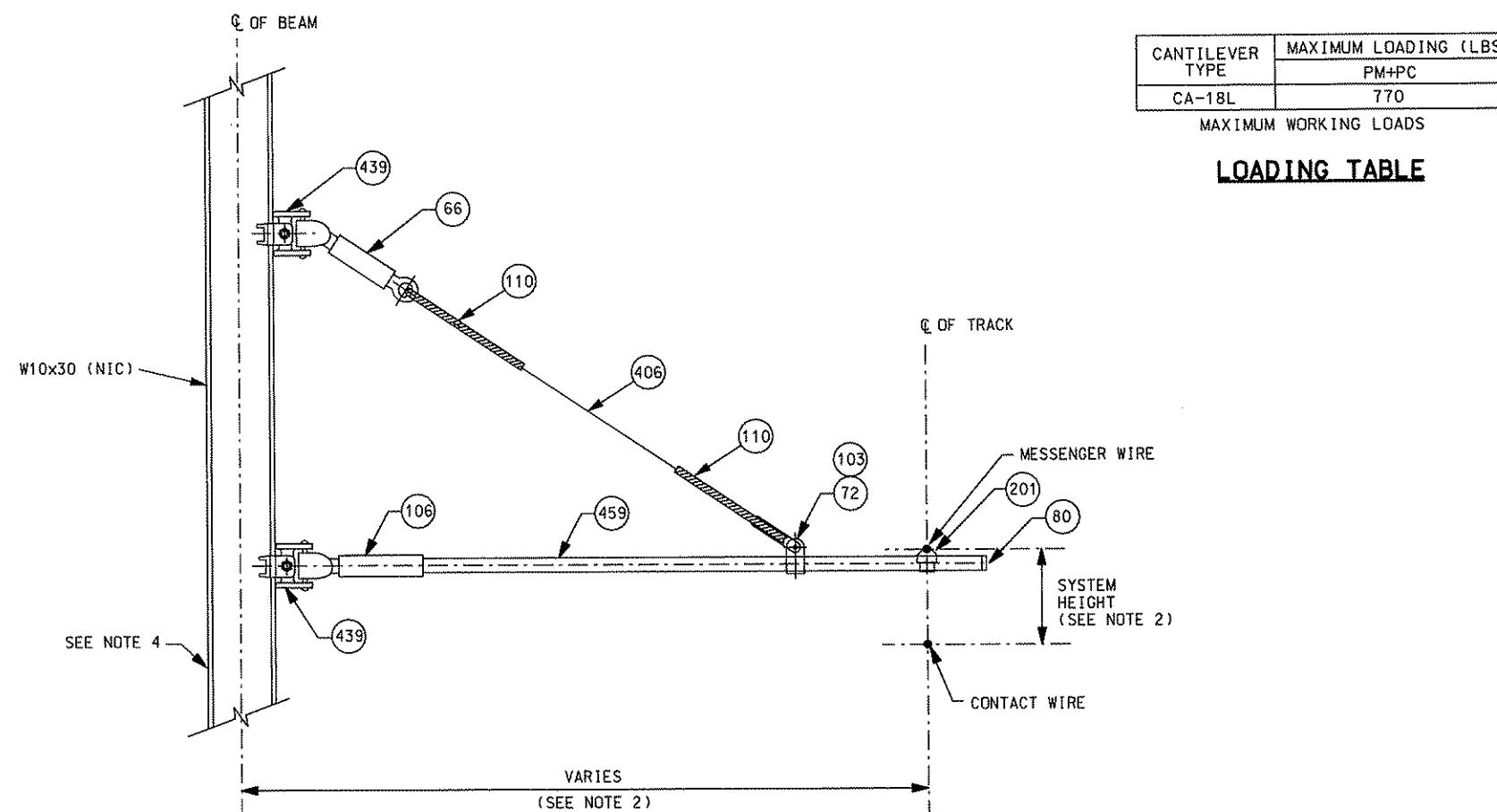
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Daniel P. Harrington 4/28/01
APPROVED DATE

PITTSBURGH		PENNSYLVANIA
NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE)		
CANTILEVER PULL-OFF		
 <small>connecting people to life</small>	CONTRACT NO. NSC-009	
	DWG. NO. OC161 SHT. 1	

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY. CA-18L
66	INSULATOR - 5/8" CLEVIS/EYE	IMPULSE NC	054961-6127	1
72	CLAMP - 2" PIPE CLEVIS	IMPULSE NC	055375-3001	1
80	CAP - 2" PIPE	IMPULSE NC	056030-4001	1
103	THIMBLE 3/8" (OPEN)	IMPULSE NC	056626-4003	1
106	INSULATOR - STRUT	IMPULSE NC	056909-3002	1
110	SPIRAL GUY GRIP 3/8"	IMPULSE NC	056997-3001	2
201	SADDLE - 2" HRZ MESSANGER	IMPULSE NC	057183-3003	1
406	ROPE - 0.38" STAINLESS STEEL	IMPULSE NC	000028-433	*
439	CLAMP-BEAM W/HINGE W10x30	IMPULSE NC	0676792	2
459	PIPE - 2" SCHEDULE 40 (HDG) ASTM A500 STEEL, GRADE C		-	-

* = QUANTITY AS REQUIRED.

LOADING DIAGRAM



NOTES:

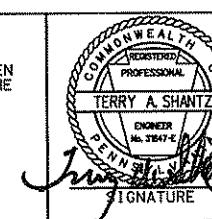
- FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
- FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS. FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS.
- CANTILEVERS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSENGER AND CONTACT WIRES
- BEAM SUPPORT PROVISIONS INCLUDED WITHIN NORTHSIDE STATION PLATFORM (FOUR LOCATIONS) IN CONTRACT NSC-011 (TYP).

REDUCED HEIGHT ASSEMBLY (CA-18L)

(CONTACT WIRE - NOT REGISTERED)

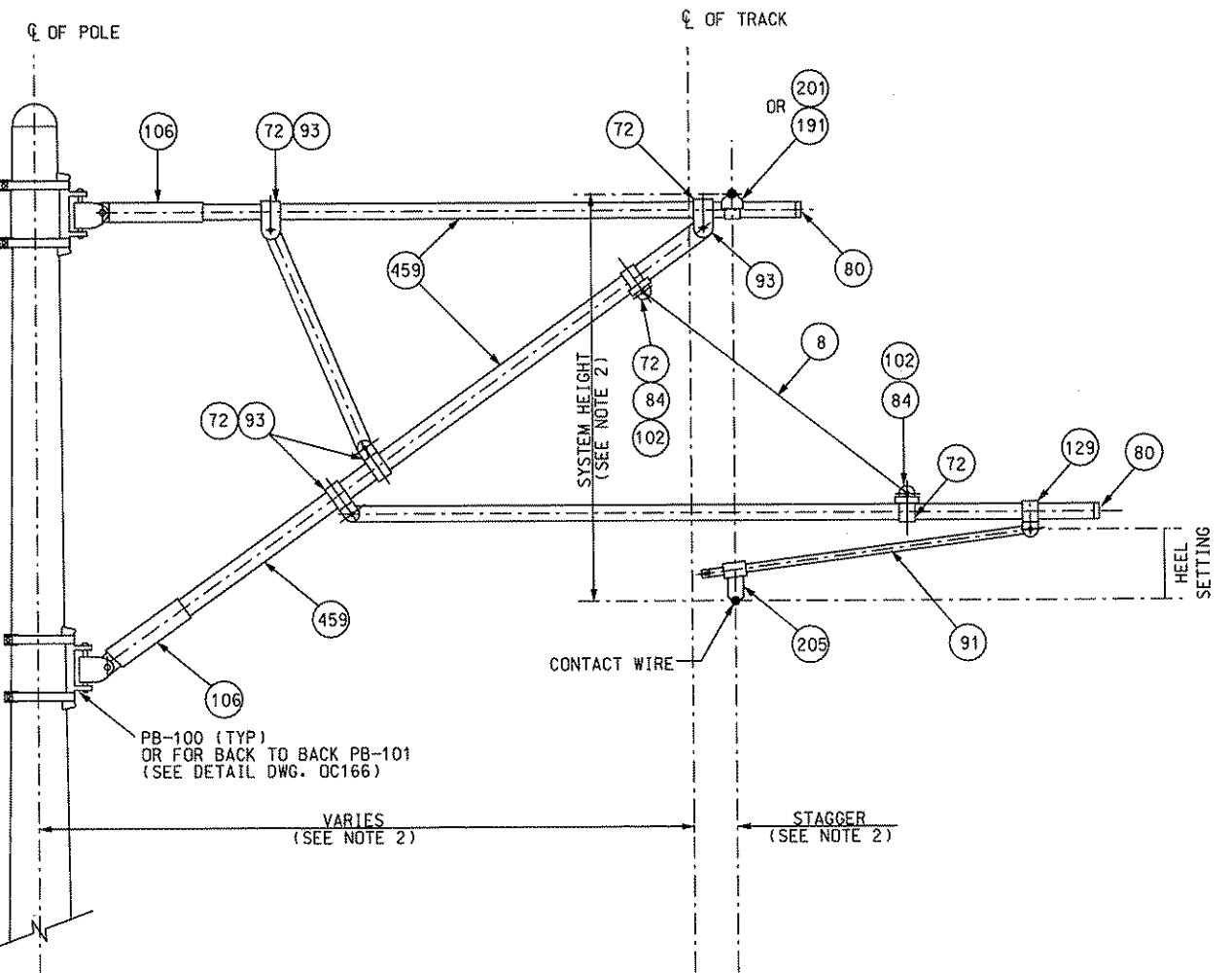
	NO. DATE	DESCRIPTION	REVISIONS

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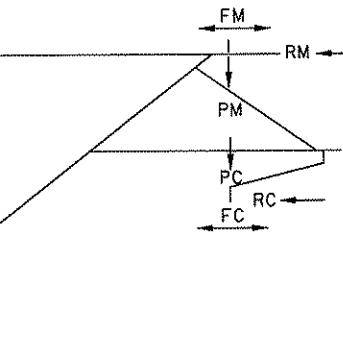


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Terry A. Shantz
OWNER
Mr. Terry A. Shantz
TERRY A. SHANTZ
PENNSYLVANIA
PROFESSIONAL ENGINEER
REGISTERED
SIGNATURE
APPROVED
DATE
4/28/08

DESIGNED SR ADKINS DRAWN KA BRANDT	PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH
CHECKED TA SHANTZ IN CHARGE CD JONES	NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE) REDUCED HEIGHT CANTILEVER
DATE APR. 28, 2008	
SCALE NTS	Port Authority
CONTRACT NO. NSC-009 DWG. NO. OC162	SHT. 185



LIGHT PUSH-OFF ASSEMBLY (CA-13L)



* = QUANTITY AS REQUIRED.

BILL OF MATERIAL

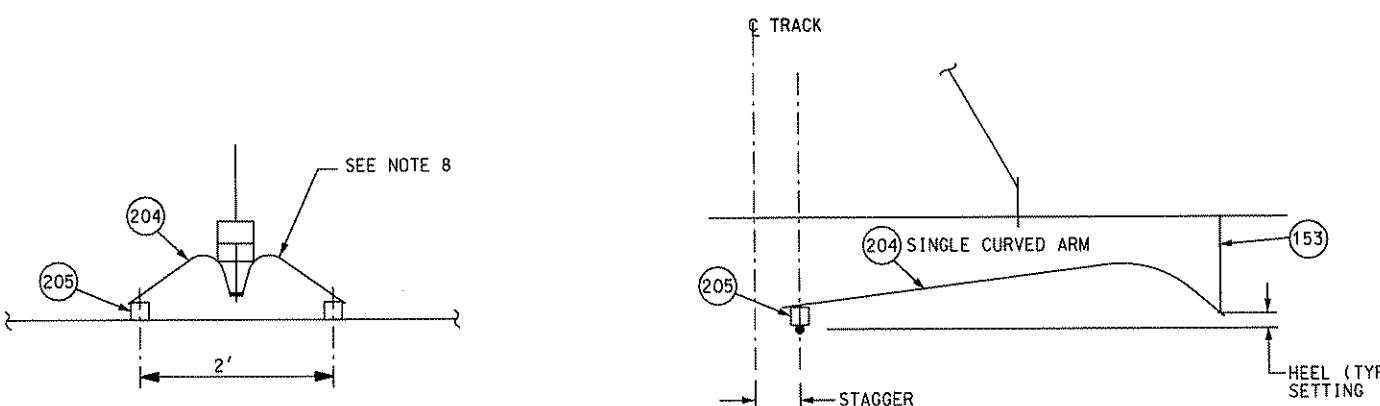
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.		
				CA-13L	CA-13M	CA-13H
8	ROPE - 0.25" STAINLESS STEEL	IMPULSE NC	00028-433	*	*	*
72	CLAMP - 2" PIPE CLEVIS	IMPULSE NC	055375-3001	6	6	6
80	CAP - 2" PIPE	IMPULSE NC	056030-4001	2	2	2
84	SLEEVE - 0.25" COMPRESSION	IMPULSE NC	056088-4004	2	2	2
91	ARM - STEADY 1" LIGHT DUTY	IMPULSE NC	75026-8060	1	-	-
93	EYE - 2" PIPE SCHEDULE 40 PIPE	IMPULSE NC	056463-3002	4	4	4
102	THIMBLE - 0.25" OPEN / PART# 10375	IMPULSE NC	056626-4001	2	2	2
106	INSULATOR - STRUT	IMPULSE NC	056909-3002	2	2	2
129	DROP BRACKET CLEVIS CLAMP	IMPULSE NC	056024-3001	1	-	-
152	Y - CLEVIS EYE ASSEMBLY	IMPULSE NC	059687-3001	-	-	1
153	CLAMP - 2" PIPE CLEVIS ASSEMBLY	IMPULSE NC	0674983	-	1	1
191	SADDLE INSULATOR - DBL. HORZ MESSENGER	IMPULSE NC	057217-3001	-	-	1
201	SADDLE INSULATOR - 2" HRZ MESSENGER	IMPULSE NC	057183-3003	1	1	-
204	ARM - UNINSULATED STEADY	IMPULSE NC	057823-8060	-	1	2
205	CLAMP - INSULATED SWIVEL	IMPULSE NC	0674999	1	1	2
459	PIPE - 2" SCHEDULE 40 (HDG) ASTM A500 STEEL, GRADE C			-	-	*

LOADING DIAGRAM

CANTILEVER TYPE	MAXIMUM LOADING (LBS)		
	FC+RC	FM+RM	PM+PC
CA-13L	390	480	830
CA-13M	750	1000	830
CA-13H	1150	1450	540

MAXIMUM WORKING LOADS

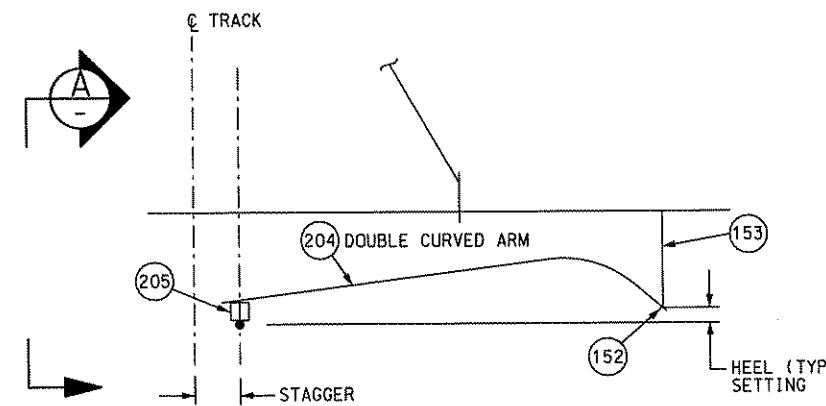
LOADING TABLE



SECTION

A
—

MEDIUM PUSH-OFF ASSEMBLY (CA-13M)



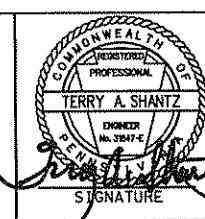
HEAVY PUSH-OFF ASSEMBLY (CA-13H)

NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
2. FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS. FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS.
3. STEADY ARM LENGTH, PIPE SIZES & HEEL SETTING TO BE DETERMINED BY CONTRACTOR
4. CONTRACTOR TO ENSURE THE CANTILEVER DESIGN CATERS FOR PANTOGRAPH DYNAMIC CLEARANCE ENVELOPE
5. CONTRACTOR TO COORDINATE PANTOGRAPH PROFILE WITH THE AUTHORITY
6. CONTRACTOR TO DESIGN CANTILEVERS BASED ON ACTUAL LOADING CONDITIONS
7. CANTILEVERS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSENGER AND CONTACT WIRES
8. USE TWO STEADY ARMS FOR HEAVY LOAD CONDITIONS

Gannett Fleming Transit & Rail Systems			
NO.	DATE	DESCRIPTION	
		REVISIONS	

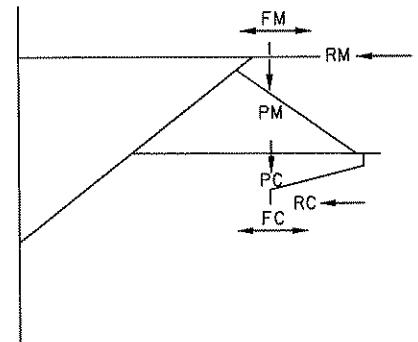
THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.



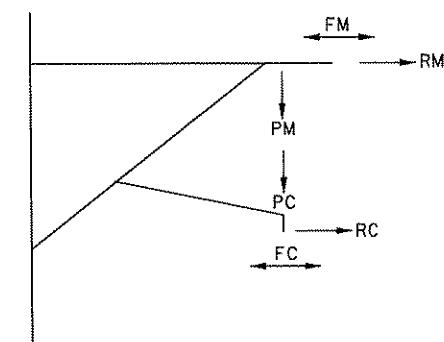
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
[Signature]
APPROVED DATE
SIGNATURE

DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS
CONTRACT NO. NSC-009
DWG. NO. OC163 SHT. 186

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
LIGHT, MEDIUM AND HEAVY CANTILEVER
PUSH OFF
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC163 SHT. 186



LOADING DIAGRAM (CA-21M)



LOADING DIAGRAM (CA-22M)

NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
2. FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO DCS PROFILE DRAWINGS.
3. FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS.
4. CONTRACTOR TO ENSURE THE CANTILEVER DESIGN CATERS FOR PANTOGRAPH DYNAMIC CLEARANCE ENVELOPE
5. CONTRACTOR TO COORDINATE PANTOGRAPH PROFILE WITH THE AUTHORITY
6. CONTRACTOR TO DESIGN CANTILEVERS BASED ON ACTUAL LOADING CONDITIONS
7. CANTILEVERS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSENGER AND CONTACT WIRES
8. REFER TO DWG DC166 FOR TWIN CANTILEVER MOUNTING BRACKET DETAIL

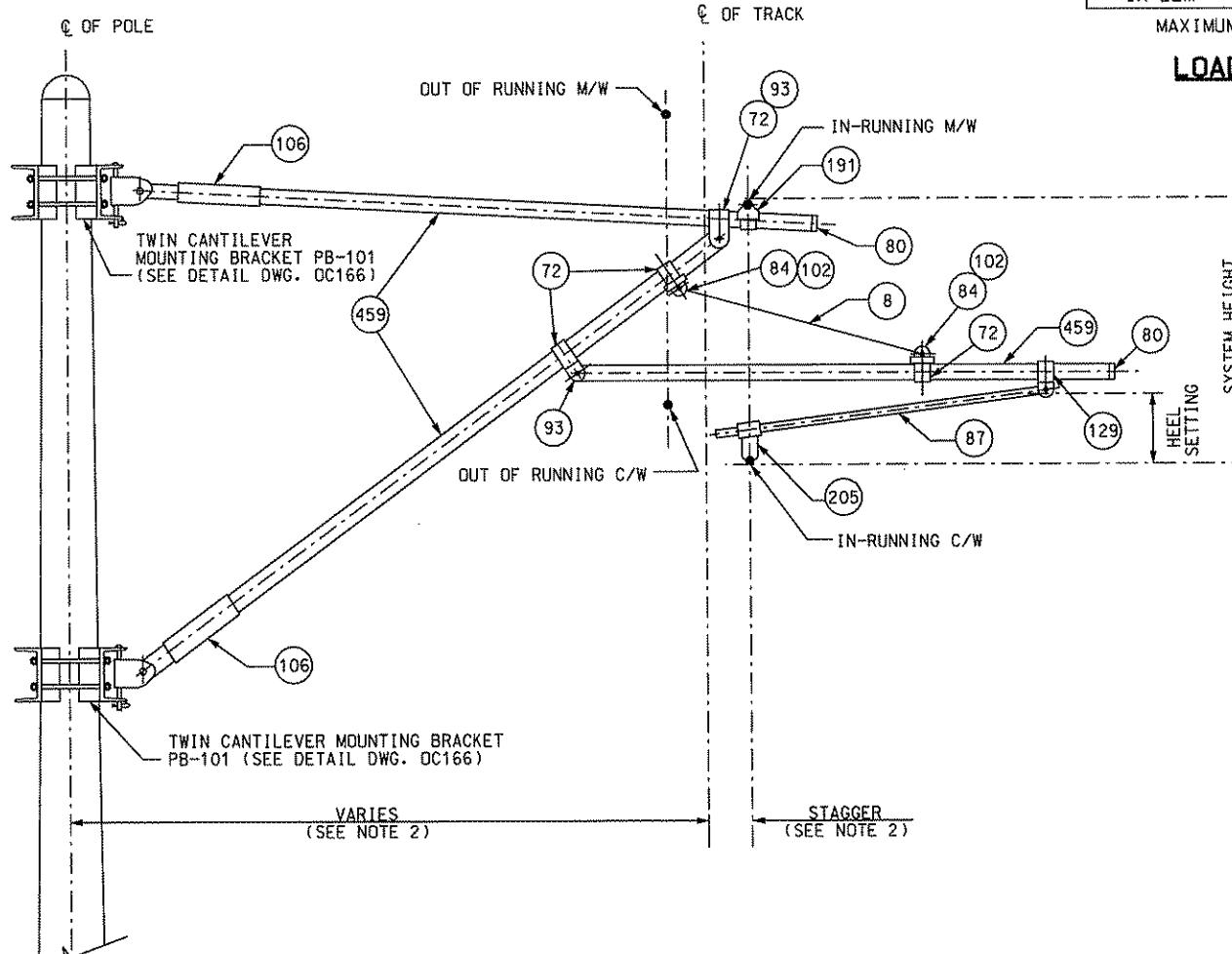
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	BILL OF MATERIAL	
				CA-21M	CA-22M
8	ROPE - 0.25" STAINLESS STEEL	IMPULSE NC	00028-433	*	-
72	CLAMP - 2" PIPE CLEVIS	IMPULSE NC	055375-3001	4	2
80	CAP - 2" PIPE	IMPULSE NC	056030-4001	2	1
84	SLEEVE - 0.25" COMPRESSION	IMPULSE NC	056088-4004	2	-
87	STEADY 1" HEAVY DUTY	IMPULSE NC	75033-806	1	1
93	EYE - 2" PIPE SCHEDULE 40 PIPE	IMPULSE NC	056463-3002	2	1
102	THIMBLE - 0.25" OPEN / PART# 10375	IMPULSE NC	056626-4001	2	-
106	INSULATOR - STRUT	IMPULSE NC	056909-3002	2	2
129	DROP BRACKET CLEVIS CLAMP	IMPULSE NC	056024-3001	1	-
191	INSULATOR - DBL. HORZ MESSENGER	IMPULSE NC	057217-3001	1	-
201	SADDLE - 2" HRZ MESSENGER	IMPULSE NC	057183-3003	-	1
205	CLAMP - INSULATED SWIVEL	IMPULSE NC	0674999	1	1
459	PIPE - 2" SCHEDULE 40 (HDG) ASTM A500 STEEL, GRADE C			-	*

* = QUANTITY AS REQUIRED.

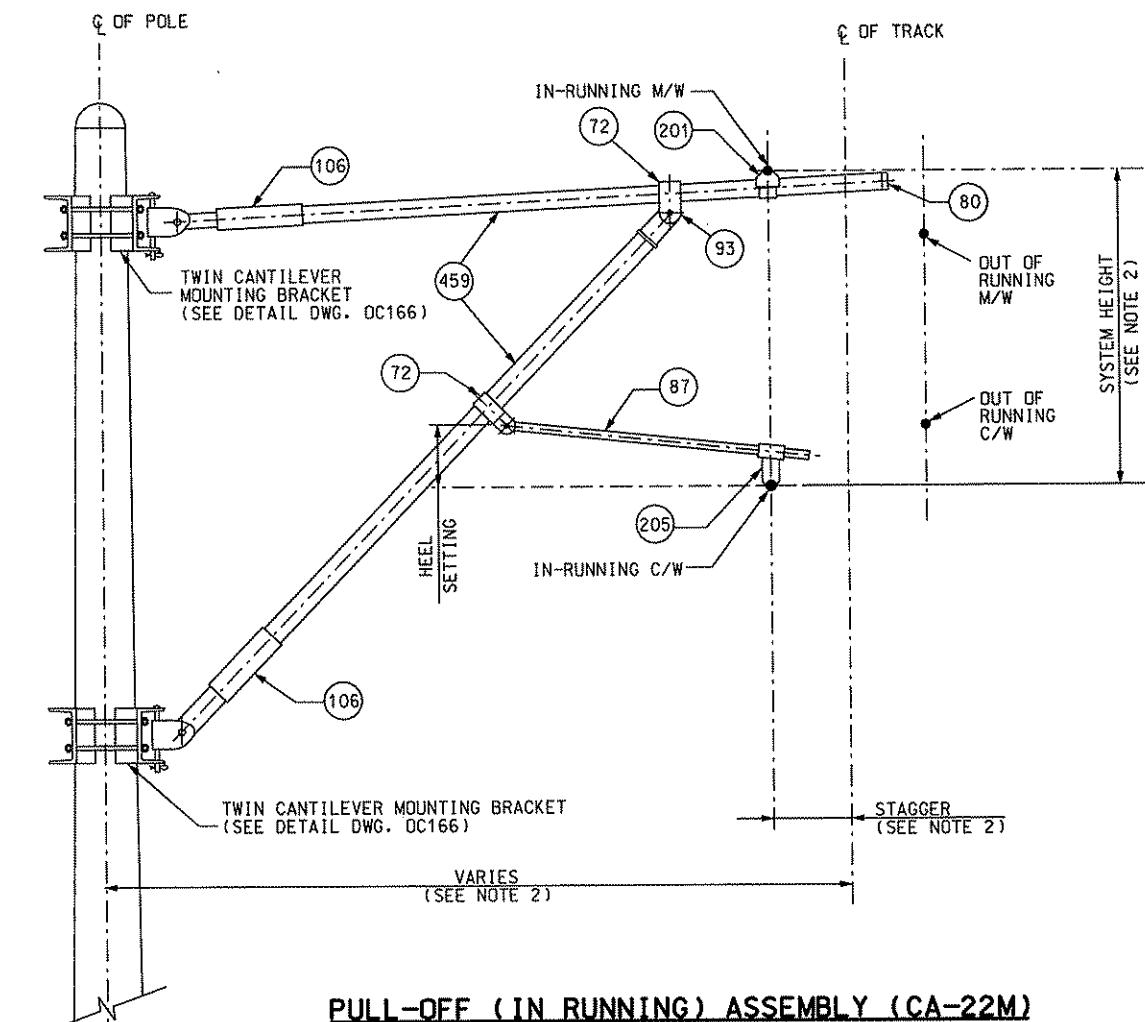
CANTILEVER TYPE	MAXIMUM LOADING (LBS)		
	FC+RC	FM+RM	PM+PC
CA-21M	230	300	640
CA-22M	260	330	520

MAXIMUM WORKING LOADS

LOADING TABLE



PUSH-OFF (IN RUNNING) ASSEMBLY (CA-21M)

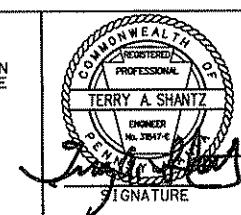


PULL-OFF (IN RUNNING) ASSEMBLY (CA-22M)

Gannett Fleming
Transit & Rail Systems

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.

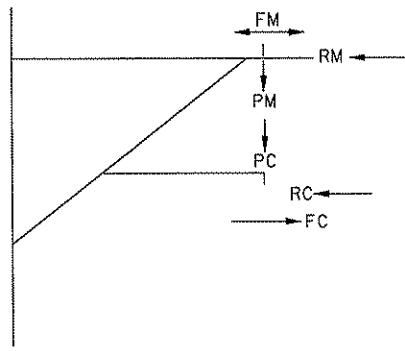


DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
APPROVED DATE
SIGNATURE

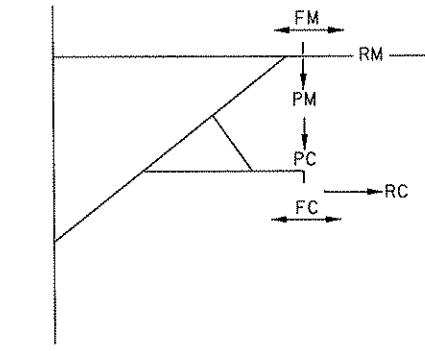
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
CANTILEVER PULL-OFF & PUSH-OFF
(OVERLAP IN-RUNNING)

CONTRACT NO. NSC-009
DWG. NO. OC164 SHT. 187



LOADING DIAGRAM (CA-23H)



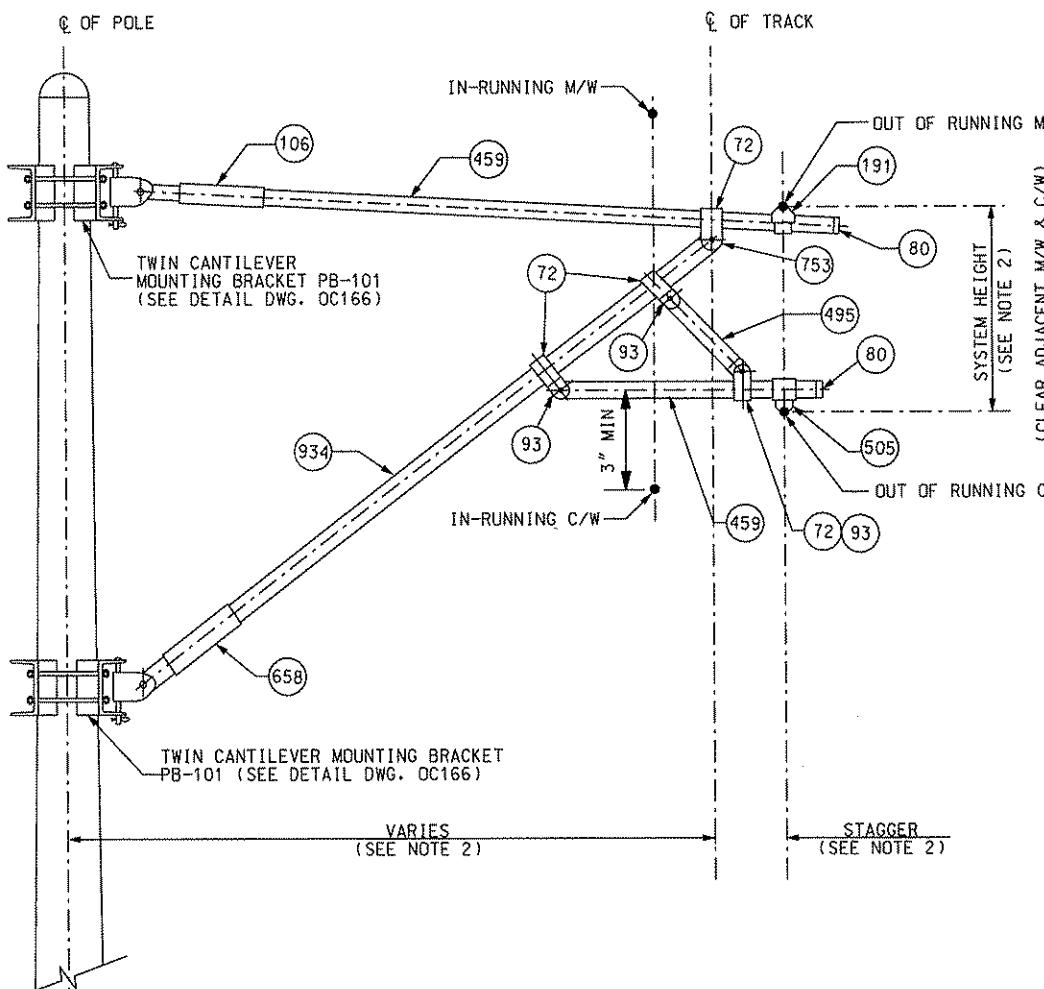
LOADING DIAGRAM (CA-24H)

NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
2. FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS. FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS.
3. STEADY ARM LENGTH, PIPE SIZES & HEEL SETTING TO BE DETERMINED BY CONTACTOR
4. CONTRACTOR TO ENSURE THE CANTILEVER DESIGN CATERS FOR PANTOGRAPH DYNAMIC CLEARANCE ENVELOPE
5. CONTRACTOR TO COORDINATE PANTOGRAPH PROFILE WITH THE AUTHORITY
6. CONTRACTOR TO DESIGN CANTILEVERS BASED ON ACTUAL LOADING CONDITIONS
7. CANTILEVERS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSENGER AND CONTACT WIRES
8. REFER TO DWG OC166 FOR TWIN CANTILEVER MOUNTING BRACKET DETAIL

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.	
				CA-23H	CA-24H
72	CLAMP - 2" PIPE CLEVIS	IMPULSE NC	055375-3001	4	4
80	CAP - 2" PIPE	IMPULSE NC	056030-4001	2	2
93	EYE - 2" PIPE SCHEDULE 40 PIPE	IMPULSE NC	056463-3002	3	4
106	INSULATOR - STRUT	IMPULSE NC	056909-3002	1	2
191	INSULATOR - DBL. HORZ MESSENGER	IMPULSE NC	057217-3001	1	1
215	STRAP, 1.50" x 0.50" x 20"	IMPULSE NC	93733-401	-	1
459	PIPE - 2" SCHEDULE 40 (HDG) ASTM A500 STEEL, GRADE C			-	*
495	STRAP, 1.50" x 0.50" x 10"	IMPULSE NC	93733-401	1	-
505	CLAMP, TROLLEY SWIVEL (2" PIPE)	IMPULSE NC	59923-300	1	1
658	TRANS*LITE STRUT 2"/80	IMPULSE NC	56909-300	1	-
753	EYE, 2" PIPE SCHEDULE 80	IMPULSE NC	56463-300	1	-
934	PIPE - 2" SCHEDULE 80 (HDG) ASTM A500 STEEL, GRADE C			-	*

* = QUANTITY AS REQUIRED.

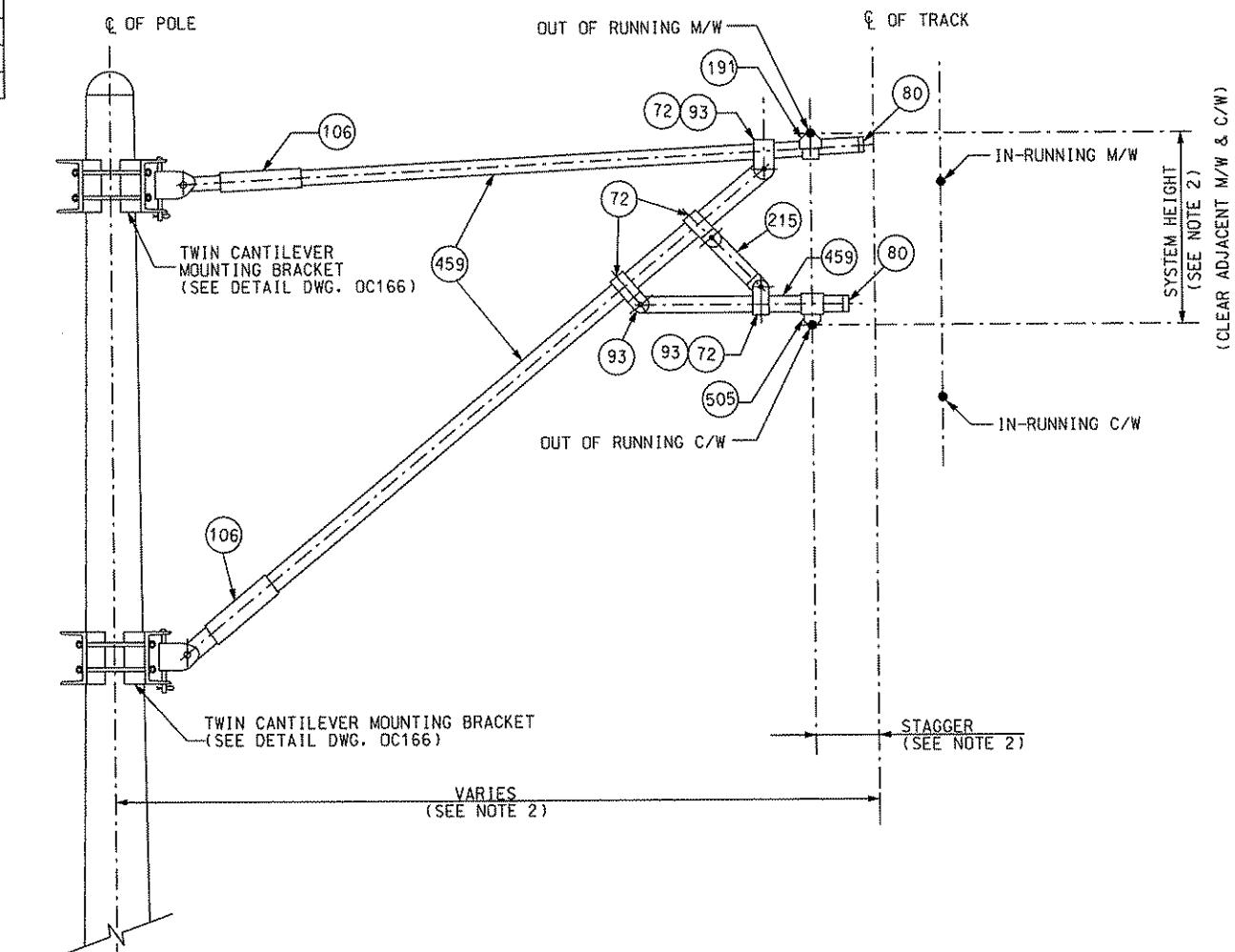


PUSH-OFF (OUT RUNNING) ASSEMBLY (CA-23H)

CANTILEVER TYPE	MAXIMUM LOADING (LBS)		
	FC+RC	FM+RM	PM+PC
CA-23H	1215	1560	660
CA-24H	775	1000	640

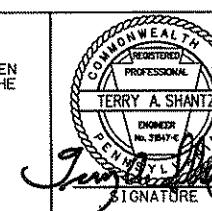
LOADING TABLE

MAXIMUM WORKING LOADS



PULL-OFF (OUT RUNNING) ASSEMBLY (CA-24H)

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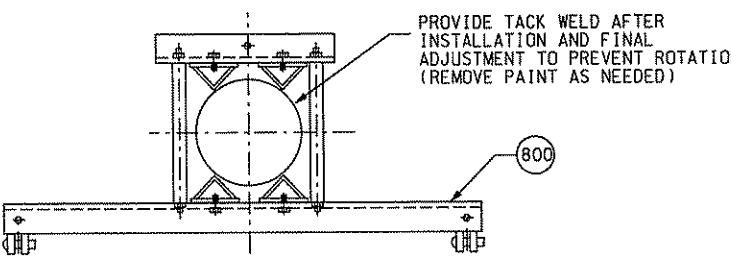


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Terry A. Shantz
TERRY A. SHANTZ
PENNSYLVANIA
NO. 3847-C
PROFESSIONAL
ENGINEER
REGISTERED
PITTSBURGH
APRIL 28, 2008
APPROVED
SIGNATURE
DATE
APRIL 28, 2008

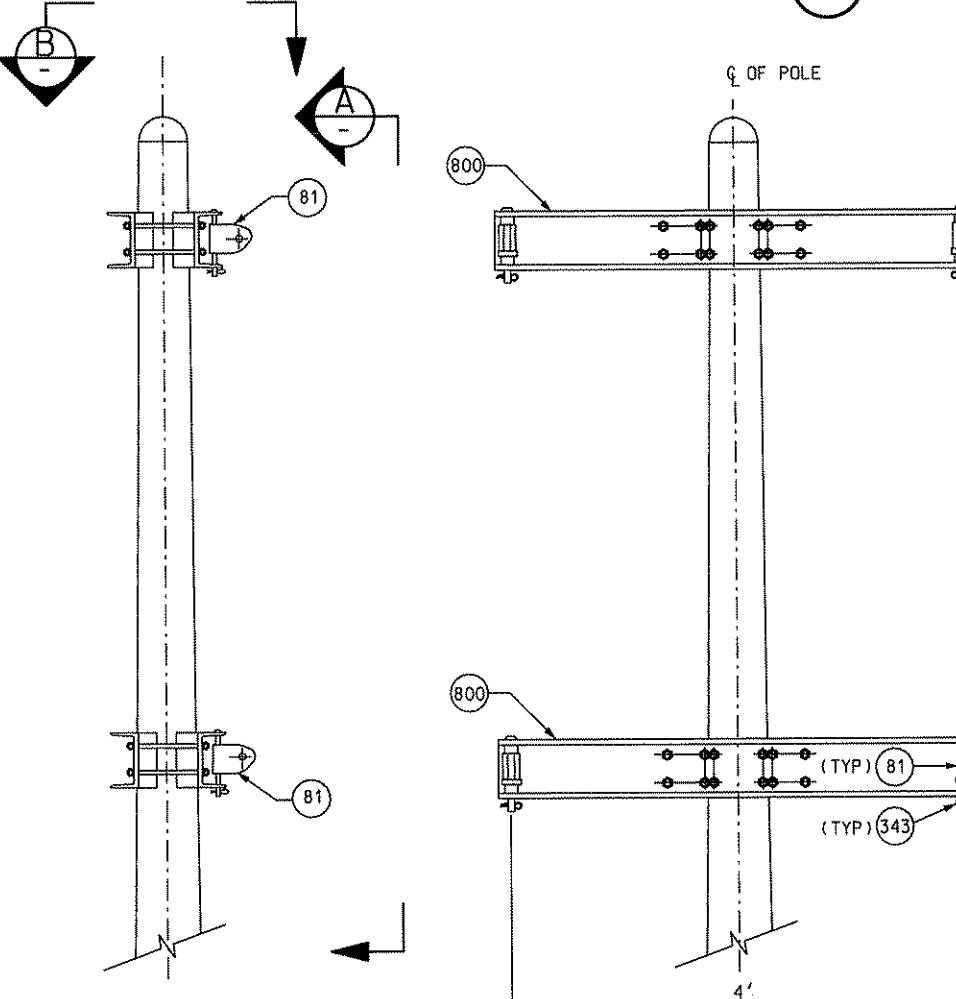
DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS
APPROVED DATE
APRIL 28, 2008

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
CANTILEVER PULL-OFF & PUSH-OFF
(OVERLAP OUT OF RUNNING)
CONTRACT NO. NSC-009
DWG. NO. OC165 SHT. 188

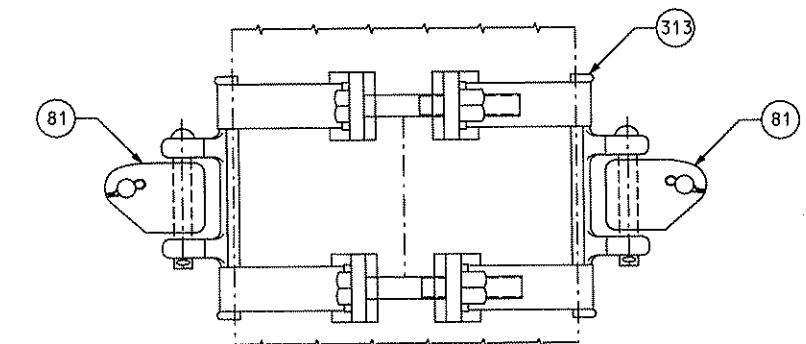
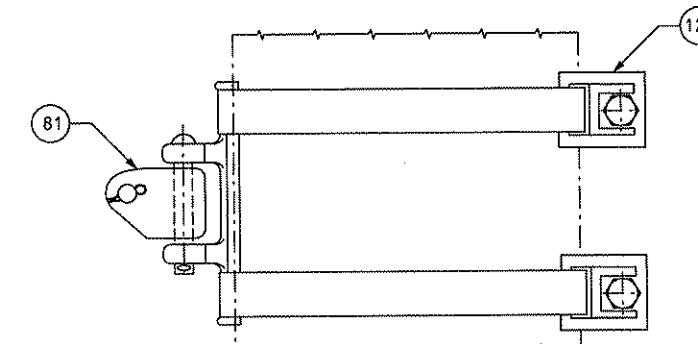
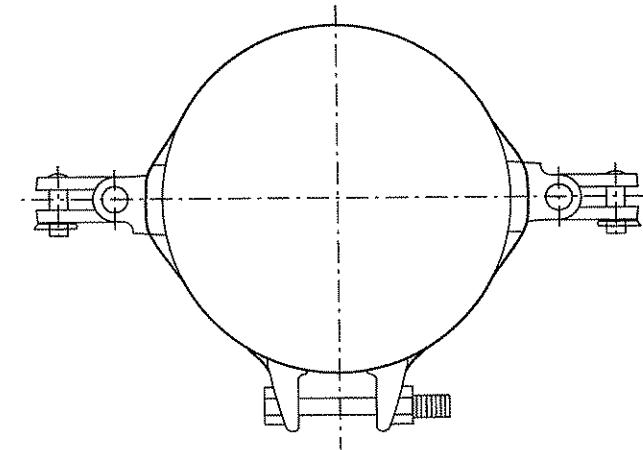
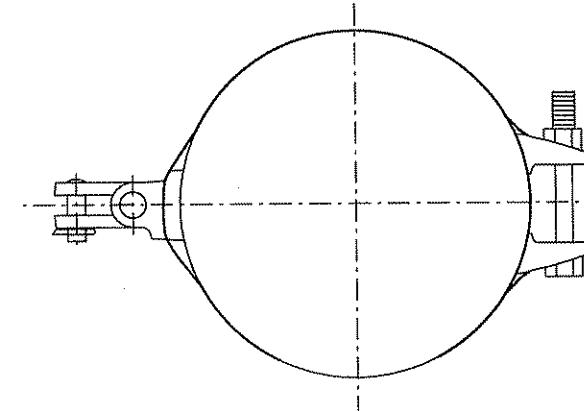
BILL OF MATERIAL						
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.		
				AD-100	PB-100	PB-101
6	WASHER, FLAT 0.63" x 175" OD (HDG)	IMPULSE NC	3-461	4	-	-
81	HINGE	IMPULSE NC	56062-300	4	1	2
122	BAND - POLE WITH SINGLE HINGE BRACKET	IMPULSE NC	57217-300	-	1	-
291	RIVET - 0.63" x 7"	IMPULSE NC	79055-423	4	-	-
313	BAND - POLE DOUBLE WITH HINGE BRACKET	IMPULSE NC	57217-300	-	-	1
343	COTTER	IMPULSE NC	86166-400	4	-	-
800	BRACKET - TWIN CANTILEVER MOUNTING	IMPULSE NC	59326-3002	2	-	-
910	SPACER	IMPULSE NC	676891	8	-	-



SECTION B



SECTION A



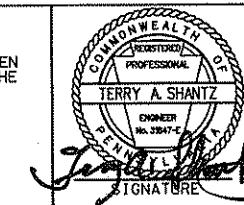
POLE BAND SINGLE SIDE (PB-100)

POLE BAND BACK TO BACK (PB-101)

TWIN CANTILEVER MOUNTING BRACKET (AD-100)
FOR TWIN CANTILEVERS - ONE TRACK

Gannett Fleming
Transit & Rail Systems

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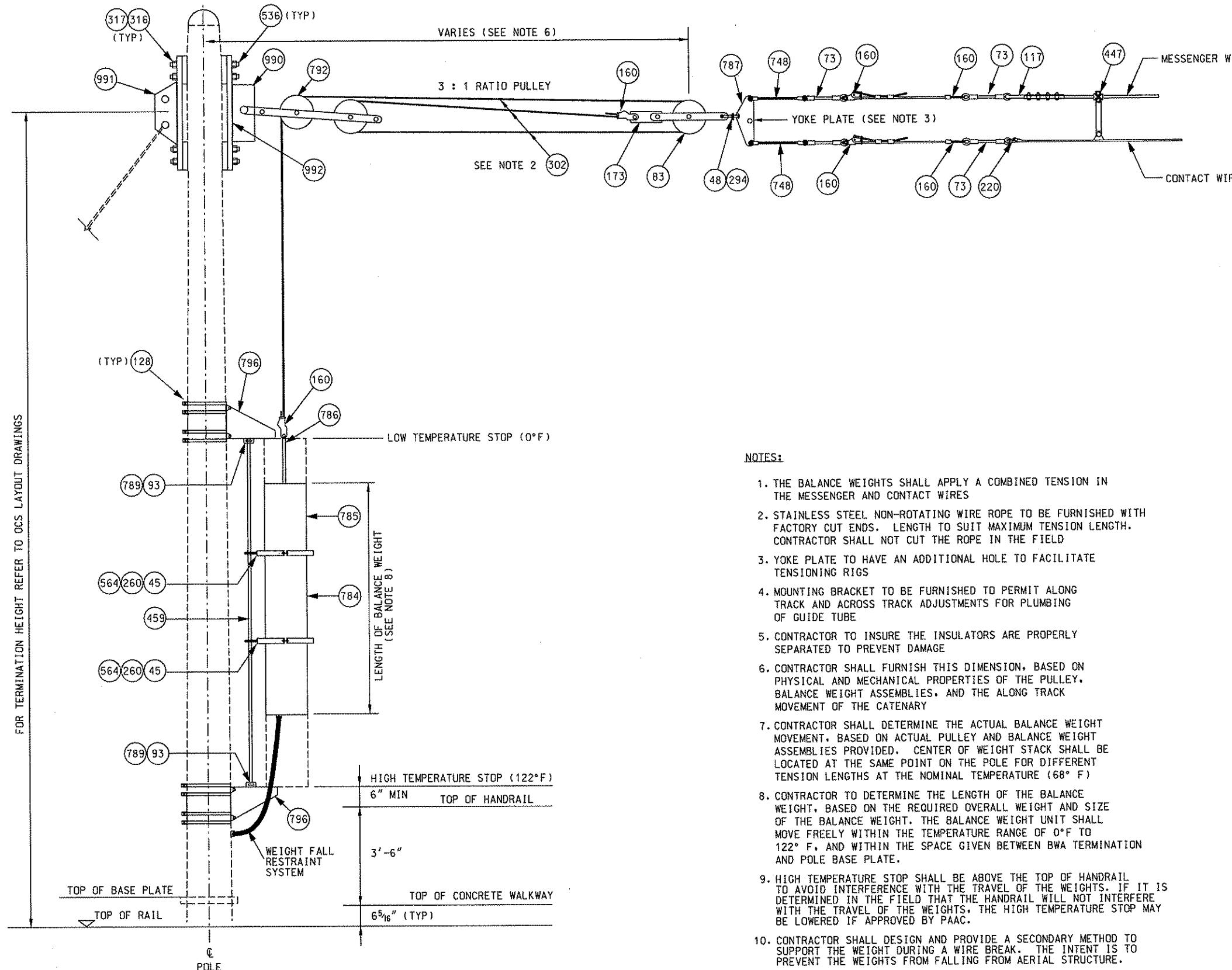


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
[Handwritten signatures over the text]

DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
POLE BANDS AND TWIN CANTILEVER BRACKET
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC166 SHT. 189

NO.	DATE	DESCRIPTION	REVISIONS



NOTES:

1. THE BALANCE WEIGHTS SHALL APPLY A COMBINED TENSION IN THE MESSINGER AND CONTACT WIRES
2. STAINLESS STEEL NON-ROTATING WIRE ROPE TO BE FURNISHED WITH FACTORY CUT ENDS. LENGTH TO SUIT MAXIMUM TENSION LENGTH. CONTRACTOR SHALL NOT CUT THE ROPE IN THE FIELD
3. YOKE PLATE TO HAVE AN ADDITIONAL HOLE TO FACILITATE TENSIONING RIGS
4. MOUNTING BRACKET TO BE FURNISHED TO PERMIT ALONG TRACK AND ACROSS TRACK ADJUSTMENTS FOR PLUMBING OF GUIDE TUBE
5. CONTRACTOR TO INSURE THE INSULATORS ARE PROPERLY SEPARATED TO PREVENT DAMAGE
6. CONTRACTOR SHALL FURNISH THIS DIMENSION, BASED ON PHYSICAL AND MECHANICAL PROPERTIES OF THE PULLEY, BALANCE WEIGHT ASSEMBLIES, AND THE ALONG TRACK MOVEMENT OF THE CATERNA
7. CONTRACTOR SHALL DETERMINE THE ACTUAL BALANCE WEIGHT MOVEMENT, BASED ON ACTUAL PULLEY AND BALANCE WEIGHT ASSEMBLIES PROVIDED. CENTER OF WEIGHT STACK SHALL BE LOCATED AT THE SAME POINT ON THE POLE FOR DIFFERENT TENSION LENGTHS AT THE NOMINAL TEMPERATURE (68° F)
8. CONTRACTOR TO DETERMINE THE LENGTH OF THE BALANCE WEIGHT, BASED ON THE REQUIRED OVERALL WEIGHT AND SIZE OF THE BALANCE WEIGHT. THE BALANCE WEIGHT UNIT SHALL MOVE FREELY WITHIN THE TEMPERATURE RANGE OF 0°F TO 122°F, AND WITHIN THE SPACE GIVEN BETWEEN BWA TERMINATION AND POLE BASE PLATE.
9. HIGH TEMPERATURE STOP SHALL BE ABOVE THE TOP OF HANDRAIL TO AVOID INTERFERENCE WITH THE TRAVEL OF THE WEIGHTS. IF IT IS DETERMINED IN THE FIELD THAT THE HANDRAIL WILL NOT INTERFERE WITH THE TRAVEL OF THE WEIGHTS, THE HIGH TEMPERATURE STOP MAY BE LOWERED IF APPROVED BY PAAC.
10. CONTRACTOR SHALL DESIGN AND PROVIDE A SECONDARY METHOD TO SUPPORT THE WEIGHT DURING A WIRE BREAK. THE INTENT IS TO PREVENT THE WEIGHTS FROM FALLING FROM AERIAL STRUCTURE.

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
45	LOCKWASHER, 5/8, STL. HDG	IMPULSE NC	019779-4055	2
48	EYE, BALL ANSI 52-3, 30K	IMPULSE NC	070776-2000	1
73	TRANS*LTE, INSULATOR, 0.63, E/E CHAIN	IMPULSE NC	055629-6150	4
83	SHEAVE, COUNTERWEIGHT	IMPULSE NC	056069-3002	1
93	EYE, PIPE 2" SCHEDULE 40	IMPULSE NC	056463-3002	2
117	CLAMP, STRAIGHTLINE, MESSENGER	IMPULSE NC	057174-3001	1
128	BAND, POLE SINGLE CLEVIS	IMPULSE NC	057234-3001	4
160	SOCKET, WEDGE 0.5" WIRE RDPE	IMPULSE NC	059971-3002	5
173	LINK, 0.63"	IMPULSE NC	79272-200	1
220	CLAMP, TROLLEY DEAD END 350 KCML	IMPULSE NC	014001-3007	1
260	NUT, 5/8-11+0.020 UFS 2B, HDG	IMPULSE NC	090499-4700	2
294	CLEVIS, SOCKET ANSI 52-3	IMPULSE NC	087603-2000	1
302	ROPE, 0.5" STAINLESS STEEL	IMPULSE NC	057464-4001	100
316	NUT, 0.75" HEX (+0.015) HDG	IMPULSE NC	090499-4800	8
317	WASHER, LOCK 0.75" (HDG)	IMPULSE NC	019779-4062	8
447	HANGER, RIGID 500/350T	IMPULSE NC	676913	1
459	PIPE - 2" SCHEDULE 40 (HDG) ASTM A500 STEEL, GRADE C		-	*
536	STUD, 0.75" x 16" HDG	IMPULSE NC	6774541600	4
564	BOLT-EYE, 0.63"	IMPULSE NC	678274	2
748	TURNBUCKLE, 0.75" x 12" J/J	IMPULSE NC	095683-3014	2
784	WEIGHT, 44 LBS, 12" x 14" (HDG)	IMPULSE NC	060414-4001	56
785	WEIGHT, 44 LBS, 12" x 14" (HDG) TAP	IMPULSE NC	060414-4002	2
786	ROD, WEIGHT SUPPORTED ASSEMBLY	IMPULSE NC	6774728073	1
787	PLATE, YOKE (BWA) 4500 LBS / 2925 LBS	IMPULSE NC	057196-4004	1
789	CLAMP, I-BEAM 5.5" FLANGE	IMPULSE NC	020494-3012	2
792	SHEAVE, COUNTERWEIGHT	IMPULSE NC	057207-3003	1
796	BRACKET, COUNTERWEIGHT STOP	IMPULSE NC	060430-3001	2
990	BRACKET, SHEAVE MOUNTING	IMPULSE NC	060464-3002	1
991	BRACKET, DOWN GUY ATTACHMENT	IMPULSE NC	060464-3001	1
992	PLATE, BACKING	IMPULSE NC	060464-3003	1

* = QUANTITY AS REQUIRED.

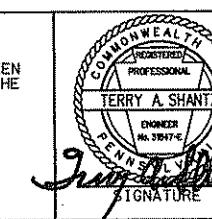
BALANCE WEIGHT ANCHOR (CT-100)

VIEW LOOKING ACROSS TRACK

Gannett Fleming
Transit & Rail Systems

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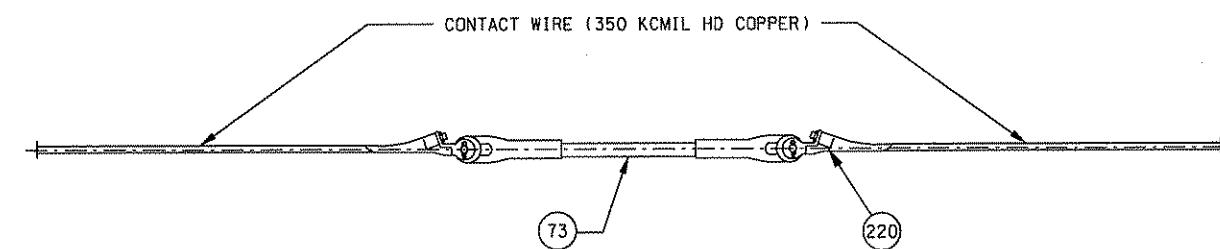
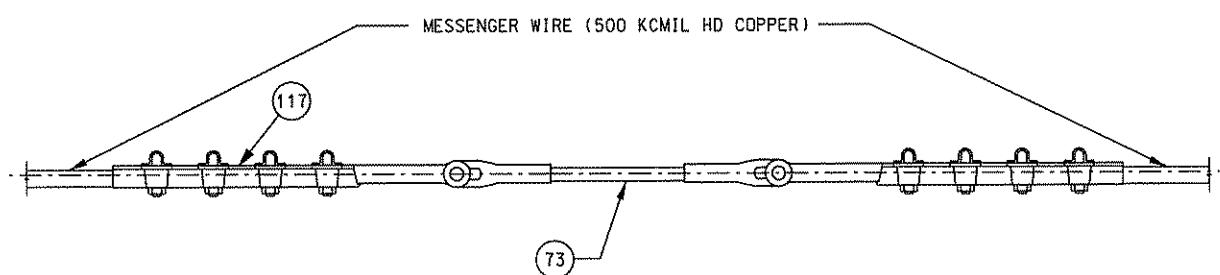
NO.	DATE	DESCRIPTION	REVISIONS



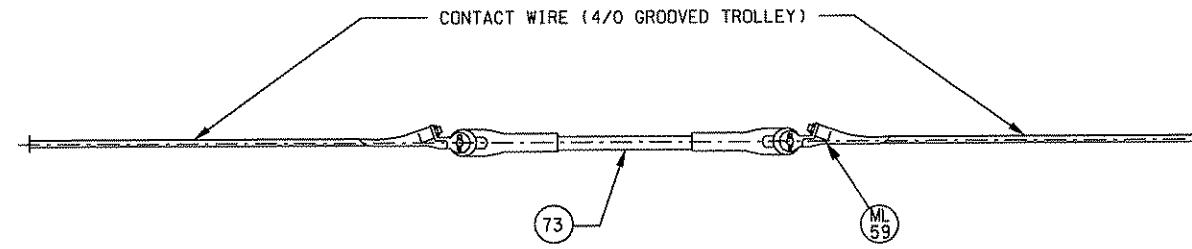
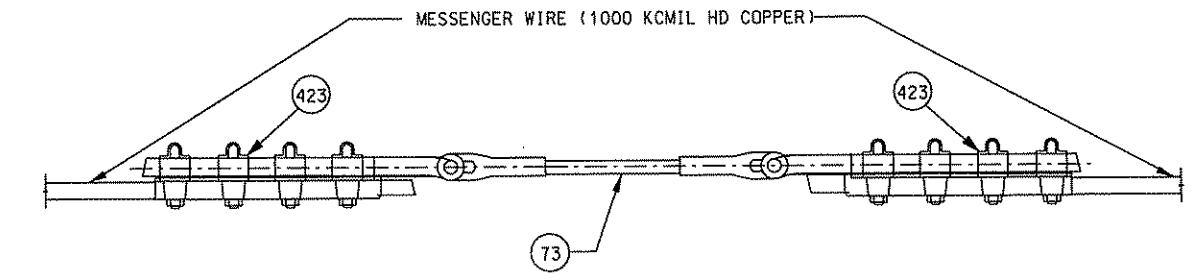
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
APPROVED
DATE APR. 28, 2008
SIGNATURE
David J. Hwang 4/28/08

DESIGNED SR ADKINS DRAWN HT TRAN	PORT AUTHORITY OF ALLEGHENY COUNTY PITTSGURGH
CHECKED TA SHANTZ	NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE)
IN CHARGE CD JONES	BALANCE WEIGHT ANCHOR
DATE APR. 28, 2008	CONTRACT NO. NSC-009
SCALE NTS	Dwg. No. OC167 Sht. 190
Port Authority	

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY. IS-100 IS-101
73	TRANS-LITE - $\frac{5}{8}$ " E/E 10K	IMPULSE NC	055629-6150	2 2
117	CLAMP - STRAIGHTLINE MESSENGER	IMPULSE NC	057174-3001	2 -
220	CLAMP - TROLLEY DEADEND 350	IMPULSE NC	014001-3007	2 -
ML59	CLAMP - TROLLEY DEADEND 4/0	IMPULSE NC	015964-2000	- 2
423	CLAMP - DEAD-END FOR 1000 KCMIL	IMPULSE NC	014497-3001	- 2



IN-SPAN INSULATION (IS-100)



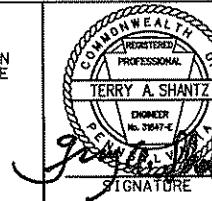
IN-SPAN INSULATION (IS-101)

NOTES:

- FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES,
SEE DRAWINGS GN203, GN310 AND OC007

			
NO.	DATE	DESCRIPTION	
		REVISIONS	

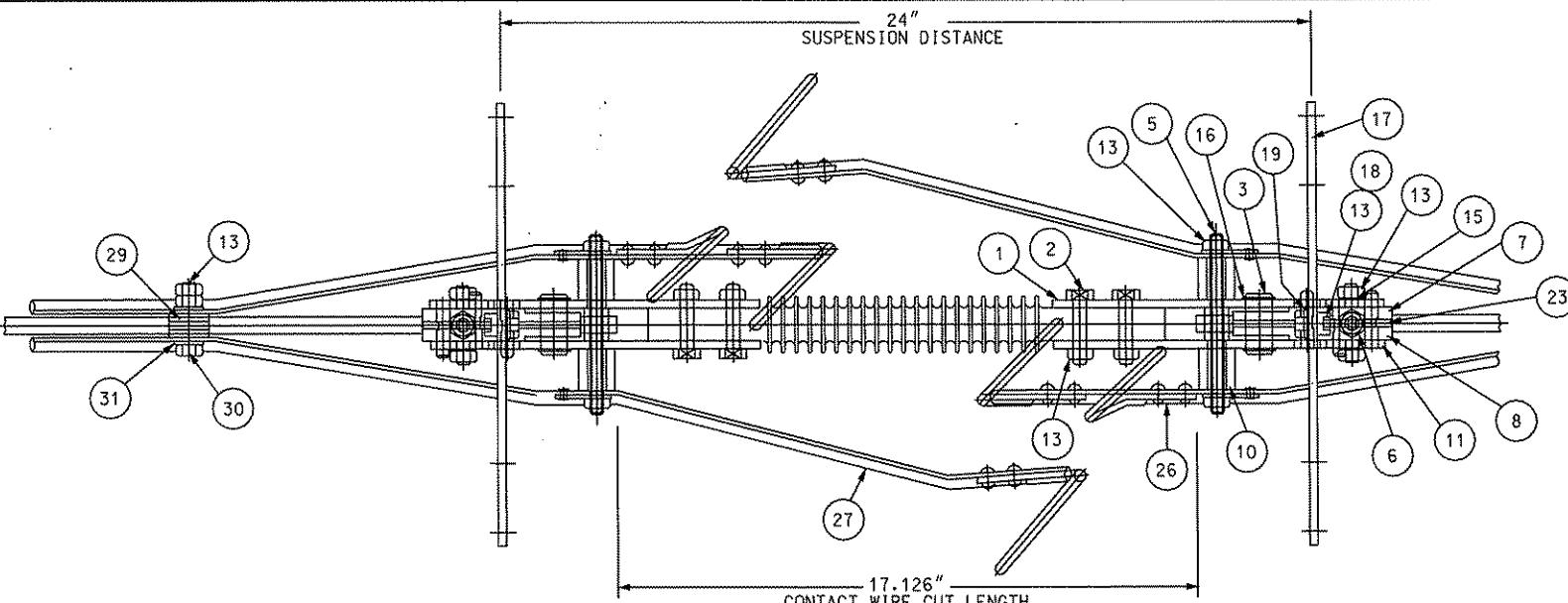
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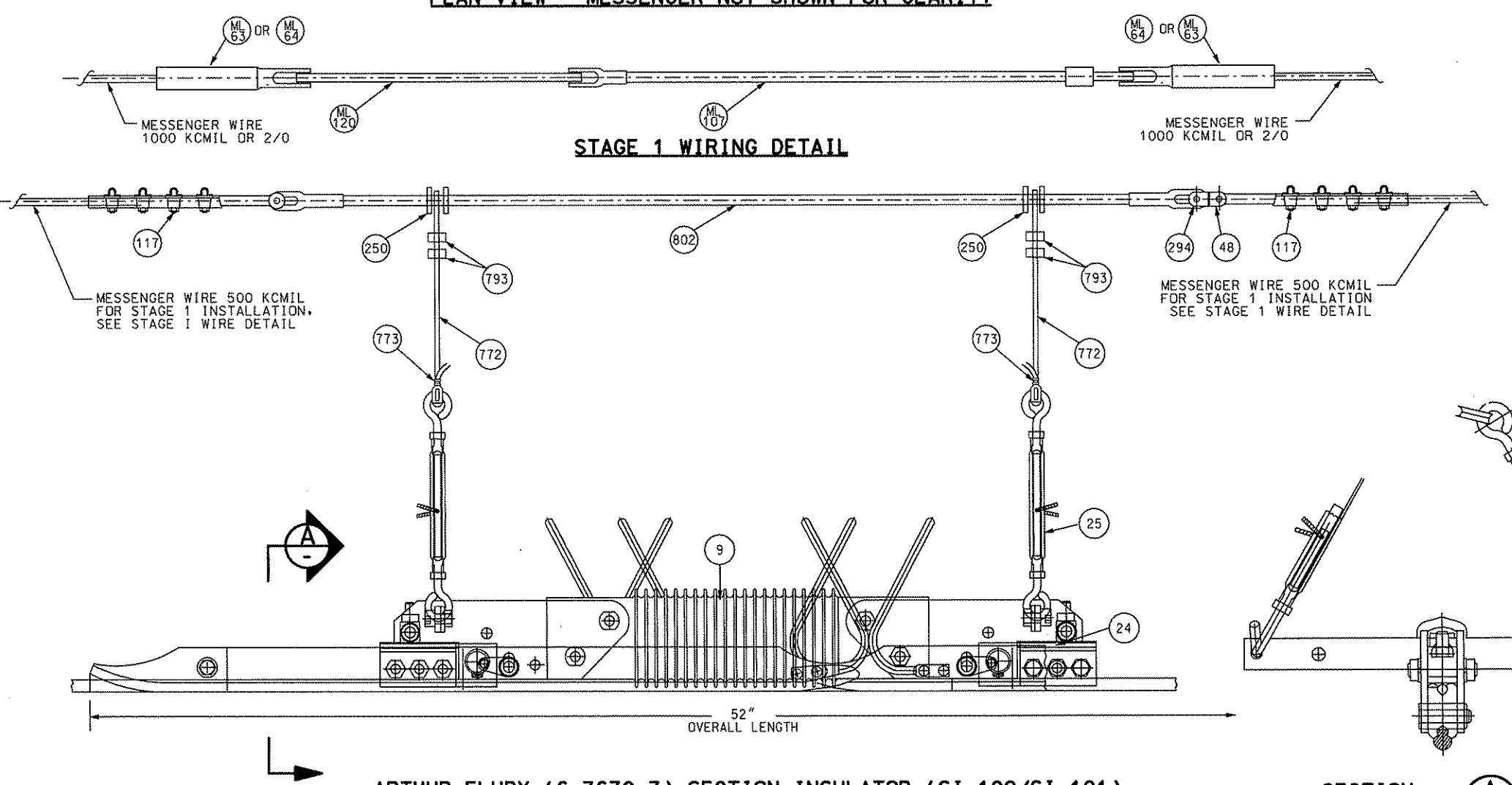
DMJM HARRIS | AECOM
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PITTSBURGH, PA. 15222
[Handwritten signatures]
APPROVED DATE
APR. 28, 2008

DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
IN-SPAN INSULATION
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC168 SHT. 91



PLAN VIEW - MESSENGER NOT SHOWN FOR CLARITY



ARTHUR FLURY (6-3670-7) SECTION INSULATOR (SI-100/SI-101)

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY. SI-100 SI-101
1	PLATE	ARTHUR FLURY	066.0827	4 4
2	BOLT	ARTHUR FLURY	066.1175	4 4
3	BOLT	ARTHUR FLURY	066.0829	2 2
5	BOLT	ARTHUR FLURY	066.0831	2 2
6	ADJUSTEMENT DEVICE	ARTHUR FLURY	066.1340	2 2
7	CLAMPING PLATE RIGHT	ARTHUR FLURY	066.0833	2 2
8	CLAMPING PLATE LEFT	ARTHUR FLURY	066.0834	2 2
9	INSULATOR BEAM	ARTHUR FLURY	941.00.122	1 1
10	DISTANCE SLEEVE	ARTHUR FLURY	066.0835	4 4
11	HEXAGON SCREW	ARTHUR FLURY	951.04.334	6 6
13	HEXAGON NUT	ARTHUR FLURY	950.04.318	24 24
15	WASHER	ARTHUR FLURY	953.04.001	4 4
16	LOCKING RING	ARTHUR FLURY	953.04.029	4 4
17	SUSPENSION	ARTHUR FLURY	066.0772	2 2
18	HEXAGON SCREW	ARTHUR FLURY	951.04.010	2 2
19	PLATE	ARTHUR FLURY	066.0875	2 2
23	DISTANCE PIECE	ARTHUR FLURY	066.0157	2 2
24	HEAVY TYPE DOWEL PIN	ARTHUR FLURY	954.04.007	2 2
25	TURNBUCKLE	ARTHUR FLURY	690.038.000	4 4
26	SKID LEFT	ARTHUR FLURY	659.500.176	2 2
27	SKID RIGHT	ARTHUR FLURY	659.500.165	2 2
29	CLAMPING PLATE	ARTHUR FLURY	066.1143	4 4
30	HEXAGON SCREW	ARTHUR FLURY	951.04.304	2 2
31	WASHER	ARTHUR FLURY	953.04.011	4 4
48	EYE, BALL ANSI 52-3, 30K	IMPULSE NC	070776-2000	1 -
117	CLAMP, STRAIGHTLINE, MESSENGER	IMPULSE NC	057174-3001	2 -
250	ARMOR AND LINER, .63"	IMPULSE NC	055412-4001	2 -
294	CLEVIS, SOCKET ANSI 52-3	IMPULSE NC	087603-2000	1 -
772	HANGER, ROPE .19" STAINLESS STEEL	IMPULSE NC	000029-4330	* *
773	SLEEVE, .19 COMPRESSION	IMPULSE NC	056088-4001	4 4
793	CLIP, GUY .19" STAINLESS STEEL	IMPULSE NC	000008-4510	8 8
802	TRANS-LITE INSULATOR,.63, E/E,10K	IMPULSE NC	055629-6540	1 -
ML63	DEADEND CLAMP FOR 2/0 STRAND	BURNDY	DUW 26	- 2
ML64	DEADEND CLAMP FOR 1000 KCMIL	BURNDY	DUW 44	- 2
ML107	HI-LITE STRAIN INSULATOR	IMPULSE NC	055819-6146	- 1
ML120	EXTENSION STRAP, DRILL ONE SIDE	IMPULSE NC	093733	- 1

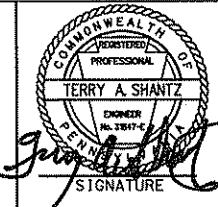
* = QUANTITY AS REQUIRED

** = ITEMS NUMBERS 1-31 INCLUDED ON THIS DRAWING ARE FROM THE MANUFACTURER'S CATALOG CUT SHEET.

NOTE: "ML" ITEMS ARE STAGE I ITEMS

NO.	DATE	DESCRIPTION	REVISIONS	
			REVISED	REVISIONS
Gannett Fleming Transit & Rail Systems				

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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Terry A. Shantz
PROFESSIONAL
ENGINEER
REGISTRATION
BOARD
PENNSYLVANIA
APRIL 28, 2008
Signature
Approved
Date
4/28/08

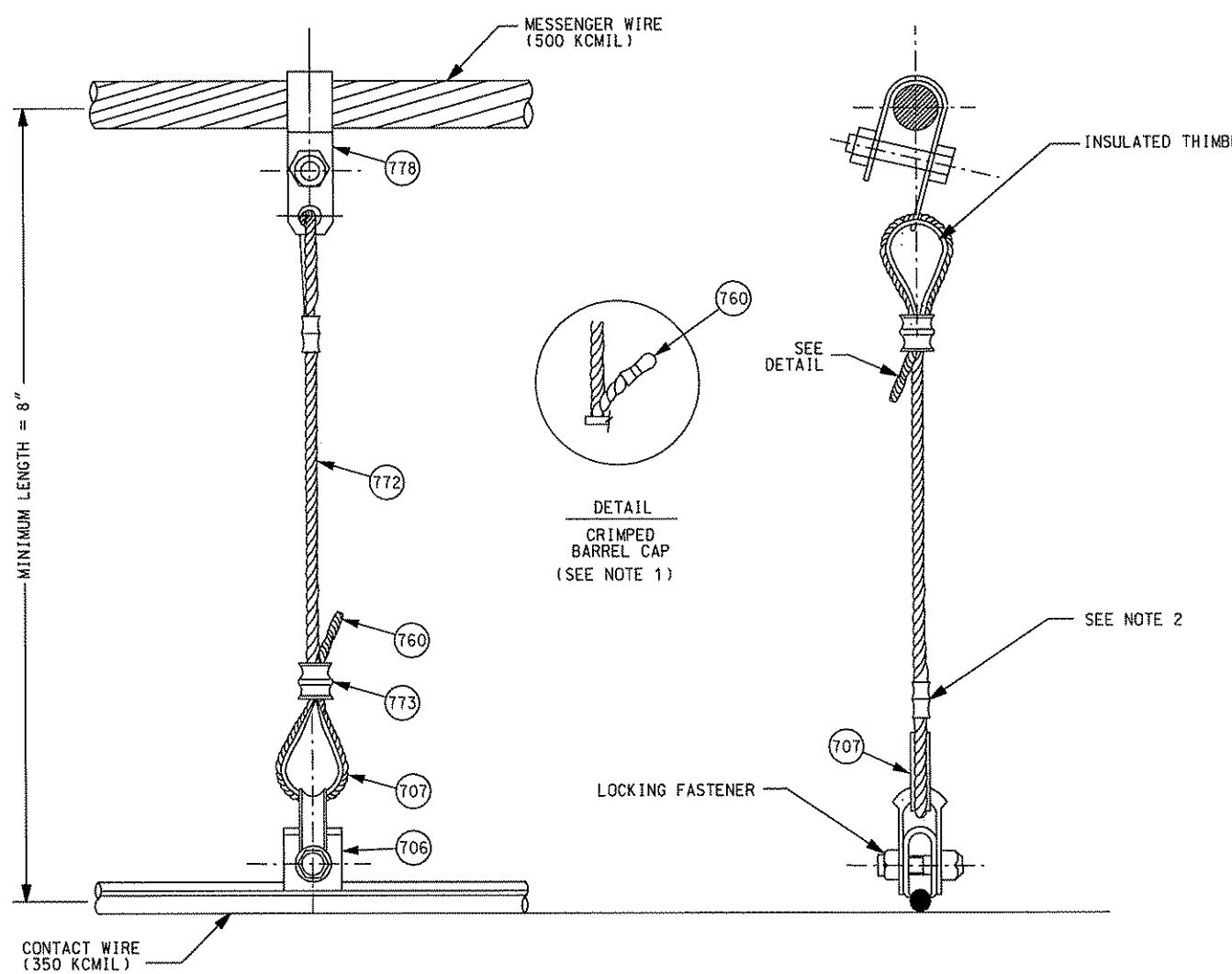
SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS
Signature
Approved
Date
4/28/08

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
SECTION INSULATOR DETAILS
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC169 SHT. 192

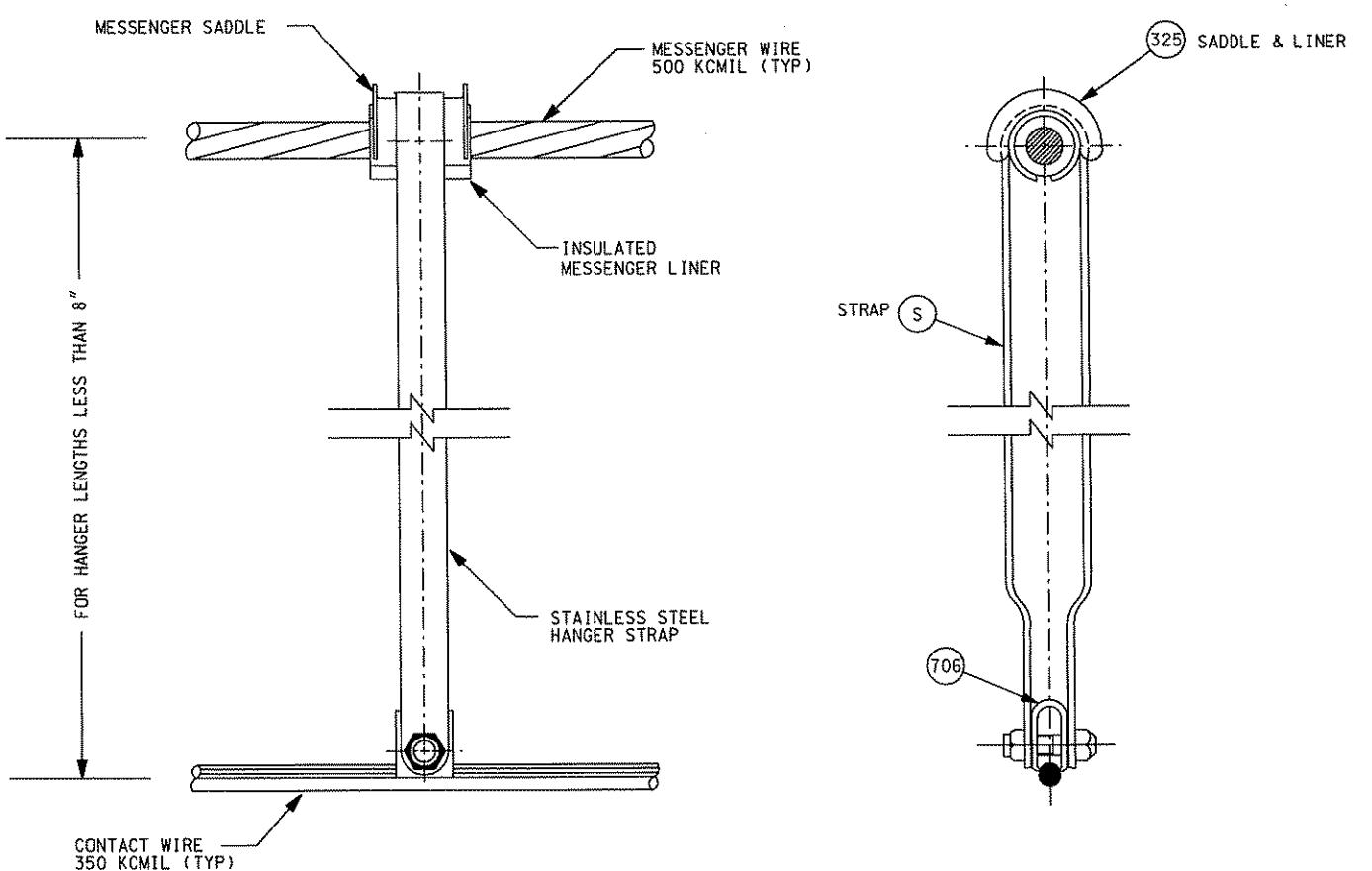
BILL OF MATERIAL

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
			HA-100	HA-101
706	CLAMP - HANGER CONTACT WIRE	IMPULSE NC	694206-3001	1 1
707	THIMBLE - 0.25" INSULATED	IMPULSE NC	694207-4002	2 -
760	CAP, CRIMP 0.19" COPPER	IMPULSE NC	692596-0030	2 -
772	ROPE, 0.19" STAINLESS STEEL	IMPULSE NC	000029-4330	* -
773	SLEEVE, 0.19" COMPRESSION	IMPULSE NC	056088-4001	2 -
778	CLAMP, FLEX HANGER 500 KCMIL MESSINGER	IMPULSE NC	060459-3001	1 -
325	INSULATED MESSENGER SADDLE	IMPULSE NC	054801-3007	- 1
S	STAINLESS STEEL STRAP, .75" x .0625" TH		-	- *

* = QUANTITY AS REQUIRED.



STANDARD INSULATED HANGER ASSEMBLY (HA-100)



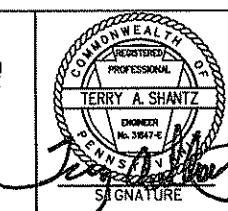
REDUCED LENGTH INSULATED HANGER ASSEMBLY (HA-101)

NOTES:

1. CAP ENDS TO ELIMINATE CABLE FRAYING. (DO NOT USE TAPE)
2. USE WIRE CLAMP TEMPORARILY AND CRIMP AFTER FINAL ADJUSTMENT

NO.	DATE	DESCRIPTION	REVISIONS	

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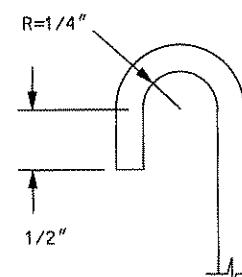
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Dave P. Henry 4/28/08
APPROVED DATE

DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

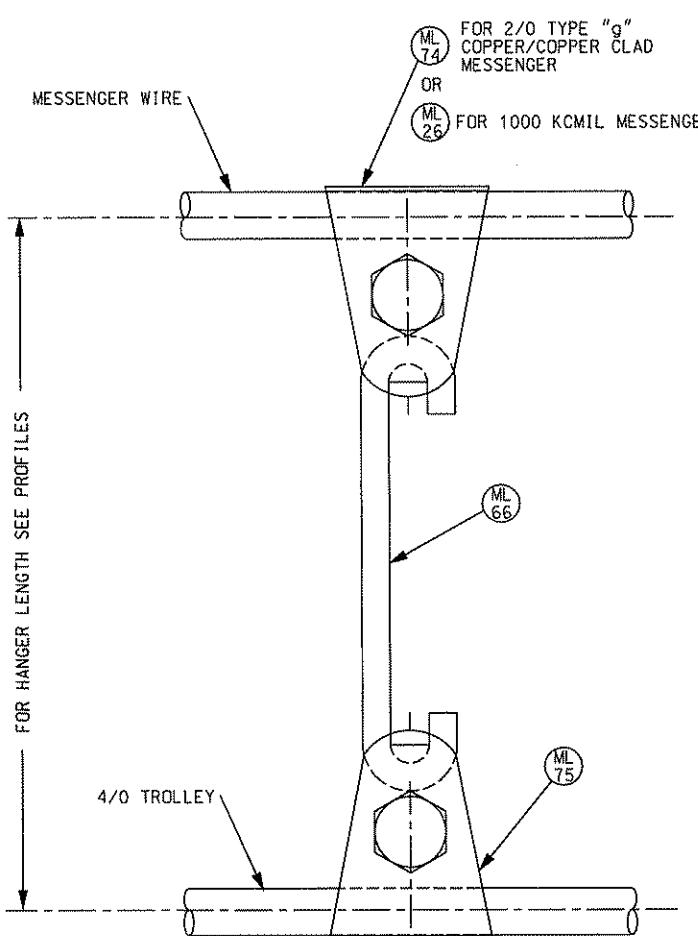
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
INSULATED HANGER ASSEMBLY
DETAILS
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC171 SHT. 193

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QUANTITIES			
				MH-1	MH-2	YH-1	YH-2
ML26	CLAMP - 1.152" DIA MESS TO .25" DIA HANGER ROD, BRZ. WITH HOLLOW SCREW	DOSSERT	DMC 100-1/4	1	1	-	-
ML66	HANGER ROD - .25 DIA BRZ, FIELD FABRICATED	IMPULSE	71-4404	*	*	*	*
ML74	CLAMP - 2/0 TO .25" DIA HANGER ROD, BRZ. WITH HOLLOW SCREW	DOSSERT	DMC 13-1/4	-	-	1	1
ML75	CLIP - 4/0 GROOVED WIRE TO .25 DIA HANGER ROD, BRZ.	IMPULSE	16095-3001	1	1	1	1

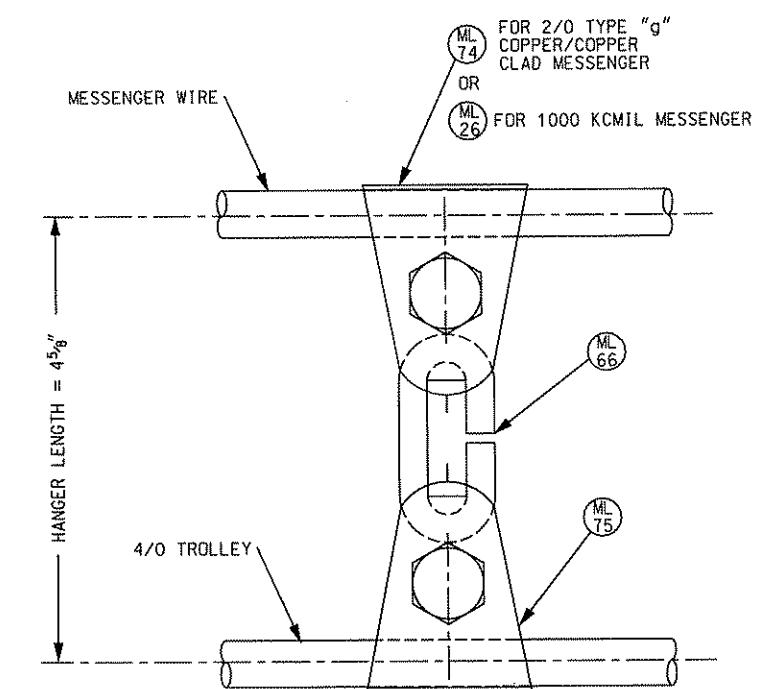
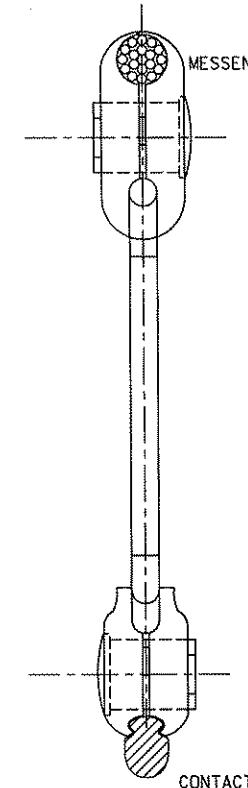
* = QUANTITY AS REQUIRED.



BENDING DETAIL

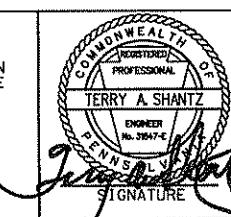


MAINLINE HANGER (MH-1) / YARD HANGER (YH-1)



MAINLINE HANGER (MH-2) / YARD HANGER (YH-2)

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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
David J. Henry 4/28/08
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DRAWN HT TRAN
CHECKED TA SHANTZ
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DATE APR. 28, 2008
SCALE NTS
APPROVED DATE

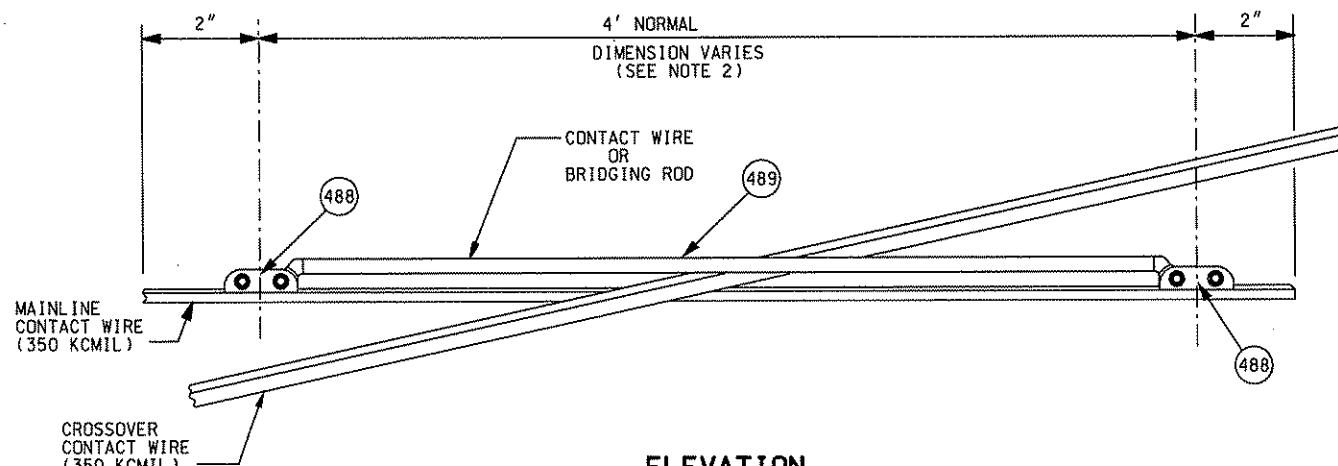
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
STAGE I HANGER DETAILS
CONTRACT NO. NSC-009
DWG. NO. OC172 SHT. 194

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
488	CLAMP - CONTACT BRIDGE ASSEMBLY	IMPULSE NC	056048-3003	2
489	PIPE - 0.50" IPS SCHEDULE 40 (BRONZE)	IMPULSE NC	000075-4255	*

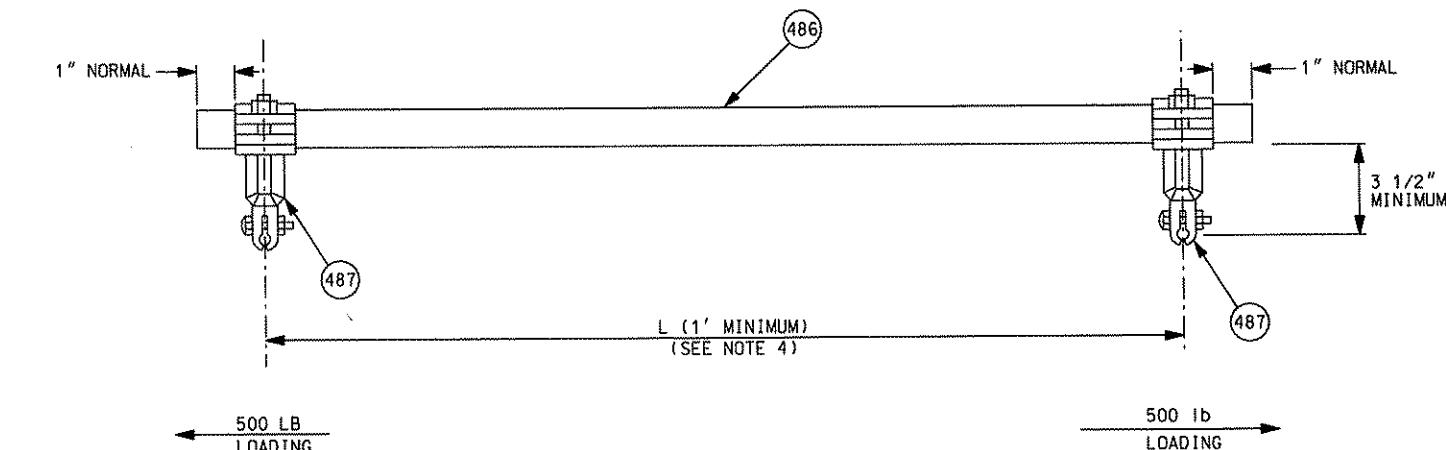
* = QUANTITY AS REQUIRED.

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
486	STEADY TUBE	IMPULSE NC	057804-8032	1
487	CLAMP - TROLLEY SWIVEL	IMPULSE NC	057219-3001	2

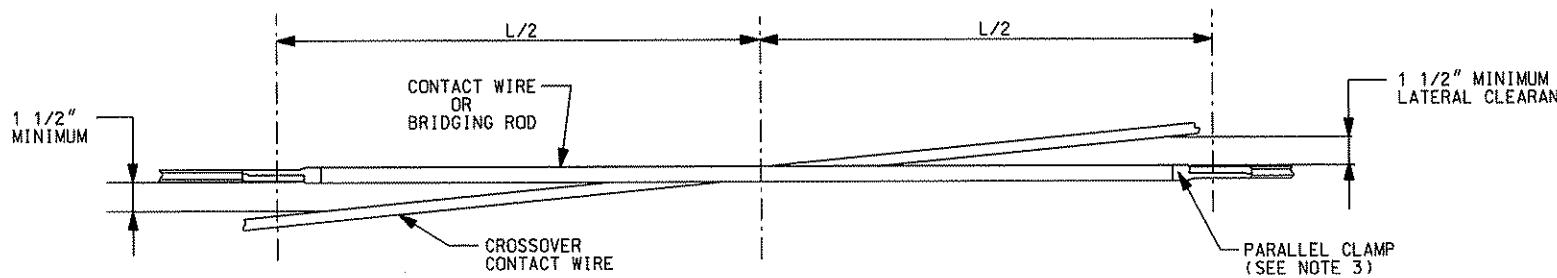
* = QUANTITY AS REQUIRED.



ELEVATION



CONTACT WIRE INSULATED KNUCKLE (KN-100)



PLAN

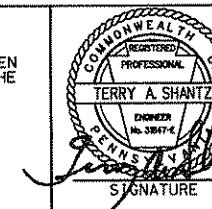
CONTACT BRIDGE (CB-100)

NOTES:

- FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND DC007
- THE LENGTH OF CONTACT BRIDGE SHALL BE INCREASED AS NECESSARY AT CROSS CONTACTS WHERE THE CROSSING ANGLE IS LESS THAN 1 IN 5 ALL CASES, THE CROSS CONTACT BAR LENGTHS MUST PROVIDE A SPAN BETWEEN THE CLIPS TO ACCOMMODATE DIFFERENTIAL TEMPERATURE MOVEMENTS OF THE CROSSING CONTACT WIRES WITHOUT CAUSING BINDING.
- TWO ADDITIONAL PARALLEL CLAMPS SHALL BE UTILIZED ON BRIDGES WITH LENGTH GREATER THAN 4'
- KNUCKLE LENGTH:
FOR AUTO TENSIONED Catenary A 6" MINIMUM KNUCKLE CAN ONLY BE USED WHERE THE ALONG TRACK MOVEMENTS ARE IDENTICAL. WHERE THE ALONG TRACK MOVEMENTS ARE NOT IDENTICAL, THE KNUCKLE SHALL BE OF SUFFICIENT LENGTH TO ACCOMMODATE THE DIFFERENTIAL MOVEMENT (NOT GREATER THAN L/5) WITHOUT CAUSING EXCESSIVE LOADING ON THE COMPONENTS OR RESTRICTING MOVEMENT. KNUCKLES CAN ONLY BE USED IN TENSION

	Transit & Rail Systems			
		NO.	DATE	DESCRIPTION

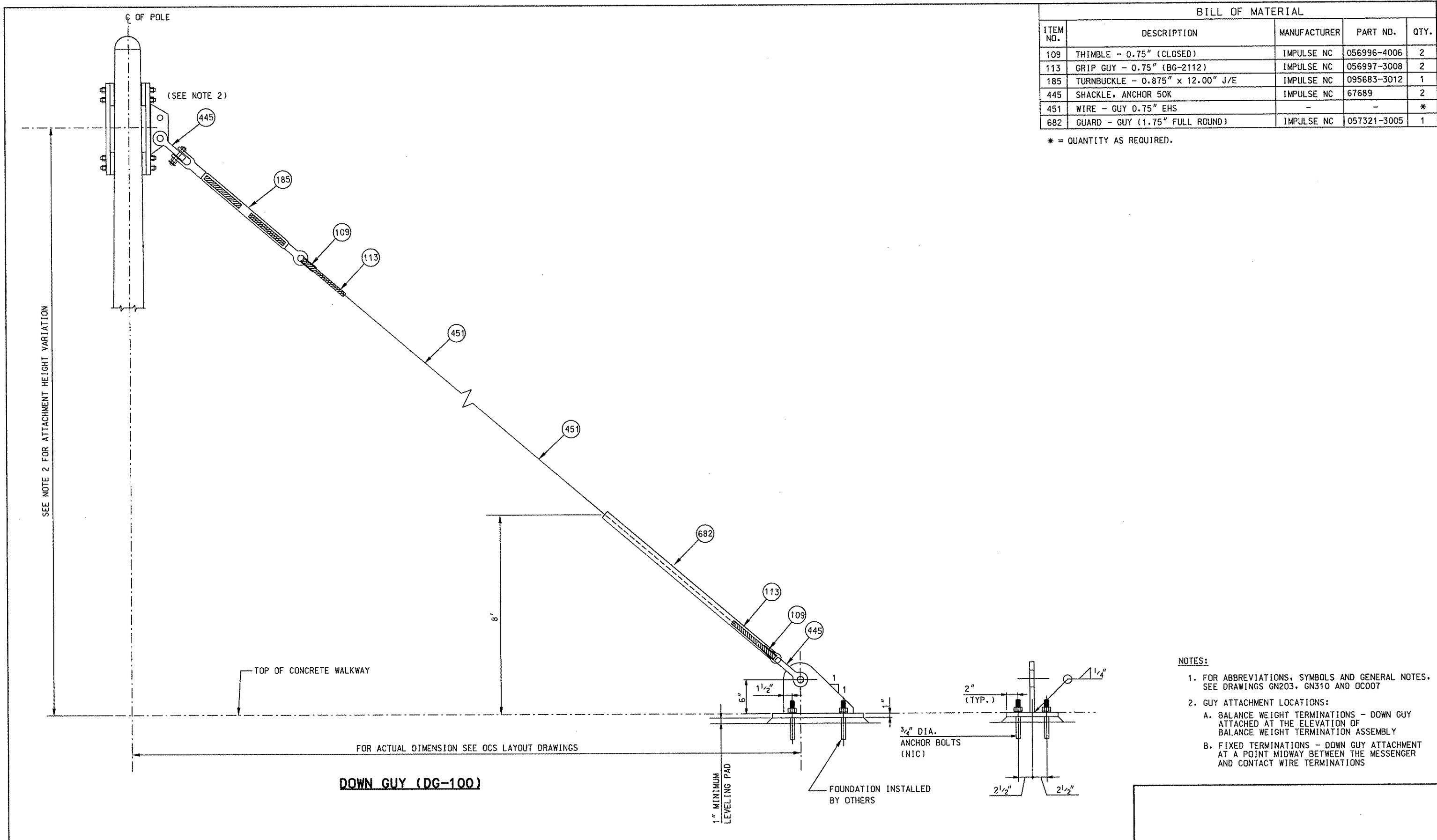
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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
APPROVED *Dave P. Henry 4/28/08*
SIGNATURE DATE

DESIGNED SR ADKINS
DRAWN KA BRANDT
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
CONTACT BRIDGE
INSULATED KNUCKLE
SCALE NTS
Port Authority
CONTRACT NO. NSC-009
DWO. NO. OC180
SHT. 195

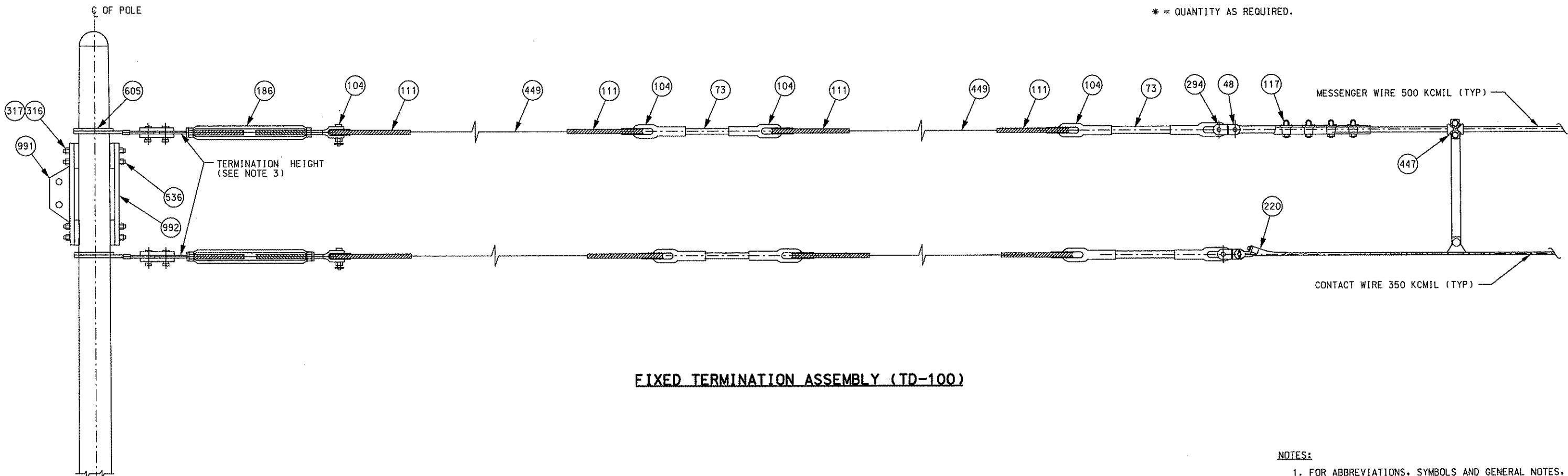
PITTSTURGH
PORT AUTHORITY OF ALLEGHENY COUNTY
PENNSYLVANIA
CONTACT BRIDGE
INSULATED KNUCKLE
CONTRACT NO. NSC-009
DWO. NO. OC180
SHT. 195



Gannett Fleming Transit & Rail Systems				PROFESSIONAL REGISTERED TERRY A. SHANTZ <small>ENGINEER No. 3847-C</small> <small>SIGNATURE</small>	DMJM HARRIS <small>AECOM</small>	FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222 <small>APRIL 28, 2008</small>	DESIGNED SR ADKINS DRAWN KA BRANDT CHECKED TA SHANTZ IN CHARGE CD JONES DATE APR. 28, 2008 SCALE NTS	PORT AUTHORITY OF ALLEGHENY COUNTY <small>PITTSBURGH</small> NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE) DOWN GUY DETAILS
	NO.	DATE	DESCRIPTION					
			REVISIONS					

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
48	EYE, BALL ANSI 52-3, 30K	IMPULSE NC	070776-2000	2
73	TRANSLITE, INSULATOR, 0.63, E/E CHAIN	IMPULSE NC	055629-6150	4
104	THIMBLE, 0.50" (OPEN)	IMPULSE NC	056626-4004	8
111	GRIP - SPIRAL GUY 0.50"	IMPULSE NC	056997-3002	8
117	CLAMP, STRAIGHTLINE, MESSENGER	IMPULSE NC	057174-3001	1
186	TURNBUCKLE, 0.75" x 12" J/E	IMPULSE NC	095683-3013	2
220	CLAMP, TROLLEY DEAD END 350 KCML	IMPULSE NC	014001-3007	1
294	CLEVIS, SOCKET ANSI 52-3	IMPULSE NC	087603-2000	2
316	NUT, 0.75" HEX (+0.015) HDG	IMPULSE NC	090499-4800	8
317	WASHER, LOCK 0.75" (HDG)	IMPULSE NC	019779-4062	8
447	HANGER, RIGID 500/350T	IMPULSE NC	676913	1
449	WIRE GUY 0.50" EHS		-	*
536	STUD, 0.75" x 16" HDG	IMPULSE NC	6774541600	4
605	BAND, 0.50" WRAP	IMPULSE NC	0694200	2
991	BRACKET, DOWN GUY ATTACHMENT	IMPULSE NC	060464-3001	1
992	PLATE, BACKING	IMPULSE NC	060464-3003	1

* = QUANTITY AS REQUIRED.



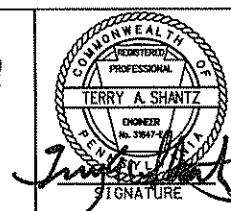
FIXED TERMINATION ASSEMBLY (TD-100)

NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
2. FOR MESSENGER WIRE AND CONTACT WIRE TENSION SEE TECHNICAL CHART DWG OC117
3. FOR TERMINATION HEIGHTS REFER TO OCS PROFILE DRAWINGS

NO.	DATE	DESCRIPTION
REVISIONS		

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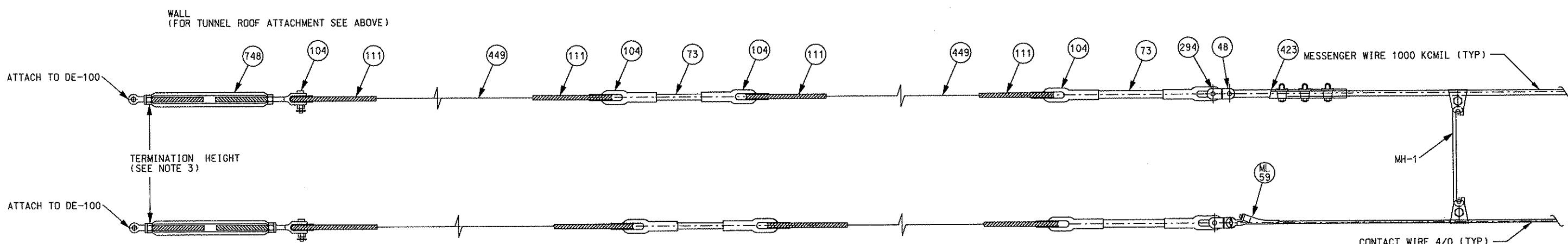
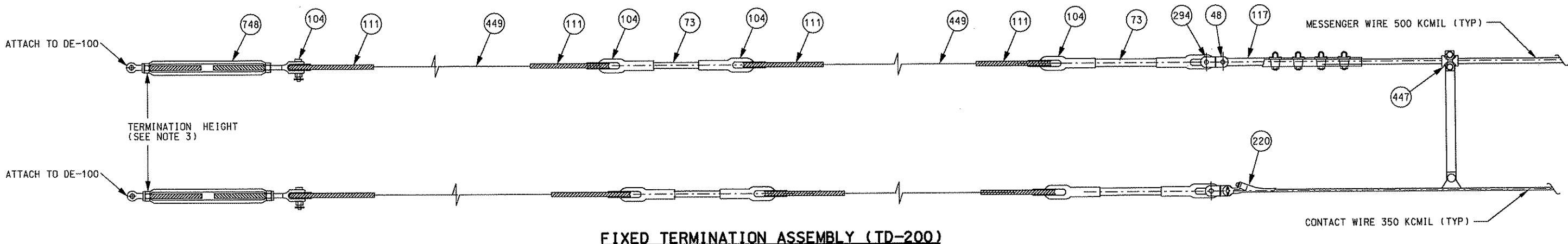


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SIGNATURE *Terry A. Shantz* APPROVED *David P. Henry* DATE *4/28/08*

PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH	
NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE)	
FIXED TERMINATION ASSEMBLY	
Port Authority	CONTRACT NO. NSC-009 DWG. NO. OC182 SHT. 197

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY. TD-200	QTY. TD-201
48	EYE, BALL ANSI 52-3, 30K	IMPULSE NC	070776-2000	2	2
73	TRANS*LITE, INSULATOR, 0.63, E/E CHAIN	IMPULSE NC	055629-6150	4	4
104	THIMBLE, 0.50" (OPEN)	IMPULSE NC	056626-4004	8	8
111	GRIP - SPIRAL GUY 0.50"	IMPULSE NC	056997-3002	8	8
117	CLAMP, STRAIGHTLINE, MESSENGER	IMPULSE NC	057174-3001	1	-
220	CLAMP, TROLLEY DEAD END 350 KCML	IMPULSE NC	014001-3007	1	-
294	CLEVIS, SOCKET ANSI 52-3	IMPULSE NC	087603-2000	2	2
447	HANGER, RIGID 500/350T	IMPULSE NC	676913	1	-
449	WIRE GUY 0.50" EHS	-	-	*	*
748	TURNBUCKLE, 0.75" x 12" J/J	IMPULSE NC	095683-3014	2	2
ML59	CLAMP - TROLLEY DEADEND 4/0	IMPULSE NC	015964-2000	-	1
423	CLAMP - DEAD-END FOR 1000 KCML	IMPULSE NC	014497-3001	-	1
MH-1	MAINLINE HANGER ASSEMBLY (DWG OC172)	-	-	-	1

* = QUANTITY AS REQUIRED.

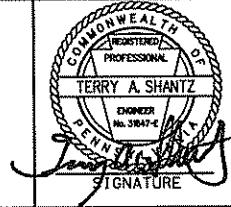


NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007.
2. FOR MESSENGER WIRE AND CONTACT WIRE TENSION SEE TECHNICAL CHART DWG OC117.
3. FOR TERMINATION HEIGHTS REFER TO OCS PROFILE DRAWINGS.

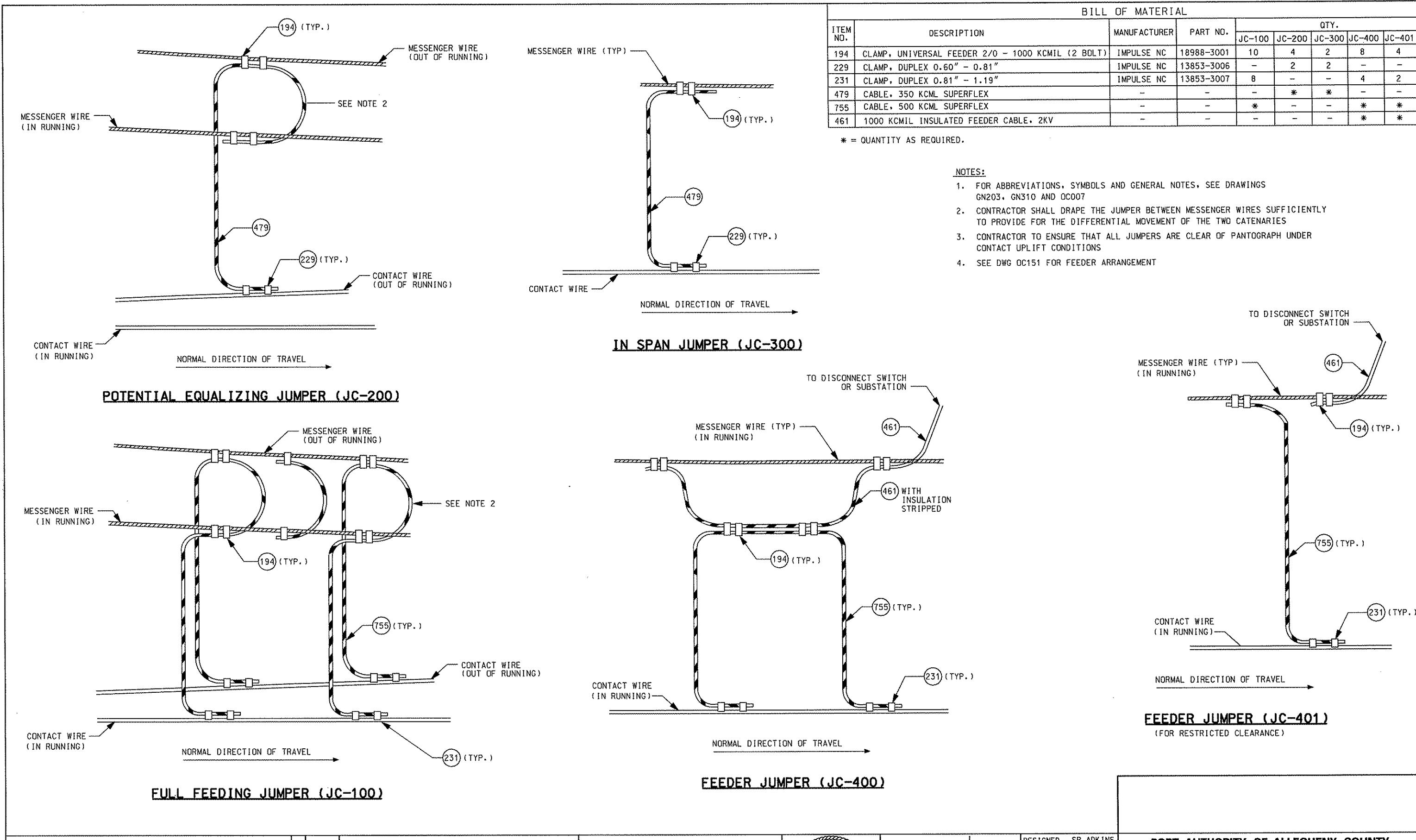
	Transit & Rail Systems			
NO.	DATE	DESCRIPTION		
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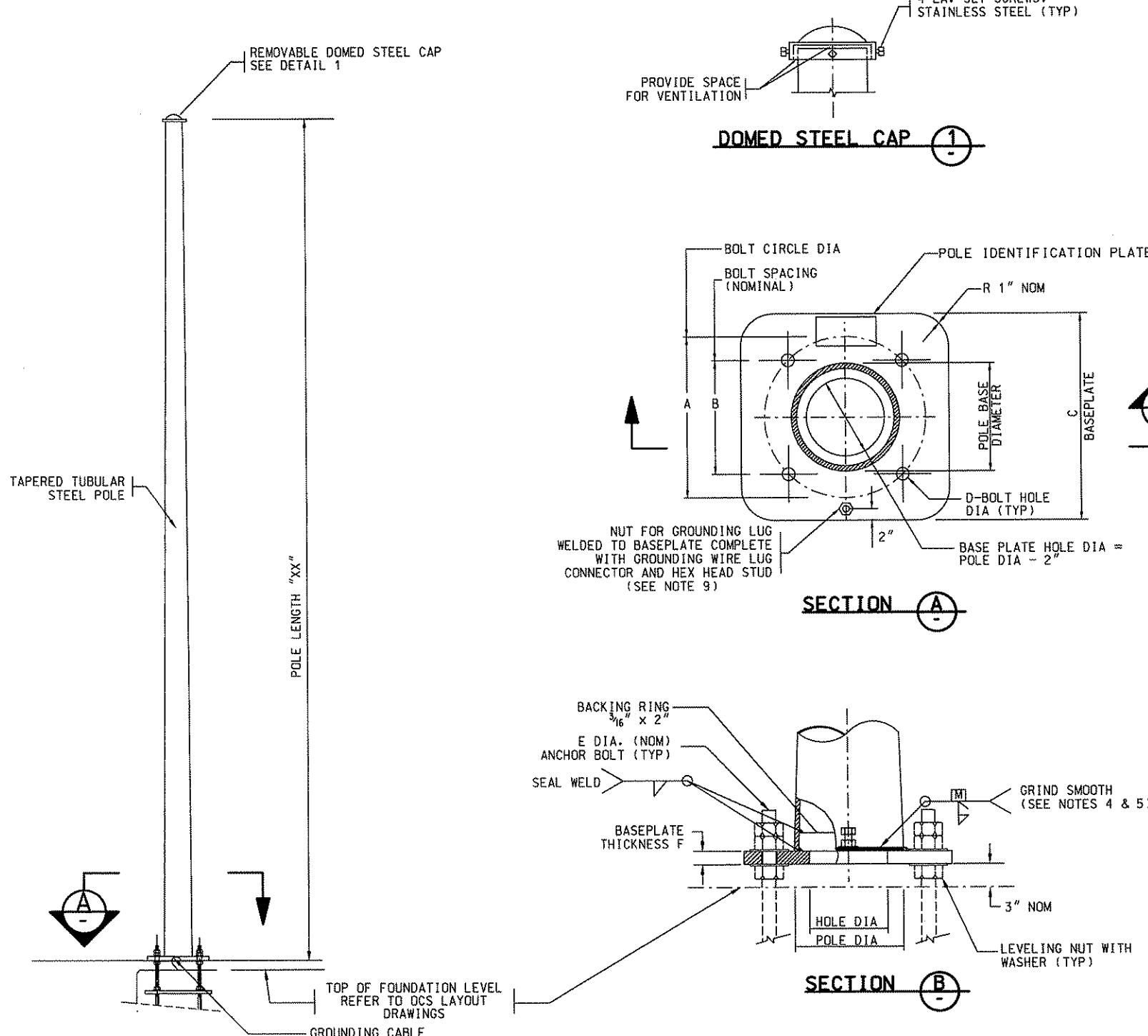


DMJM HARRIS AECOM
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PITTSBURGH, PA. 15222
CHECKED TA SHANTZ
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DATE APR. 28, 2008
SCALE NTS
APPROVED DATE
4/28/08

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
FIXED TERMINATION ASSEMBLY
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC163 SHT. 198



	Transit & Rail Systems												
		NO.	DATE	DESCRIPTION	REVISIONS	DESIGNED	SR ADKINS	PORT AUTHORITY OF ALLEGHENY COUNTY	PITTSBURGH				
				DRAWN	HT TRAN	NORTH SHORE CONNECTOR		NSC TRAIN SYSTEM (SYSTEM-WIDE)					
				CHECKED	TA SHANTZ	JUMPER DETAILS							
				IN CHARGE	CD JONES								
				DATE	APR. 28, 2008								
				SCALE	NTS								
				APPROVED	DATE								
				SIGNATURE	David P. Henry 4/28/08								
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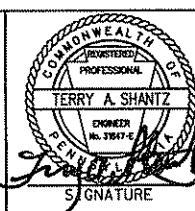


TYPICAL POLE (PS2-XX & PS5-XX)

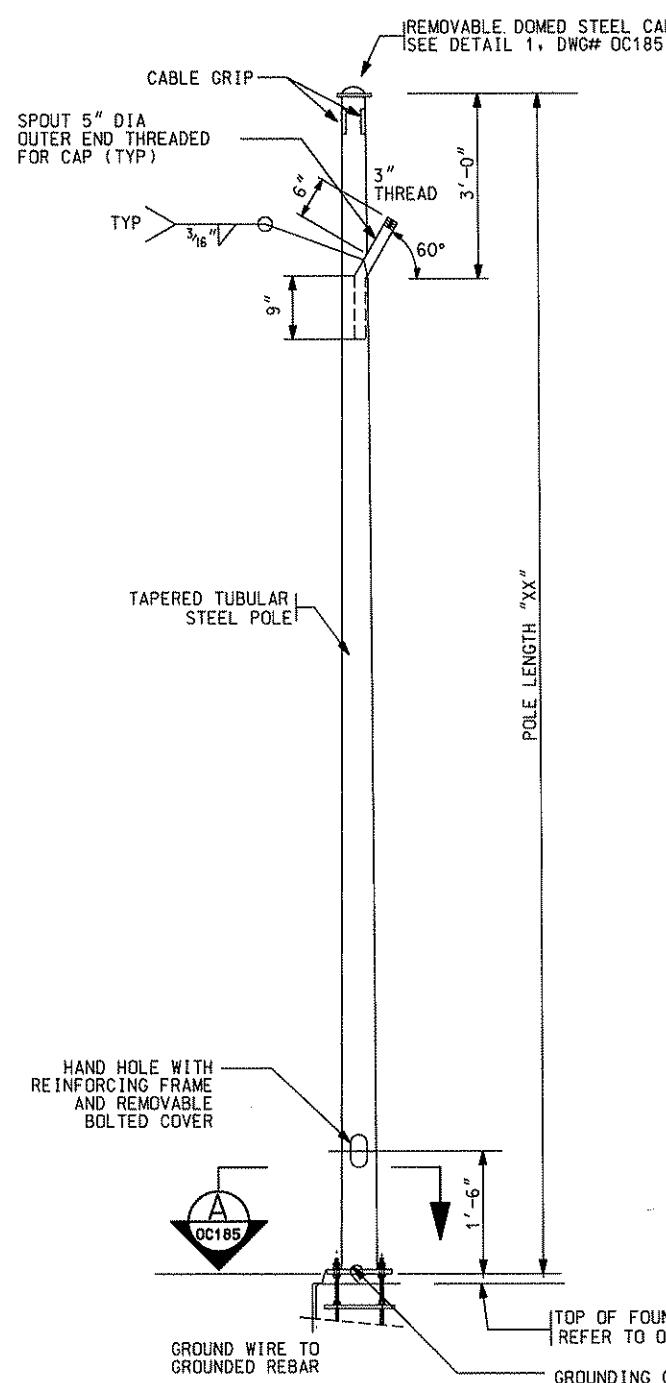
POLE SCHEDULE							
POLE TYPE	POLE BASE DIAMETER	WALL THICKNESS	BASE PLATE DIMENSIONS				MOMENT (KIP-FT)
			A	B	C	D	
PS2-XX	13-5/16	.2242	18	12-3/4	18	2-5/16	2 1.5 100
PS5-XX	14-1/4	.4375	22	15-1/2	22	2-13/16	2-1/2 2 210

NOTES:

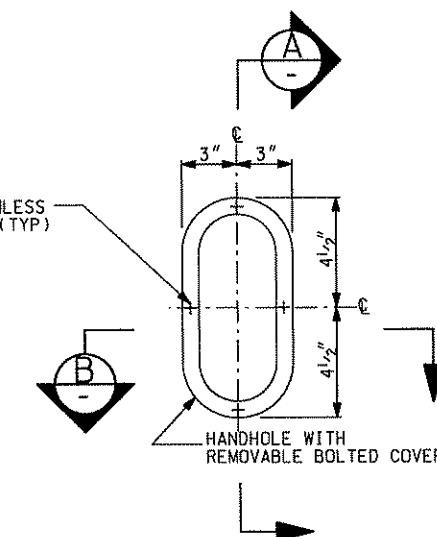
1. ALL DIMENSIONS SHOWN ARE IN INCHES UNLESS OTHERWISE SPECIFIED
 2. STEEL POLES SHALL BE ASTM A-871 GRADE 60. REFER TO SPECIFICATIONS FOR POLE FINISH SELECTION AND USAGE CRITERIA.
 3. BASE PLATE STEEL SHALL BE A-588 GRADE 50 STEEL.
 4. WELDING SHALL BE IN CONFORMANCE TO THE AWS D1.1 SPECIFICATIONS USING E70XX WELDING ELECTRODE
 5. TORSIONAL LOADING SHALL BE CONSIDERED IN THE DESIGN OF WELDS FOR ALL TWIN CANTILEVER POLES.
 6. STANDARD POLE TAPER TO BE .14" PER LINEAR FEET, MEASURED AS CHANGE IN DIAMETER.
 7. THE "XX" PORTION OF POLE REFERENCE INDICATES THE POLE LENGTH IN FEET. ACTUAL POLE LENGTH IS SHOWN ON THE OCS LAYOUT DRAWINGS
 8. ALL POLES SHALL HAVE IDENTIFICATION PLATES FOR THEIR TYPE REFERENCE SEE CONTRACT SPECIFICATION FOR REQUIREMENT
 9. ATTACH GROUNDING LUG TO THE 2/0 COPPER CABLE AND CONNECT TO POLE GROUND NUT. CONNECT THE OTHER END OF THE CABLE TO THE EMBEDDED GROUND PLATE. SEE DRAWING OC187 FOR GROUNDING CONNECTION DETAIL
 10. THE POLE SHALL BE RAKED AS REQUIRED, AND AS CALCULATED BY THE CONTRACTOR BASED ON FINAL LOADINGS
 11. FOR MAXIMUM WORKING MOMENT AT POLE BASE, REFER TO POLE SCHEDULE
 12. CONTRACTOR SHALL SUPPLY NUTS AND WASHERS REQUIRED TO INSTALL POLE ON ANCHOR BOLTS INCLUDED IN CONTRACTS NSC-006 AND NSC-007.
- HEAVY HEX NUTS: ASTM A563/GRADE A 12 PER POLE LOCATION
FLAT WASHERS: ASTM F436 8 PER POLE LOCATION

 Gannett Fleming Transit & Rail Systems							PORT AUTHORITY OF ALLEGHENY COUNTY	
							PITTSBURGH	NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE) TYPICAL TAPERED TUBULAR POLE
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.	 PROFESSIONAL ENGINEER REGISTERED TERRY A. SHANTZ NO. 3847-E PENNSYLVANIA SIGNATURE <i>[Signature]</i>	DMJM HARRIS AECOM	FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222 APPROVED DATE APR. 28, 2008 DATE 4/28/08	DESIGNED SR ADKINS DRAWN KA BRANDT CHECKED TA SHANTZ IN CHARGE CD JONES DATE APR. 28, 2008 SCALE NTS Port Authority CONTRACT NO. NSC-009 DWO. NO. OC185 SHT. 200	PORT AUTHORITY OF ALLEGHENY COUNTY PENNSYLVANIA

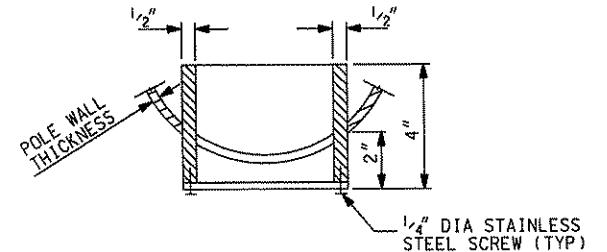
POLE TYPE	POLE BASE DIAMETER	WALL THICKNESS	BASE PLATE DIMENSIONS						MOMENT (KIP-FT)
			A	B	C	D	E	F	
PF2-XX	13-5/16	.2242	18	12-3/4	18	2-5/16	2	1.5	100
PF5-XX	14-1/4	.4375	22	15-1/2	22	2-13/16	2-1/2	2	210



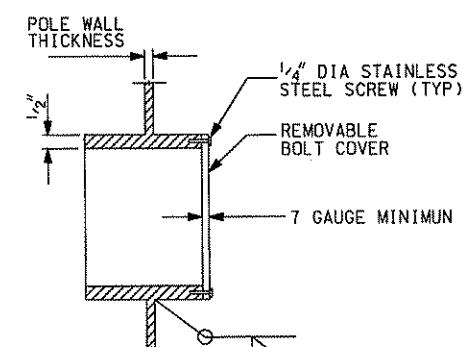
SPOUT ORIENTATION DETAIL
(SEE NOTE 3)



HANDHOLE



SECTION B



SECTION A

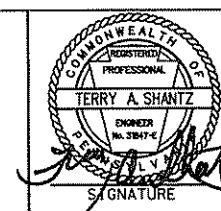
TYPICAL FEEDER POLE (PF2-XX & PF5-XX)

NOTES:

1. SEE DWG OC185 FOR APPLICABLE NOTES
2. CONTRACTOR TO PROVIDE CABLE SPOUTS AS REQUIRED
3. REFER TO DWGS OC151 FOR SPOUT ORIENTATION TO TRACK

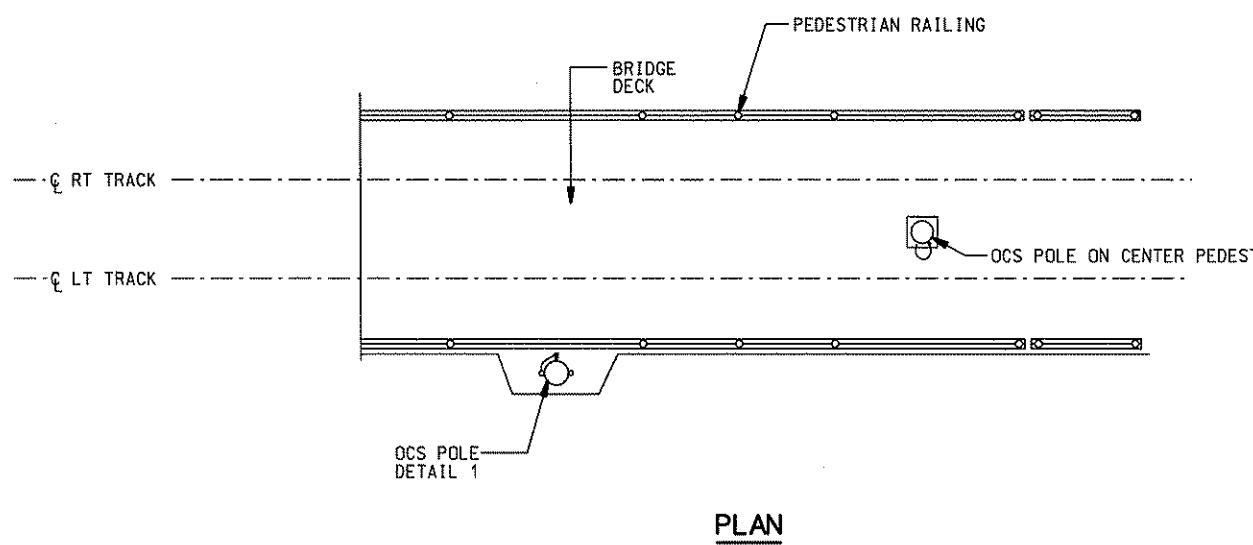
 Gannett Fleming Transit & Rail Systems		
NO.	DATE	DESCRIPTION
		REVISIONS

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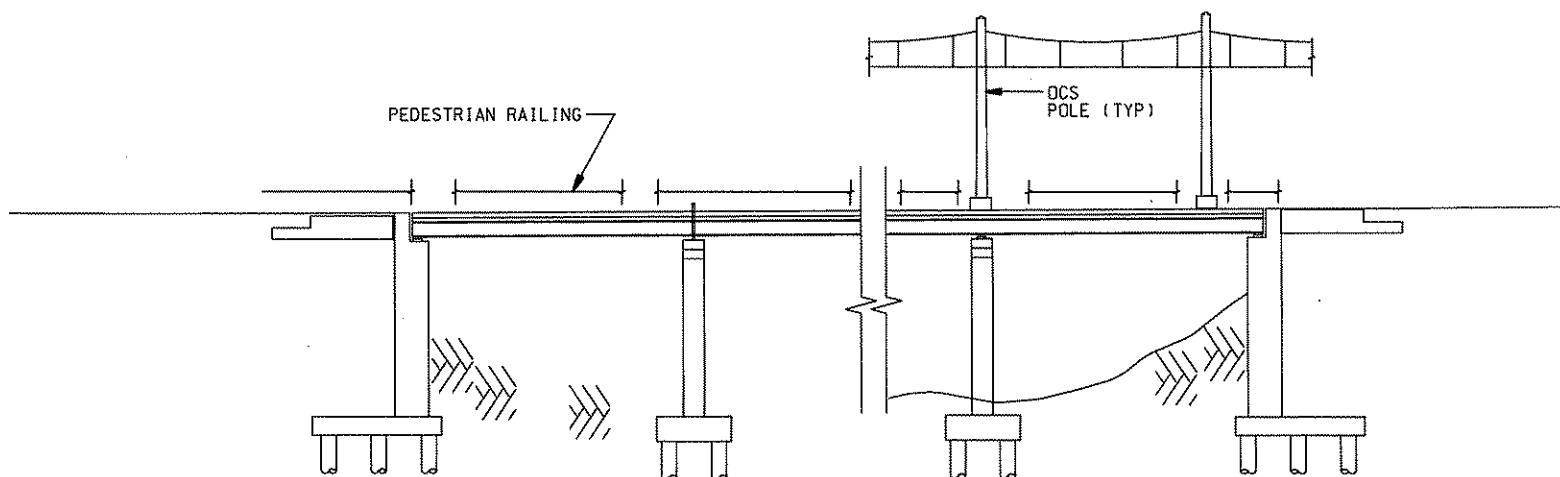


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS
APPROVED DATE
David P. Henry 4/28/08

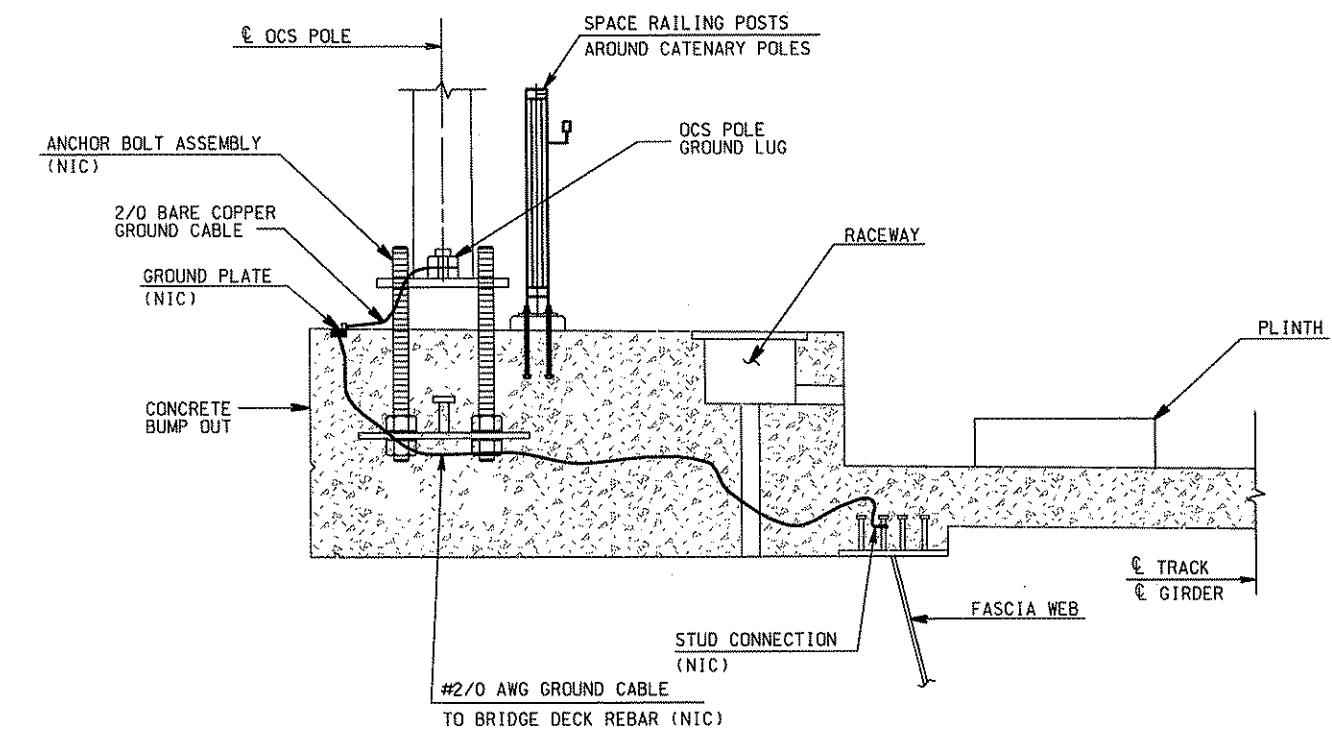
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSTURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
TYPICAL TAPERED
TUBULAR POLE WITH SPOUTS
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC186 SHT. 201



PLAN



ELEVATION



GROUNDING CONNECTION AT BASE OF OCS POLE - DETAIL

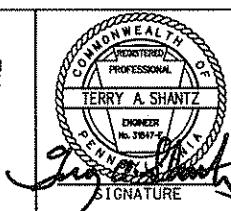
1

NOTES:

1. GROUNDING & BONDING SHALL BE IN ACCORDANCE WITH SECTION 16060
2. ALL GROUNDING AND BONDING MATERIALS TO COMPLY WITH UL STANDARDS
3. GRIND AND CLEAN SURFACES PRIOR TO MAKING CONNECTIONS
4. GROUNDING REQUIRED TO ACHIEVE 25 OHMS MAX OR 5 OHMS MAX RESISTANCE IF SURGE ARRESTOR INSTALLED ON CATENARY POLE
5. GROUNDING OF PEDESTRIAN RAILING BY OTHERS

NO.	DATE	DESCRIPTION	REVISIONS		
Gannett Fleming Transit & Rail Systems					

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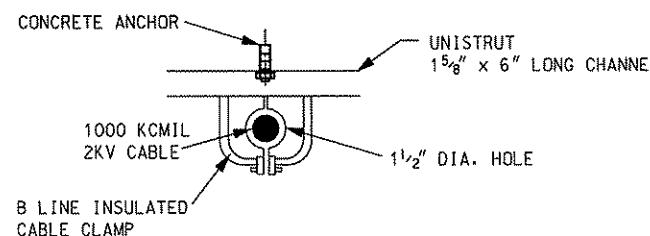
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Signature *David P. Henry 4/26/08*
APPROVED DATE

DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

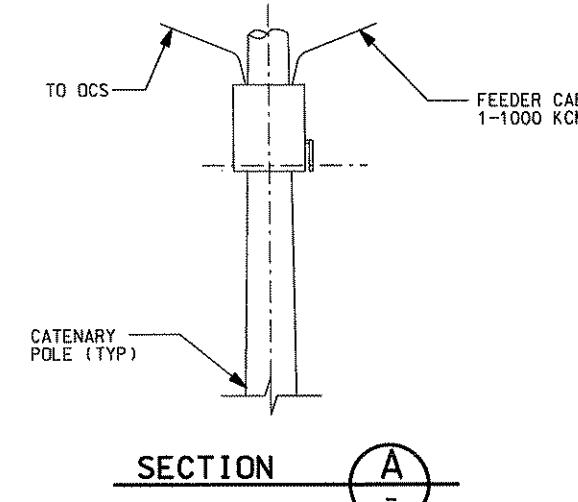
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GROUNDING ARRANGEMENT
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC187 SHT. 202

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
265	BAND, POLE (SINGLE STRAP)	IMPULSE NC	057180-3001	1
461	1000 KCMIL INSULATED FEEDER CABLE, 2KV	-	-	*
A	SUPPORT SPAN (FEED WIRES) FOR 1000 KCMIL	-	-	*
1	KWIK BOLT 3, STS STL, 1/2" x 3 3/4" LONG	HILTI	00282558	*
2	SLOTTED CHANNEL	UNISTRUT	P1000T	*
3	INSULATED CABLE CLAMP	B LINE	B4069	*

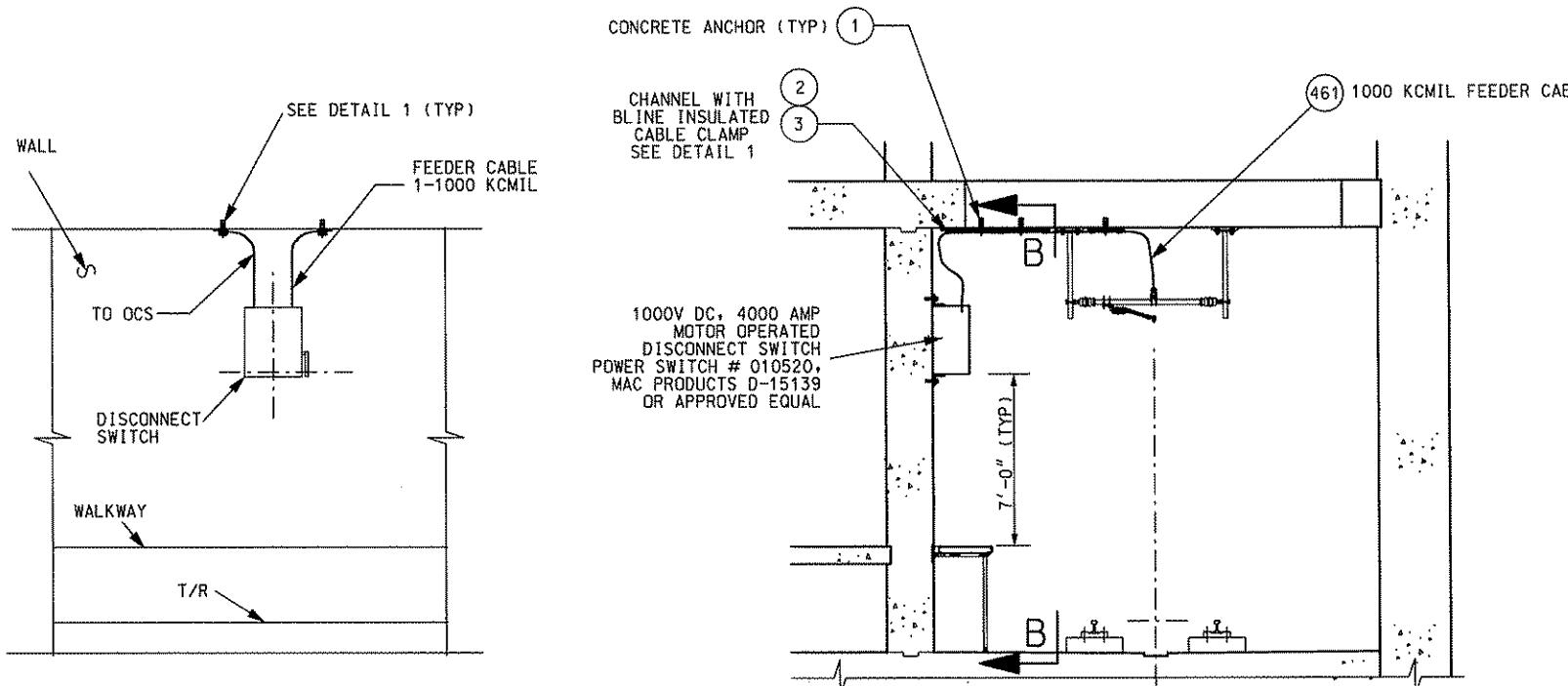
* = QUANTITY AS REQUIRED.



DETAIL 1

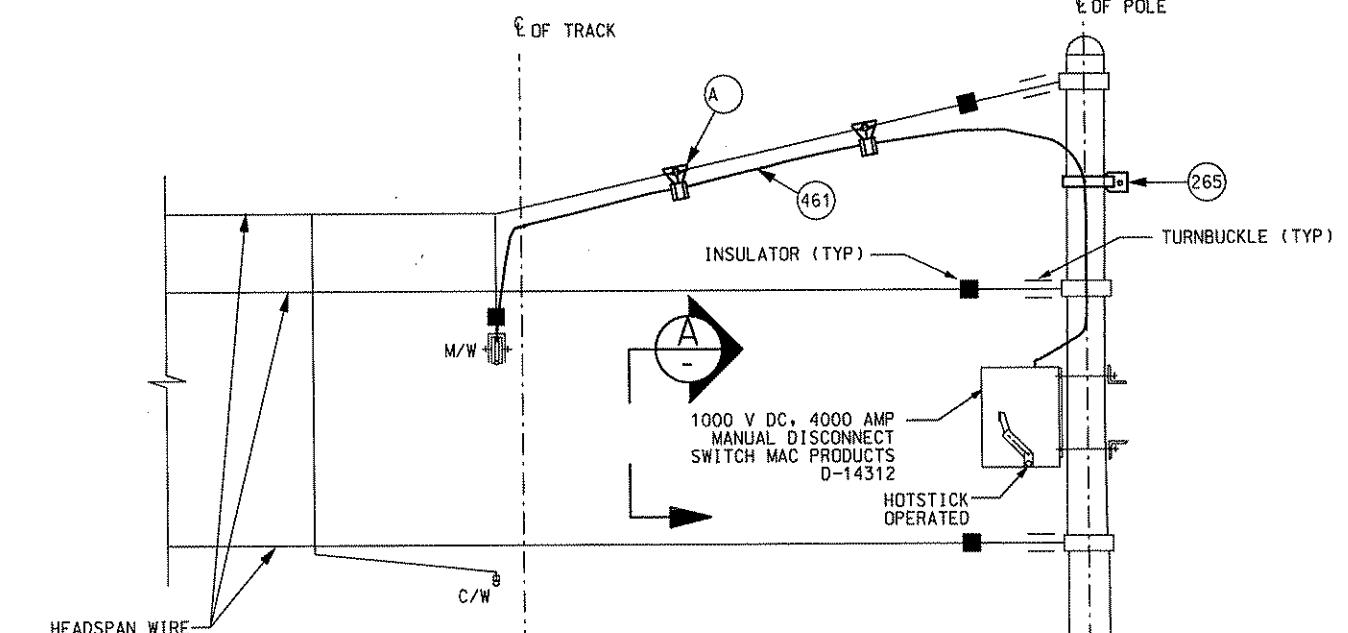


SECTION A



SECTION B

WALL MOUNTED MOTOR OPERATED DISCONNECT SWITCH (DS-200-MO-W)



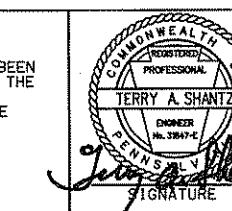
POLE MOUNTED MANUAL DISCONNECT SWITCH (DS-100-M-P)

NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
2. FOR LOCATION OF DISCONNECT SWITCHES SEE OCS LAYOUT DRAWINGS AND SECTIONING DIAGRAMS.

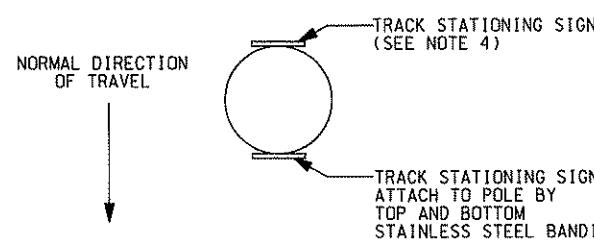
Gannett Fleming Transit & Rail Systems			
	NO.	DATE	DESCRIPTION
			REVISIONS

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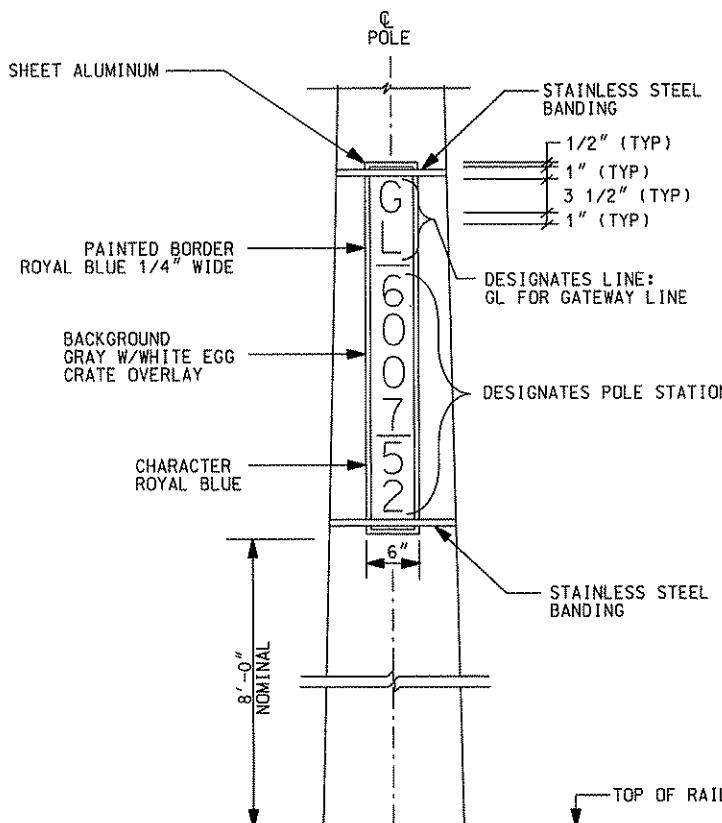
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
David P. Henry 4/28/08
APPROVED DATE

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
DISCONNECT SWITCH (Tx-SWITCH)
CONTRACT NO. NSC-009
DWG. NO. OC188 SHT. 203

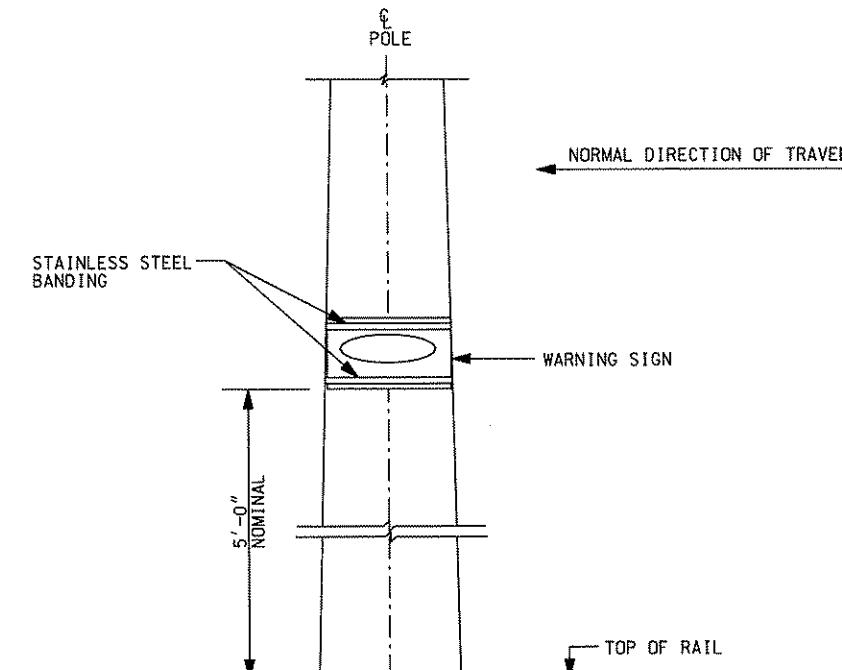


TOP VIEW

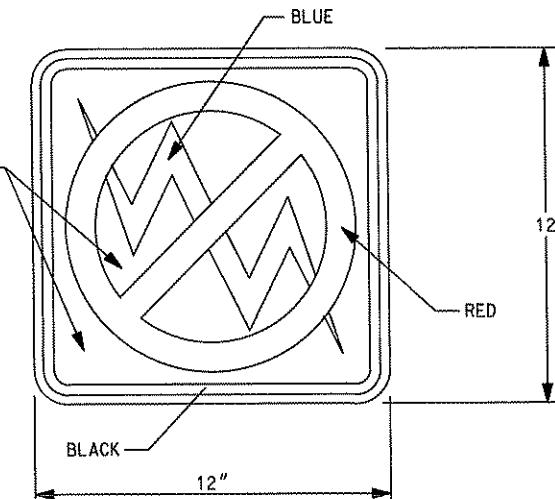
TOP VIEW



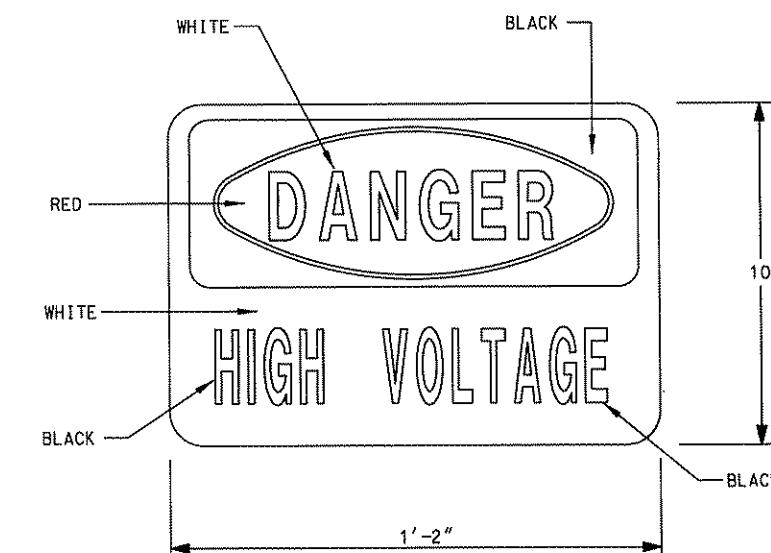
ALONG TRACK VIEW TRACK STATIONING SIGN (GL-XXXX+XX)



TYPICAL WARNING SIGN MOUNTING



SECTION INSULATOR WARNING SIGN (WS-101)



WARNING SIGN (WS-100)

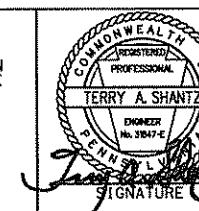
NOTES:

1. ALL SIGNS SHALL BE MADE WITH A .080" THICK RIGID ALUMINUM BACKING PLATE.
ALL SHARP EDGES SHALL BE ROUNDED.
 2. LETTERS SHALL BE ON FRONT OF SIGN ONLY.
 3. WARNING SIGNS SHALL BE PERMANENTLY ATTACHED TO ALL CATENARY POLES AND BRIDGE BARRIERS
BY USING POWER DRIVEN NAILS (6 EACH MINIMUM FOR OVERHEAD BRIDGE WARNING SIGN) AND
STAINLESS STEEL BANDING MATERIALS FOR POLE WARNING AND TRACK STATIONING SIGN. NAILS SHALL
BE CAPABLE OF HOLDING SIGNS AND ANCHORING INTO BACKING OR BASE MATERIAL (STEEL, CONCRETE, WOOD, ETC.).
 4. THE MOUNTING HEIGHT OF THE SIGNS MAY REQUIRE SITE SPECIFIC ADJUSTMENT TO CATER FOR CLEAR VISIBILITY.
 5. PLACE SECTION INSULATOR WARNING SIGN AT EACH SECTION INSULATOR.



No.	DATE	DESCRIPTION
REVISIONS		

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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 | AECO
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

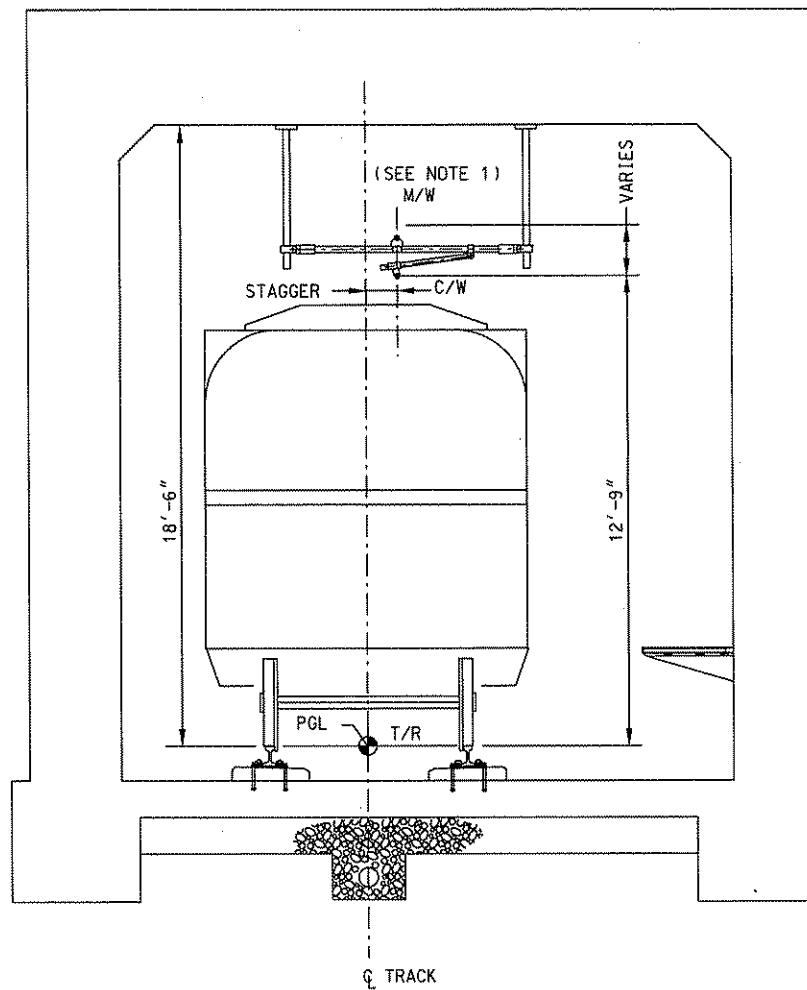
Daniel P. Hwang 4/28
APPROVED DATE

DESIGNED	SR ADKINS
DRAWN	KA BRANDT
CHECKED	TA SHANTZ
IN CHARGE	CD JONES
DATE	APR. 28, 2008
SCALE	NTS

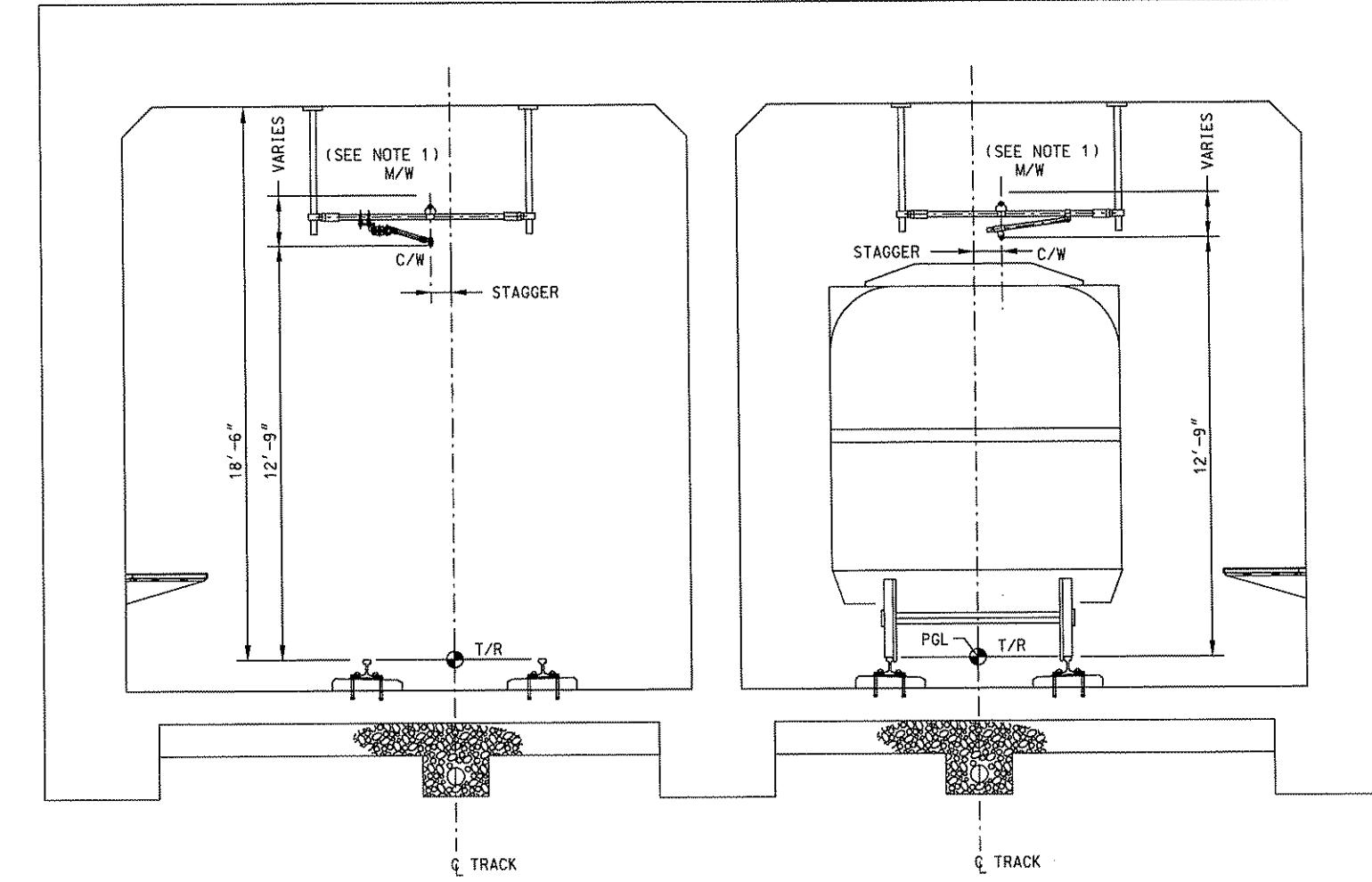
PORT AUTHORITY OF ALLEGHENY COUNTY

**NORTH SHORE CONNECTOR
SC TRAIN SYSTEM (SYSTEM-WIDE)
SIGNAGE**

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
SIGNAGE



SINGLE CUT & COVER BOX



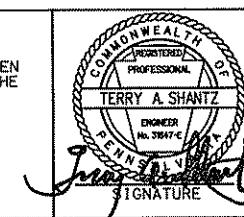
DOUBLE CUT & COVER BOX

NOTES:

1. FOR TUNNEL ASSEMBLIES SEE DWGS. OC196 & OC198.

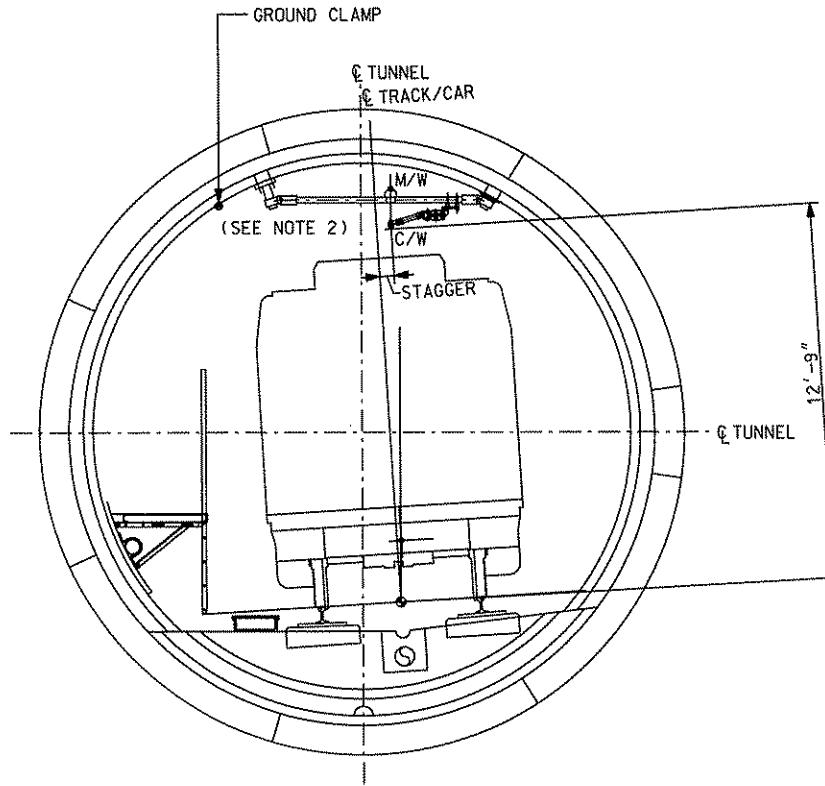
NO.	DATE	DESCRIPTION
REVISIONS		

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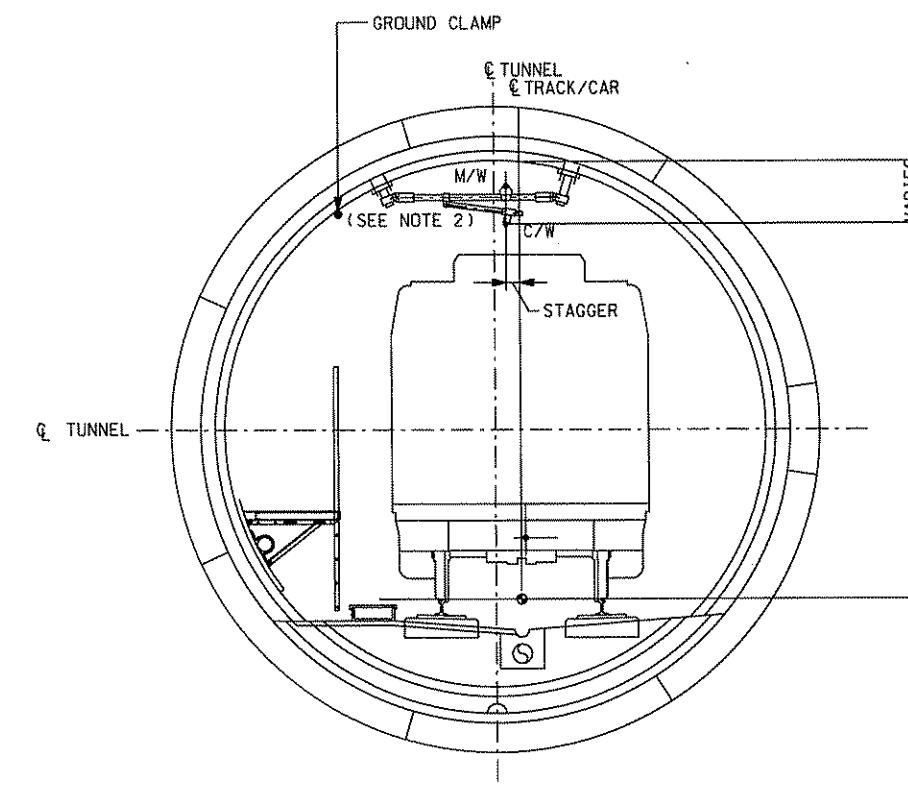


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SCALE NTS
APPROVED DATE
David J. Henry 4/28/08

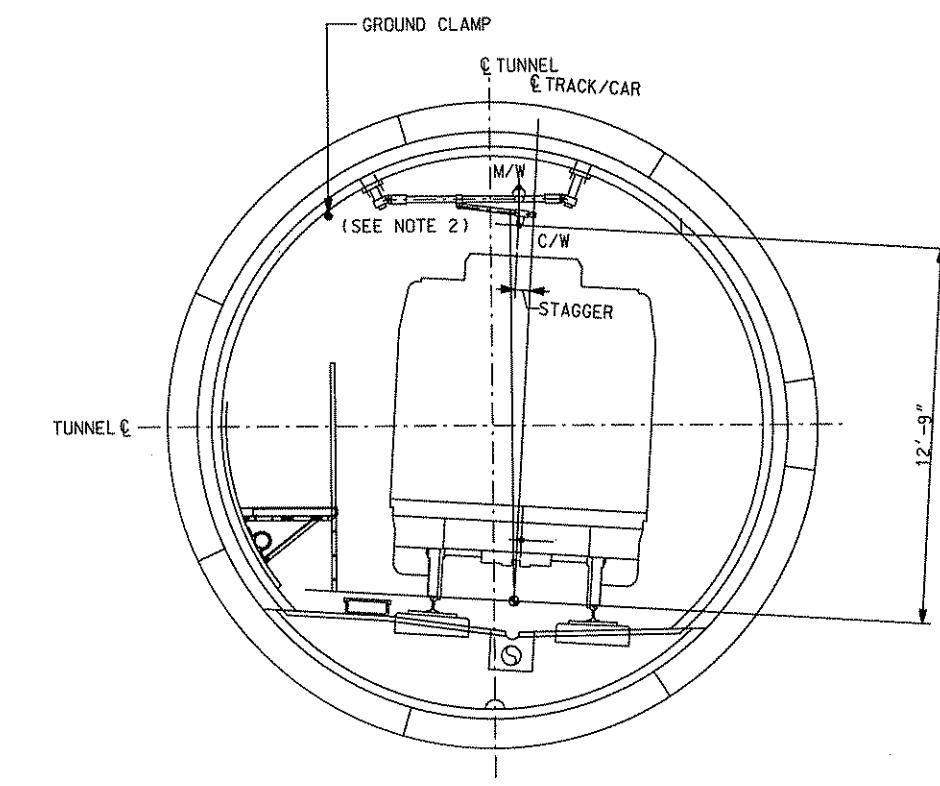
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
CUT & COVER TUNNEL SECTION
TYPICAL - OCS SUPPORT DETAILS
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC191 SHT. 205



LEFT HAND CURVE, SUPEELEVATION



ZERO SUPEELEVATION



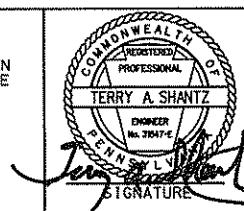
RIGHT HAND CURVE, SUPEELEVATION

NOTES:

1. BORED TUNNEL SECTION STARTS AT 6014+50 AND ENDS AT 6036+85.
2. FOR TUNNEL ASSEMBLIES SEE DWG. OC193.

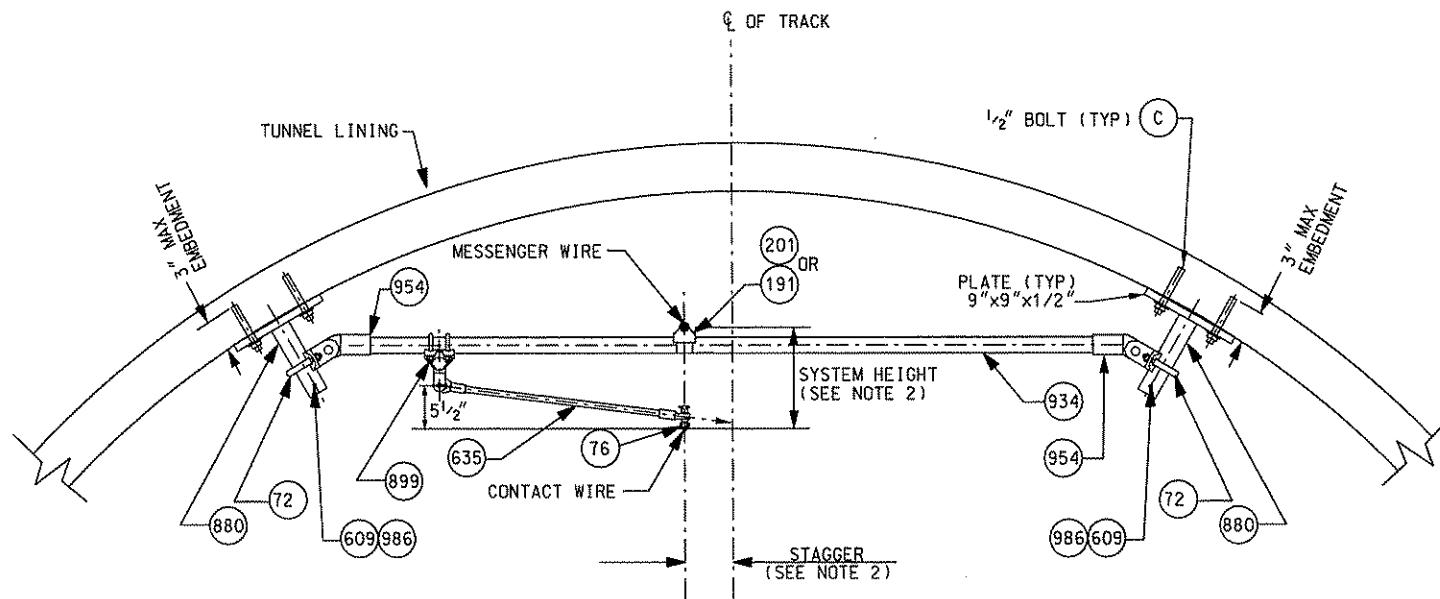
 Gannett Fleming Transit & Rail Systems		
NO. DATE	DESCRIPTION	
	REVISIONS	

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DMJM HARRIS AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
David P. Fleming 4/28/08
APPROVED DATE

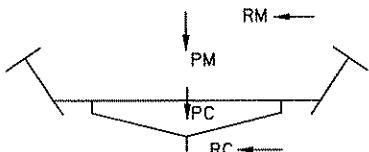
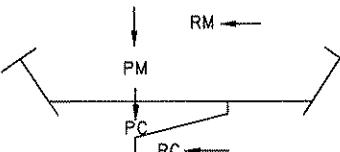
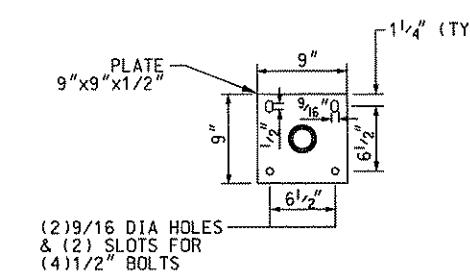
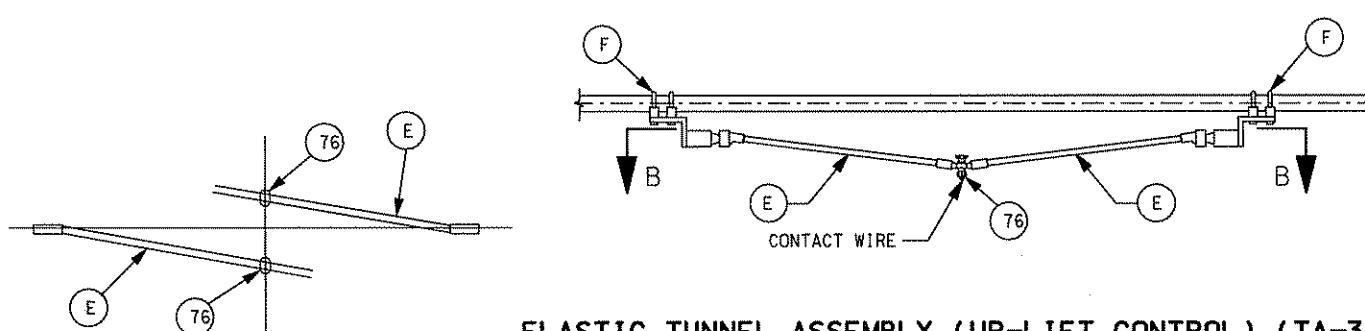
PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH		NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE) BORED TUNNEL SECTION TYPICAL - OCS SUPPORT DETAILS	
CONTRACT NO.	NSC-009	DWG. NO.	OC192
SHT.	206		



ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.			
				TA-31L	TA-31M	TA-31H	TA-31E
C	KWIK BOLT 3, 304 STS STL. 1/2 DIA x 4 1/2	HILTI	00282559	8	8	8	8
E	ELASTIC ARM CONTACT WIRE, CLAMP 5/8" TO 2.0" PIPE	K & M	102177	-	-	-	2
F	PIPE CLAMP TO 2.0" PIPE	K & M	02336-01	-	-	-	2
72	CLAMP - CLEVIS 2" PIPE	IMPULSE NC	055375-3001	2	2	2	2
76	CLAMP - SWIVEL TROLLEY 0.63" STUD	IMPULSE NC	055755-3001	1	-	-	2
152	Y - CLEVIS EYE ASSEMBLY	IMPULSE NC	059687-3001	-	-	1	-
191	SADDLE INSULATOR - DBL. HORZ MESSINGER	IMPULSE NC	057217-3001	-	-	1	-
201	SADDLE - 2" HRZ MESSINGER	IMPULSE NC	057183-3003	1	1	-	1
204	ARM - UNINSULATED STEADY	IMPULSE NC	057823-8060	-	1	2	-
205	CLAMP - INSULATED SWIVEL	IMPULSE NC	0674999	-	1	2	-
609	COTTER	IMPULSE NC	315902-136	2	2	2	2
635	STEADY ARM, TRANS*LITE 24.7"	IMPULSE NC	060756-6247	1	-	-	-
880	SUPPORT, DROP TUBE	IMPULSE NC	-	2	2	2	2
899	BRACKET, DROP 2" (6.00")	IMPULSE NC	060758-3001	1	1	1	-
934	PIPE - 2" SCHEDULE 80 (HDG) ASTM A500 STEEL, GRADE B	-	-	*	*	*	*
954	TRANS*LITE STRUT, 2"/80 LONG EYE	IMPULSE NC	056909-3010	2	2	2	2
986	PIN, CLEVIS .375 X 2.5 STSTL	IMPULSE NC	315920-127	2	2	2	2

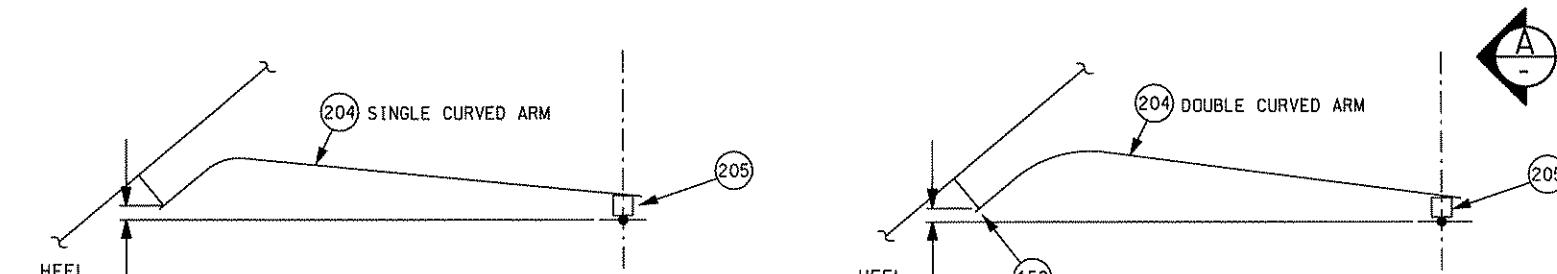
* = QUANTITY AS REQUIRED.

LIGHT PULL-OFF ASSEMBLY (TA-31L)



ELASTIC TUNNEL ASSEMBLY (UP-LIFT CONTROL) (TA-31E)

VIEW B-B



SUPPORT TYPE	MAXIMUM LOADING (LBS)		
	RC	RM	PM+PC
TA-31L	320	460	250
TA-31M	710	1040	250
TA-31H	1030	1520	250

LOADING TABLE

SUPPORT TYPE	MAXIMUM LOADING (LBS)		
	RC	RM	PM+PC
TA-31E	650	1040	250

LOADING TABLE

NOTES:

- FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
- FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS. FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS.
- TUNNEL SUPPORTS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSINGER AND CONTACT WIRES
- USE TWO INSULATED MESSINGER WIRE CLAMPS OR AN ALTERNATIVE ARRANGEMENT, AS APPROVED BY THE ENGINEER, FOR HEAVY CONDITION
- USE TWO STEADY ARMS FOR HEAVY LOAD CONDITIONS

SECTION A-A



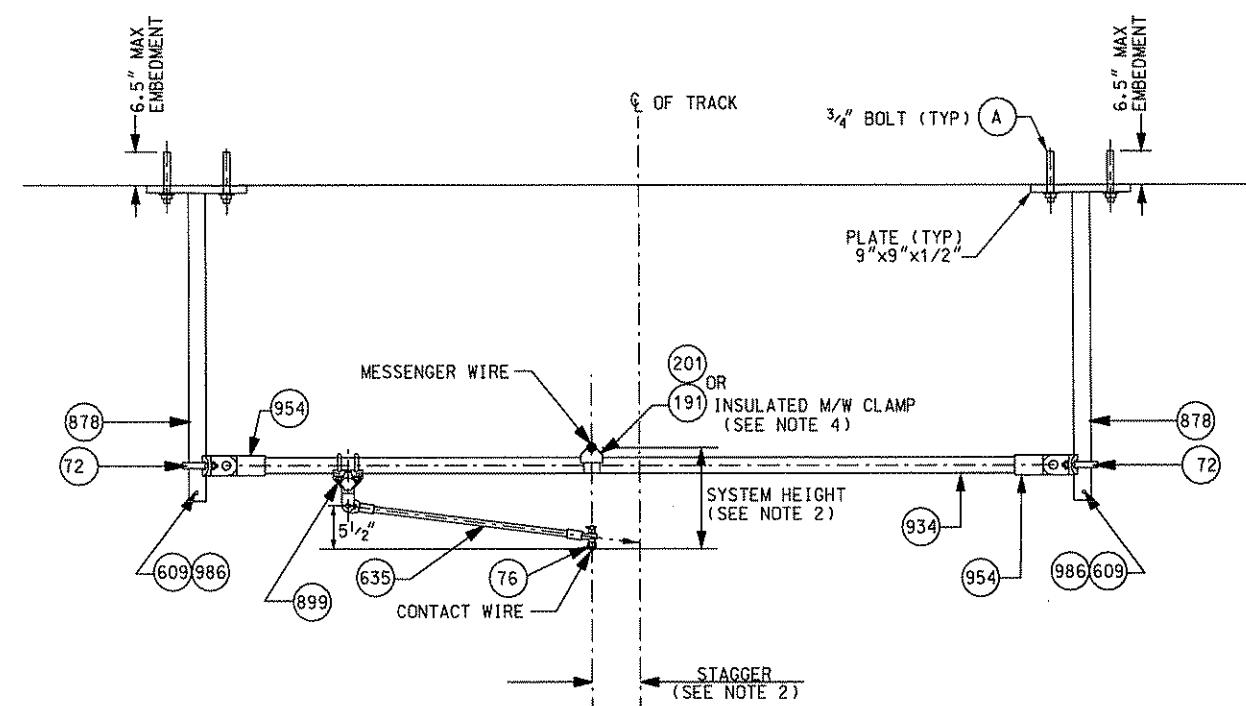
DMJM HARRIS AECOM
 FOUR GATEWAY CENTER
 20TH FLOOR
 PITTSBURGH, PA. 15222
 CHECKED TA SHANTZ
 IN CHARGE CD JONES
 DATE APR. 28, 2008
 APPROVED DAVID P. HARRIS
 DATE 4/28/08
 SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
 PITTSBURGH
 NORTH SHORE CONNECTOR
 NSC TRAIN SYSTEM (SYSTEM-WIDE)
 LIGHT, MEDIUM AND HEAVY BORED TUNNEL SUPPORT
 PULL - OFF
 Port Authority
 CONTRACT NO. NSC-009
 DWG. NO. OC193 SHT. 207

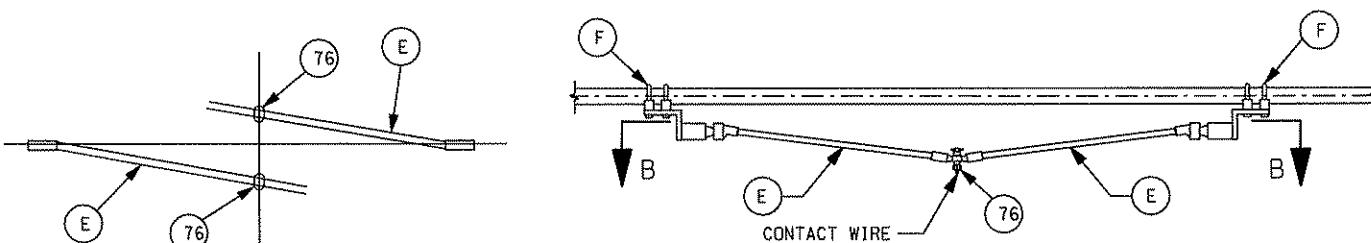
Gannett Fleming
 Transit & Rail Systems

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.

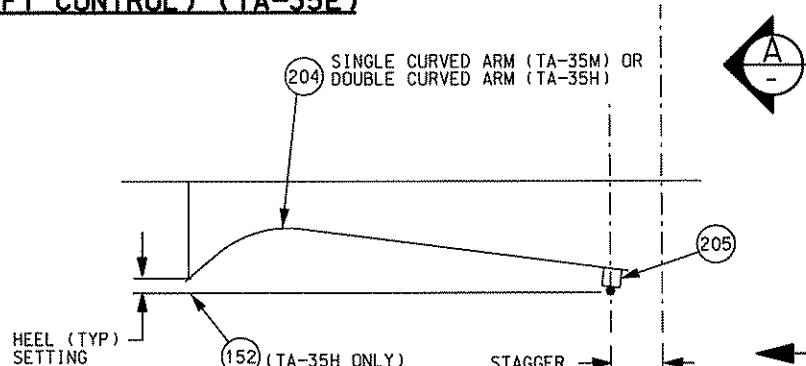
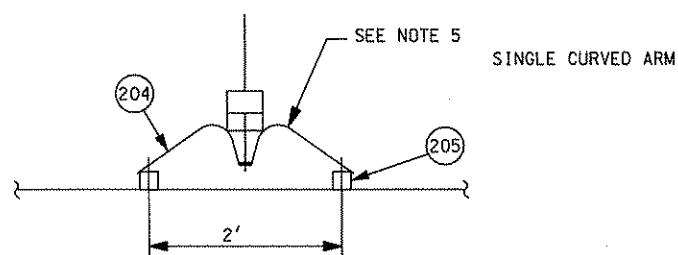


LIGHT PULL-OFF ASSEMBLY (TA-35L)



VIEW B-B

ELASTIC TUNNEL ASSEMBLY (UP-LIFT CONTROL) (TA-35E)



SECTION

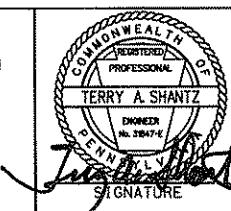


MEDIUM AND HEAVY PULL-OFF ASSEMBLY (TA-35M & TA-35H)

Gannett Fleming
Transit & Rail Systems

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
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
APPROVED *Dave P. Hagan 4/28/08*
SIGNATURE DATE
APPROVED DATE

BILL OF MATERIAL

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.			
				TA-35L	TA-35M	TA-35H	TA-35E
A	KWIK BOLT 3, 3/4x8 LONG THREAD, 304SS	HILTI	0286027	8	8	8	8
E	ELASTIC ARM CONTACT WIRE, CLAMP 5/8" TO 2.0" PIPE	K & M	102177	-	-	-	2
F	PIPE CLAMP TO 2.0" PIPE	K & M	02336-01	-	-	-	2
72	CLAMP - CLEVIS 2" PIPE	IMPULSE NC	055375-3001	2	2	2	2
76	CLAMP - SWIVEL TROLLEY 0.63" STUD	IMPULSE NC	055755-3001	1	-	-	-
152	Y - CLEVIS EYE ASSEMBLY	IMPULSE NC	059687-3001	-	-	1	-
191	SADDLE INSULATOR - DBL. HORZ MESSANGER	IMPULSE NC	057217-3001	-	-	1	-
201	SADDLE - 2" HRZ MESSANGER	IMPULSE NC	057183-3003	1	1	-	1
204	ARM - UNINSULATED STEADY	IMPULSE NC	057823-8060	-	1	2	-
205	CLAMP - INSULATED SWIVEL	IMPULSE NC	0674999	-	1	2	-
609	COTTER	IMPULSE NC	315902-136	2	2	2	2
635	STEADY ARM, TRANSLITE 24.7"	IMPULSE NC	060756-6247	1	-	-	-
878	SUPPORT, DROP TUBE	IMPULSE NC	2	2	2	2	2
899	BRACKET, DROP 2" (6.00")	IMPULSE NC	060758-3001	1	1	1	-
934	PIPE - 2" SCHEDULE 80 (HDG) ASTM A500 STEEL, GRADE B		-	-	*	*	*
954	TRANSLITE STRUT, 2"/80 LONG EYE	IMPULSE NC	056909-3010	2	2	2	2
986	PIN, CLEVIS .375 X 2.5 STSTL	IMPULSE NC	315920-127	2	2	2	2

* = QUANTITY AS REQUIRED.

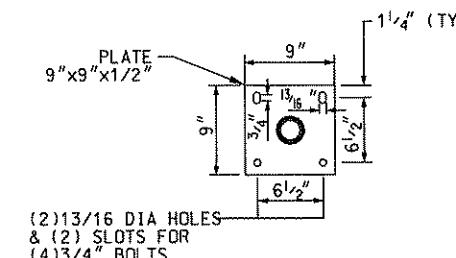
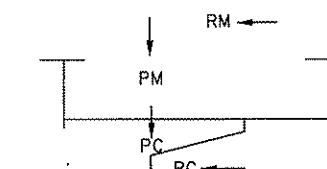
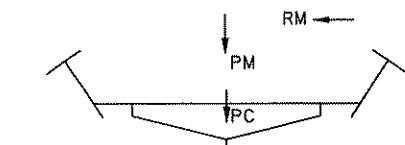


PLATE DETAIL



LOADING DIAGRAM



LOADING DIAGRAM

SUPPORT TYPE	MAXIMUM LOADING (LBS)		
	RC	RM	PM+PC
TA-35L	320	460	250
TA-35M	710	1040	250
TA-35H	1030	1520	250

LOADING TABLE

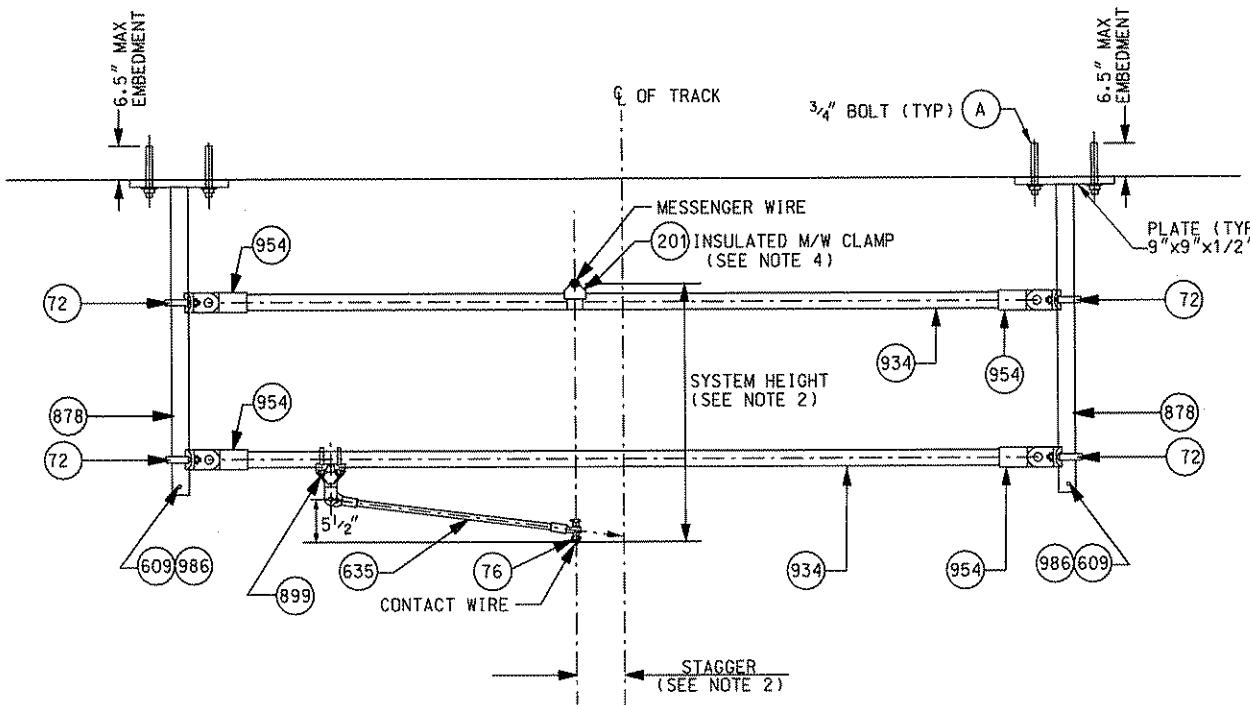
SUPPORT TYPE	MAXIMUM LOADING (LBS)		
	RC	RM	PM+PC
TA-35E	650	1040	250

LOADING TABLE

NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
2. FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS. FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS.
3. TUNNEL SUPPORTS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSENGER AND CONTACT WIRES
4. USE TWO INSULATED MESSENGER WIRE CLAMPS OR AN ALTERNATIVE ARRANGEMENT, AS APPROVED BY THE ENGINEER, FOR HEAVY CONDITION
5. USE TWO STEADY ARMS FOR HEAVY LOAD CONDITIONS

PORT AUTHORITY OF ALLEGHENY COUNTY
PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
LIGHT, MEDIUM AND HEAVY CUT & COVER TUNNEL SUPPORT
REDUCED HEIGHT PULL - OFF
CONTRACT NO. NSC-009
DWG. NO. OC196 SHT. Z08



LIGHT PULL-OFF ASSEMBLY (TA-39L)

LOADING DIAGRAM

SUPPORT TYPE	MAXIMUM LOADING (LBS)		
	RC	RM	PM+PC
TA-39L	320	460	250
TA-39M	710	1040	250
TA-39H	1030	1520	250

MAXIMUM WORKING LOADS

LOADING TABLE

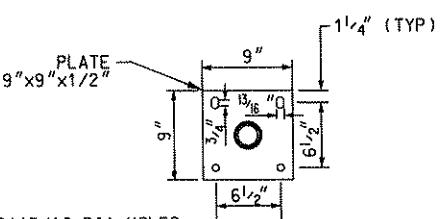
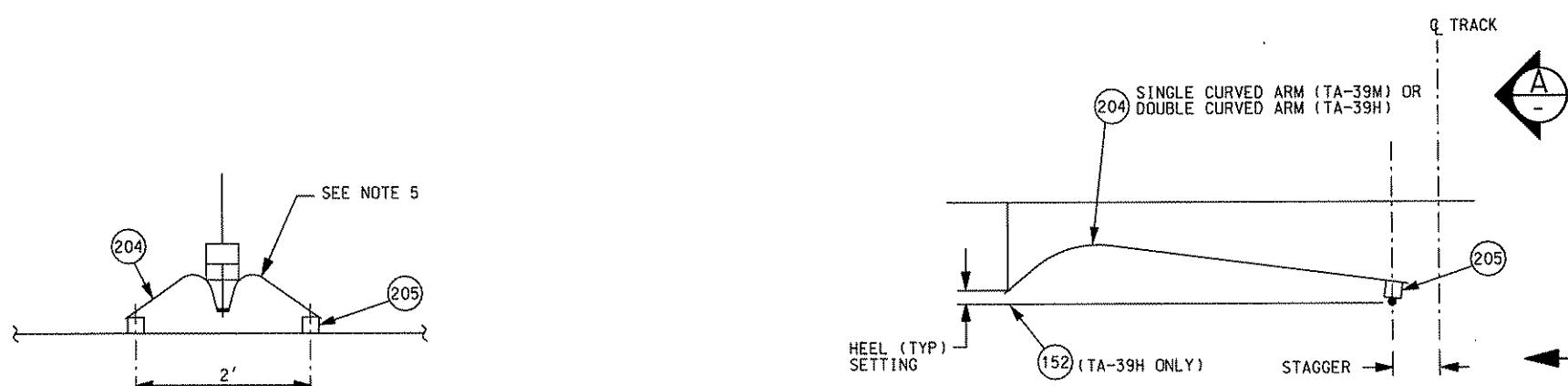


PLATE DETAIL



SECTION A

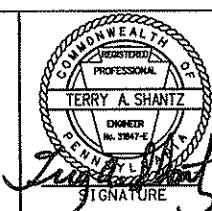
MEDIUM AND HEAVY PULL-OFF ASSEMBLY (TA-39M & TA-39H)

NOTES:

- FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
- FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS. FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS.
- TUNNEL SUPPORTS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSANGER AND CONTACT WIRES
- USE TWO INSULATED MESSANGER WIRE CLAMPS OR AN ALTERNATIVE ARRANGEMENT, AS APPROVED BY THE ENGINEER, FOR HEAVY CONDITION
- USE TWO STEADY ARMS FOR HEAVY LOAD CONDITIONS

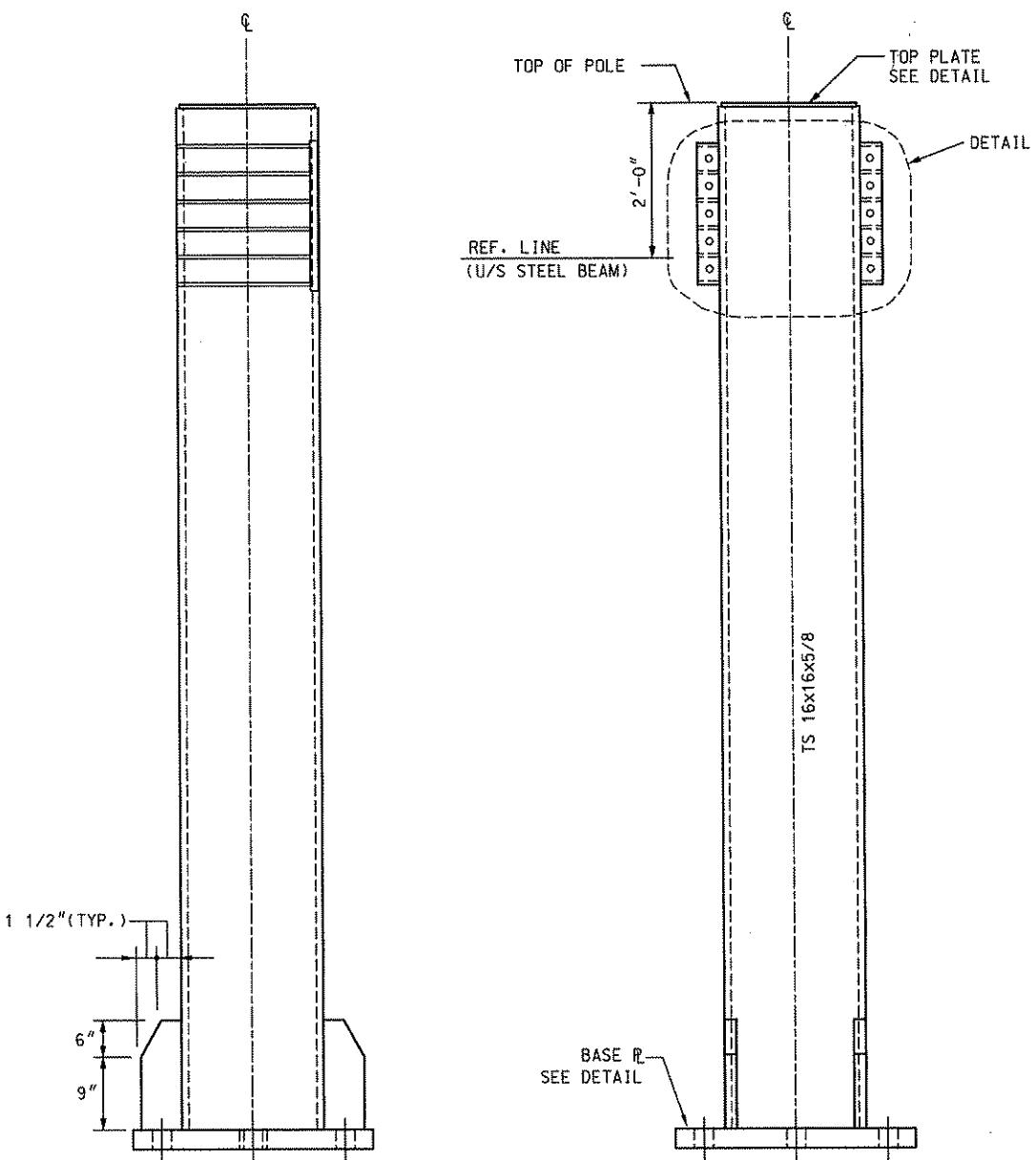
NO.	DATE	DESCRIPTION	REVISIONS

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.

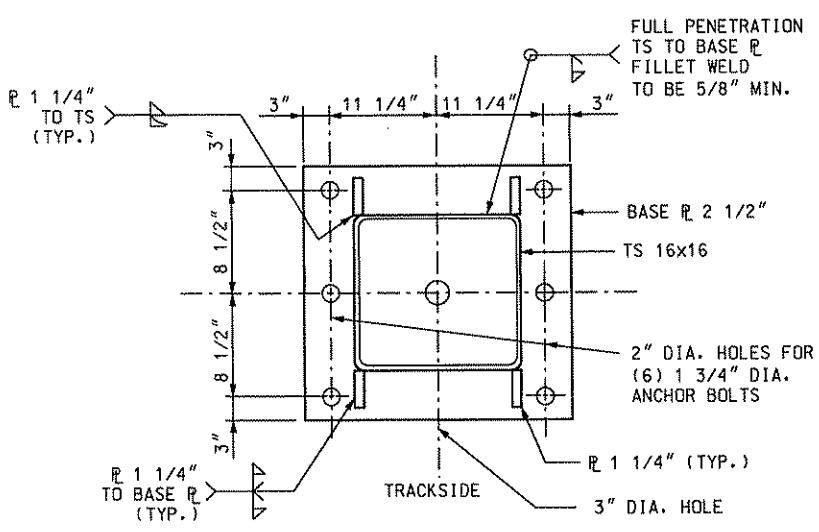


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS
APPROVED DATE
David P. Fleming 4/28/08

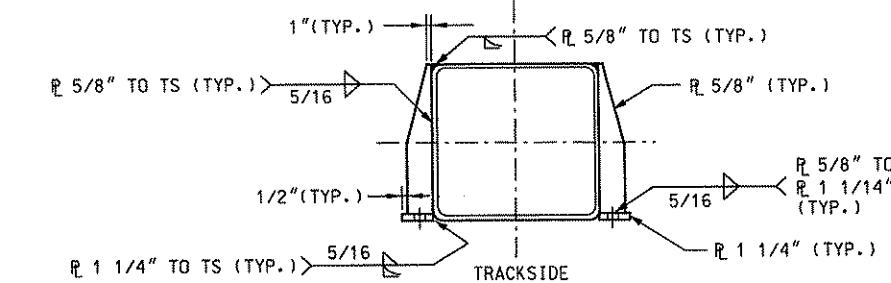
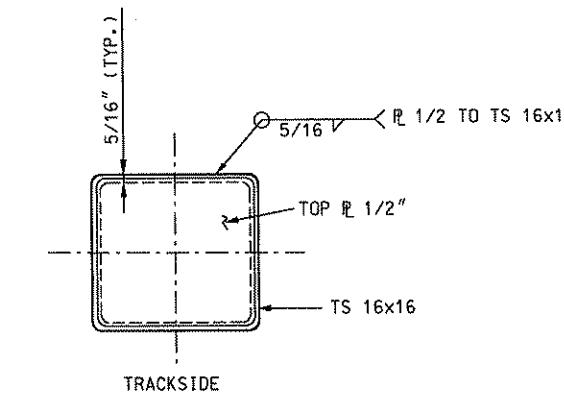
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH, PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
LIGHT, MEDIUM AND HEAVY CUT & COVER TUNNEL SUPPORT
PULL - OFF
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC198 SHT. 209



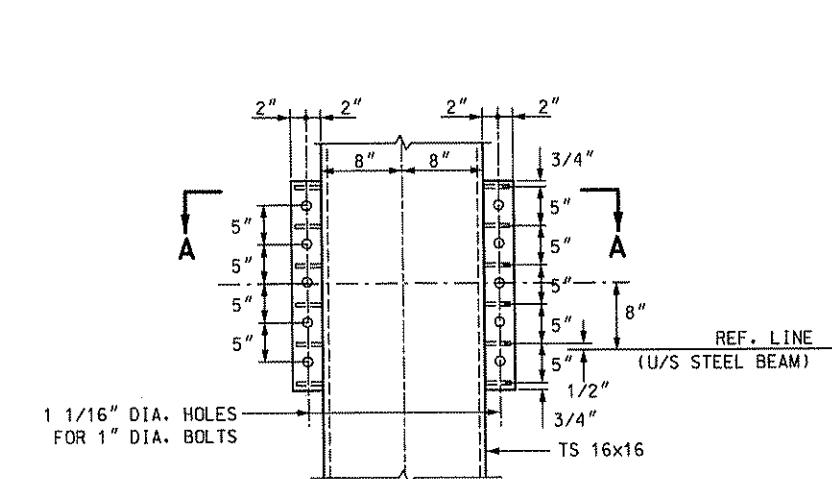
POLE (P-1)



TOP PLATE DETAIL



SECTION A-A



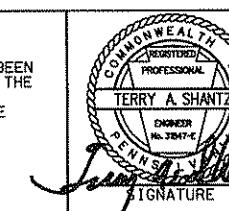
DETAIL 1

NOTE:

- WELDING SHALL BE IN CONFORMANCE TO THE AWS D1.1 SPECIFICATIONS FOR POLE FINISH SELECTION AND USAGE CRITERIA.

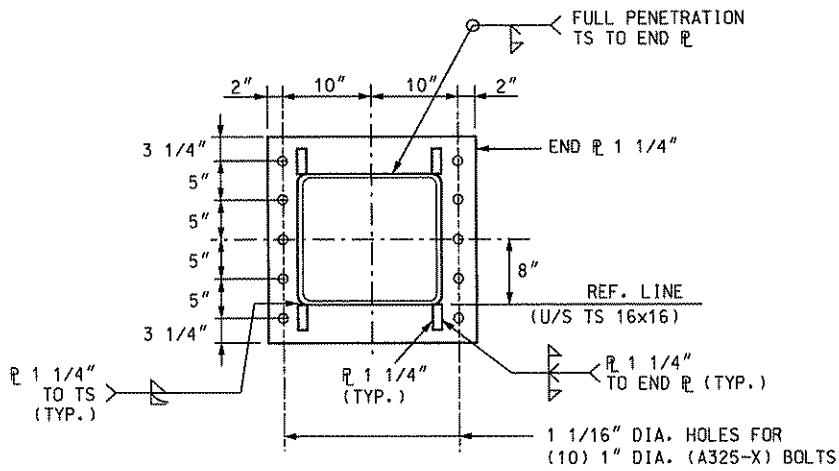
NO.	DATE	DESCRIPTION
REVISIONS		

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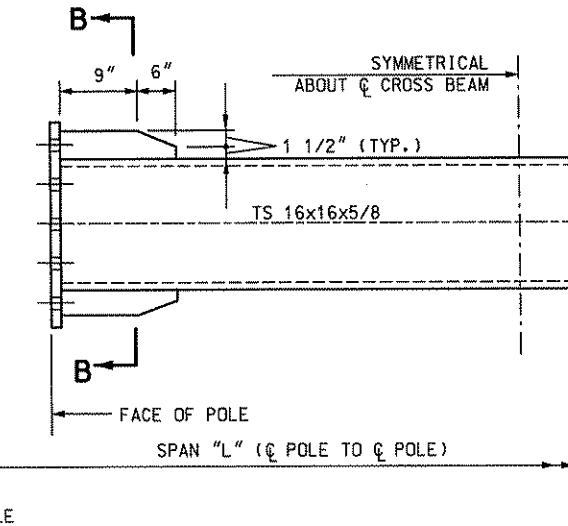


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
David F. Harris 4/28/08
APPROVED DATE

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
DEAD-END PORTAL DETAILS
CONTRACT NO. NSC-009
DWG. NO. OC199 SHT. 210

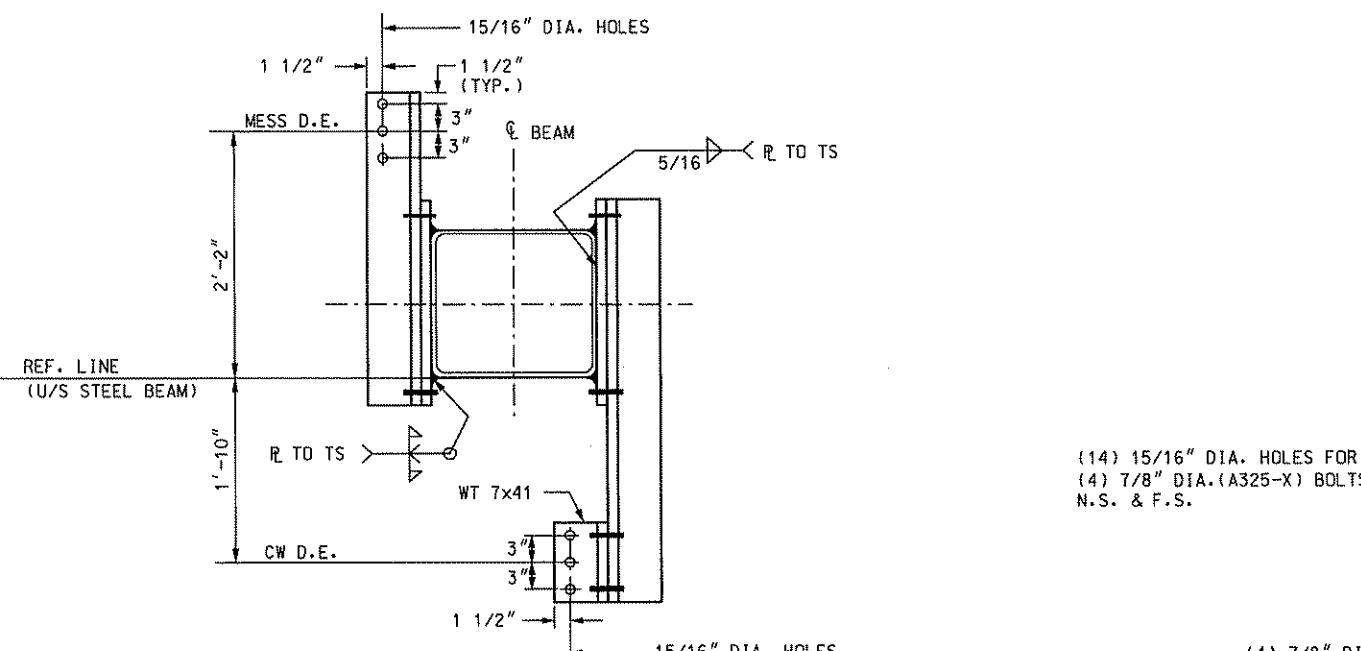


SECTION B-B

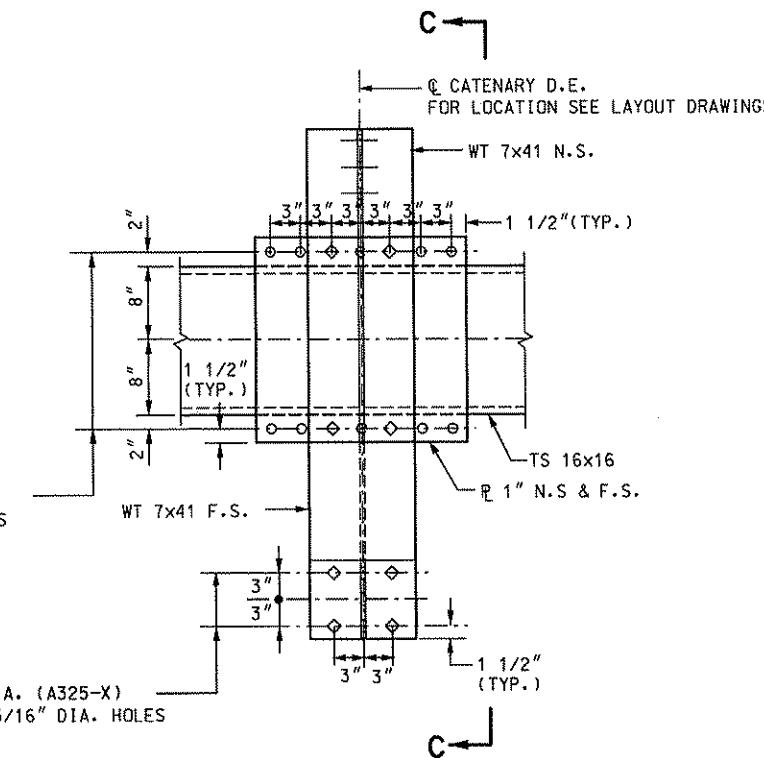


BEAM CAMBER	
L	SHOP CAMBER
UP TO 50'	2 1/2"
50.01'-55'	3"
55.01'-60'	3 1/2"

CROSS BEAM (CB-1)



SECTION C-C

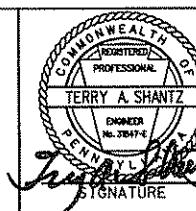


DETAIL (CDE-1)
CATENARY DEAD END DETAILS

NOTE:
1. WELDING SHALL BE IN CONFORMANCE TO
THE AWS D1.1 SPECIFICATIONS FOR POLE
FINISH SELECTION AND USAGE CRITERIA.

NO.	DATE	DESCRIPTION
REVISIONS		

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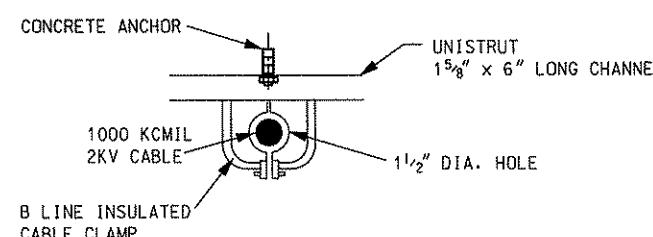
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Terry A. Shantz
TERRY A. SHANTZ
PENNSYLVANIA
PROFESSIONAL ENGINEER
REGISTRATION BOARD
No. 28874
SIGNATURE
David P. Harris 4/28/08
APPROVED DATE

DESIGNED M CHONG
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

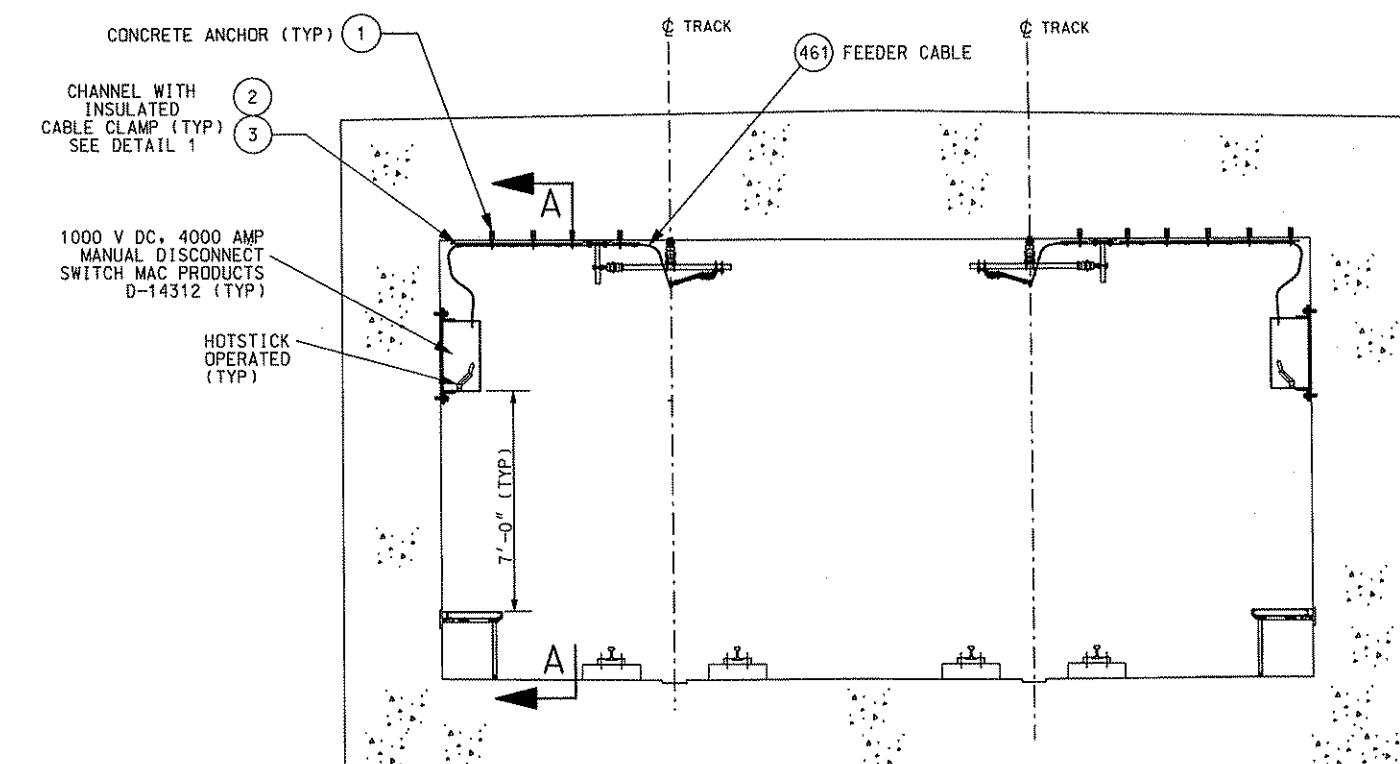
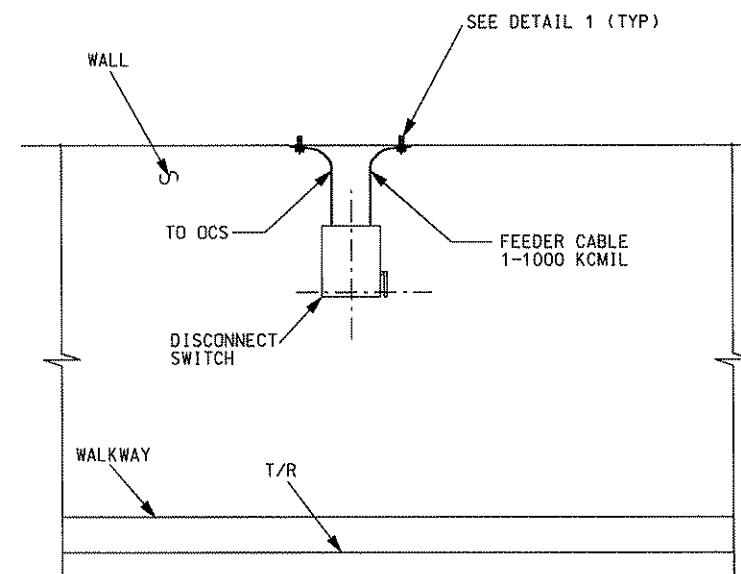
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
DEAD-END PORTAL
CROSS BEAM CB-1 AND CATENARY DEAD-END CDE-1 DETAILS
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC200 SHT. 2/11

BILL OF MATERIAL				
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.
461	1000 KCMIL INSULATED FEEDER CABLE, 2KV	-	-	*
1	KWIK BOLT 3, STS STL, $1\frac{1}{2}$ " x $3\frac{3}{4}$ " LONG	HILTI	00282558	*
2	SLOTTED CHANNEL	UNISTRUT	P1000T	*
3	INSULATED CABLE CLAMP	B LINE	B4069	*

* = QUANTITY AS REQUIRED.



DETAIL 1



SECTION A-A

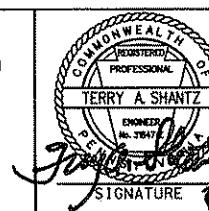
WALL MOUNTED MANUAL DISCONNECT SWITCH (DS-100-M-W)

NOTES:

1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
2. CATENARY ASSEMBLIES SHOWN ARE REPRESENTATIVE AND MAY NOT REFLECT WHAT IS INSTALLED IN THE FIELD.

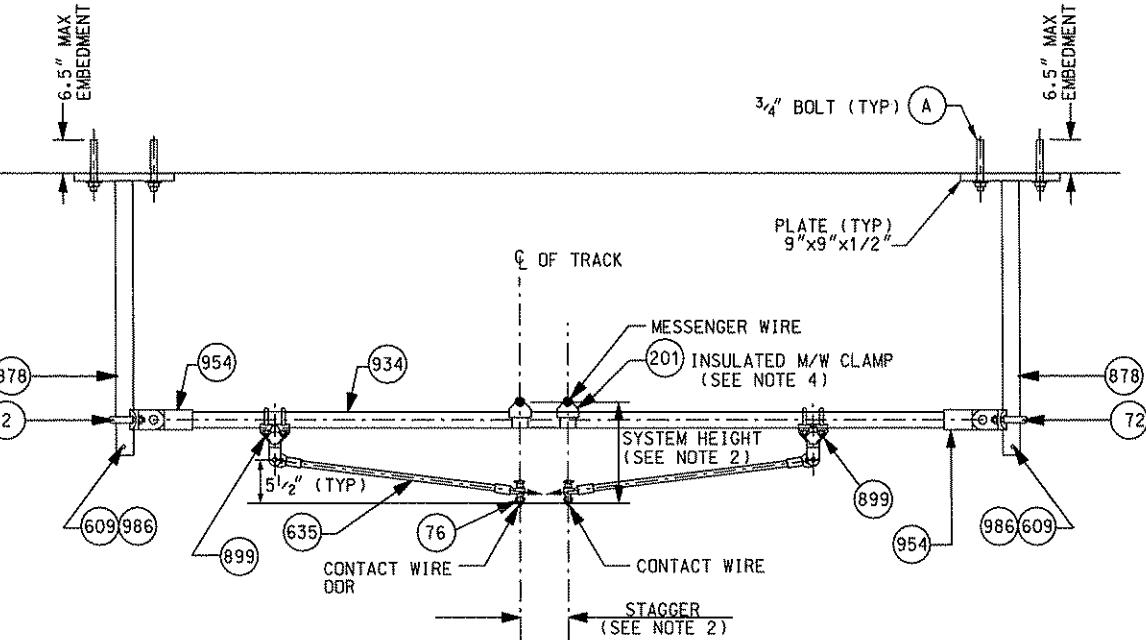
NO.	DATE	DESCRIPTION		
		REVISIONS		

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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Dave P. Henry 4/28/08
APPROVED DATE

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
DISCONNECT SWITCH (Tx-SWITCH) - WOOD STREET INTERLOCKING
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC201 SHT. 212



LIGHT PULL-OFF ASSEMBLY (TA-43L)

LOADING DIAGRAM

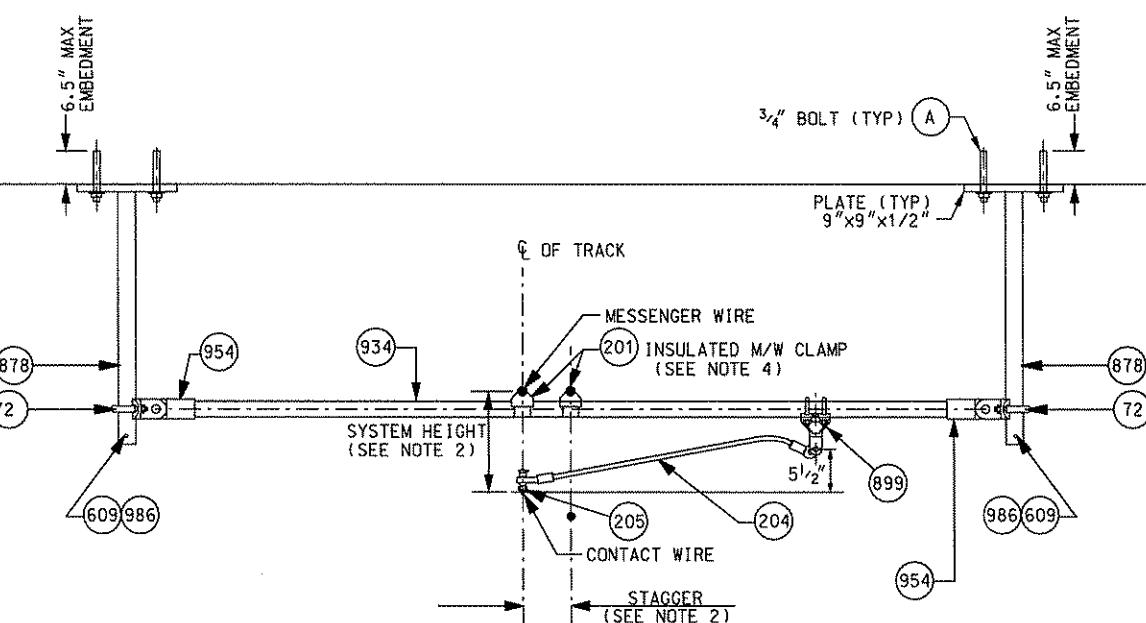
SUPPORT TYPE	MAXIMUM LOADING (LBS)		
	RC	RM	PM+PC
TA-43L	320	460	250

MAXIMUM WORKING LOADS

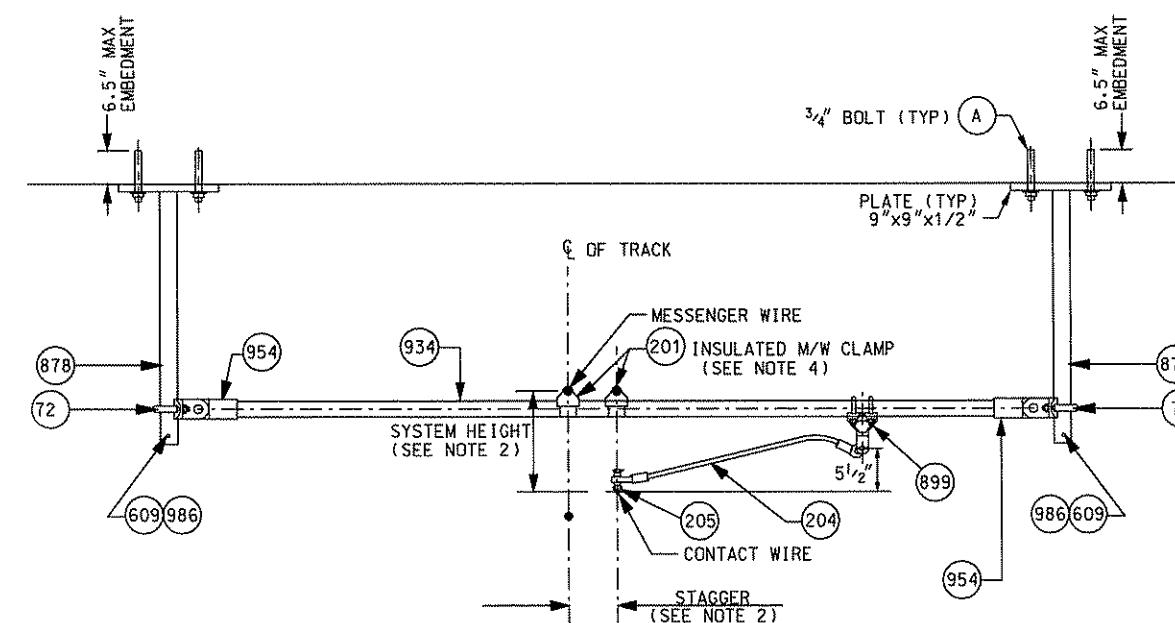
ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.	
				TA-43L	TA-43D
A	KWIKE BOLT 3, 3/4x8 LONG THREAD, 304SS	HILTI	0286027	8	8
72	CLAMP - CLEVIS 2" PIPE	IMPULSE NC	055375-3001	2	2
76	CLAMP - SWIVEL TROLLEY 0.63" STUD	IMPULSE NC	055755-3001	2	1
152	Y - CLEVIS EYE ASSEMBLY	IMPULSE NC	059687-3001	-	1
201	SADDLE - 2" HRZ MESSENGER	IMPULSE NC	057183-3003	2	2
204	ARM - UNINSULATED STEADY	IMPULSE NC	057823-8060	-	2
205	CLAMP - INSULATED SWIVEL	IMPULSE NC	0674999	-	2
609	COTTER	IMPULSE NC	315902-136	2	2
635	STEADY ARM, TRANS*LITE 24.7"	IMPULSE NC	060756-6247	2	-
878	SUPPORT, DROP TUBE	IMPULSE NC		2	2
899	BRACKET, DROP 2" (6.00")	IMPULSE NC	060758-3001	2	1
934	PIPE - 2" SCHEDULE 80 (HDG) ASTM A500 STEEL, GRADE B			-	*
954	TRANS*LITE STRUT, 2"/80 LONG EYE	IMPULSE NC	056909-3010	2	2
986	PIN, CLEVIS .375 X 2.5 STSL	IMPULSE NC	315920-127	2	2

* = QUANTITY AS REQUIRED.

LOADING TABLE



PULL-OFF ASSEMBLY (TA-430) REACH



PULL-OFF ASSEMBLY (TA-430) NON-REACH

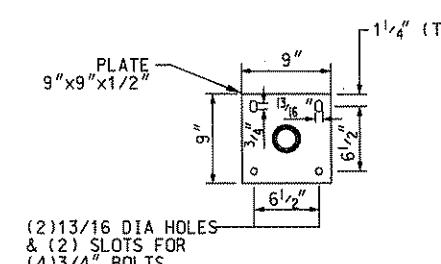
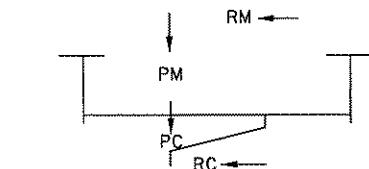


PLATE DETAIL



LOADING DIAGRAM

SUPPORT TYPE	MAXIMUM LOADING (LBS)		
	RC	RM	PM+PC
TA-430	710	1040	250

MAXIMUM WORKING LOADS

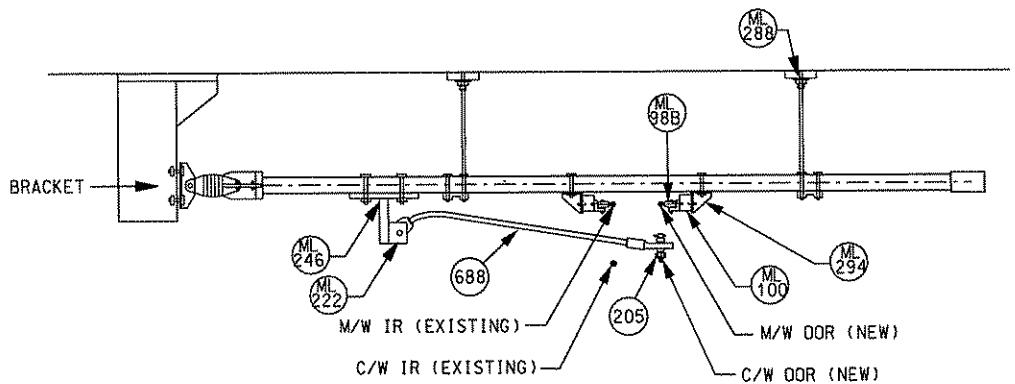
LOADING TABLE

NOTES:

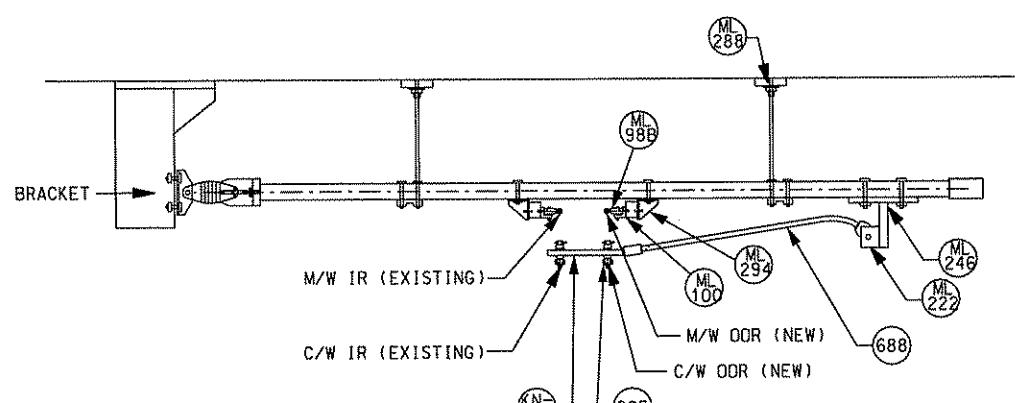
1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
2. FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS. FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS
3. TUNNEL SUPPORTS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSENGER AND CONTACT WIRES
4. USE TWO INSULATED MESSENGER WIRE CLAMPS OR AN ALTERNATIVE ARRANGEMENT, AS APPROVED BY THE ENGINEER, FOR HEAVY CONDITION
5. USE TWO STEADY ARMS FOR HEAVY LOAD CONDITIONS

 Gannett Fleming Transit & Rail Systems	<table border="1"> <tr> <td>NO.</td> <td>DATE</td> <td>DESCRIPTION</td> </tr> <tr> <td colspan="3">REVISIONS</td> </tr> </table>	NO.	DATE	DESCRIPTION	REVISIONS			<p>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.</p>		DMJM HARRIS FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222 AECOM TERRY A. SHANTZ ENGINERED NO. 39847-E 	DESIGNED SR ADKINS
		NO.	DATE	DESCRIPTION							
REVISIONS											
DRAWN	HT TRAN	CHECKED TA SHANTZ									

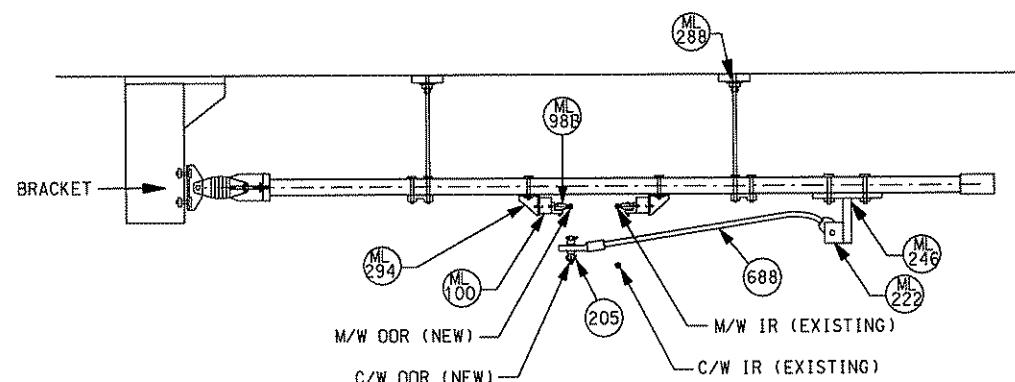
PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH		NORTH SHORE CONNECTOR	
		NSC TRAIN SYSTEM (SYSTEM-WIDE)	
		OVERLAP TUNNEL SUPPORT	
		REDUCED HEIGHT	
 Port Authority <p>Contract No. NSC-009 DWG. No. OC202 Sht. 213</p>	SCALE NTS		Port Authority <p>Contract No. NSC-009 DWG. No. OC202 Sht. 213</p>
	APPROVED	DATE	



ASSEMBLY S-67 (MOD1)



ASSEMBLY S-67 (MOD2)

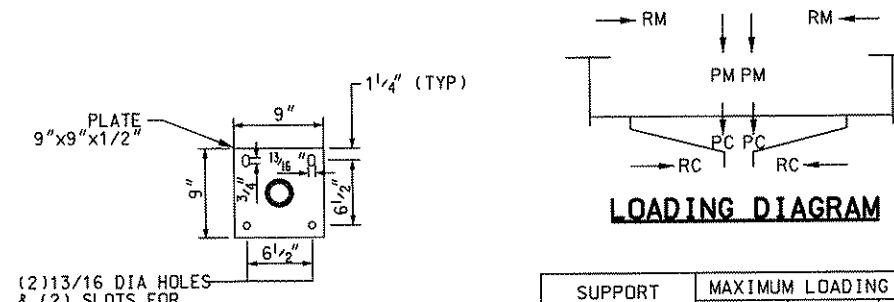


ASSEMBLY S-68 (MOD)

BILL OF MATERIAL

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.			
				S-67(MOD1)	S-67(MOD2)	S-68(MOD)	TA-40M
ML98B	WIRE CLAMP WITH BRACKET M/W	DUQUESNE	6573-MW	1	1	1	1
ML100	HANGER INSULATOR WITH 1 1/4" STUD	DUQUESNE	6521-LS	1	1	1	1
ML222	CONNECTION PLATE (PER STAGE 1 DWGS)	STAGE 1 BOM	STAGE 1 BOM	1	1	1	1
ML246	PULL OFF ARM ATTACHMENT (PER STAGE 1 DWGS)	STAGE 1 BOM	STAGE 1 BOM	1	1	1	1
ML288	BRACKET & HANGER (PER STAGE 1 DWGS)	STAGE 1 BOM	STAGE 1 BOM	1	1	1	1
ML294	SUPPORT BRACKET, FABRICATED	DWG OC205	-	1	1	1	1
204	ARM - UNINSULATED STEADY	IMPULSE NC	057823-8060	-	-	-	2
205	CLAMP - INSULATED SWIVEL	IMPULSE NC	0674999	1	1	1	1
KN-100	CONTACT WIRE INSULATED KNUCKLE (KN-100)	DWG DC180	-	-	1	-	-
A	KWIK BOLT 3, 3/4x8 LONG THREAD, 304SS	HILTI	0286027				8
72	CLAMP - CLEVIS 2" PIPE	IMPULSE NC	055375-3001				2
201	SADDLE - 2" HRZ MESSENGER	IMPULSE NC	057183-3003				1
487	CLAMP - SWIVEL TROLLEY 4/0	IMPULSE NC	057219-3001				1
609	COTTER	IMPULSE NC	315902-136				2
878	SUPPORT, DROP TUBE	IMPULSE NC					2
688	ARM - UNINSULATED STEADY, ADJUSTABLE	IMPULSE NC	057822-8050	1	1	1	-
899	BRACKET, DROP 2" (6.00")	IMPULSE NC	060758-3001				2
934	PIPE - 2" SCHEDULE 80 (HDG) ASTM A500 STEEL, GRADE B		-	-			*
954	TRANS*LITE STRUT, 2"/80 LONG EYE	IMPULSE NC	056909-3010				2
986	PIN, CLEVIS .375 X 2.5 STSTL	IMPULSE NC	315920-127				2

* = QUANTITY AS REQUIRED.

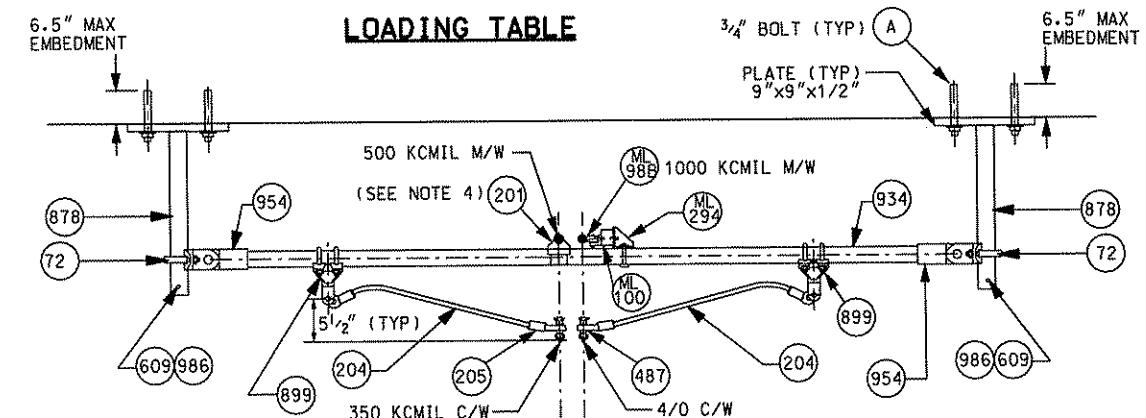


LOADING DIAGRAM

PLATE DETAIL

SUPPORT TYPE	MAXIMUM LOADING (LBS)		
	RC	RM	PM+PC
TA-40M	710	1040	250

MAXIMUM WORKING LOADS



LIGHT PULL-OFF ASSEMBLY (TA-40M)

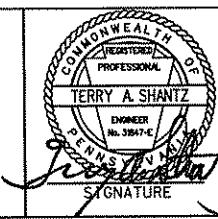
NOTES:

- FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
- FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS. FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS
- TUNNEL SUPPORTS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSENGER AND CONTACT WIRES
- USE TWO INSULATED MESSENGER WIRE CLAMPS OR AN ALTERNATIVE ARRANGEMENT, AS APPROVED BY THE ENGINEER, FOR HEAVY CONDITION
- USE TWO STEADY ARMS FOR HEAVY LOAD CONDITIONS
- SOME OF THESE ASSEMBLIES ARE MODIFIED STAGE 1 ASSEMBLIES. EXISTING MATERIALS ARE NOT INCLUDED IN BILL OF MATERIAL.

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.

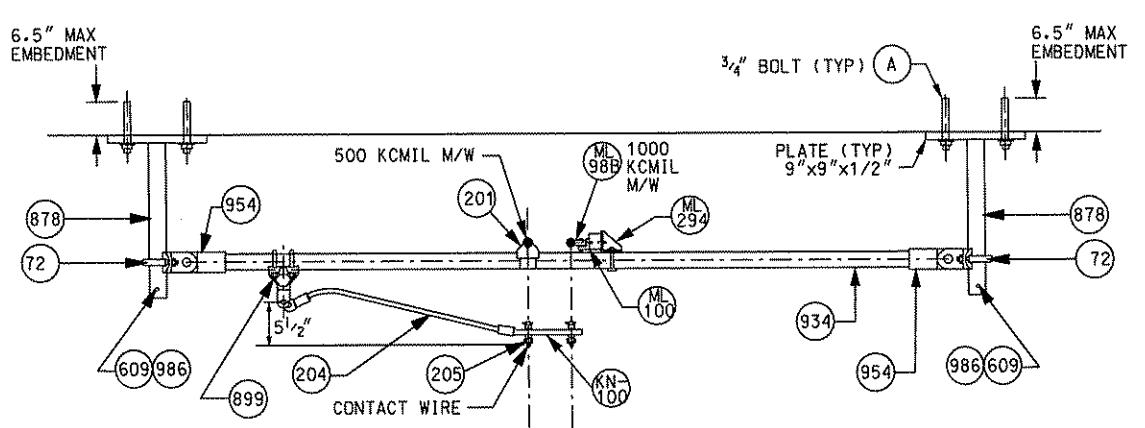
Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS

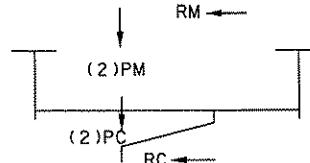


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS
APPROVED DATE
SIGNATURE
APPROVED DATE
Terry A. Shantz
APR 28 2008
Signature"/>

PORT AUTHORITY OF ALLEGHENY COUNTY
PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
MODIFIED TUNNEL SUPPORT
REDUCED HEIGHT
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC203 SHT. 214



LIGHT PULL-OFF ASSEMBLY (TA-36M)

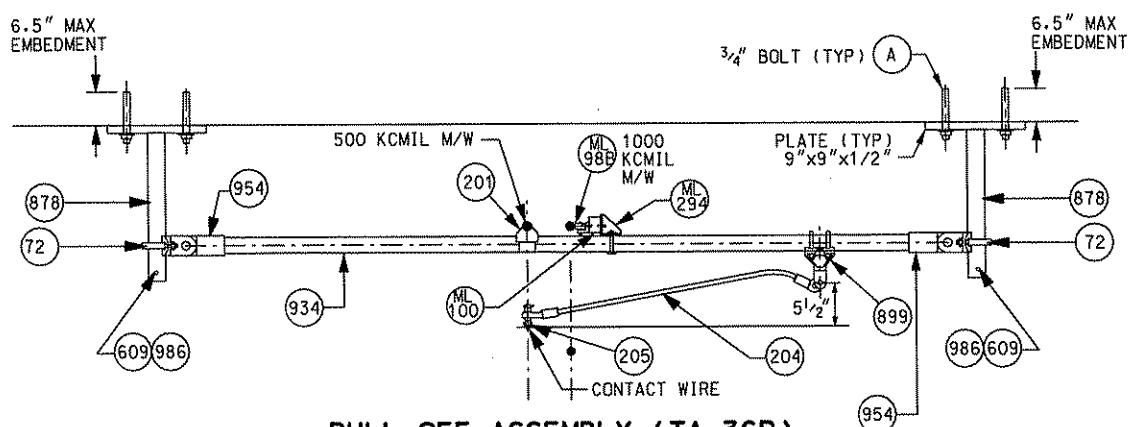


LOADING DIAGRAM

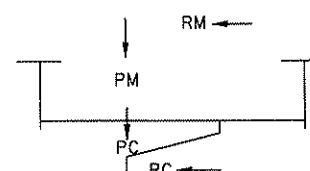
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	RC	RM	PM+PC
TA-36M	710	1040	250

MAXIMUM WORKING LOADS

LOADING TABLE



PULL-OFF ASSEMBLY (TA-36R)

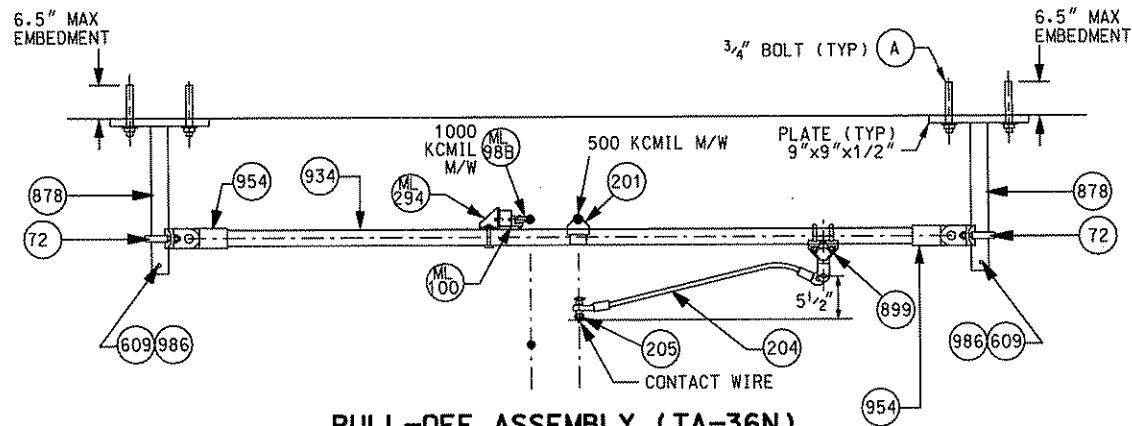


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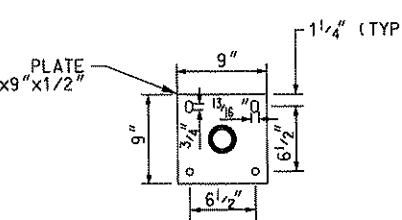
SUPPORT TYPE	MAXIMUM LOADING (LBS)		
	RC	RM	PM+PC
TA-36R	710	1040	250
TA-36N	710	1040	250
TA-37R	710	1040	250
TA-37N	710	1040	250

MAXIMUM WORKING LOADS

LOADING TABLE



PULL-OFF ASSEMBLY (TA-36N)



(2) 13/16 DIA HOLES
& (2) SLOTS FOR
(4) 3/4" BOLTS

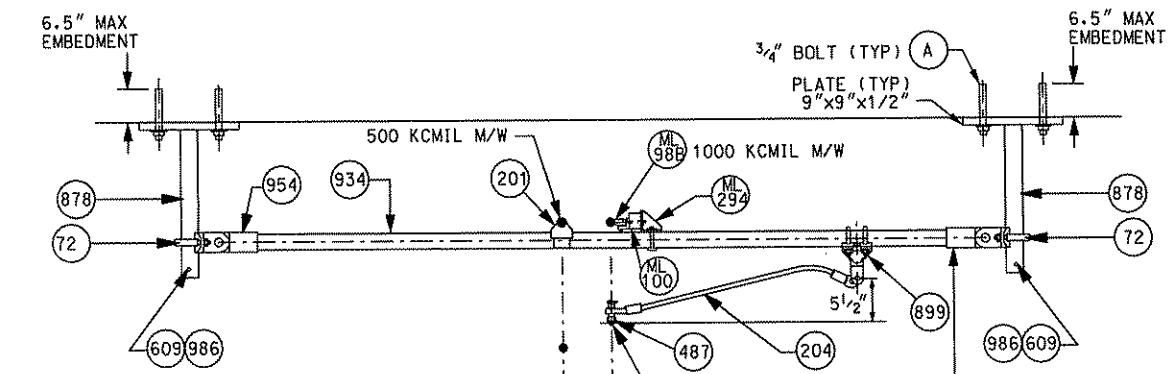
PLATE DETAIL

NOTES:

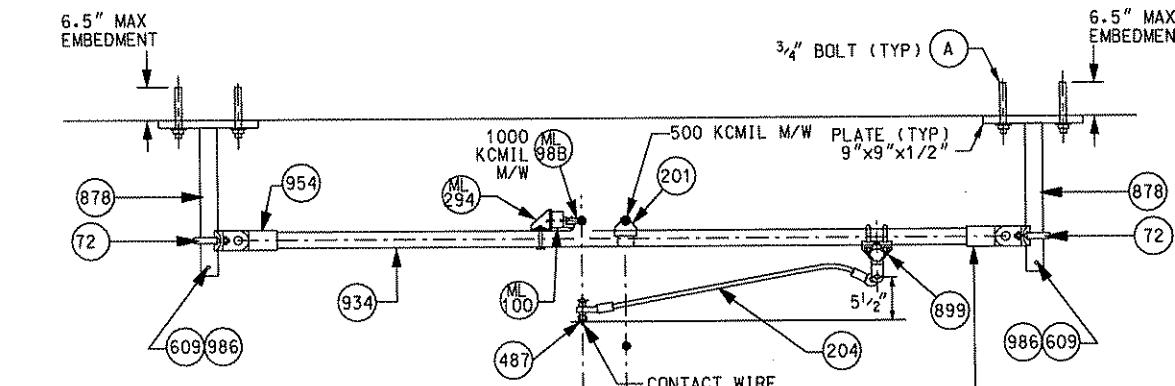
1. FOR ABBREVIATIONS, SYMBOLS AND GENERAL NOTES, SEE DRAWINGS GN203, GN310 AND OC007
2. FOR CONDUCTOR HEIGHTS AND SYSTEM HEIGHT REFER TO OCS PROFILE DRAWINGS.
FOR STAGGER VALUES AND DIRECTION, REFER TO OCS LAYOUT DRAWINGS.
3. TUNNEL SUPPORTS MUST ALLOW FOR 8" ADJUSTMENTS IN BOTH DIRECTIONS FOR MESSENGER AND CONTACT WIRES
4. USE TWO INSULATED MESSENGER WIRE CLAMPS OR AN ALTERNATIVE ARRANGEMENT, AS APPROVED BY THE ENGINEER, FOR HEAVY CONDITION
5. USE TWO STEADY ARMS FOR HEAVY LOAD CONDITIONS

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	BILL OF MATERIAL				
				TA-36M	TA-36R	TA-36N	TA-37R	TA-37N
A	KWIK BOLT 3. 3/4x8 LONG THREAD, 304SS	HILTI	0286027	8	8	8	8	8
72	CLAMP - CLEVIS 2" PIPE	IMPULSE NC	055375-3001	2	2	2	2	2
201	SADDLE - 2" HRZ MESSENGER	IMPULSE NC	057183-3003	1	1	1	1	1
204	ARM - UNINSULATED STEADY	IMPULSE NC	057823-8060	1	1	1	1	1
205	CLAMP - INSULATED SWIVEL	IMPULSE NC	0674999	1	1	1	-	-
487	CLAMP - SWIVEL TROLLEY 4/0	IMPULSE NC	057219-3001	-	-	-	1	1
609	COTTER	IMPULSE NC	315902-136	2	2	2	2	2
878	SUPPORT, DROP TUBE	IMPULSE NC		2	2	2	2	2
899	BRACKET, DROP 2" (6.00")	IMPULSE NC	060758-3001	1	1	1	1	1
934	PIPE - 2" SCHEDULE 80 (HDG) ASTM A500 STEEL, GRADE B			-	-	*	*	*
954	TRANSLITE STRUT, 2"/80 LONG EYE	IMPULSE NC	056909-3010	2	2	2	2	2
986	PIN, CLEVIS .375 X 2.5 STSTL	IMPULSE NC	315920-127	2	2	2	2	2
ML98B	WIRE CLAMP WITH BRACKET FOR MESSENGER	DUQUESNE	6573-MW	1	1	1	1	1
ML100	HANGER INSULATOR WITH 1 1/4" STUD	DUQUESNE	6521-LS	1	1	1	1	1
ML294	SUPPORT BRACKET, FABRICATED	DWG OC205		-	1	1	1	1
KN-100	CONTACT WIRE INSULATED KNUCKLE (KN-100)	DWG OC180		-	1	-	-	-

* = QUANTITY AS REQUIRED.



PULL-OFF ASSEMBLY (TA-37N)

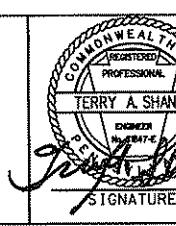


PULL-OFF ASSEMBLY (TA-37R)

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS

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DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SIGNATURE *[Signature]* APPROVED *[Signature]* DATE *4/28/08*

PORT AUTHORITY OF ALLEGHENY COUNTY
Pittsburgh, Pennsylvania
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
OVERLAP TUNNEL SUPPORT
REDUCED HEIGHT PULL - OFF
Port Authority
Contract No. NSC-009
Dwg. No. OC204 Sht. 215

1024+00	1024+42	1024+76	1025+10	1025+42	1025+44	1025+78	1025+94	1026+31	1026+69	1027+19	1027+69
DCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	B15/8/12Y N/A LT SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	DCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	B15/8 815/12Y N/A LT SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	DCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	815/8 6 12 LT SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	DCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	815/12Y W-14 3 3 XOVER SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	DCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	815/8 W-14 0 12 LT SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	DCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY	815/8 6 12 LT SUPPORT ASSY STRUCT TYPE OFFSET INSERT REF INSERT HT MISC ASSY
IR / DOR EXISTING	IR / DOR EXISTING	IR / DOR EXISTING	IR / IR EXISTING	IR / IR EXISTING	IR / IR NEW	IR / IR NEW	IR / IR EXISTING	IR / OOR EXISTING	IR / OOR EXISTING	IR / OOR EXISTING	IR / OOR EXISTING
IR / DOR EXISTING	IR / DOR EXISTING	IR / DOR EXISTING	IR / IR EXISTING	IR / IR EXISTING	IR / IR NEW	IR / IR EXISTING	IR / IR EXISTING	IR / OOR EXISTING	IR / OOR EXISTING	IR / OOR EXISTING	IR / OOR EXISTING

1023+65	
REF TRACK	LT
DCS WIRE NO	815/12Y
OFFSET	N/A
ASSY TYPE	
INSERT REF	
EXISTING	
FTA FOR WIRE 815/12Y(T)	

1023+58	
DCS WIRE NO	815/8
STAGGER	N/A
REF TRACK	LT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1023+58	
DCS WIRE NO	815/10
STAGGER	N/A
REF TRACK	RT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1024+00	
DCS WIRE NO	815/10
STAGGER	N/A
REF TRACK	RT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1024+42	
DCS WIRE NO	815/10
STAGGER	N/A
REF TRACK	RT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1024+66	
DCS WIRE NO	W-14 815/10
STAGGER	12 6
REF TRACK	RT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1025+10	
DCS WIRE NO	W-14 815/10
STAGGER	6 0
REF TRACK	RT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1025+32	
DCS WIRE NO	815/10
STAGGER	N/A
REF TRACK	RT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1025+78	
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STAGGER	0 12
REF TRACK	RT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1025+19	
DCS WIRE NO	815/10 815/12Y
STAGGER	N/A
REF TRACK	RT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1026+31	
DCS WIRE NO	815/8
STAGGER	N/A
REF TRACK	LT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1026+69	
DCS WIRE NO	815/8
STAGGER	N/A
REF TRACK	LT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

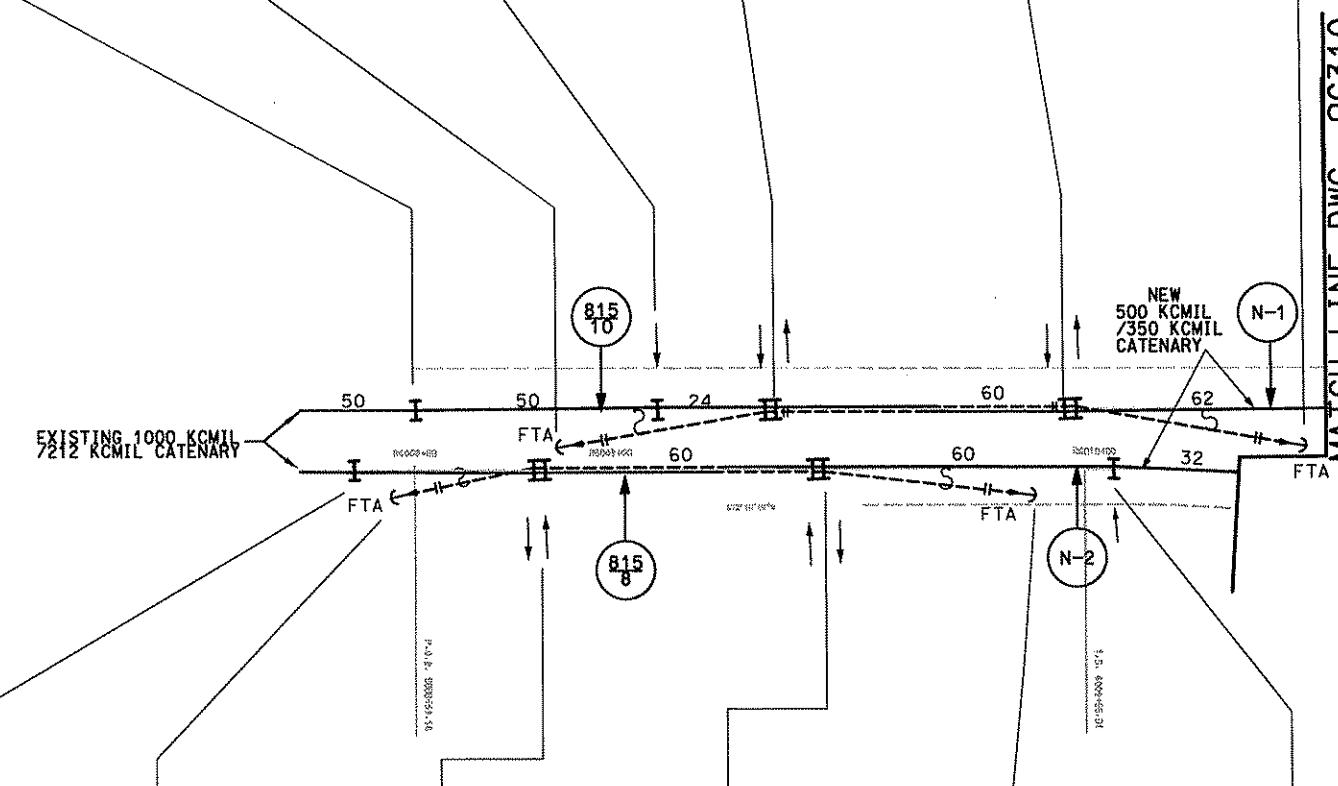
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STAGGER	N/A
REF TRACK	LT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1027+69	
DCS WIRE NO	815/8
STAGGER	N/A
REF TRACK	LT
SUPPORT ASSY	
STRUCT TYPE	
OFFSET	
INSERT REF	
INSERT HT	
MISC ASSY	
EXISTING	

1027+65	

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STAGGER	-	STAGGER	-	STAGGER	-	STAGGER	9 9	STAGGER	9 9	STAGGER	9
REF TRACK	-	REF TRACK	LT	REF TRACK	LT	REF TRACK	LT	REF TRACK	LT	REF TRACK	LT
SUPPORT ASSY	-	SUPPORT ASSY	-	SUPPORT ASSY	-	SUPPORT ASSY	TA-36R, TA-40M	SUPPORT ASSY	TA-40M, TA-37N	SUPPORT ASSY	-
STRUCT TYPE	-	STRUCT TYPE	DE-100	STRUCT TYPE	-	STRUCT TYPE	-	STRUCT TYPE	-	STRUCT TYPE	DE-100
OFFSET	-	OFFSET	4'-6"	OFFSET	-	OFFSET	-	OFFSET	-	OFFSET	4'-6"
FDN REF	-	FDN REF	-	FDN REF	-	FDN REF	-	FDN REF	-	FDN REF	-
FDN FINISH	-	FDN FINISH	-	FDN FINISH	-	FDN FINISH	-	FDN FINISH	-	FDN FINISH	-
MISC ASSY	-	MISC ASSY	TD-200	MISC ASSY	-	MISC ASSY	-	MISC ASSY	-	MISC ASSY	TD-201
TUNNEL SUPPORT		FTA FOR WIRE N-1		TUNNEL SUPPORT		TWIN SUPPORTS		TWIN SUPPORTS		FTA FOR WIRE 815/10	
EXISTING		EXISTING									



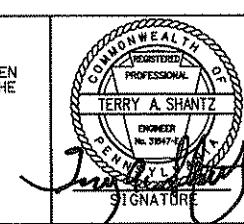
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STAGGER	-	STAGGER	9 9	STAGGER	9 9	STAGGER	9 9	STAGGER	-	STAGGER	6
REF TRACK	-	REF TRACK	RT	REF TRACK	RT	REF TRACK	RT	REF TRACK	RT	REF TRACK	RT
SUPPORT ASSY	-	SUPPORT ASSY	-	SUPPORT ASSY	TA-36N, TA-40M	SUPPORT ASSY	TA-40M, TA-37R	SUPPORT ASSY	-	SUPPORT ASSY	TA-35E
STRUCT TYPE	-	STRUCT TYPE	DE-100	STRUCT TYPE	-	STRUCT TYPE	-	STRUCT TYPE	DE-100	STRUCT TYPE	-
OFFSET	-	OFFSET	4'-6"	OFFSET	-	OFFSET	-	OFFSET	4'-6"	OFFSET	-
FDN REF	-	FDN REF	-	FDN REF	-	FDN REF	-	FDN REF	-	FDN REF	-
FDN FINISH	-	FDN FINISH	-	FDN FINISH	-	FDN FINISH	-	FDN FINISH	-	FDN FINISH	-
MISC ASSY	-	MISC ASSY	TD-200	MISC ASSY	-	MISC ASSY	-	MISC ASSY	TD-201	MISC ASSY	-
TUNNEL SUPPORT		FTA FOR WIRE N-2		TWIN SUPPORTS		TWIN SUPPORTS		FTA FOR WIRE 815/8		TUNNEL SUPPORT	
EXISTING											

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

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

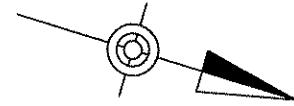
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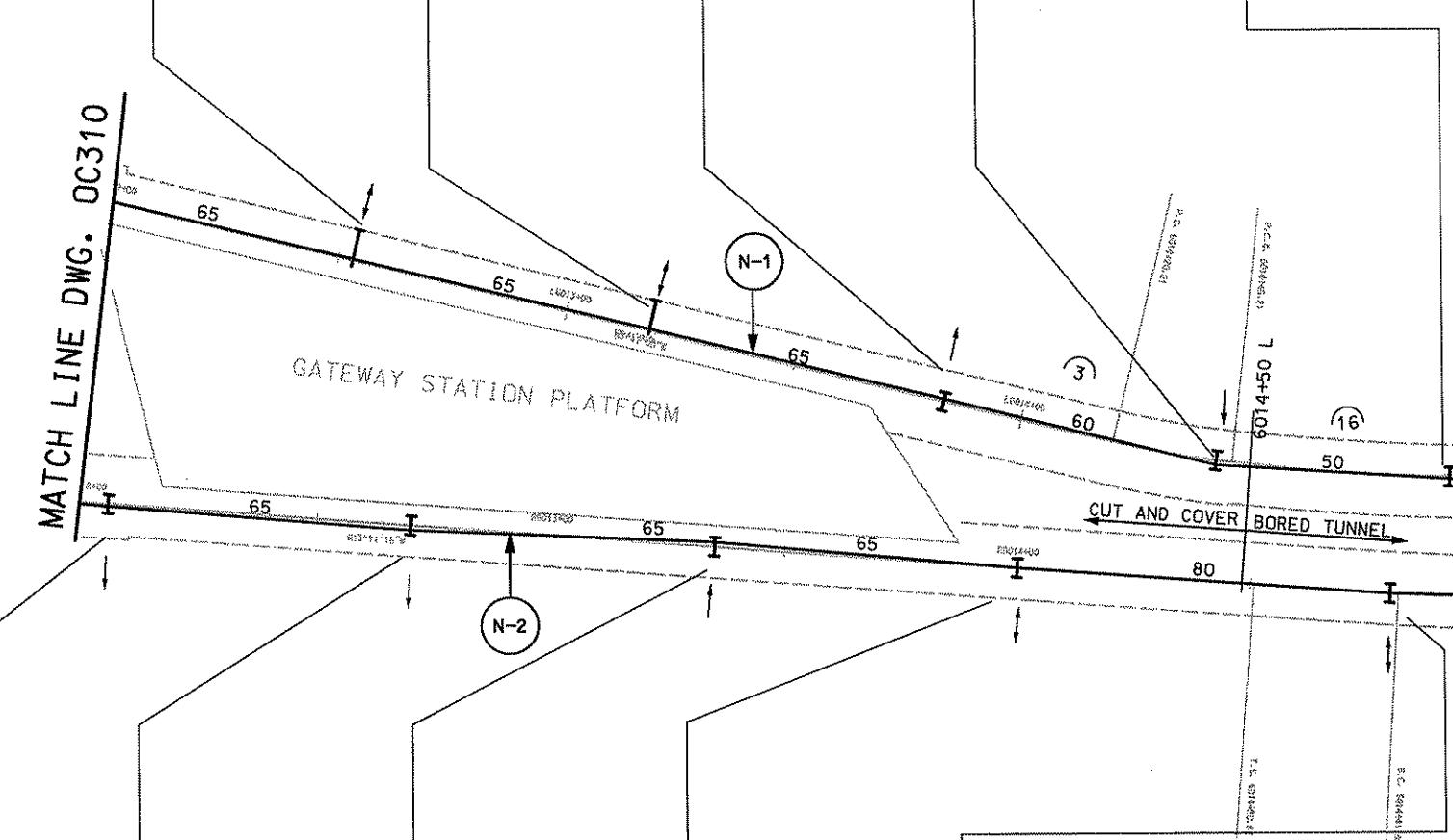
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Terry A. Shantz
OWNER
REG. NO. 3097-PA
PENNSYLVANIA
SIGNATURE
David P. Hays 4/28/08
APPROVED DATE

DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATEINARY ALIGNMENT
EXISTING OCS TO STA. 6010+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC309 SHT. 218

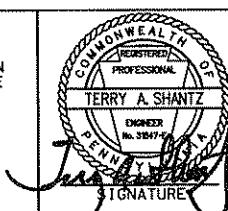


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STAGGER	NR	STAGGER	NR	STAGGER	6	STAGGER	12	STAGGER	12
REF TRACK	LT	REF TRACK	LT	REF TRACK	LT	REF TRACK	LT	REF TRACK	LT
SUPPORT ASSY	CA-18L	SUPPORT ASSY	CA-18L	SUPPORT ASSY	TA-35E	SUPPORT ASSY	TA-35E	SUPPORT ASSY	TA-31E
STRUCT TYPE	-	STRUCT TYPE	-	STRUCT TYPE	-	STRUCT TYPE	-	STRUCT TYPE	-
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FDN REF	-	FDN REF	-	FDN REF	-	FDN REF	-	FDN REF	-
FDN FINISH	-	FDN FINISH	-	FDN FINISH	-	FDN FINISH	-	FDN FINISH	-
MISC ASSY	-	MISC ASSY	-	MISC ASSY	-	MISC ASSY	-	MISC ASSY	-
WALL MOUNTED		WALL MOUNTED		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
CANTILEVER		CANTILEVER		-		-		-	



6012+05		6012+70		6013+35		6014+00		6014+80	
OCS WIRE NO	N-2								
STAGGER	6	STAGGER	12	STAGGER	12	STAGGER	0	STAGGER	0
REF TRACK	RT								
SUPPORT ASSY	TA-35L	SUPPORT ASSY	TA-35M	SUPPORT ASSY	TA-35M	SUPPORT ASSY	TA-35L	SUPPORT ASSY	TA-31E
STRUCT TYPE	-								
OFFSET	-								
FDN REF	-								
FDN FINISH	-								
MISC ASSY	-								
TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
-		-		-		-		-	

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DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

Daniel J. Fleming 4/28/08
APPROVED DATE

Gannett Fleming
Transit & Rail Systems

NO. DATE DESCRIPTION

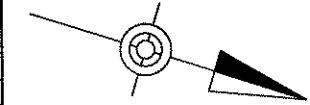
REVISIONS

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY ALIGNMENT
STA. 6012+00 TO STA. 6015+00

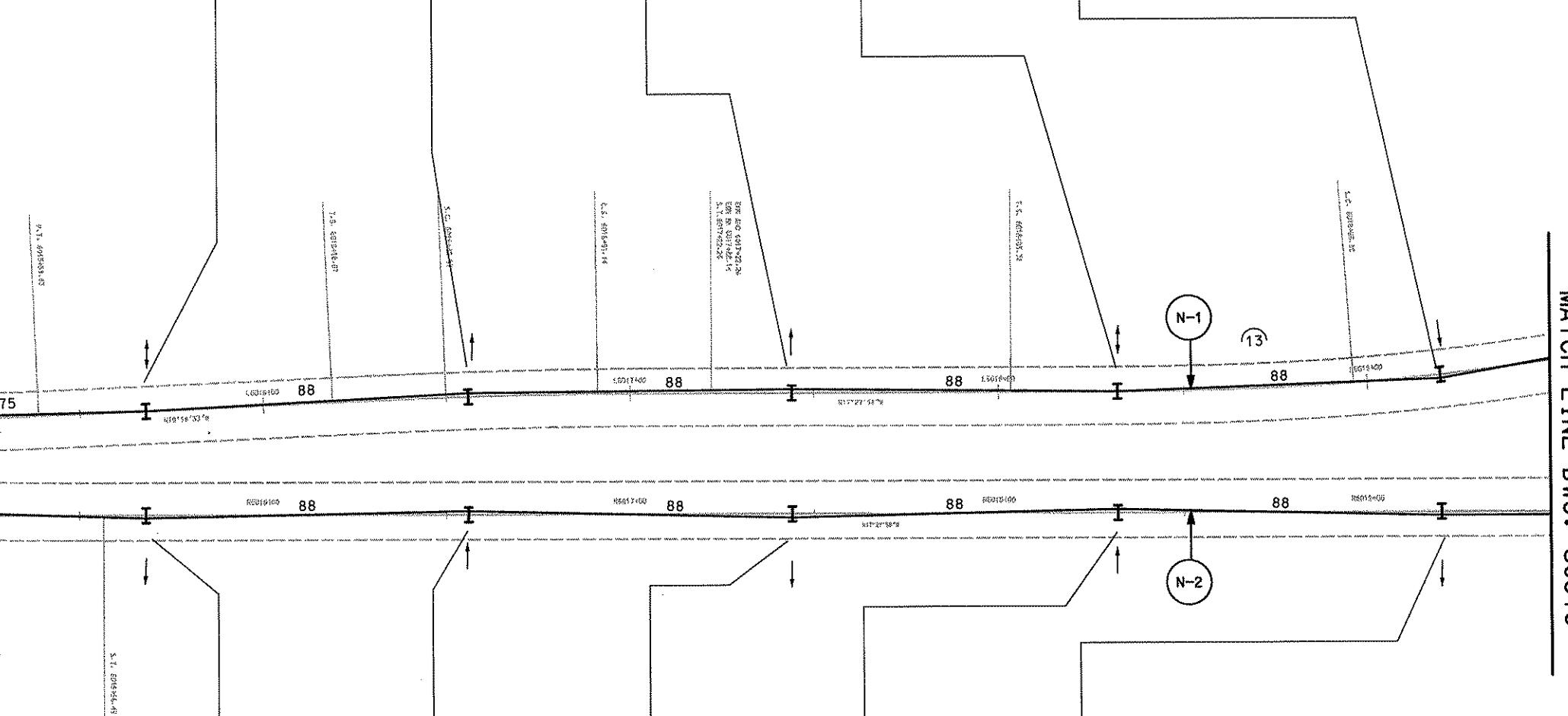
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC311 SHT. 220

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

6015+68		6016+56		6017+44		6018+32		6019+20	
OCS WIRE NO	N-1								
STAGGER	0	STAGGER	12	STAGGER	12	STAGGER	0	STAGGER	12
REF TRACK	LT								
SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31L	SUPPORT ASSY	TA-31L	SUPPORT ASSY	TA-31M	SUPPORT ASSY	TA-31M
STRUCT TYPE	-								
OFFSET	-								
FDN REF	-								
FDN FINISH	-								
MISC ASSY	-								
TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
-		-		-		-		-	



MATCH LINE DWG. OC311



MATCH LINE DWG. OC313

6015+68		6016+56		6017+44		6018+32		6019+20	
OCS WIRE NO	N-2								
STAGGER	9	STAGGER	12	STAGGER	12	STAGGER	12	STAGGER	12
REF TRACK	RT								
SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31L	SUPPORT ASSY	TA-31L	SUPPORT ASSY	TA-31L
STRUCT TYPE	-								
OFFSET	-								
FDN REF	-								
FDN FINISH	-								
MISC ASSY	-								
TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
-		-		-		-		-	

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

Gannett Fleming
Transit & Rail Systems

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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
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
APPROVED DATE
Signature
David A. Harris 4/28/08
APPROVED DATE
Signature
David A. Harris 4/28/08

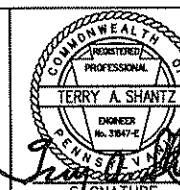
DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH, PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY ALIGNMENT
STA. 6015+00 TO STA. 6019+50
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC312 SHT. 22

6020+08		6020+96		6021+84		6022+72		6023+60		6024+48	
OCS WIRE NO	N-1										
STAGGER	12	STAGGER	12	STAGGER	12	STAGGER	9	STAGGER	9	STAGGER	12
REF TRACK	LT										
SUPPORT ASSY	TA-31M	SUPPORT ASSY	TA-31E								
STRUCT TYPE	-										
OFFSET	-										
FDN REF	-										
FDN FINISH	-										
MISC ASSY	-										
TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
-		-		-		-		-		-	

MATCH LINE DWG. OC312

6020+08		6020+96		6021+84		6022+72	
OCS WIRE NO	N-2						
STAGGER	12	STAGGER	12	STAGGER	12	STAGGER	12
REF TRACK	RT						
SUPPORT ASSY	TA-31M	SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31E
STRUCT TYPE	-						
OFFSET	-	OFFSET	-	OFFSET	-	OFFSET	-
FDN REF	-						
FDN FINISH	-						
MISC ASSY	-						
TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
-		-		-		-	



DMJM HARRIS AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
PENNSYLVANIA
ENGINEER
NO. 31847-E
APPROVED
4/28/08
DATE

DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY ALIGNMENT
STA. 6019+50 TO STA. 6025+50
Contract No. NSC-009
Dwg. No. OC313 Sht. 222

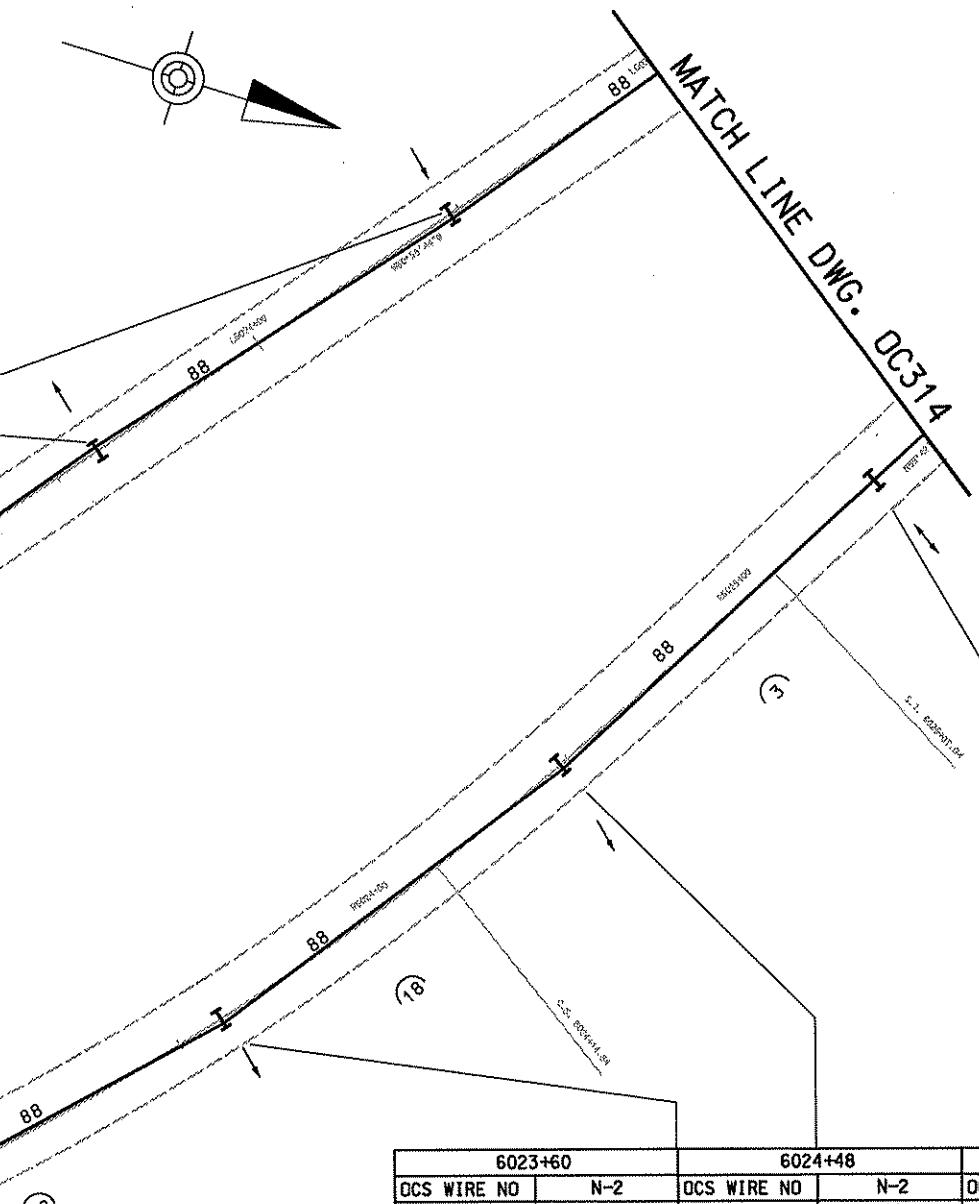
Gannett Fleming
Transit & Rail Systems

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FEDERAL TRANSIT ADMINISTRATION, U.S.
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ALLEGHENY COUNTY, PENNSYLVANIA.

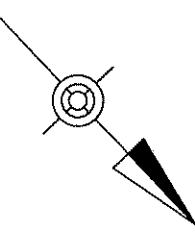
NO. DATE	DESCRIPTION
REVISIONS	

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

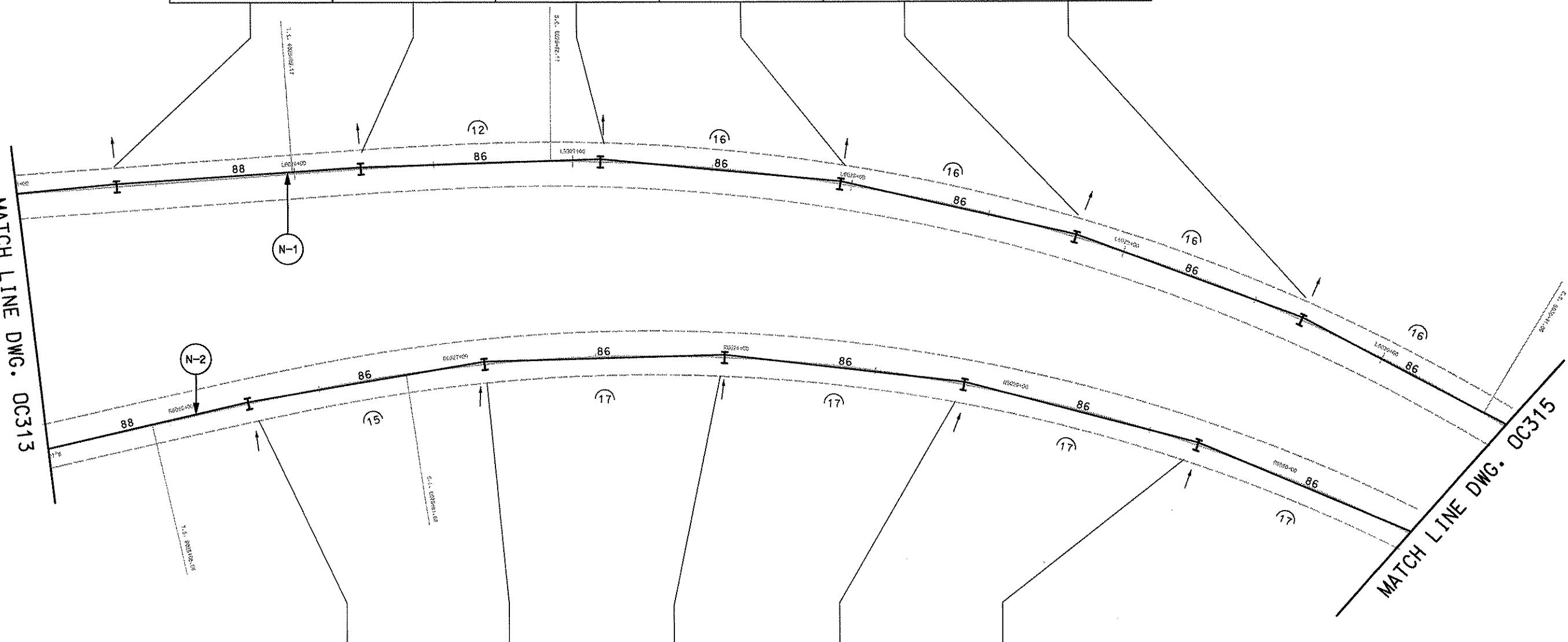
MATCH LINE DWG. DC31A



6025+36		6026+24		6027+10		6027+96		6028+82		6029+68	
OCS WIRE NO	N-1										
STAGGER	12	STAGGER	6	STAGGER	12	STAGGER	12	STAGGER	12	STAGGER	12
REF TRACK	LT										
SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31M	SUPPORT ASSY	TA-31M						
STRUCT TYPE	-										
OFFSET	-										
FDN REF	-										
FDN FINISH	-										
MISC ASSY	-										
TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
-		-		-		-		-		-	



MATCH LINE DWG. DC313



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

6026+24		6027+10		6027+96		6028+82		6029+68	
OCS WIRE NO	N-2								
STAGGER	6	STAGGER	12	STAGGER	12	STAGGER	12	STAGGER	12
REF TRACK	RT								
SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31M						
STRUCT TYPE	-								
OFFSET	-								
FDN REF	-								
FDN FINISH	-								
MISC ASSY	-								
TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
-		-		-		-		-	

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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
PENNSYLVANIA
SIGNATURE
APPROVED
DATE

DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

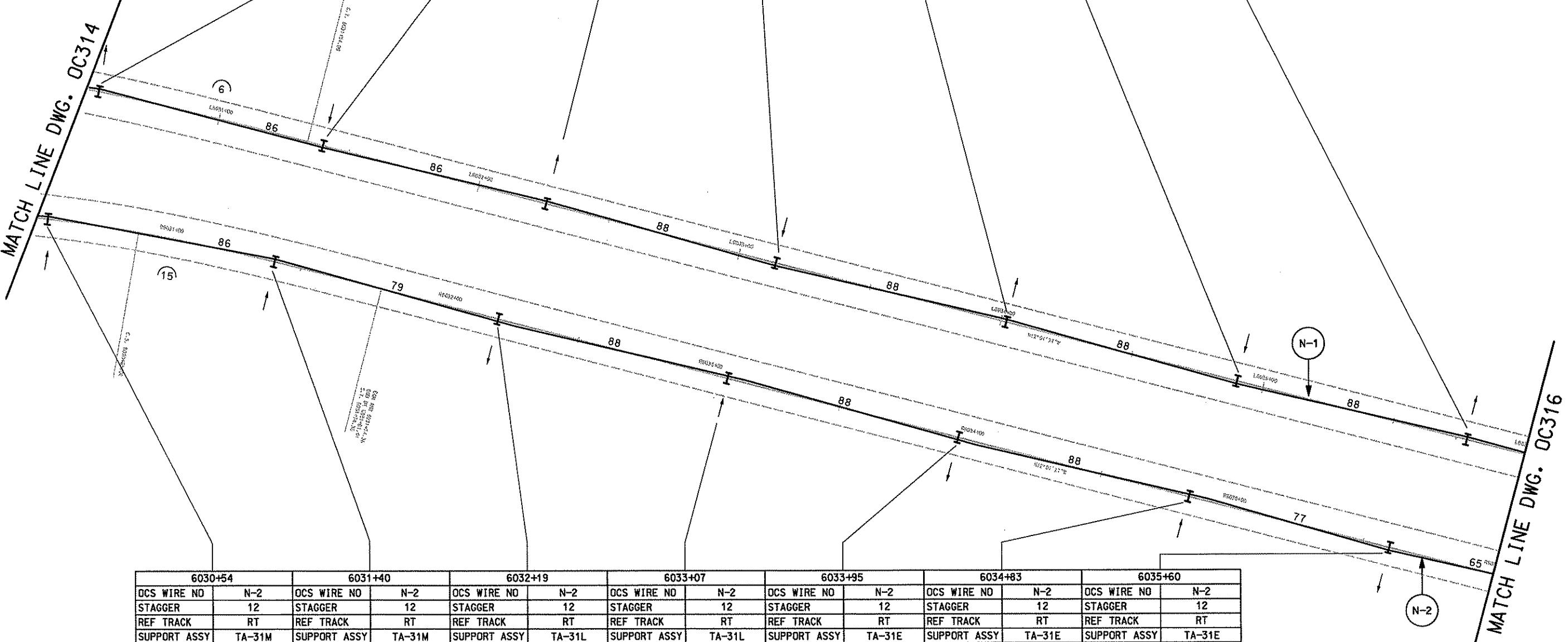
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY ALIGNMENT
STA. 6025+50 TO STA. 6030+50
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC314 SHT. 223

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS

6030+54		6031+40		6032+26		6033+14		6034+02		6034+90		6035+78	
DCS WIRE NO	N-1												
STAGGER	12	STAGGER	6	STAGGER	12								
REF TRACK	LT												
SUPPORT ASSY	TA-31M	SUPPORT ASSY	TA-31L	SUPPORT ASSY	TA-31L	SUPPORT ASSY	TA-31L	SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31E
STRUCT TYPE	-												
OFFSET	-												
FDN REF	-												
FDN FINISH	-												
MISC ASSY	-												
TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
-		-		-		-		-		-		-	

MATCH LINE DWG. OC314



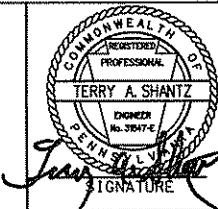
20' 15' 10' 5' 0
SCALE

6030+54		6031+40		6032+19		6033+07		6033+95		6034+83		6035+60	
DCS WIRE NO	N-2												
STAGGER	12												
REF TRACK	RT												
SUPPORT ASSY	TA-31M	SUPPORT ASSY	TA-31M	SUPPORT ASSY	TA-31L	SUPPORT ASSY	TA-31L	SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31E	SUPPORT ASSY	TA-31E
STRUCT TYPE	-												
OFFSET	-												
FDN REF	-												
FDN FINISH	-												
MISC ASSY	-												
TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT		TUNNEL SUPPORT	
-		-		-		-		-		-		-	

Gannett Fleming
Transit & Rail Systems

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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.

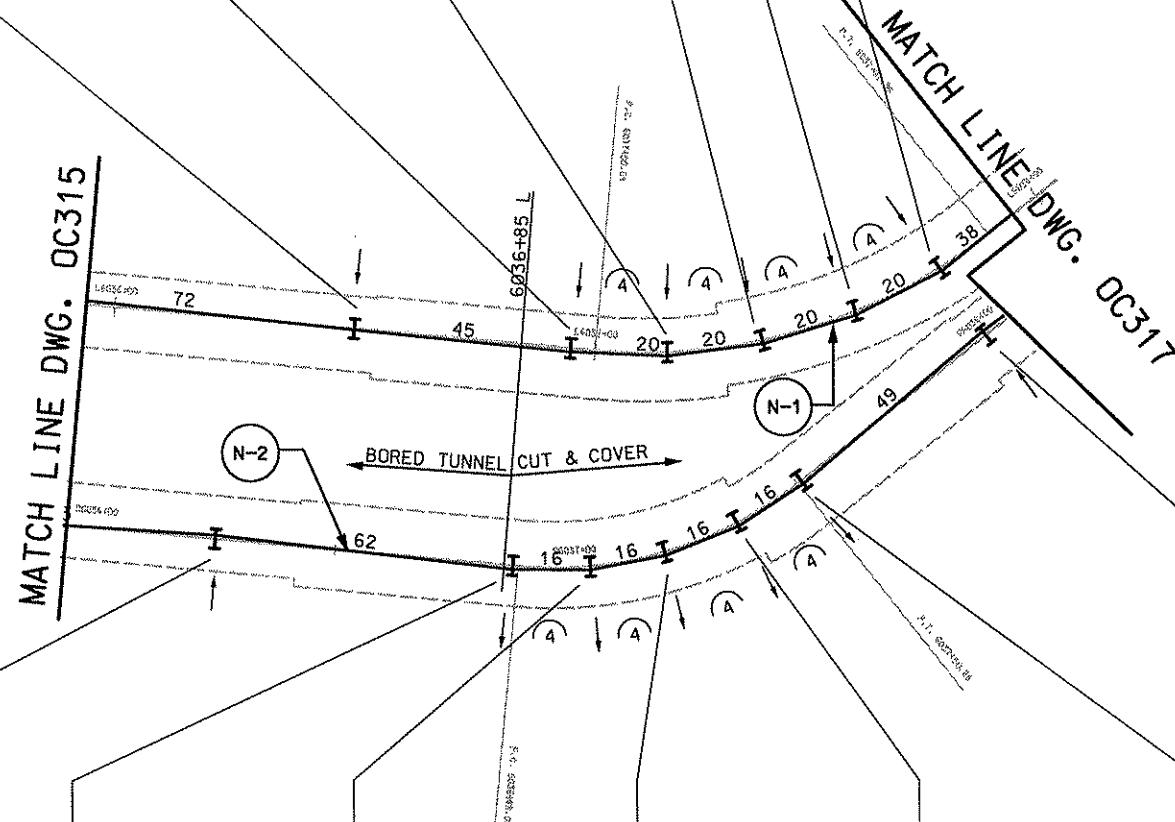
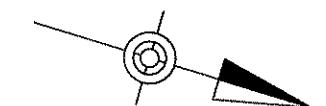
NO.	DATE	DESCRIPTION
REVISIONS		



TMJ M HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
APPROVED DATE
Signature
David F. Henry 4/28/08

DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN
DATE

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY ALIGNMENT
STA. 6030+50 TO STA. 6036+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC315 SHT. 224



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DMJM HARRIS | AECOM

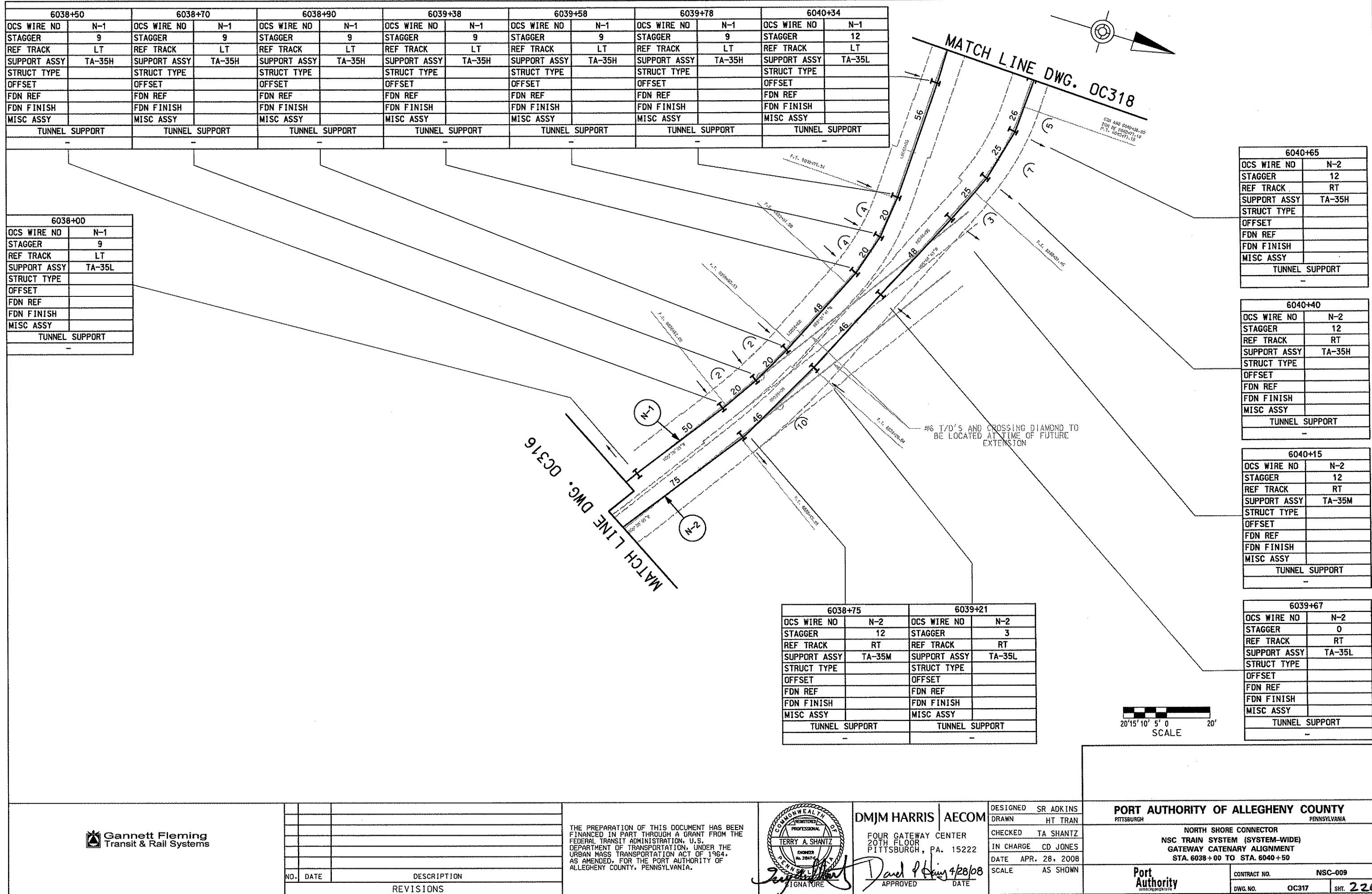
Daniel P. Hwang 4/28/08
APPROVED DATE

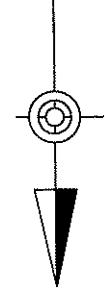
DESIGNED	SR ADKINS
DRAWN	HT TRAN
CHECKED	TA SHANTZ
IN CHARGE	CD JONES
DATE	APR. 28, 2008
SCALE	AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH, PENNSYLVANIA

**NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY ALIGNMENT
STA. 6036+00 TO STA. 6038+00**

Port Authority connecting people to life	CONTRACT NO.	NSC-009
	DWG. NO.	OC316

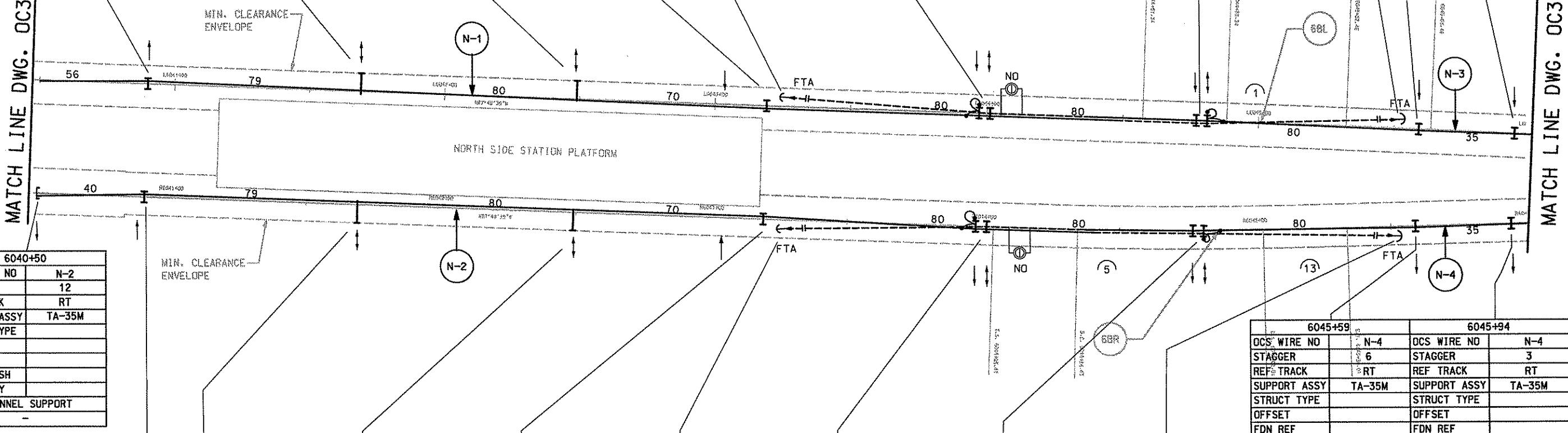




6040+90	6041+69	6042+49	6043+19	6043+24	6043+99	6044+79	6045+54	6045+59	6045+94
OCS WIRE NO N-1	OCS WIRE NO N-1	OCS WIRE NO N-1	OCS WIRE NO N-1	OCS WIRE NO N-3	OCS WIRE NO N-3 N-1	OCS WIRE NO N-3 N-1	OCS WIRE NO N-1	OCS WIRE NO N-3	OCS WIRE NO N-3
STAGGER 12	STAGGER NR	STAGGER NR	STAGGER NR	STAGGER N/A	STAGGER 0 12	STAGGER 0 12	STAGGER N/A	STAGGER 6	STAGGER 3
REF TRACK LT	REF TRACK LT	REF TRACK LT	REF TRACK LT	REF TRACK LT					
SUPPORT ASSY TA-35L	SUPPORT ASSY CA-18L	SUPPORT ASSY CA-18L	SUPPORT ASSY CA-18L	SUPPORT ASSY TA-35L	SUPPORT ASSY TA-430, TA-43L	SUPPORT ASSY TA-43L, TA-43D	SUPPORT ASSY TA-43L, TA-43D	SUPPORT ASSY TA-35M	SUPPORT ASSY TA-35M
STRUCT TYPE	STRUCT TYPE	STRUCT TYPE	STRUCT TYPE	STRUCT TYPE DE-100	STRUCT TYPE	STRUCT TYPE	STRUCT TYPE DE-100	STRUCT TYPE	STRUCT TYPE
OFFSET	OFFSET	OFFSET	OFFSET	OFFSET 4'-6"	OFFSET	OFFSET	OFFSET 4'-6"	OFFSET	OFFSET
FDN REF	FDN REF	FDN REF	FDN REF	FDN REF					
FDN FINISH	FDN FINISH	FDN FINISH	FDN FINISH	FDN FINISH					
MISC ASSY	MISC ASSY	MISC ASSY	MISC ASSY	MISC ASSY TD-200	MISC ASSY DS-200	MISC ASSY	MISC ASSY TD-200	MISC ASSY	MISC ASSY
TUNNEL SUPPORT	WALL MOUNTED	WALL MOUNTED	TUNNEL SUPPORT	FTA FOR WIRE N-3			FTA FOR WIRE N-1	TUNNEL SUPPORT	TUNNEL SUPPORT
-	CANTILEVER	CANTILEVER	-	-	TWIN SUPPORT, FEEDER 11F01	TWIN SUPPORT, FEEDER 11F03	-	-	-

MATCH LINE DWG. OC317

MATCH LINE DWG. OC319



6040+50	
OCS WIRE NO	N-2
STAGGER	12
REF TRACK	RT
SUPPORT ASSY	TA-35M
STRUCT TYPE	
OFFSET	
FDN REF	
FDN FINISH	
MISC ASSY	
TUNNEL SUPPORT	
-	

6045+59	6045+94
OCS WIRE NO N-4	OCS WIRE NO N-4
STAGGER 6	STAGGER 3
REF TRACK RT	REF TRACK RT
SUPPORT ASSY TA-35M	SUPPORT ASSY TA-35M
STRUCT TYPE	STRUCT TYPE
OFFSET	OFFSET
FDN REF	FDN REF
FDN FINISH	FDN FINISH
MISC ASSY	MISC ASSY
TUNNEL SUPPORT	TUNNEL SUPPORT
-	

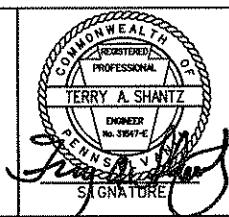
6040+90	6041+69	6042+49	6043+19	6043+24	6043+99	6044+79	6045+54
OCS WIRE NO N-2	OCS WIRE NO N-2	OCS WIRE NO N-2	OCS WIRE NO N-2	OCS WIRE NO N-4	OCS WIRE NO N-2 N-4	OCS WIRE NO N-2 N-4	OCS WIRE NO N-2
STAGGER 12	STAGGER NR	STAGGER NR	STAGGER NR	STAGGER 12	STAGGER N/A	STAGGER 0 12	STAGGER N/A
REF TRACK RT	REF TRACK RT	REF TRACK RT					
SUPPORT ASSY TA-35L	SUPPORT ASSY CA-18L	SUPPORT ASSY CA-18L	SUPPORT ASSY CA-18L	SUPPORT ASSY TA-35L	SUPPORT ASSY TA-430, TA-43L	SUPPORT ASSY TA-43L, TA-43D	SUPPORT ASSY TA-43L, TA-43D
STRUCT TYPE	STRUCT TYPE	STRUCT TYPE	STRUCT TYPE	STRUCT TYPE DE-100	STRUCT TYPE	STRUCT TYPE	STRUCT TYPE DE-100
OFFSET	OFFSET	OFFSET	OFFSET	OFFSET 4'-6"	OFFSET	OFFSET	OFFSET 4'-6"
FDN REF	FDN REF	FDN REF					
FDN FINISH	FDN FINISH	FDN FINISH					
MISC ASSY	MISC ASSY	MISC ASSY	MISC ASSY	MISC ASSY TD-200	MISC ASSY DS-200	MISC ASSY	MISC ASSY TD-200
TUNNEL SUPPORT	WALL MOUNTED	WALL MOUNTED	TUNNEL SUPPORT	FTA FOR WIRE N-4			FTA FOR WIRE N-2
-	CANTILEVER	CANTILEVER	-	-	TWIN SUPPORT, FEEDER 11F02	TWIN SUPPORT, FEEDER 11F04	-

20'15"10' 5' 0
SCALE

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NO. DATE DESCRIPTION

REVISIONS



DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
APPROVED DATE
Signature
Date
4/28/08

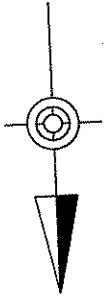
DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC318 SH. 227

Gannett Fleming
Transit & Rail Systems

PORT AUTHORITY OF ALLEGHENY COUNTY
PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATEINARY ALIGNMENT
STA. 6040+50 TO STA. 6046+00

Contract No. NSC-009
DWG. No. OC318 Sh. 227



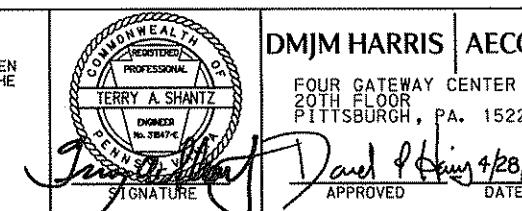
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OCS WIRE NO	N-3	OCS WIRE NO	N-3	OCS WIRE NO	N-3														
STAGGER	0	STAGGER	0	STAGGER	0	STAGGER	0	STAGGER	3	STAGGER	12	STAGGER	12	STAGGER	0	STAGGER	12	STAGGER	12
REF TRACK	LT	REF TRACK	LT	REF TRACK	LT														
SUPPORT ASSY	TA-35E	SUPPORT ASSY	TA-35E	SUPPORT ASSY	TA-35E	SUPPORT ASSY	TA-35M	SUPPORT ASSY	TA-39M	SUPPORT ASSY	CA-11L	SUPPORT ASSY	CA-11L						
STRUCT TYPE	PS5-22	STRUCT TYPE	PS5-22																
OFFSET	7'-6"	OFFSET	7'-6"																
FDN REF	AB-5	FDN REF	AB-5																
FDN FINISH	0'-0"	FDN FINISH	0'-0"																
MISC ASSY	MISC ASSY	MISC ASSY	MISC ASSY																
TUNNEL SUPPORT	CANTILEVER SUPPORT	CANTILEVER SUPPORT	CANTILEVER SUPPORT	CANTILEVER SUPPORT															
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATCH LINE DWG. OC318

MATCH LINE DWG. OC320

6046+24		6046+54		6046+84		6047+14		6047+44		6047+74		6048+24		6048+90		6049+90		6051+00		
OCS WIRE NO	N-4	OCS WIRE NO	N-4																	
STAGGER	0	STAGGER	3	STAGGER	3	STAGGER	6	STAGGER	8	STAGGER	10	STAGGER	12	STAGGER	12	STAGGER	0	STAGGER	12	
REF TRACK	RT	REF TRACK	RT																	
SUPPORT ASSY	TA-35M	SUPPORT ASSY	TA-35E	SUPPORT ASSY	TA-35E	SUPPORT ASSY	TA-35E	SUPPORT ASSY	TA-39M	SUPPORT ASSY	CA-13L									
STRUCT TYPE	STRUCT TYPE	STRUCT TYPE	STRUCT TYPE																	
OFFSET	OFFSET	OFFSET	OFFSET																	
FDN REF	SEE LT	SEE LT	SEE LT	SEE LT																
FDN FINISH	SEE LT	SEE LT	SEE LT	SEE LT																
MISC ASSY	MISC ASSY	MISC ASSY	MISC ASSY																	
TUNNEL SUPPORT	CANTILEVER SUPPORT	CANTILEVER SUPPORT	CANTILEVER SUPPORT	CANTILEVER SUPPORT																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

20'15" 10' 5' 0
SCALE



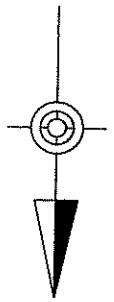
Gannett Fleming Transit & Rail Systems	NO.	DATE	DESCRIPTION	
			REVISIONS	

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DESIGNED SR ADKINS
DRAWN HT TRAN
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
Pittsburgh
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY ALIGNMENT
STA. 6046+00 TO STA. 6051+50
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC319 SHT. Z28

MATCH LINE DWG. OC321



T.S. 6073+71.15

T.S. 6073+72.33

N-3
N-4

PIER 2
PIER 1

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

SR ADKINS
HT TRAN
T.A. SHANTZ
CD JONES
APR. 28, 2008
AS SHOWN
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC320 SHT. 229

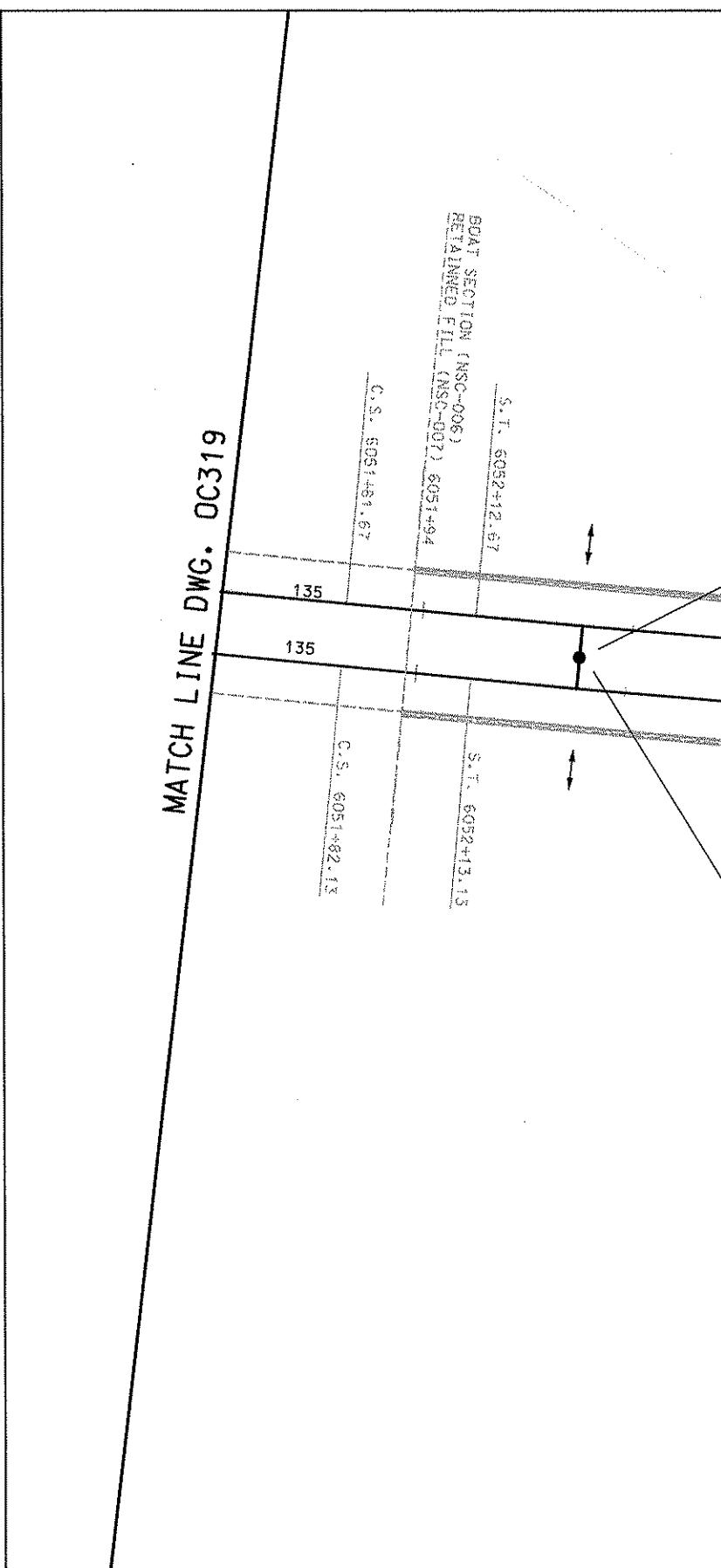
PROFESSIONAL
REGISTERED
TERRY A. SHANTZ
ENGINEER
PENNSYLVANIA
S. T. 6073+71.15
R. O. T. 6073+72.33
C. S. 6051+82.13
C. S. 6051+83.67
S. T. 6052+12.67
S. T. 6052+13.15
SOFT SECTION (NSC-006)
RETAINED FILL (NSC-007) 6051+94

6052+35		6070+72		6071+93		6073+17.77	
OCS WIRE NO	N-3						
STAGGER	0	STAGGER	12	STAGGER	12	STAGGER	12
REF TRACK	LT						
SUPPORT ASSY	CA-11L	SUPPORT ASSY	CA-13L	SUPPORT ASSY	CA-11L	SUPPORT ASSY	CA-13M
STRUCT TYPE	PS2-22						
OFFSET	7'-6" R						
FDN REF	AB-2						
FDN FINISH	(+) 0'-6"						
MISC ASSY	-						
CANTILEVER SUPPORT		CANTILEVER SUPPORT		CANTILEVER SUPPORT		CANTILEVER SUPPORT	

MATCH LINE DWG. OC319

PITTTSBURGH
PORT AUTHORITY OF ALLEGHENY COUNTY
PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY ALIGNMENT
STA. 6061+50 TO STA. 6074+00

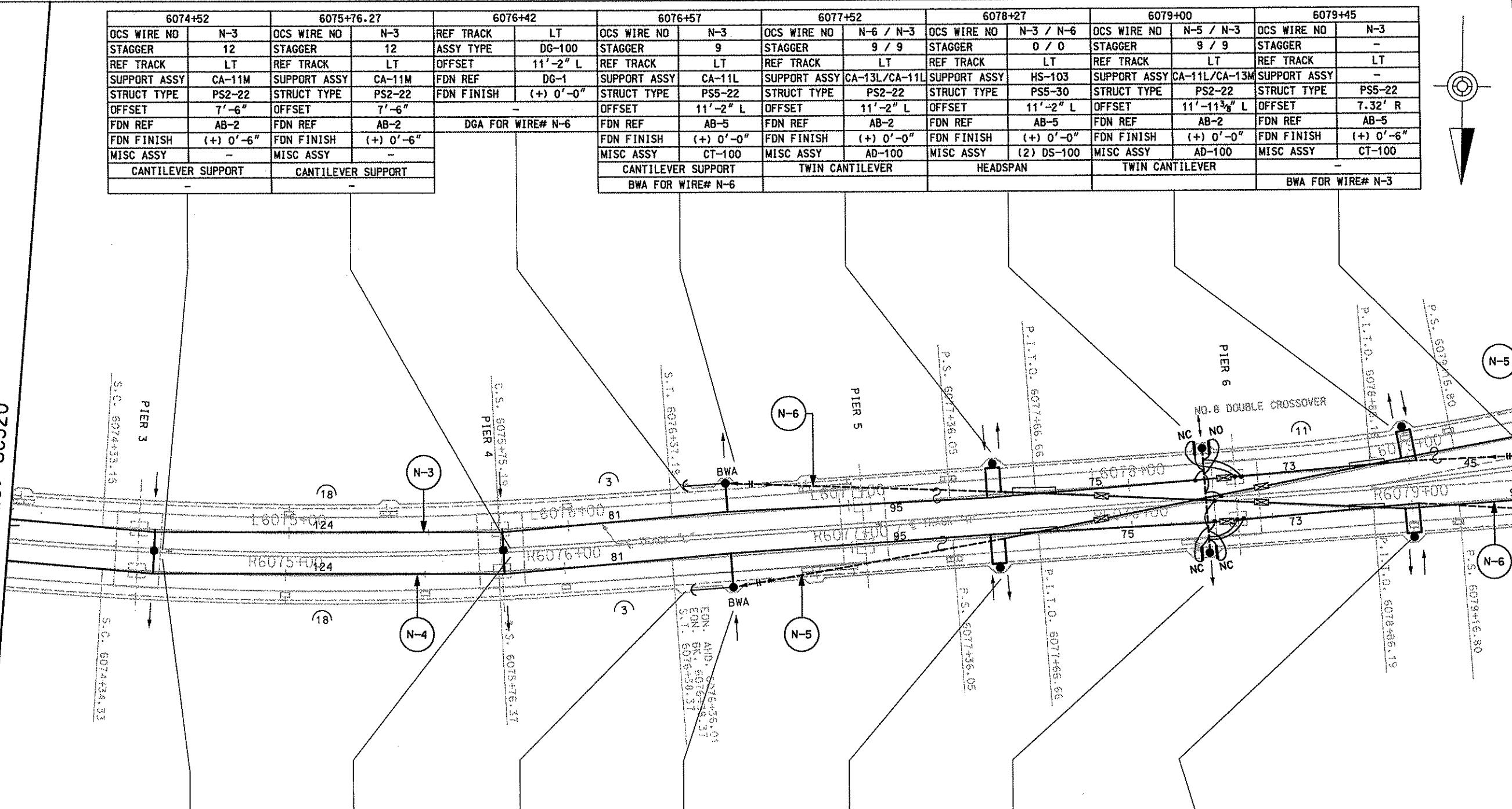
6052+35		6070+72		6071+93		6073+17.77	
OCS WIRE NO	N-4						
STAGGER	0	STAGGER	12	STAGGER	12	STAGGER	12
REF TRACK	RT						
SUPPORT ASSY	CA-13L	SUPPORT ASSY	CA-11L	SUPPORT ASSY	CA-13L	SUPPORT ASSY	CA-11M
STRUCT TYPE	SEE LT						
OFFSET	SEE LT						
FDN REF	SEE LT						
FDN FINISH	SEE LT						
MISC ASSY	-						
CANTILEVER SUPPORT		CANTILEVER SUPPORT		CANTILEVER SUPPORT		CANTILEVER SUPPORT	



Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS

MATCH LINE DWG. OC320



MATCH LINE DWG. OC322

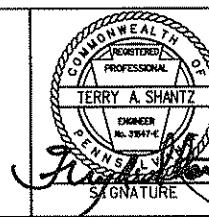
6074+52	6075+76.27	6076+42	6076+57	6077+52	6078+27	6079+00			
OCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET FDN REF FDN FINISH MISC ASSY CANTILEVER SUPPORT	N-4 12 SEE LT CA-13M SEE LT SEE LT SEE LT SEE LT - CANTILEVER SUPPORT	OCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET FDN REF FDN FINISH MISC ASSY CANTILEVER SUPPORT	N-4 12 SEE LT CA-13M SEE LT FDN FINISH (+) 0'-0" SEE LT SEE LT SEE LT SEE LT SEE LT - CANTILEVER SUPPORT	OCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET FDN REF FDN FINISH MISC ASSY CANTILEVER SUPPORT	N-4 / N-5 9 / 9 RT CA-13L PS5-22 11'-2" R AB-5 FDN FINISH CT-100 BWA FOR WIRE# N-5	OCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET FDN REF FDN FINISH MISC ASSY TWIN CANTILEVER	N-4 / N-6 9 / 9 RT HS-103 PS5-30 11'-2" R AB-5 FDN FINISH (+) DS-100 HEADSPAN	OCS WIRE NO STAGGER REF TRACK SUPPORT ASSY STRUCT TYPE OFFSET FDN REF FDN FINISH MISC ASSY TWIN CANTILEVER	N-4 / N-6 9 / 9 RT CA-11H/CA-13H PS2-22 11'-2" R AB-2 FDN FINISH (+) 0'-0" HT-100 / SA-100

20'15" 10' 5' 0
SCALE

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

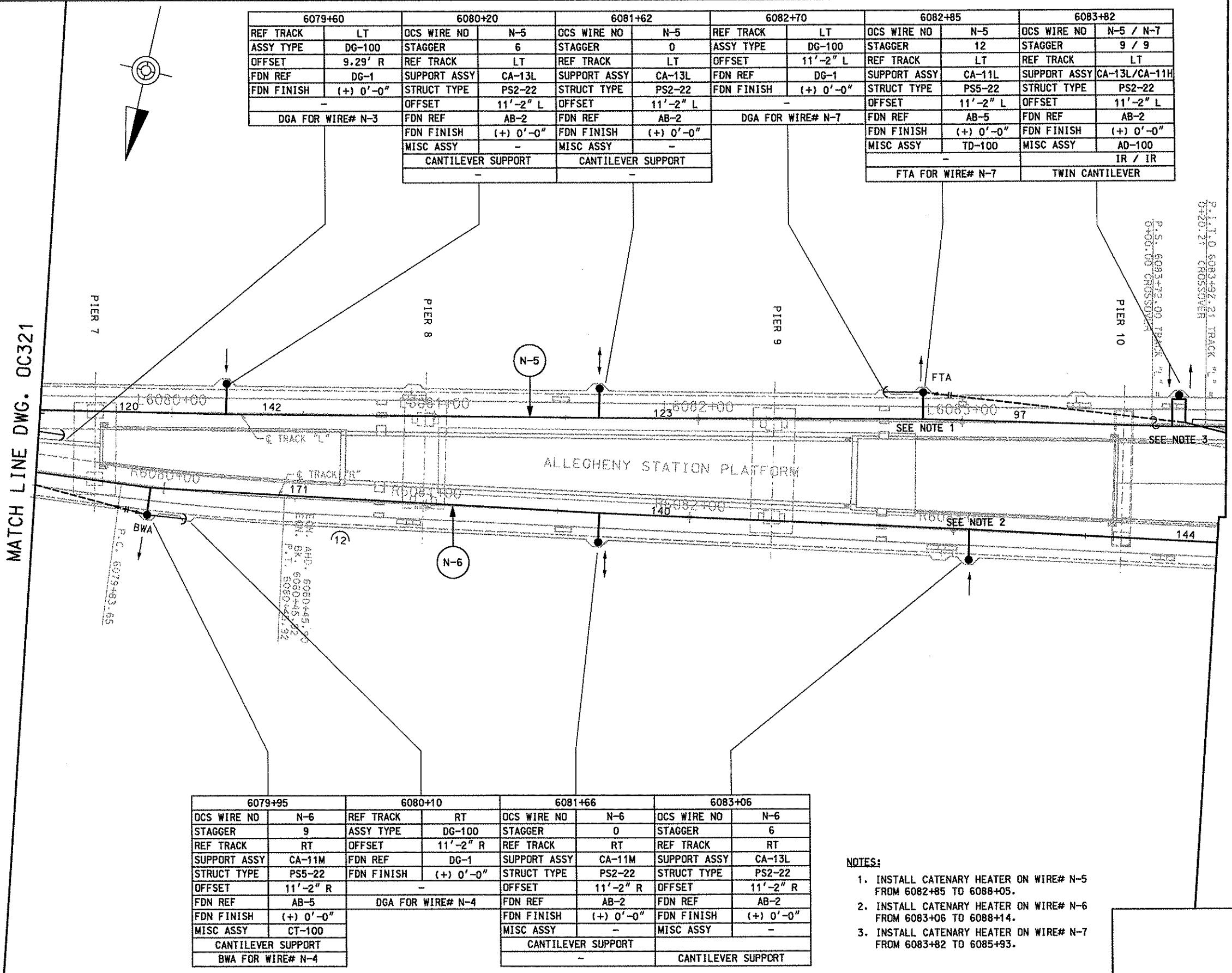
THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.



TMJM HARRIS AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
ENGINEER
REG. NO. 28444
APPROVED
Dated 4/28/08
Signature

SR ADKINS
DRAWN
HT TRAN
CHECKED
TA SHANTZ
IN CHARGE
CD JONES
DATE APR. 28, 2008
SCALE
AS SHOWN

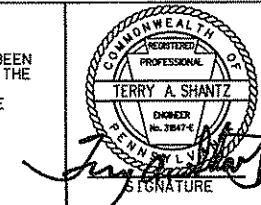
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY ALIGNMENT
STA. 6074+00 TO STA. 6079+50
Port Authority
CONTRACT NO. NSC-009
DWD. NO. OC321 SHT. 230



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AS AMENDED, FOR THE PORT AUTHORITY OF
ALLENTOWN COUNTY, PENNSYLVANIA.

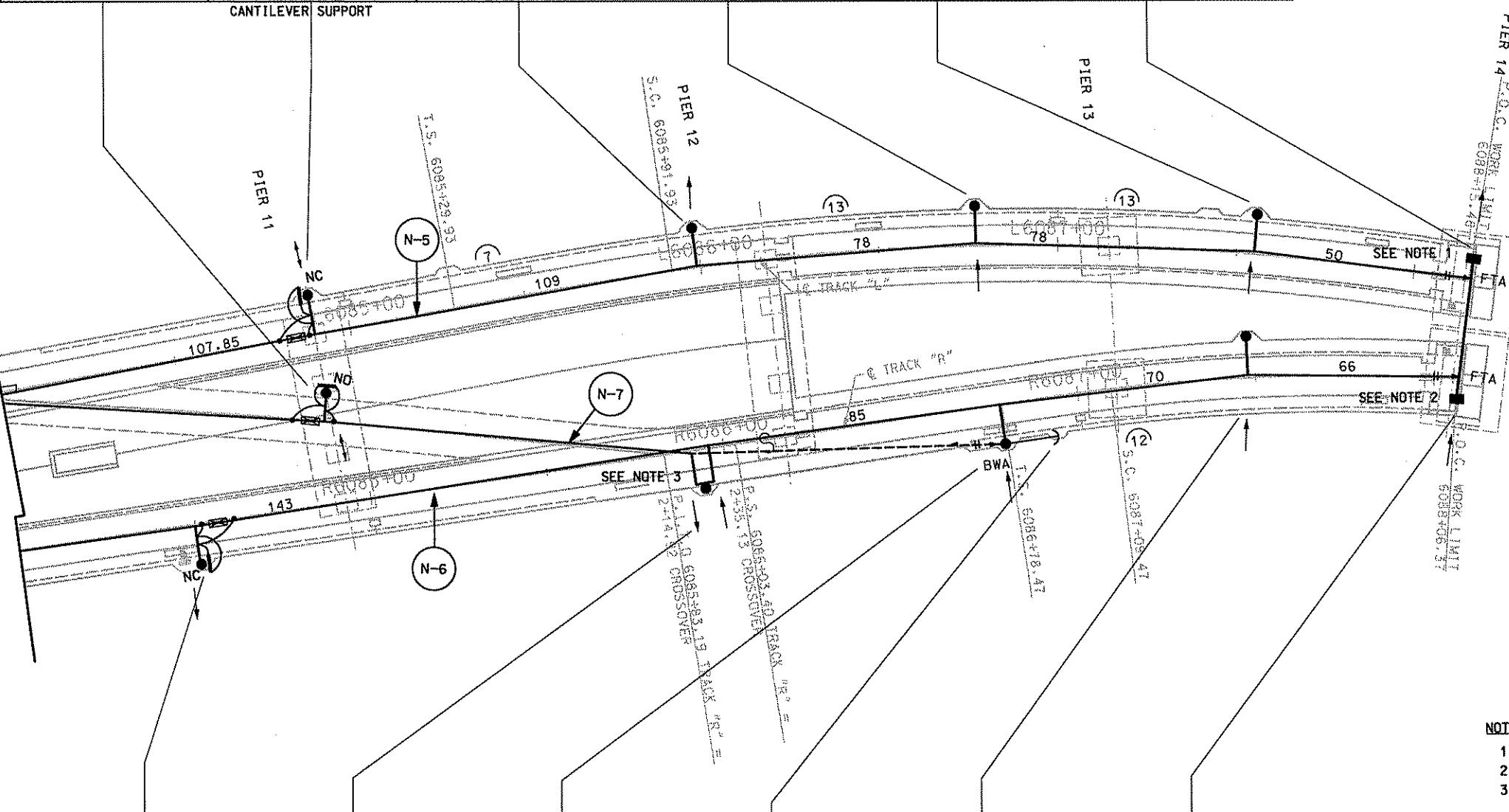


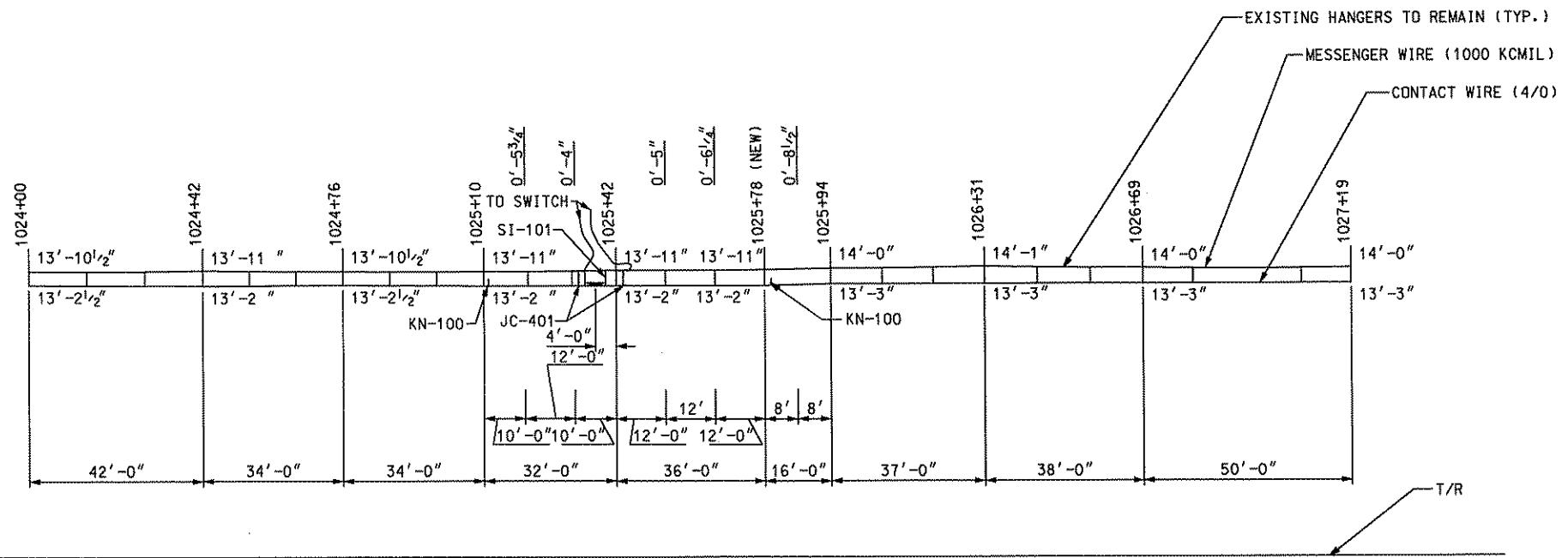
DMJM HARRIS AECO
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Daniel J. Harris 4/28/01
APPROVED DATE

PITTSBURGH		PENNSYLVANIA
NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE) GATEWAY CATENARY ALIGNMENT STA. 6079+50 TO STA. 6084+00		
 <small>connecting people to places</small>	CONTRACT NO.	NSC-009
	DWG. NO.	OC322

MATCH LINE DWG. OC322

6084+89.85		6084+89.85		6085+99		6086+77		6087+55		6088+05	
OCS WIRE NO	N-7	OCS WIRE NO	N-5	OCS WIRE NO	N-5						
STAGGER	0	STAGGER	0	STAGGER	6	STAGGER	9	STAGGER	9	STAGGER	9
REF TRACK	XO	REF TRACK	LT	REF TRACK	LT						
SUPPORT ASSY	CA-11L	SUPPORT ASSY	CA-11L	SUPPORT ASSY	CA-11M	SUPPORT ASSY	CA-11M	SUPPORT ASSY	CA-11M	SUPPORT ASSY	-
STRUCT TYPE	PS2-22	STRUCT TYPE	PF2-22	STRUCT TYPE	PS2-22	STRUCT TYPE	PS2-22	STRUCT TYPE	PS2-22	STRUCT TYPE	DEAD END PORTAL
OFFSET	7'-6"	OFFSET	11'-2" L	OFFSET	12'-3"± L						
FDN REF	AB-2	FDN REF	AB-2	FDN REF	AB-2	FDN REF	AB-2	FDN REF	AB-2	FDN REF	SEE NSC-007
FDN FINISH	(+) 0'-0"	FDN FINISH	(+) 0'-0"	FDN FINISH	(+) 0'-0"	FDN FINISH	(+) 0'-0"	FDN FINISH	(+) 0'-0"	FDN FINISH	-
MISC ASSY	DS-100-M-P	MISC ASSY	DS-100-M-P	MISC ASSY	-	MISC ASSY	-	MISC ASSY	-	MISC ASSY	TD-200
CANTILEVER SUPPORT	FT-100, SA-100	CANTILEVER SUPPORT	PORTAL								
	FEED FROM 5TB01										FTA FOR WIRE# N-5





WIRE 815/8 (EXISTING)

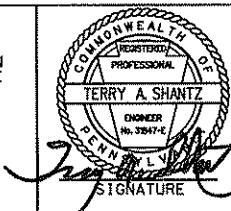
NOTE:

1. HANGERS ARE MH-1.
2. FOR HANGER DETAILS SEE DRAWING OC172.
3. FOR SECTION INSULATOR DETAILS SEE DRAWING OC169.
4. FOR FEEDER JUMPER DETAILS SEE DRAWING OC188.
5. LOCATION OF INSULATED KNUCKLE TO BE DETERMINED IN THE FIELD.



HORIZONTAL 20' 10' 0 20'

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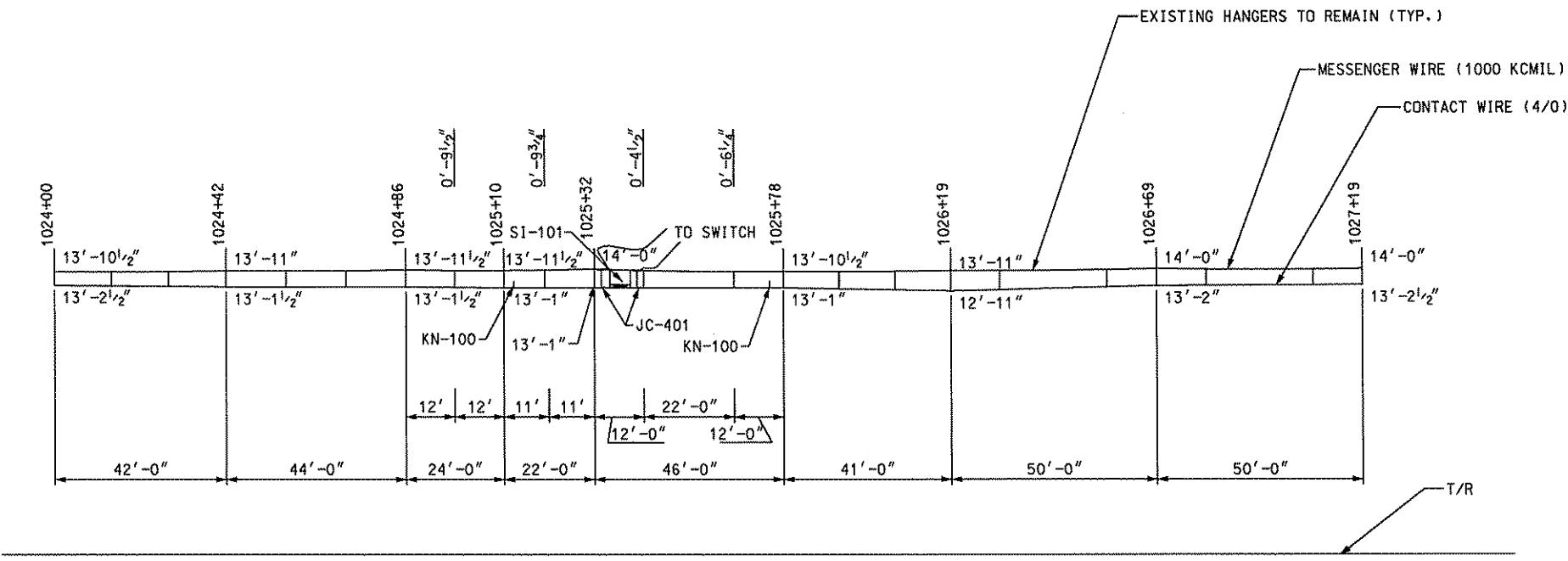
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
OWNER
No. 35947-1
PENNSYLVANIA
SIGNATURE
APPROVED
DATE
David P. Henry 4/28/08

DESIGNED SR ADKINS
DRAWN DN MARKER
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN
DATE

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE 815/8
S.B. TRACK 1 STA. 1024+00 TO STA. 1027+19
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC345 SHT. 233

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		



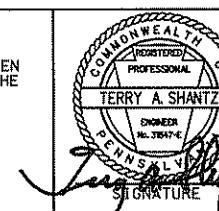
WIRE 815/10 (EXISTING)

NOTE

1. HANGERS ARE MH-1.
 2. FOR HANGER DETAILS SEE DWG OC172.
 3. FOR SECTION INSULATOR DETAILS SEE DRAWING OC169.
 4. FOR FEEDER JUMPER DETAILS SEE DRAWING OC184.
 5. FOR CONDUIT WIRE INSULATED KNUCKLE
SEE DRAWING OC180.



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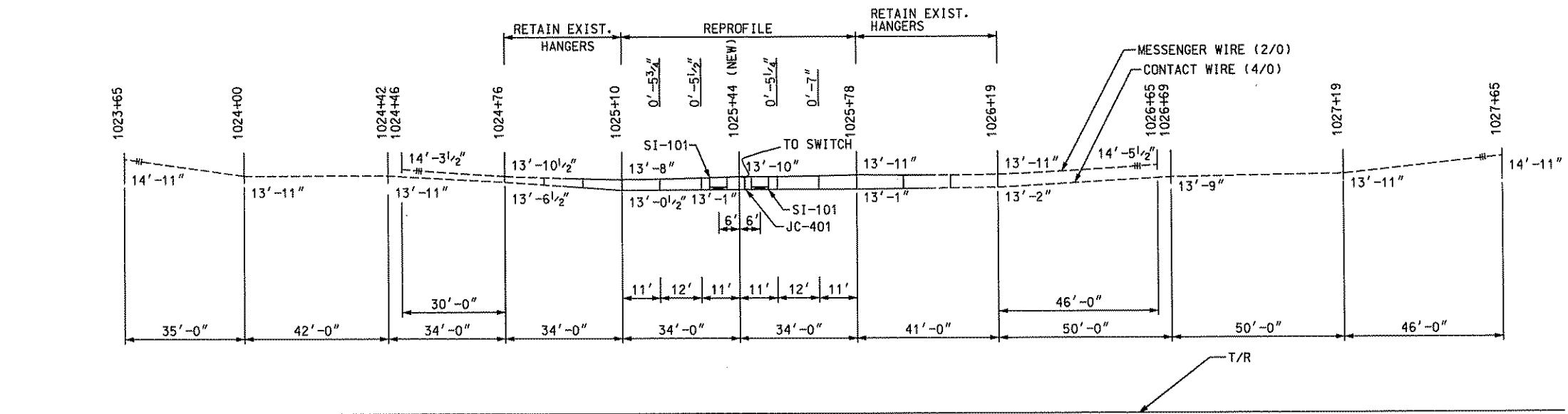
M	DESIGNED	SR ADKINS
	DRAWN	DN MARKER
	CHECKED	TA SHANTZ
	IN CHARGE	CD JONES
	DATE	APR. 28, 2008
8	SCALE	AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
 PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE 815/10
N.B TRACK 2 STA. 1024+00 TO STA. 1027+19



HORIZONTAL 
20' 10' 0 20'



WIRE 815/12Y (MODIFIED)

NOTE:

- NOTE.

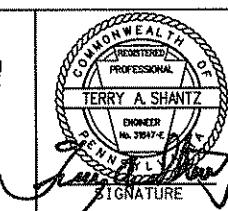
 1. HANGERS ARE MH-2.
 2. FOR HANGER DETAILS SEE DRAWING OC172.
 3. FOR SECTION INSULATOR DETAILS SEE
DRAWING OC170.
 4. FOR FEEDER JUMPER DETAILS SEE DRAWING OC184.



HORIZONTAL  20' 10' 0 20'

 Gannett Fleming Transit & Rail Systems	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table>																								
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NO.	DATE	DESCRIPTION																							
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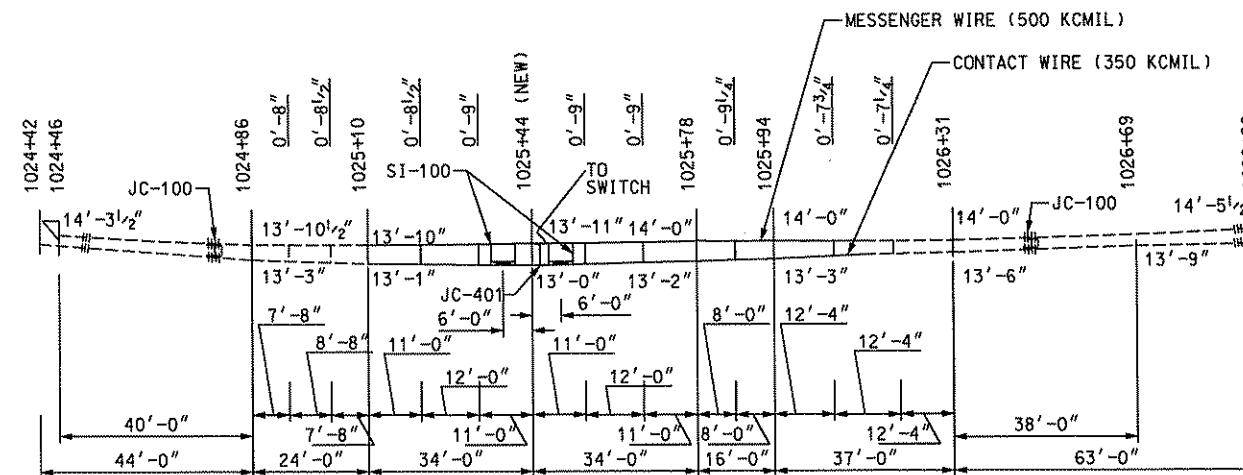
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ALLENTOWN, PENNSYLVANIA.



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PITTSBURGH, PA. 15222

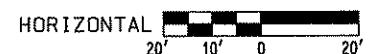
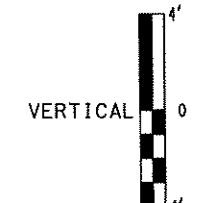
DESIGNED	SR ADKINS
DRAWN	DN MARKER
CHECKED	TA SHANTZ
IN CHARGE	CD JONES
DATE	APR. 28, 2008
SCALE	AS SHOWN

PITTSBURGH		PENNSYLVANIA	
NORTH SHORE CONNECTOR			
NSC TRAIN SYSTEM (SYSTEM-WIDE)			
GATEWAY CATENARY PROFILE - WIRE 81512Y			
CROSSOVER STA. 1023 + 65 TO STA. 1027 + 65			
Port Authority <small>COMMERCIAL PROPERTY</small>	CONTRACT NO.		NSC-009
	DWG. NO.	OC347	SHT. 2



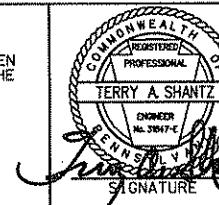
WIRE W-14 (NEW)

- NOTE:
1. HANGERS ARE HA-100 OR HA-101.
 2. FOR HANGER DETAILS SEE DRAWING OC171.
 3. FOR SECTION INSULATOR DETAILS SEE DRAWING OC169.
 4. FOR FEEDER JUMPER DETAILS SEE DRAWING OC184.



NO.	DATE	DESCRIPTION	REVISIONS
Gannett Fleming Transit & Rail Systems			

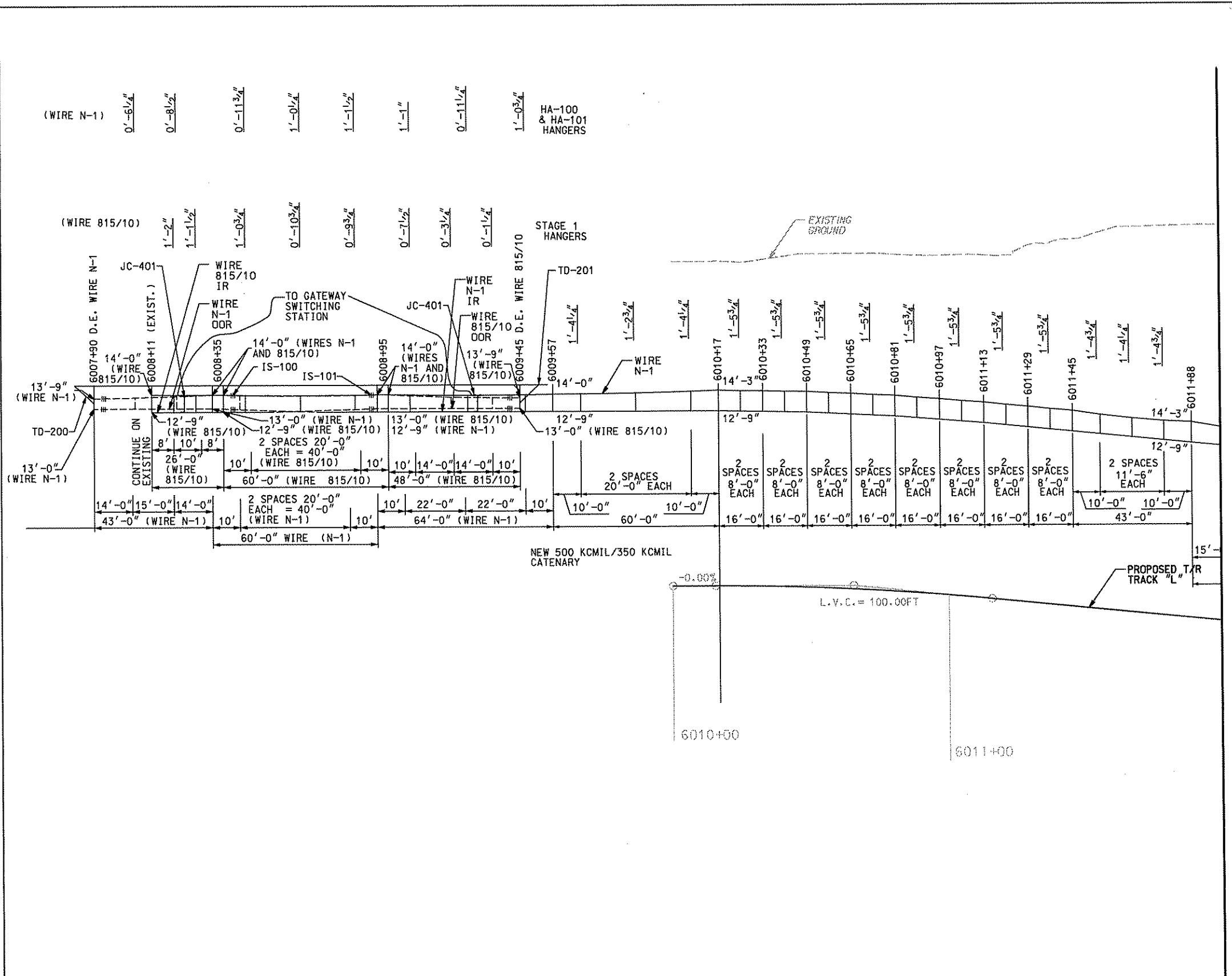
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20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
ENGINEER
AL-3947-E
PA-1000
4/28/08
Signature
APPROVED DATE

DESIGNED SR ADKINS
DRAWN DN MARKER
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - CROSSOVER WIRE W-14
STA. 1023+65 TO STA. 1027+65
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC348 SHT. 236



MATCH LINE DWG. OC352

- NOTE:

 1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. FOR STAGE I HANGER DETAILS SEE DRAWING OC172.
 5. FOR IN-SPAN INSULATOR ASSEMBLY DETAILS SEE DRAWING OC168.
 6. FOR FIXED TERMINATION ASSEMBLY DETAILS SEE DRAWING OC183.



VERTICAL

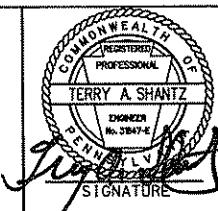
VERTICAL 9

-4-

HORIZONTAL

 Gannett Fleming Transit & Rail Systems			
NO.	DATE	DESCRIPTION	
		REVISIONS	

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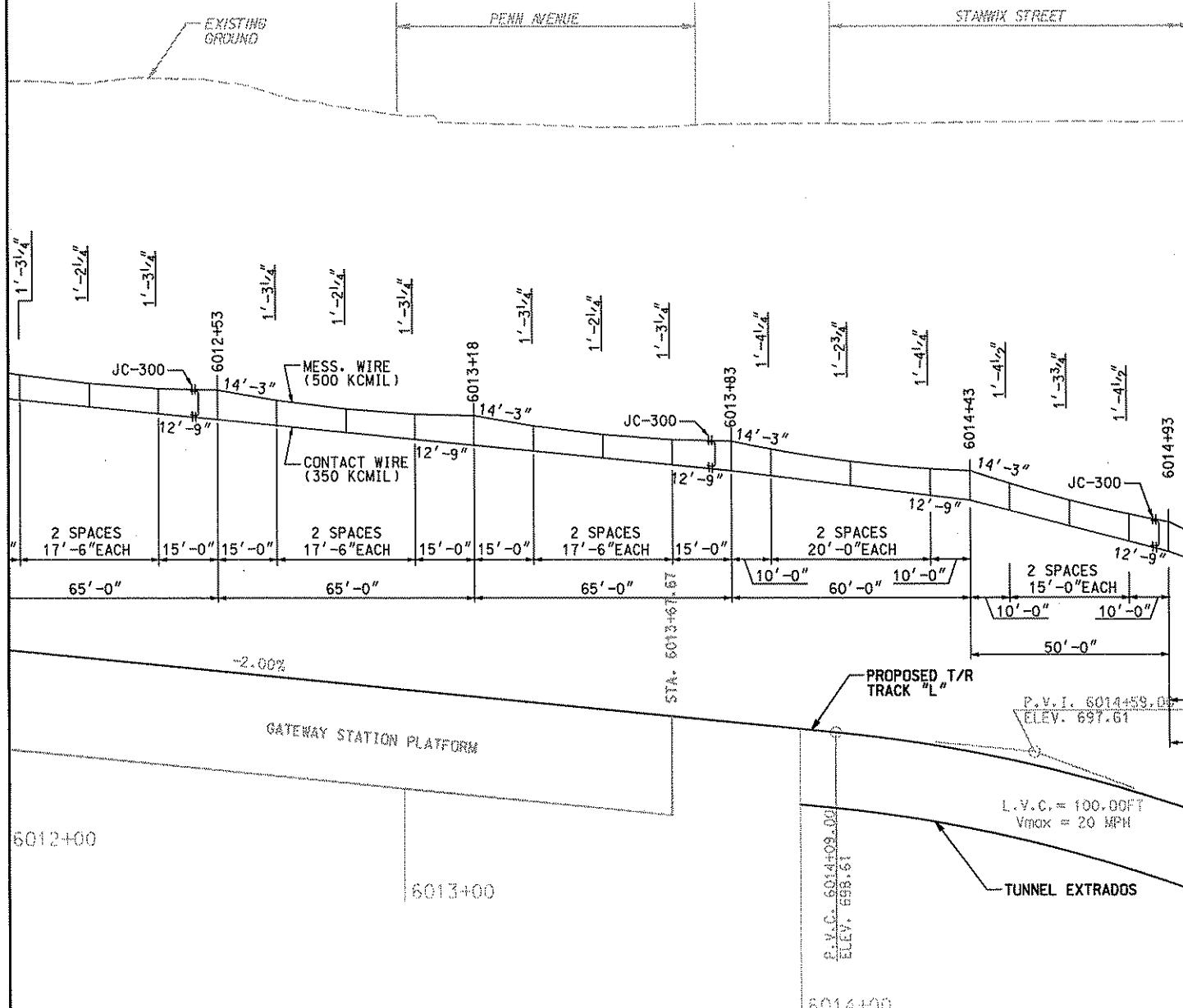


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Daniel P. Harrington 4/28/08
APPROVED DATE

DESIGNED	SR ADKINS
DRAWN	KA BRANDT
CHECKED	TA SHANTZ
IN CHARGE	CD JONES
DATE	APR. 28, 2008
SCALE	AS SHOWN

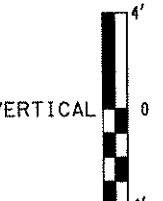
PITTSBURGH PORT AUTHORITY OF ALLEGHENY COUNTY	
PENNSYLVANIA	
NORTH SHORE CONNECTOR	
NSC TRAIN SYSTEM (SYSTEM-WIDE)	
GATEWAY CATENARY PROFILE - WIRE N-1	
S.B TRACK 1 STA. 6007+90 TO STA. 6012+00	
Port Authority connecting people to life	CONTRACT NO.
	NSC-009
DWG. NO.	OC351
	SHT. 2

MATCH LINE DWG. OC351



MATCH LINE DWG. OC353

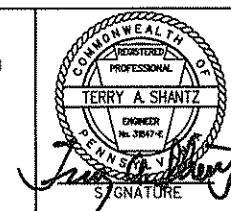
- NOTE:
1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.



Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
		REVISIONS

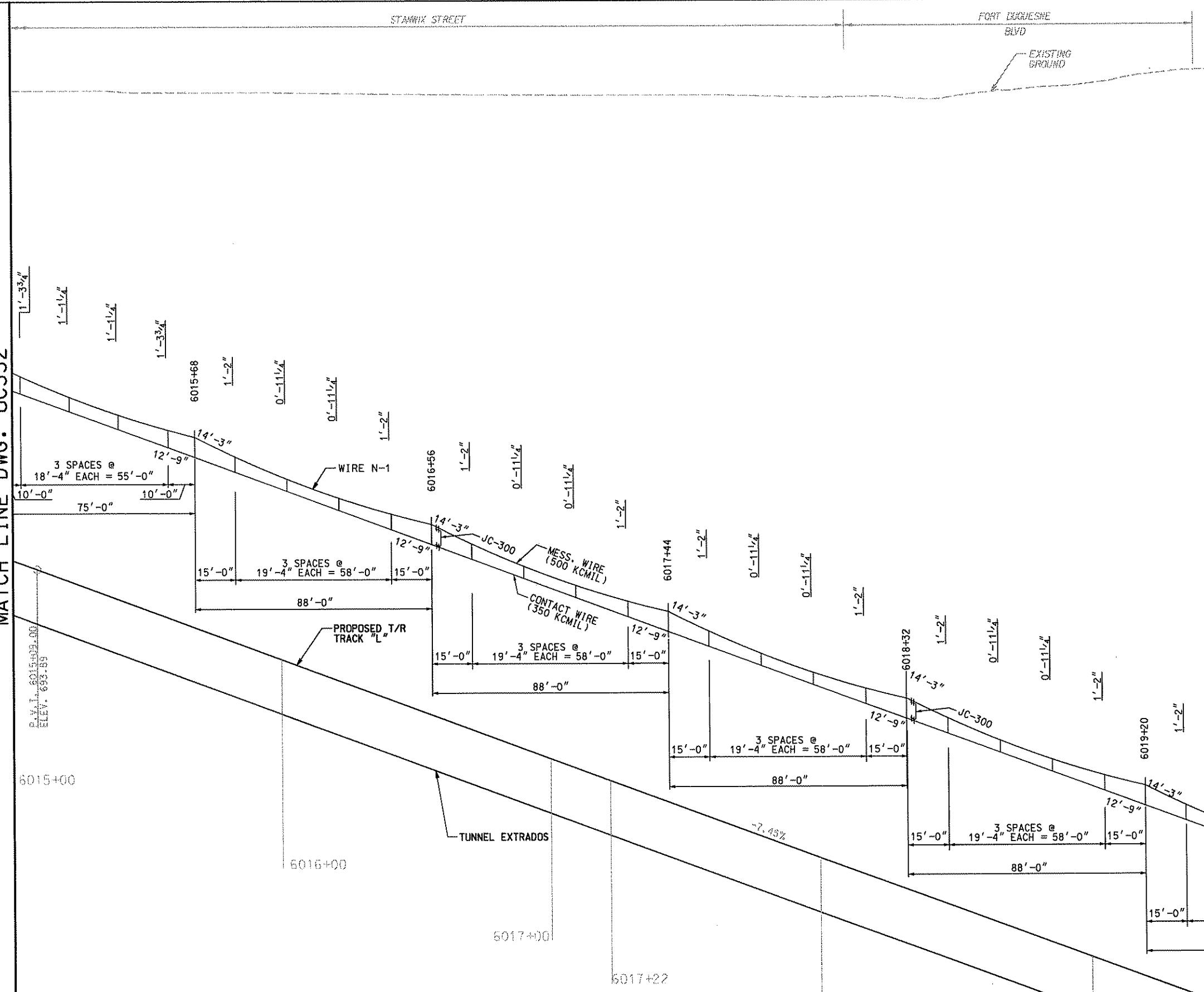
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PITTSBURGH, PA. 15222
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IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN
APPROVED DATE
Daniel P. Henry 4/28/08

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-1
S.B. TRACK 1 STA. 6012+00 TO STA. 6015+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC352 SHT. 238

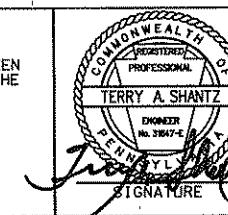
MATCH LINE DWG. OC352



Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS
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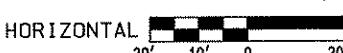
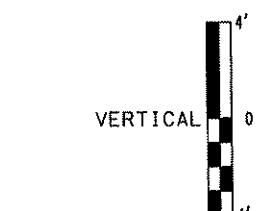
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FOUR GATEWAY CENTER
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David F. Henry 4/28/08
APPROVED DATE

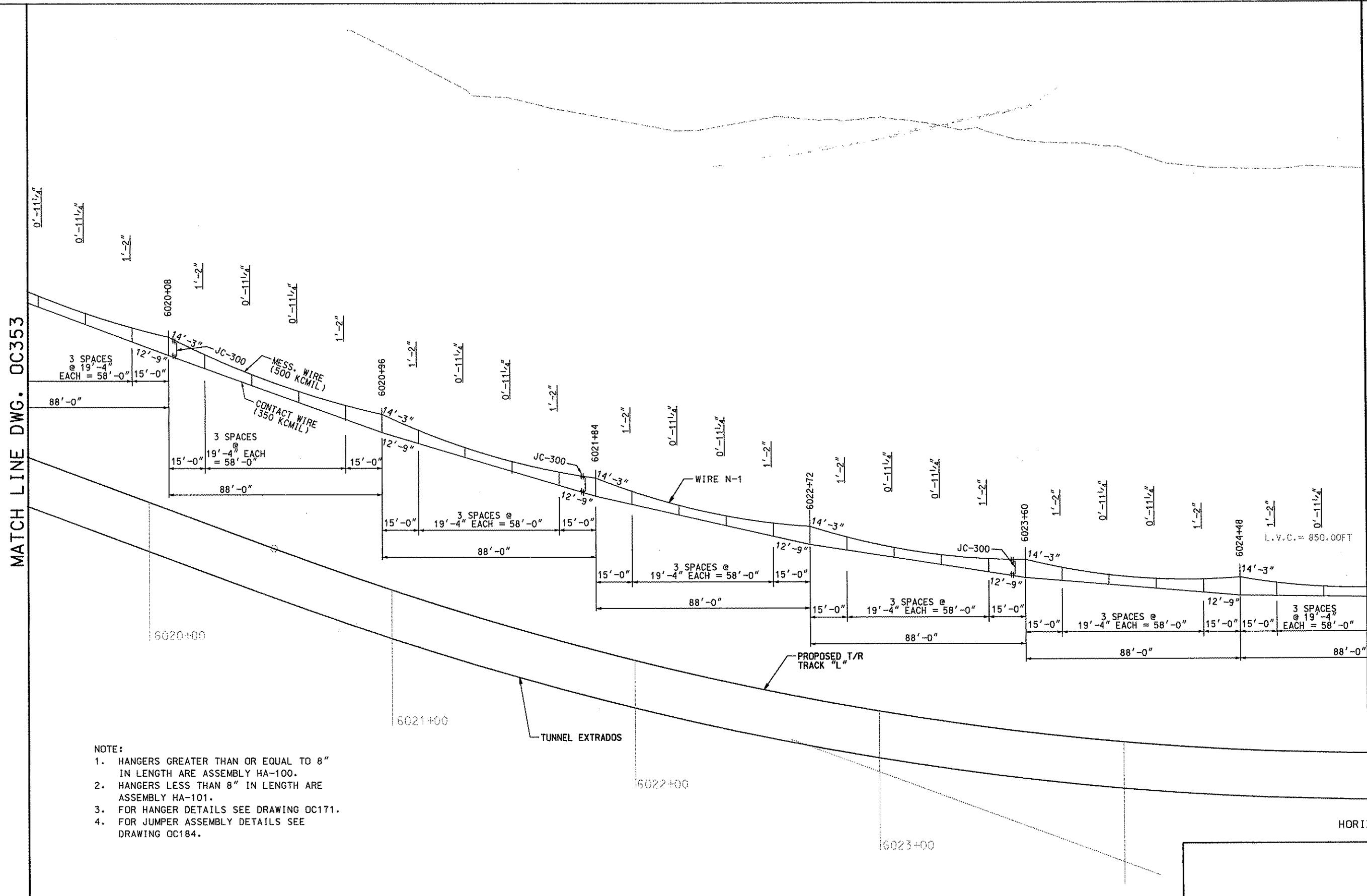
DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH, PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-1
S.B. TRACK 1 STA. 6015+00 TO STA. 6019+50
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC353 SHT. 239



- NOTE:**
1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.

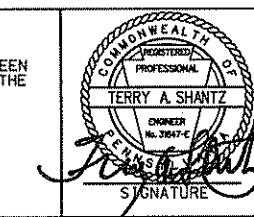
MATCH LINE DWG. OC353



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REVISIONS		

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David P. Henry 4/28/08
SIGNATURE
APPROVED DATE

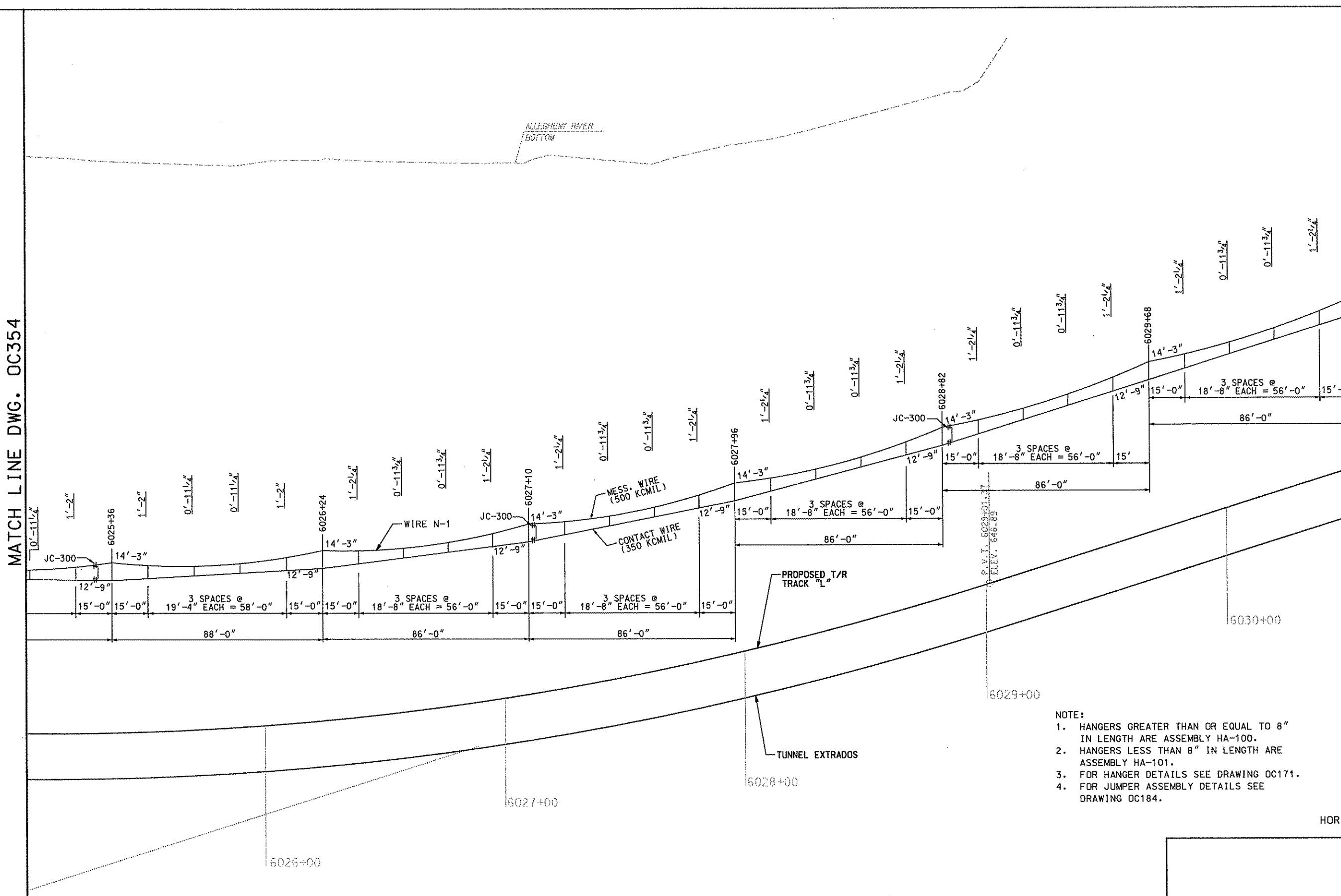
DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-1
S.B. TRACK 1 STA. 6019+50 TO STA. 6025+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC354 SHT. 240

VERTICAL
0' 4'
4' 0'

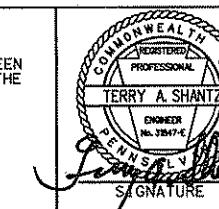
HORIZONTAL
20' 10' 0' 20'

MATCH LINE DWG. OC354



 Gannett Fleming
Transit & Rail Systems

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DMJM HARRIS | AECO
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Daniel P. Harrington 4/28/01
APPROVED DATE

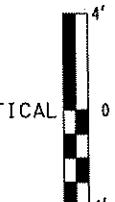
M	DESIGNED	SR ADKINS
	DRAWN	KA BRANDT
	CHECKED	TA SHANTZ
	IN CHARGE	CD JONES
8	DATE	APR. 28, 2008
	SCALE	AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
 PITTSBURGH PENNSYLVANIA

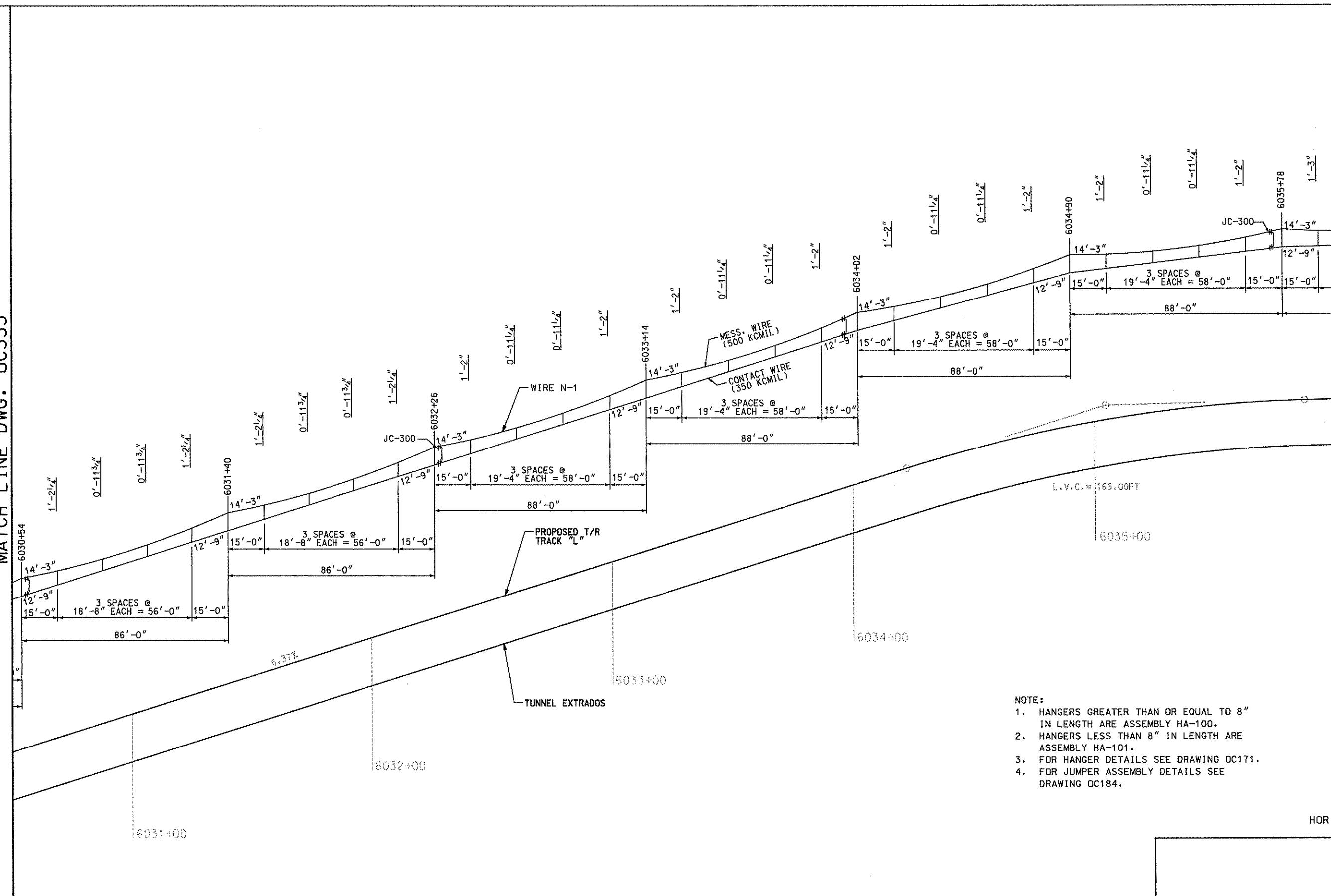
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATERARY PROFILE - WIRE N-4
S.B. TRACK 1 STA. 6025+00 TO STA. 6030+50

NOTE:

1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
3. FOR HANGER DETAILS SEE DRAWING OC171.
4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.



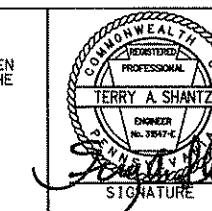
MATCH LINE DWG. OC355



Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

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DMJM HARRIS AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
ENGINEER NO. 05047-6
APRIL 28, 2008
Signature: David P. Henry
APPROVED DATE: 4/28/08

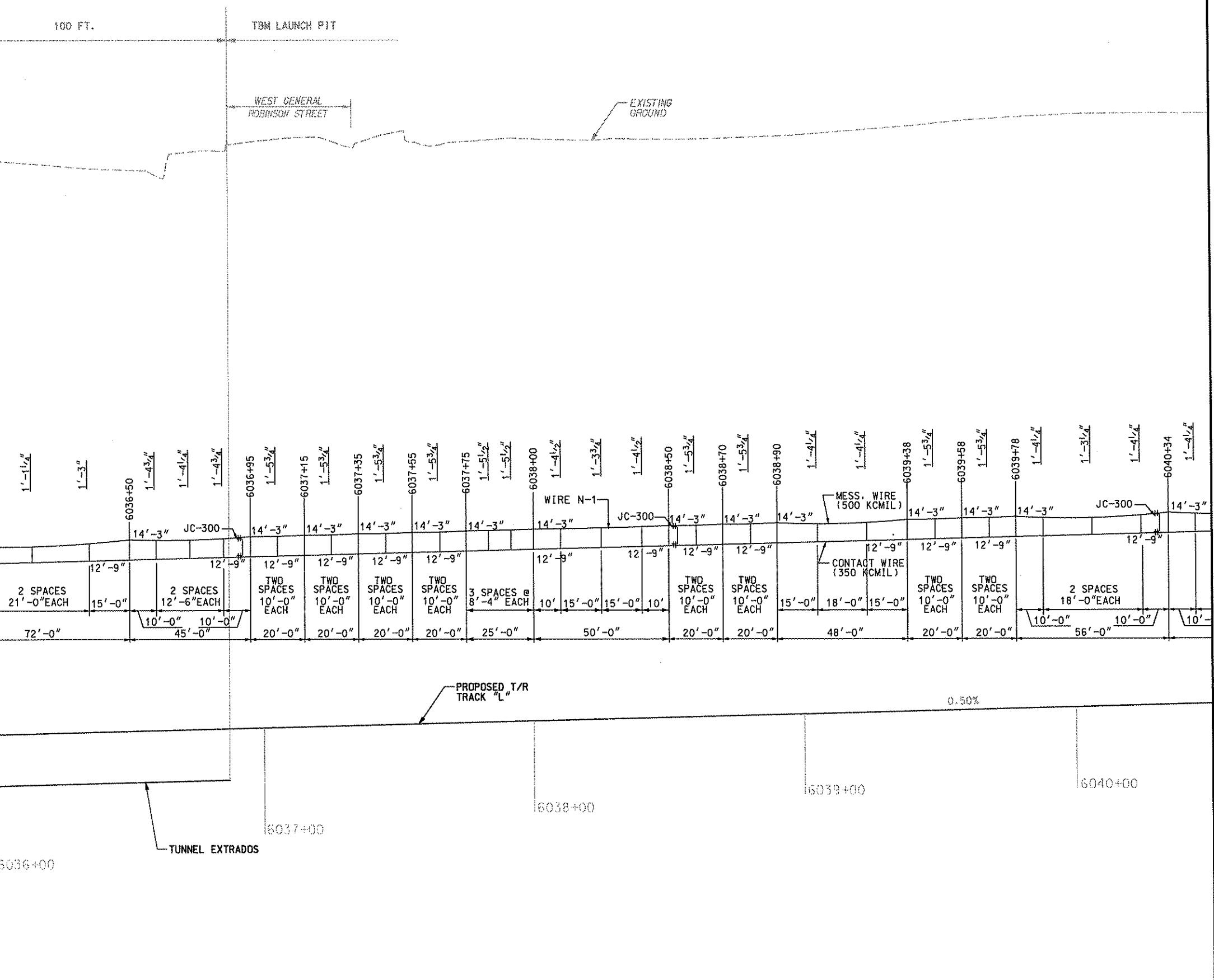
DESIGNED BY SR ADKINS
DRAWN BY KA BRANDT
CHECKED BY TA SHANTZ
IN CHARGE BY CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PITTSTON
PORT AUTHORITY OF ALLEGHENY COUNTY
PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-1
S.B. TRACK 1 STA. 6030+50 TO STA. 6036+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC356 SHT. 242

MATCH LINE DWG. OC356

100 FT.

TBM LAUNCH PIT



NOTE:

1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.



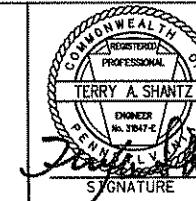
VERTICAL



HORIZONTAL 

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DMJM HARRIS | AECC

David P. Hwang 4/28/14
APPROVED DATE

PITTSBURGH

PENNSYLVANIA

NORTH SHORE CONNECTOR
C TRAIN SYSTEM (SYSTEM-WIDE)
WAY CATENARY PROFILE - WIRE N-1
ACK 1 STA. 6036+00 TO STA. 6040+50

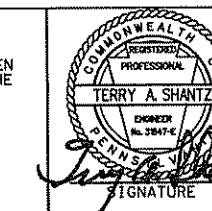
ty	CONTRACT NO.		NSC-009
	DWG. NO.	OC357	SHT. 243

MATCH LINE DWG. OC357

NOTE:

1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH
ARE ASSEMBLY HA-100.
2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
3. FOR HANGER DETAILS SEE DRAWING DC171.
4. FOR FEEDER JUMPER DETAILS SEE DRAWING DC184.
5. FOR IN-SPAN INSULATOR DETAILS SEE DRAWING DC168.

The diagram illustrates two reference scales. On the left, a vertical scale is labeled 'VERTICAL' with markings at 0, 4', and 8'. On the right, a horizontal scale is labeled 'HORIZONTAL' with markings at 0, 4', and 8'. Both scales feature a dashed pattern of squares and rectangles.



DMJM HARRIS | **AECO**
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20TH FLOOR
PITTSBURGH, PA. 15222
Daniel J. Harrington 4/28/01
APPROVED DATE

M	DESIGNED	SR ADKINS
	DRAWN	KA BRANDT
	CHECKED	TA SHANTZ
	IN CHARGE	CD JONES
8	DATE	APR. 28, 2008
	SCALE	AS SHOWN

PITTSTON AUTHORITY OF ALLEGHENY COUNTY
 PITTSBURGH, PENNSYLVANIA

NORTH SHORE CONNECTOR
 NSC TRAIN SYSTEM (SYSTEM-WIDE)
 WIRE N-1 & N-3
 S.B. TRACK 1 STA. 6040+50 TO STA. 6046+00

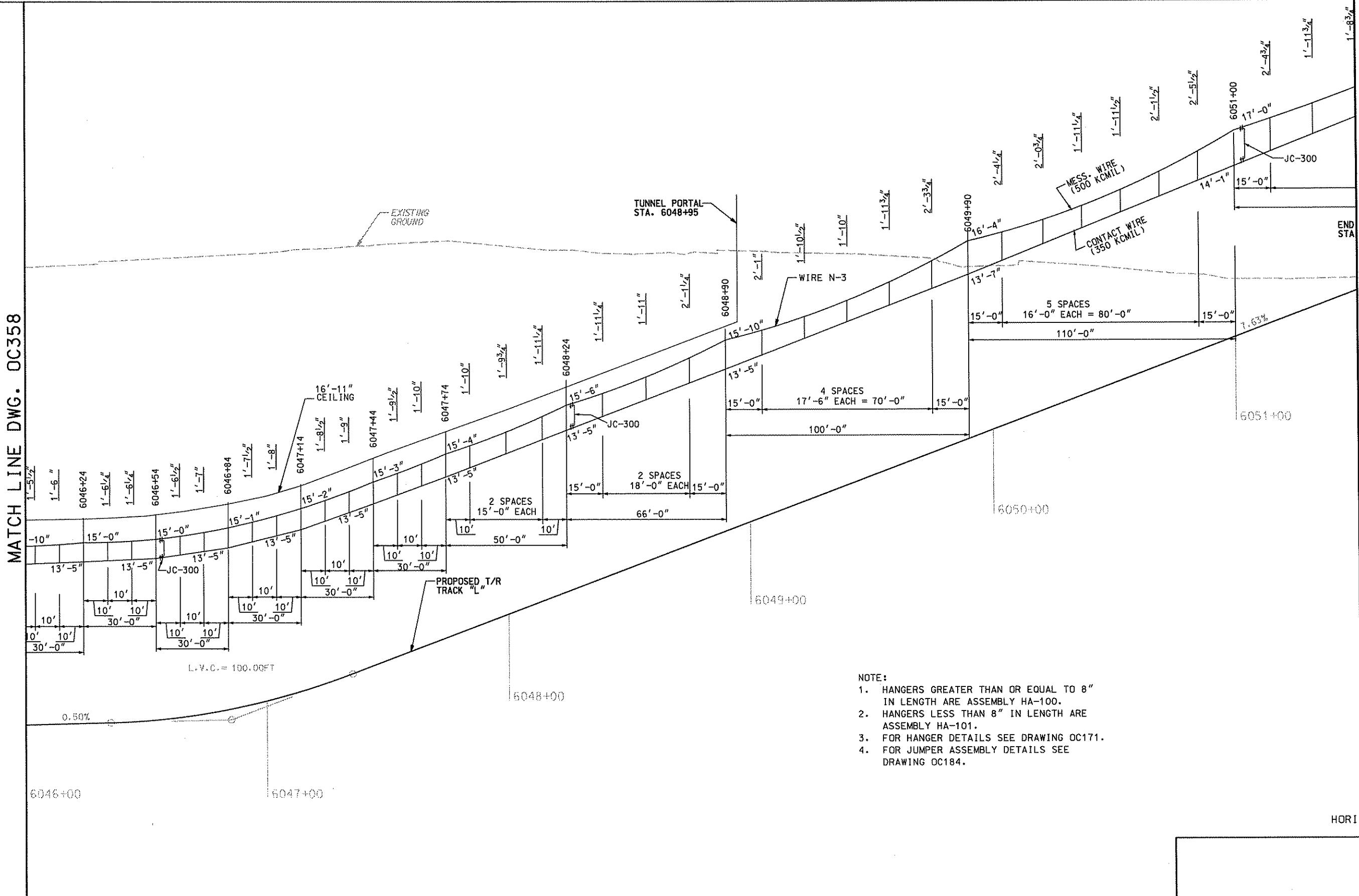
Port Authority <small>connecting people to life</small>	CONTRACT NO.	NSC-009
	DWG. NO.	OC358
		SHT. 2

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10. The following table summarizes the results of the study.

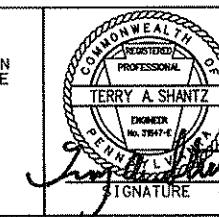
MATCH LINE DWG. OC358



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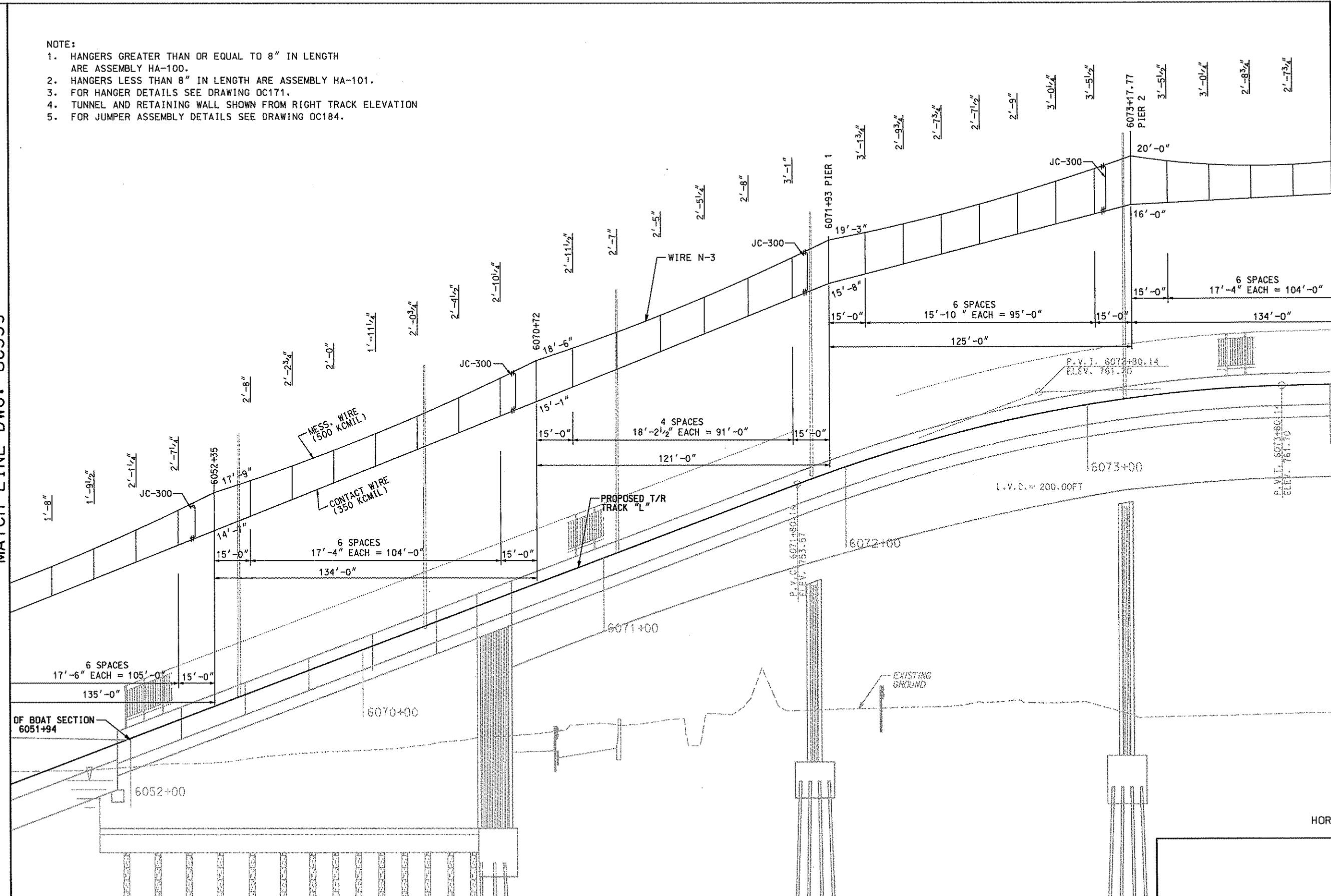


DMJM HARRIS | AECOM
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David F. Henry 4/28/08
DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-3
S.B. TRACK 1 STA. 6046+00 TO STA. 6051+50
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC359 SHT. 245

MATCH LINE DWG. OC359

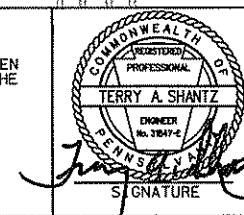
- NOTE:
1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. TUNNEL AND RETAINING WALL SHOWN FROM RIGHT TRACK ELEVATION
 5. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.



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NO.	DATE	DESCRIPTION
REVISIONS		

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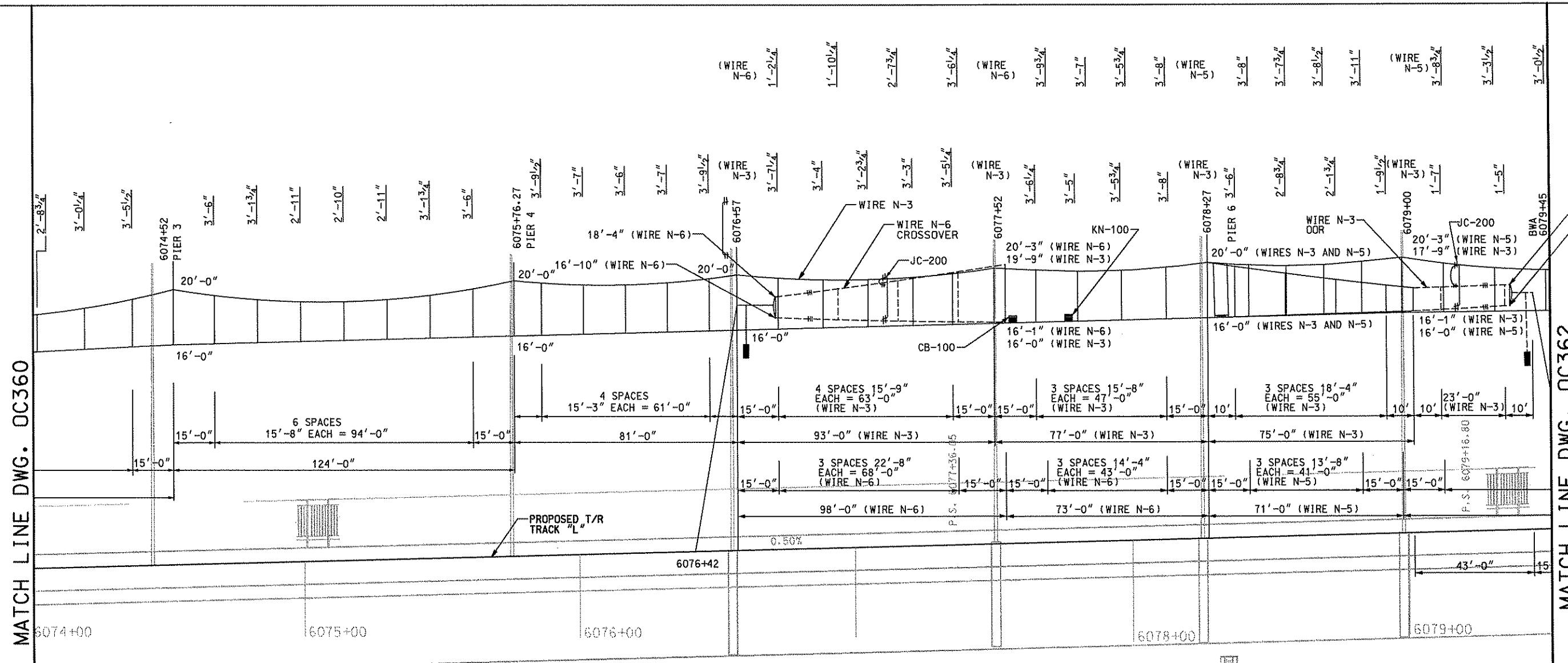


DMJM HARRIS | AECOM
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20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
PROFESSIONAL
REGISTERED
ENGINEER
No. 28474
Terry A. Shantz
APPROVED
DATE
Signature: David F. Hagan 4/28/08

DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

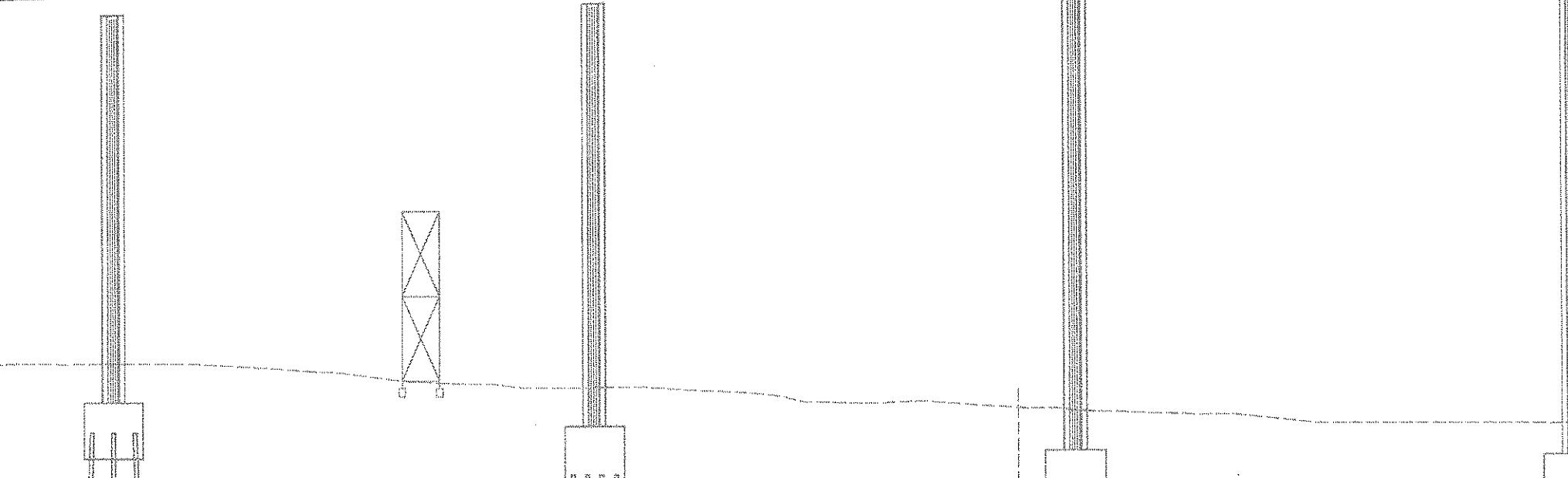
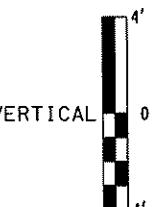
PORT AUTHORITY OF ALLEGHENY COUNTY
Pittsburgh, Pennsylvania
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-3
S.B. TRACK 1 STA. 6051+50 TO STA. 6074+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC360 SHT. 246

MATCH LINE DWG. OC360

17'-9 1/2" WIRE N-3
16'-3 1/2" WIRE N-317'-9 1/2" WIRE N-3
16'-3 1/2" WIRE N-3

MATCH LINE DWG. OC362

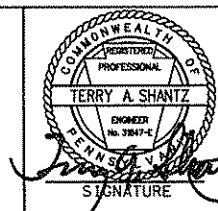
- NOTE:**
1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.
 5. FOR SECTION INSULATOR DETAILS SEE DRAWING OC169.
 6. FOR BALANCE WEIGHT ANCHOR DETAILS SEE DRAWING OC167.
 7. FOR CONTACT WIRE BRIDGE AND INSULATED KNUCKLE DETAILS SEE DRAWING OC180.
 8. TUNNEL AND RETAINING WALL SHOWN FROM RIGHT TRACK ELEVATION.



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Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS

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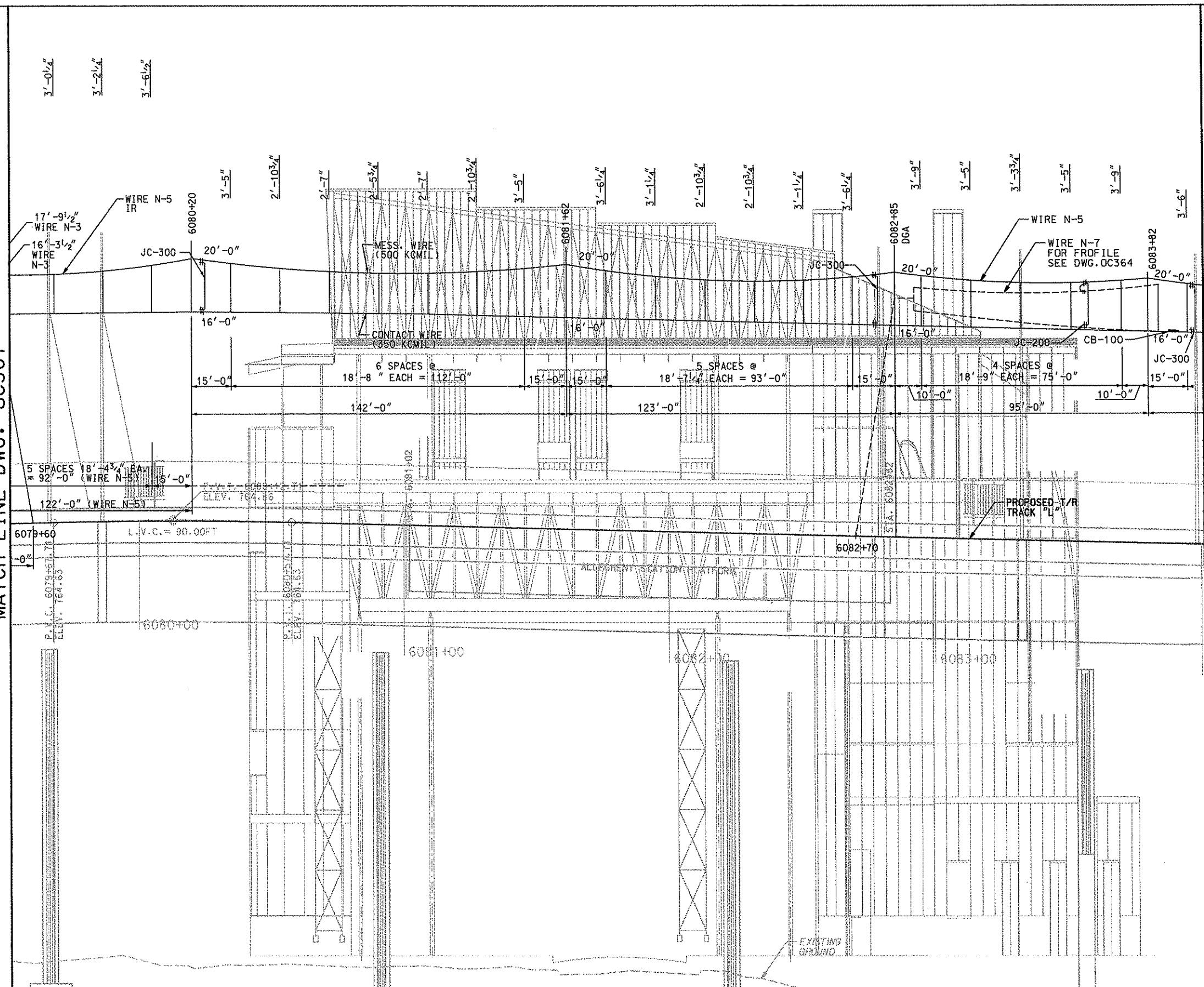


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Terry A. Shantz
Engineer
Pennsylvania
Signature
APPROVED
Date
4/28/08

DESIGNED BY SR ADKINS
DRAWN BY KA BRANDT
CHECKED BY TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC361 SHT. 247

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATEWAY PROFILE - WIRE N-3 & N-5
S.B. TRACK 1 STA. 6074+00 TO STA. 6079+50
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC361 SHT. 247

MATCH LINE DWG. OC361



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DMJM HARRIS | AECO
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20TH FLOOR
PITTSBURGH, PA. 15222

PITTSBURGH **PENNSYLVANIA**

NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-5
S.B. TRACK 1 STA. 6079+50 TO STA. 6084+00

**Port
Authority**
connecting people to life

CONTRACT NO.	NSC-009	
DWG. NO.	OC362	SHT. 2

- NOTE:

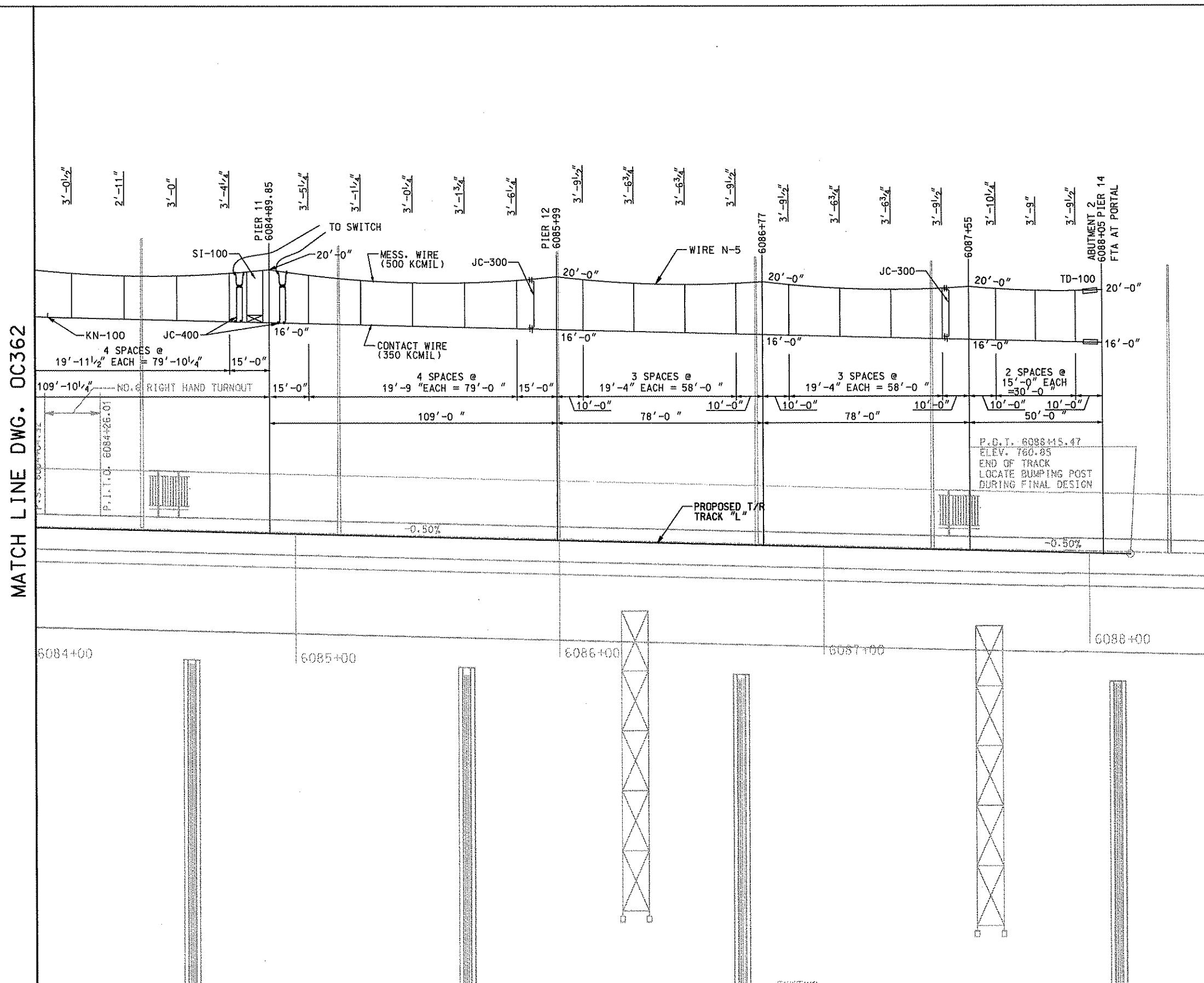
 1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. DOUBLE ARM CANTILEVER AT 4' APART
 5. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.
 6. FOR CONTACT BRIDGE DETAILS SEE DRAWING OC180.



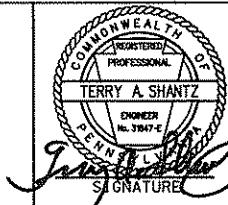
VERTICAL 0

ZONTAL [REDACTED] 20' 10' 0 20'

MATCH LINE DWG. OC362



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DMJM HARRIS | AECO
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

Dave 4/28/00
APPROVED DATE

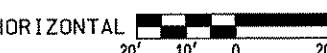
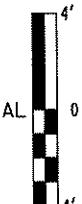
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH, PENNSYLVANIA

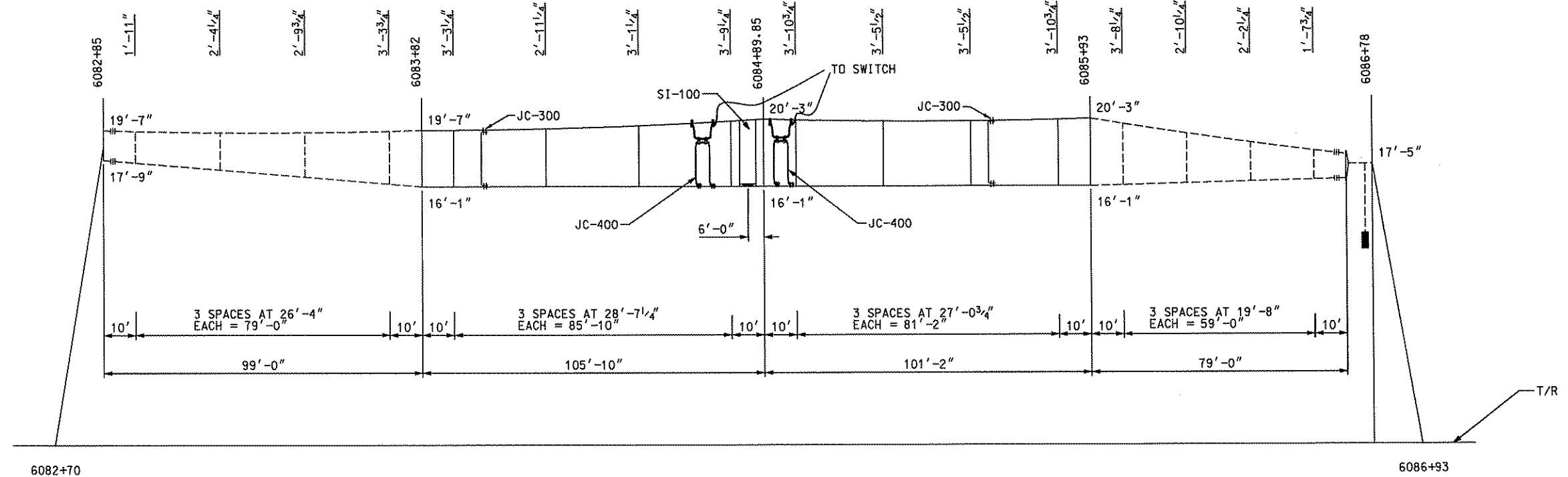
**NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-5
S.B. TRACK 1 STA. 6084+00 TO STA. 6088+00**

Port Authority <small>of New York and New Jersey</small>	CONTRACT NO. NSC-009	
DWG. NO.	OC363	SHT. 24

 Gannett Fleming
Transit & Rail Systems

1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
3. FOR HANGER DETAILS SEE DRAWING DC171.
4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.
5. FOR SECTION INSULATOR DETAILS SEE DRAWING OC169.
6. FOR FIXED TERMINATION ASSEMBLY DETAILS SEE DRAWING OC182

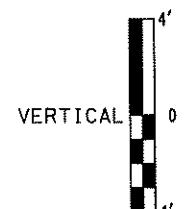




WIRE N-7 (NEW)

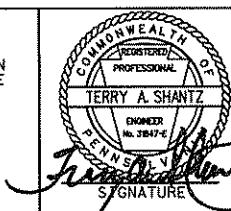
NOTE:

1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
2. HANGERS LESS THAN 1'-0" IN LENGTH ARE ASSEMBLY HA-101.
3. FOR HANGER DETAILS SEE DRAWING DC171.
4. FOR SECTION INSULATOR DETAILS, SEE DRAWING DC169.
5. FOR FEEDER JUMPER DETAILS SEE DRAWING DC184.



HORIZONTAL 20' 10' 0 20'

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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
[Handwritten signature]
APPROVED DATE
Terry A. Shantz
E.I.T.
P.E.

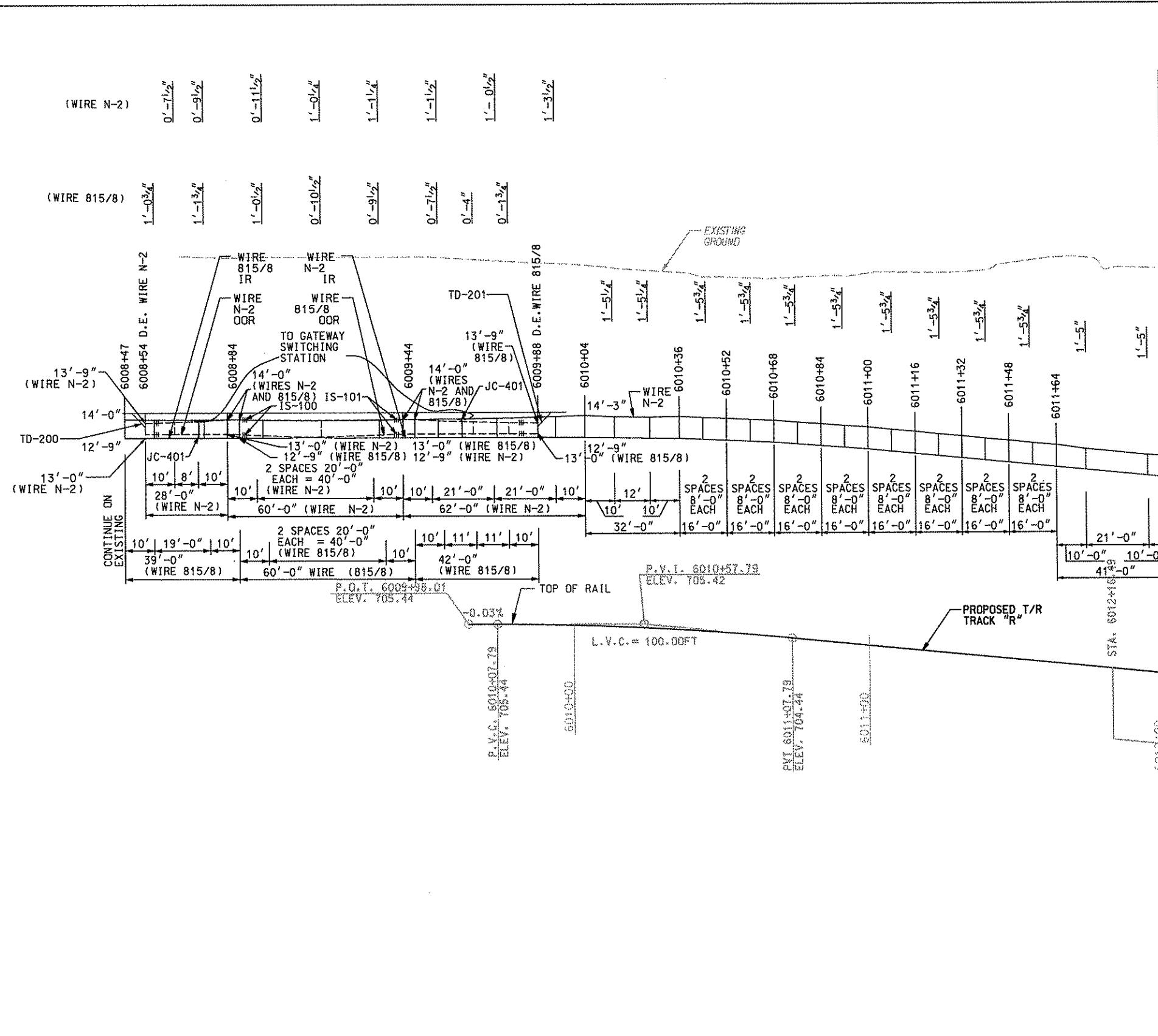
DESIGNED SR ADKINS
DRAWN DN MARKER
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN
S.H.

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-7

Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC364 SHT. 250

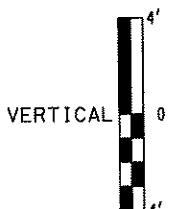
Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		



MATCH LINE DWG. OC372

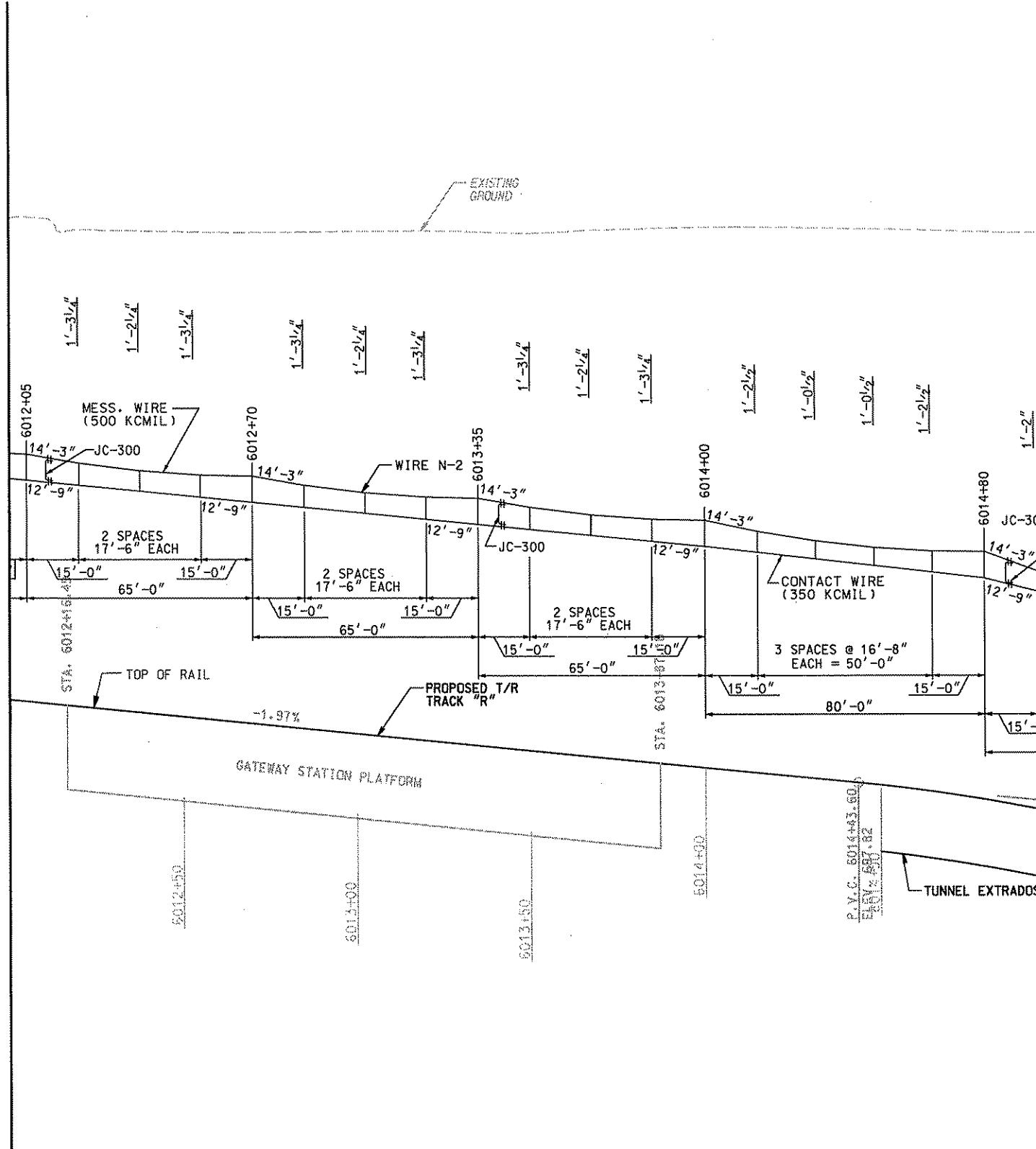
- NOTE:
1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. SUPPORTS IN OVERLAP AREA ARE DOUBLE, 4' APART. AT 2' ON EITHER SIDE OF STATION SHOWN.
 5. FOR STAGE I HANGER DETAILS SEE DRAWING OC172.
 6. FOR IN-SPAN INSULATOR ASSEMBLY DETAILS SEE DRAWING OC-168.
 7. FOR FIXED TERMINATION ASSEMBLY DETAILS SEE DRAWING OC183.



HORIZONTAL 20' 10' 0 20'

 Gannett Fleming Transit & Rail Systems			<small>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.</small>	 TERRY A. SHANTZ ENGINER NO. 1847-E S.A.N.S.P.A. SIGNATURE	DMJM HARRIS FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222	AECOM DESIGNED BY SR ADKINS DRAWN BY KA BRANDT CHECKED BY TA SHANTZ IN CHARGE BY CD JONES DATE APR. 28, 2008 APPROVED BY <i>Dave P. Hargan</i> 4/28/08 SCALE AS SHOWN DATE	PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM-WIDE) GATEWAY CATEINARY PROFILE - WIRE N-2 N.B. TRACK 2 STA. 6008+54 TO STA. 6012+16
	NO. DATE	DESCRIPTION					
		REVISIONS					 Port Authority CONTRACT NO. NSC-009 DWG. NO. OC371 SHT. 251

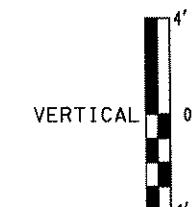
MATCH LINE DWG. OC371



MATCH LINE DWG. OC373

NOTE:

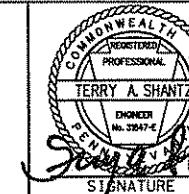
- HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
- HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
- FOR HANGER DETAILS SEE DRAWING OC171.
- FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.



NO.	DATE	DESCRIPTION
REVISIONS		

Gannett Fleming
Transit & Rail Systems

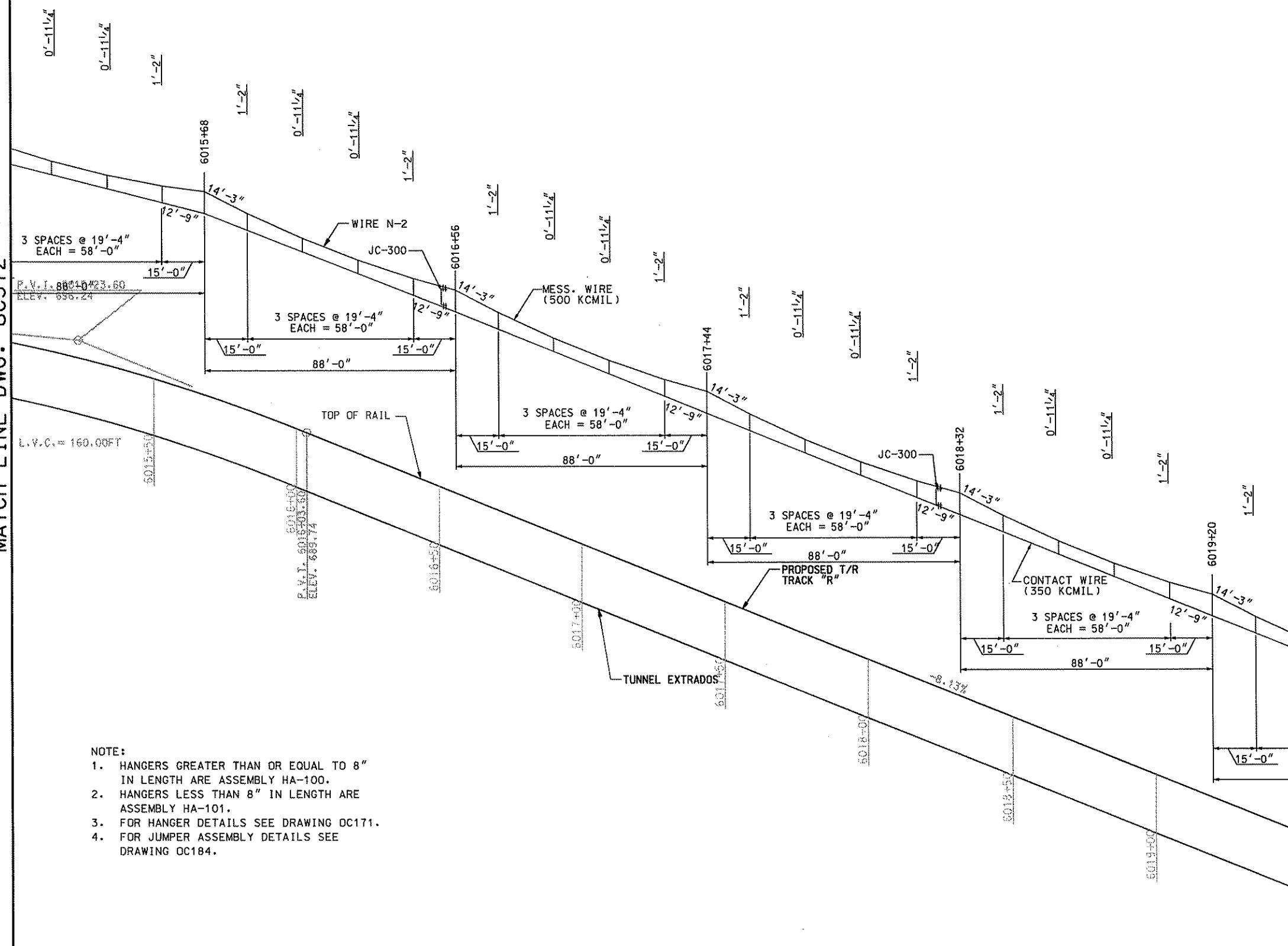
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DMJM HARRIS AECOM
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OWNER
NO. 3847-E
TERRY A. SHANTZ
PROFESSIONAL
ENGINEER
APPROVED
SIGNATURE
DAVID M. HARRIS
APPROVED
DATE
4/28/08

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-2
N.B. TRACK 2 STA. 6012+00 TO STA. 6015+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC372 SHT. 252

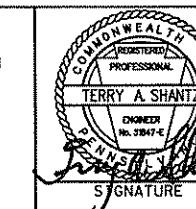
MATCH LINE DWG. DC372



Gannett Fleming
Transit & Rail Systems

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.



TERRY A SHANTZ
CHIEF ENGINEER
PENNSYLVANIA
APPROVED
4/28/08

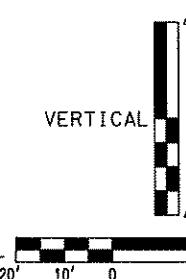
Dave P. Henry
APPROVED
4/28/08

DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

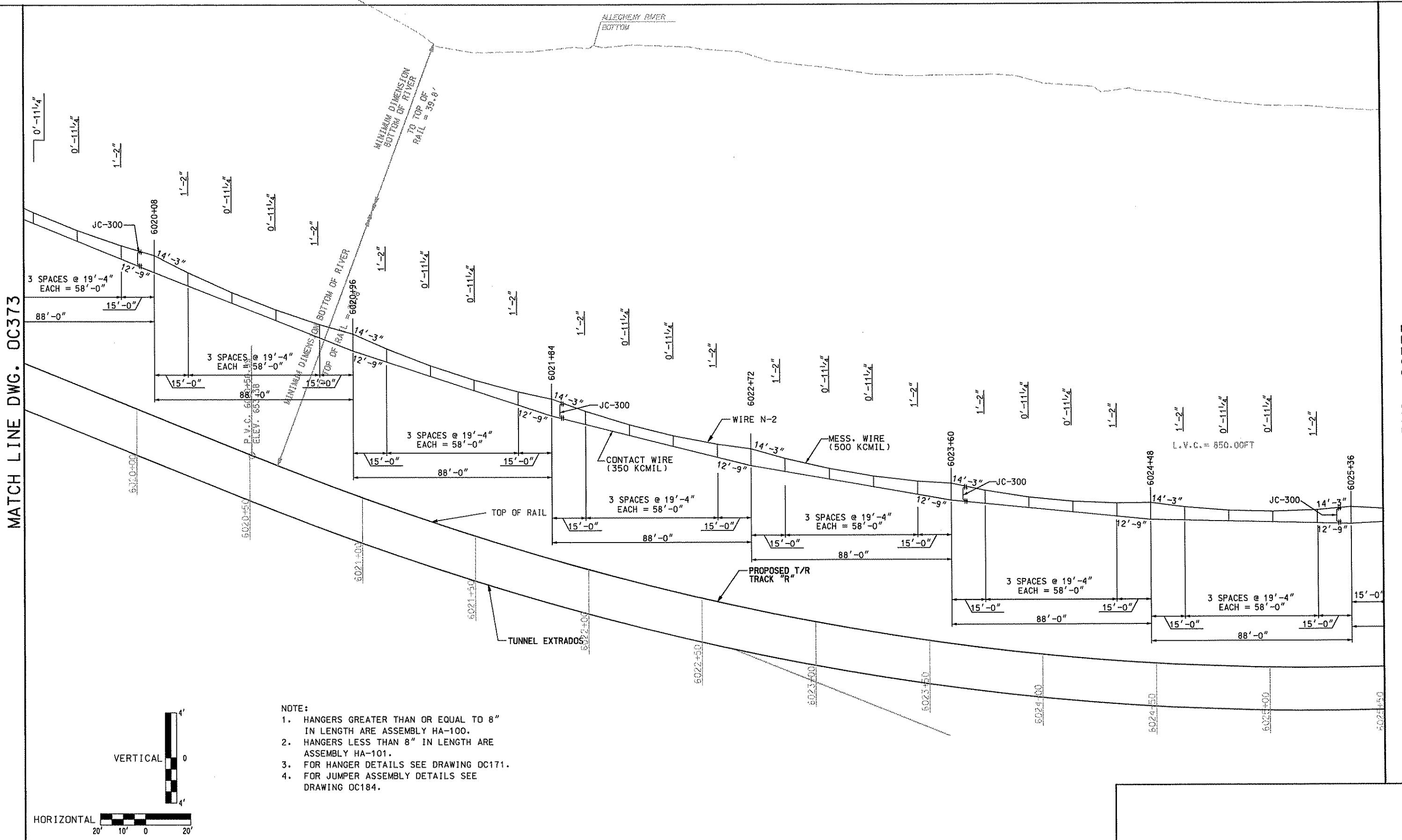
DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-2
N.B. TRACK 2 STA. 6015+00 TO STA. 6019+20
Port Authority
CONTRACT NO. NSC-008
DWG. NO. OC373 SHT. 263

MATCH LINE DWG. OC373



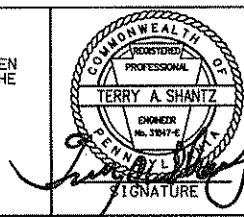
- NOTE:
1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING DC171.
 4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.



Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS
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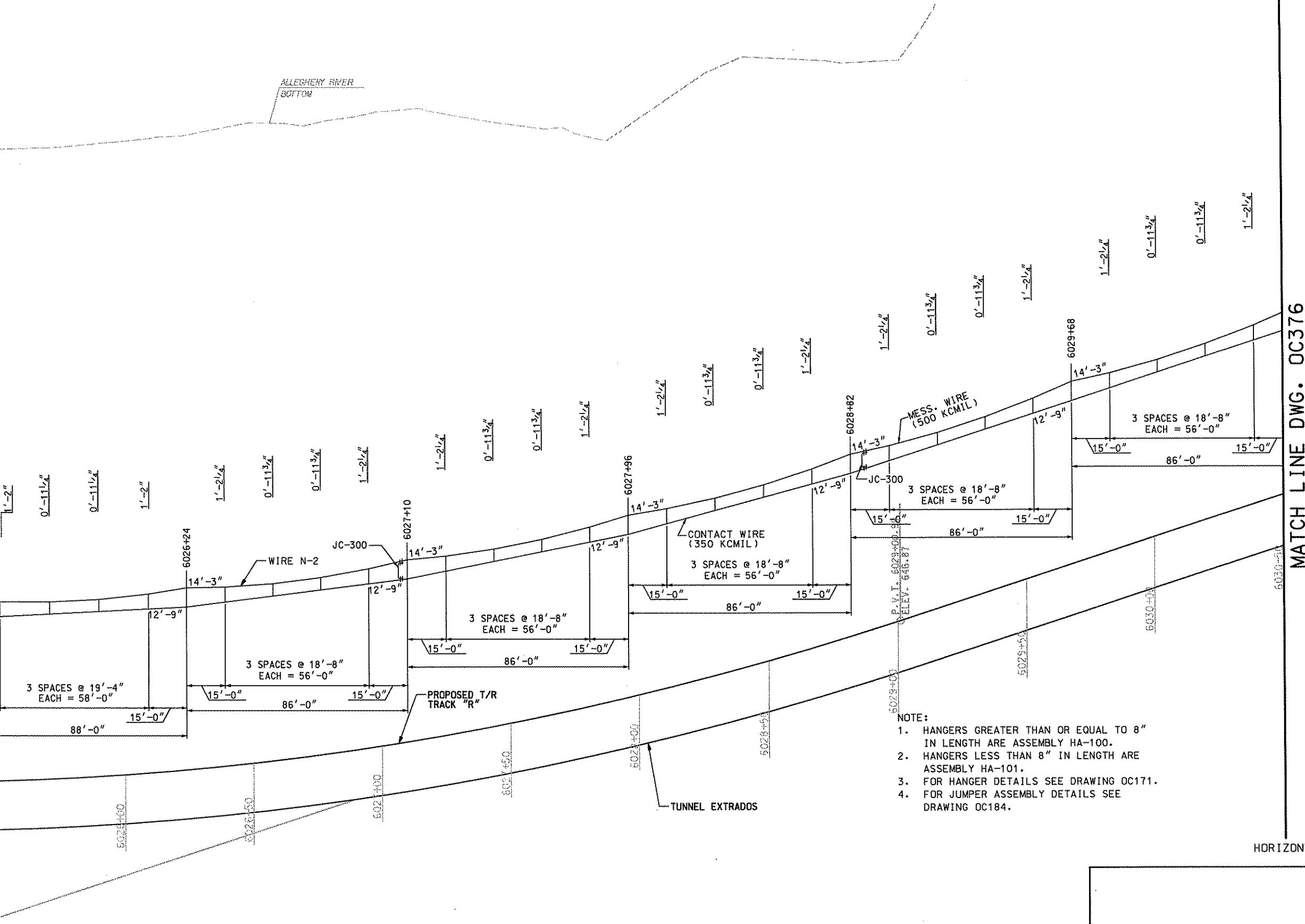
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
ENRINEER
PENNSYLVANIA
SIGNATURE
APPROVED
DATE
David P. Henry 4/28/08

DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-2
N.B. TRACK 2 STA. 6019+50 TO STA. 6025+50
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC374 SHT. 254

MATCH LINE DWG. OC375

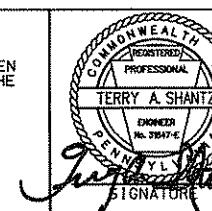
MATCH LINE DWG. OC374



MATCH LINE DWG. OC376



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DMJM HARRIS | AECO

FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

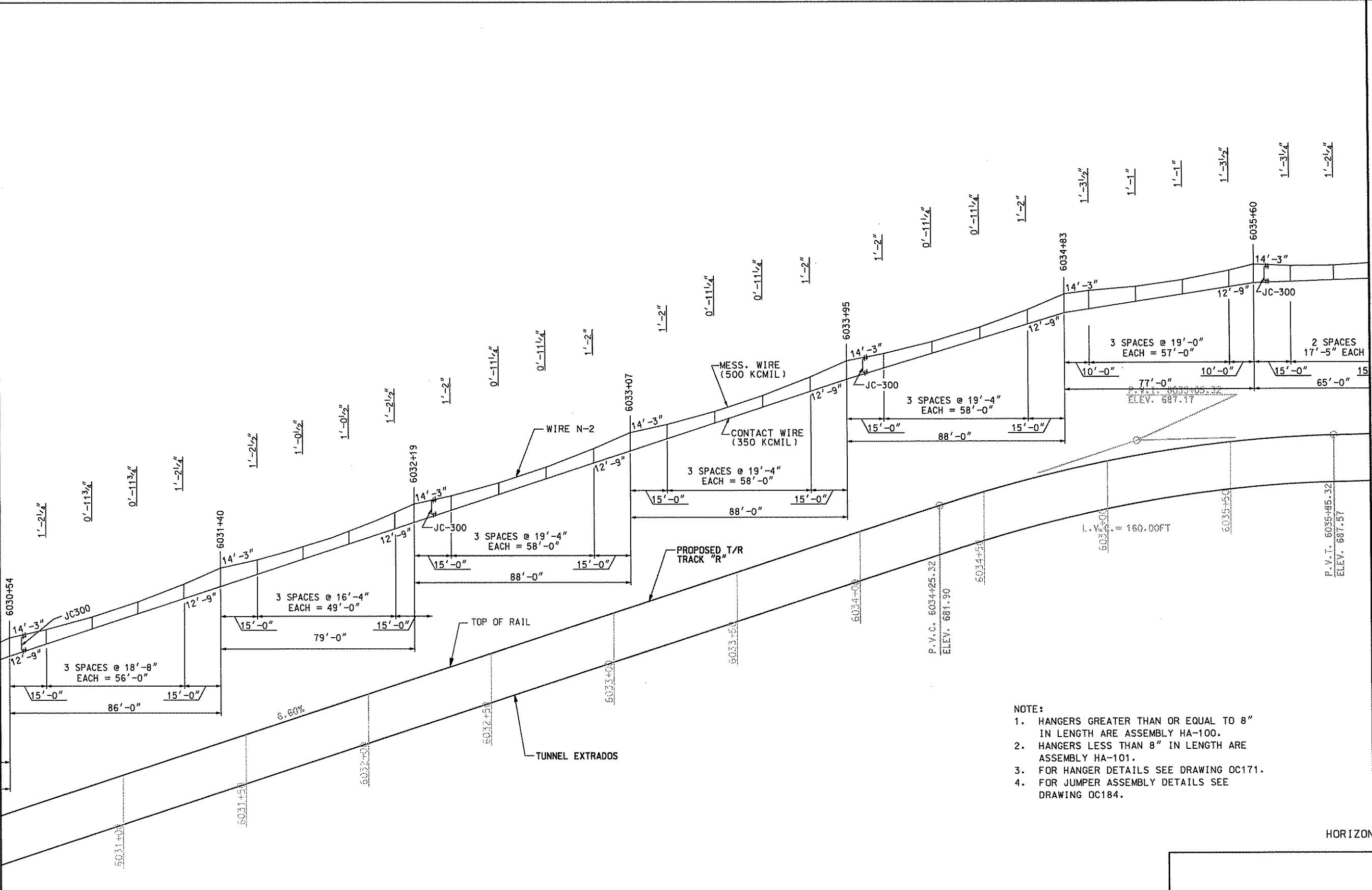
M DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE 1:6 CLOTHED

PITTSBURGH PORT AUTHORITY OF ALLEGHENY COUNTY PENNSYLVANIA

**NORTH SHORE CONNECTOR
C TRAIN SYSTEM (SYSTEM-WIDE)
WAY CATENARY PROFILE - WIRE N-2
ACK 2 STA 6025+50 TO STA 6030+50**

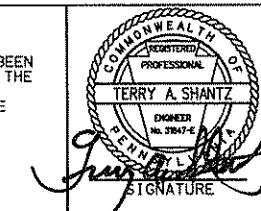
Y	CONTRACT NO.	NSC-009	
	DWG. NO.	OC375	SHT. 2

MATCH LINE DWG. OC375



 Gannett Fleming
Transit & Rail Systems

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DMJM HARRIS | AECOM

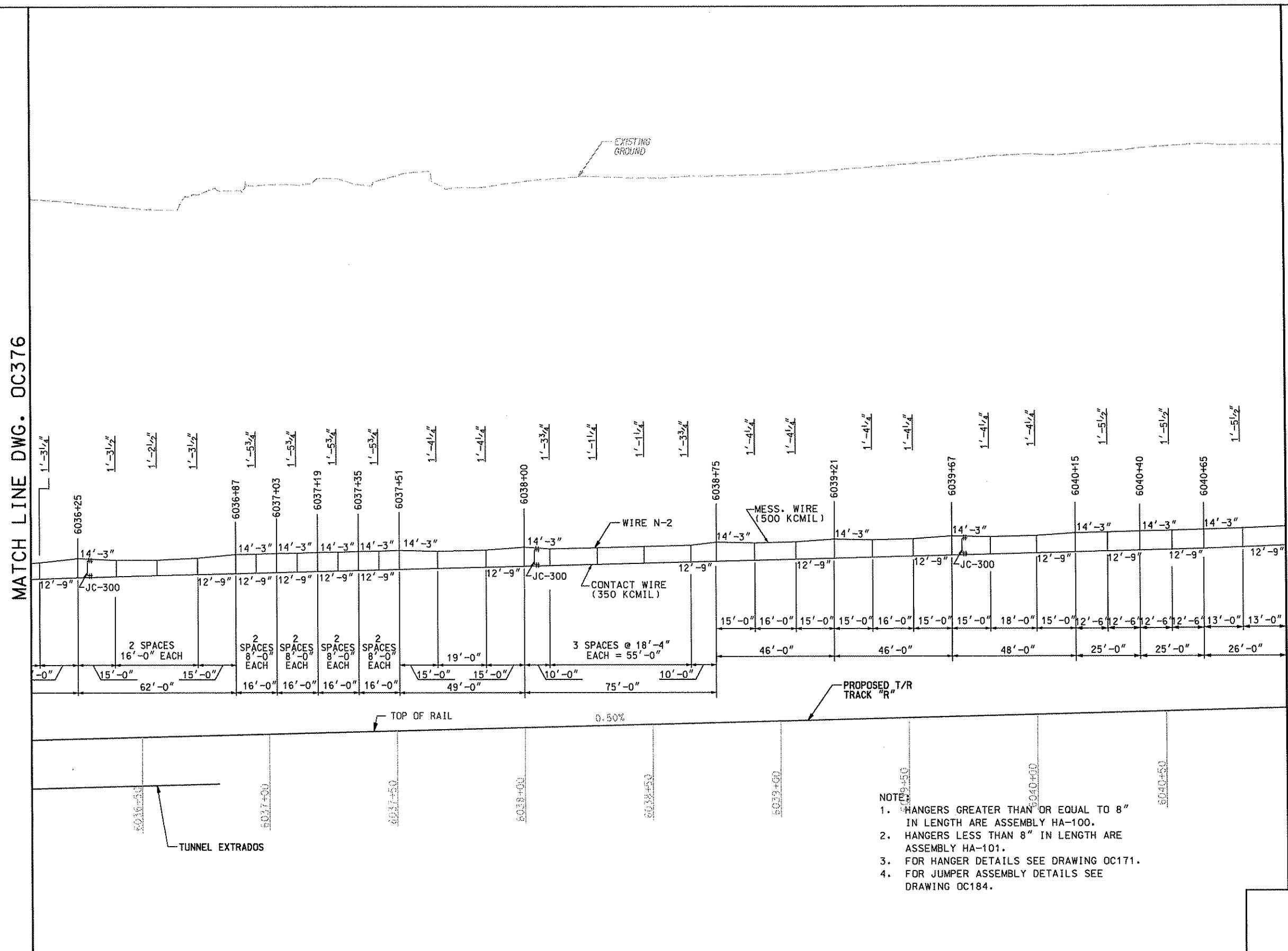
Daniel J. Hwang 4/28/08
APPROVED DATE

PITTSBURGH PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH, PENNSYLVANIA

**NORTH SHORE CONNECTOR
TRAIN SYSTEM (SYSTEM-WIDE)
DAY CATENARY PROFILE - WIRE N-2
CLK 2 STA. 6030+50 TO STA. 6036+00**

	CONTRACT NO.	NSC-009
	DWG. NO.	OC376
		SHT. 4

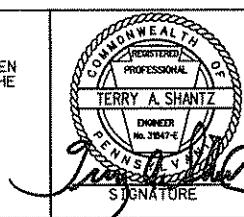
MATCH LINE DWG. OC376



Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

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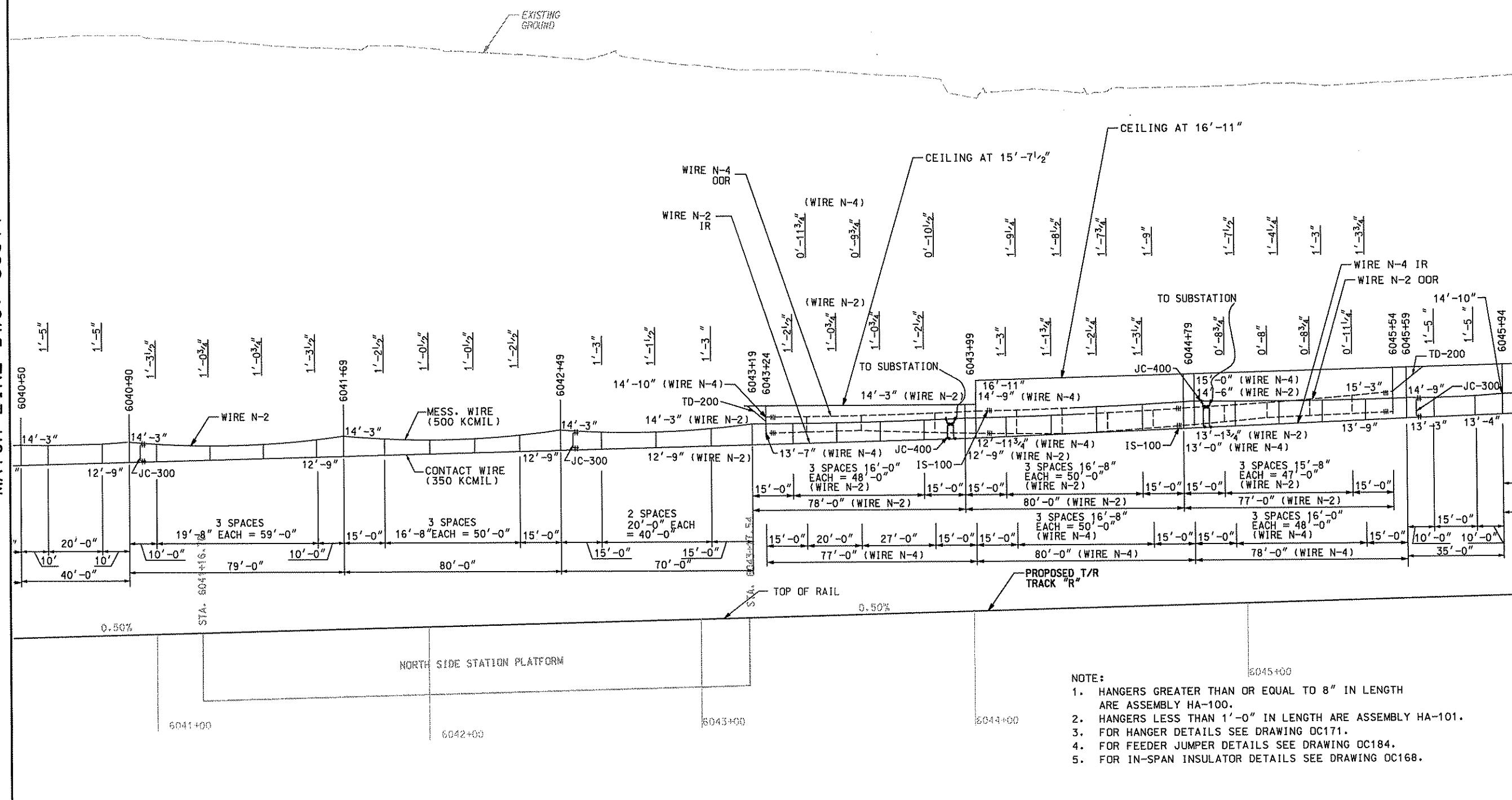
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
OWNER
No. 3547-4
PENNSYLVANIA
SIGNATURE
Dave L. Shantz 4/28/08
APPROVED DATE
APR. 28, 2008

DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-2
N.B. TRACK 2 STA. 6036+00 TO STA. 6040+50
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC377 SHT. 257

MATCH LINE DWG. OC377

EXC
GRD

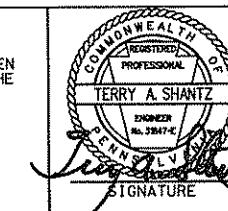


MATCH LINE DWG. OC379

A vertical scale bar with markings at 4' intervals, labeled "VERTICAL" horizontally across it.



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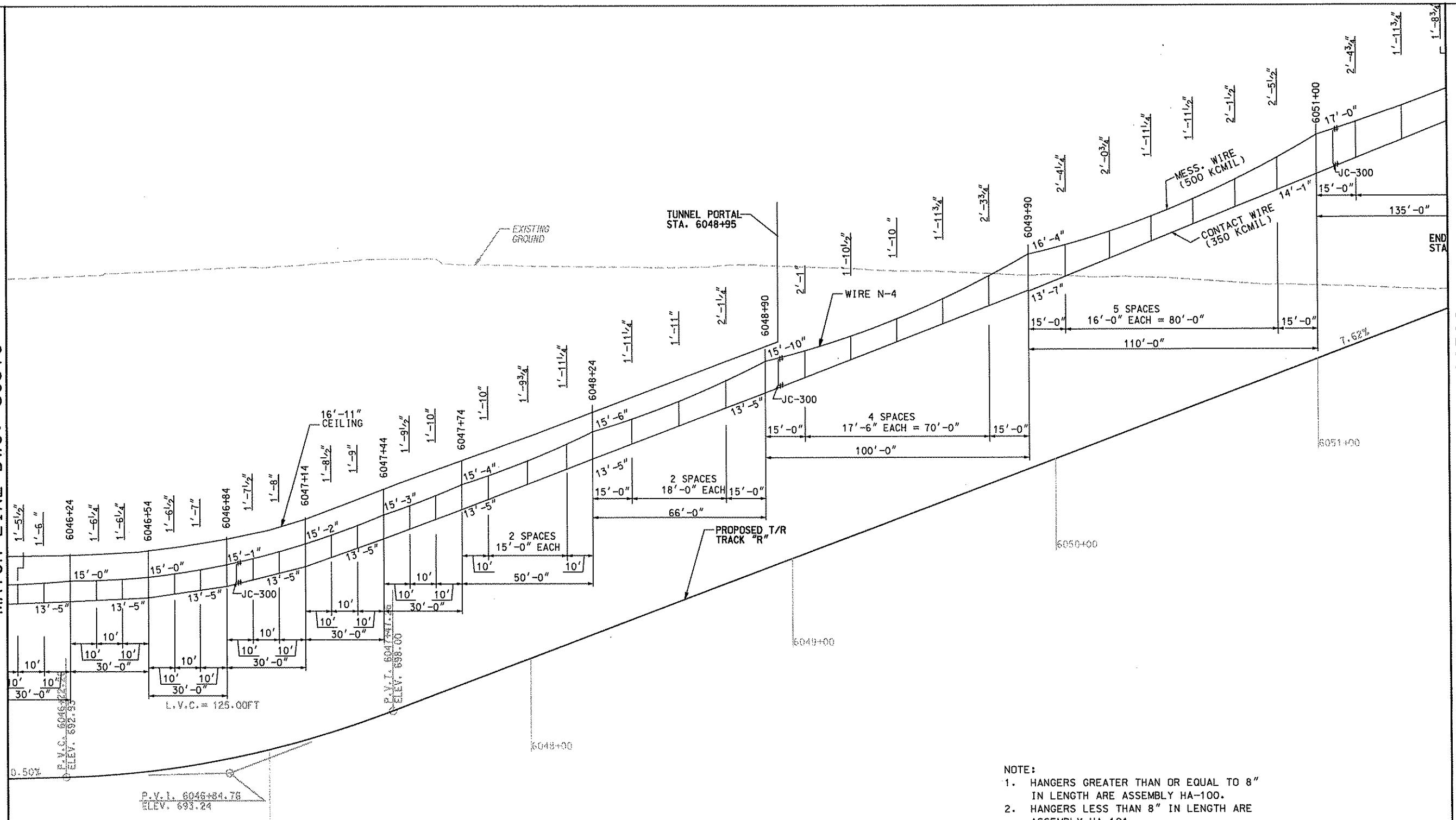
DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222

DESIGNED	SR ADKINS
DRAWN	KA BRANDT
CHECKED	TA SHANTZ
IN CHARGE	CD JONES
DATE	APR. 28, 2008
SCALE	AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
 PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR
 NSC TRAIN SYSTEM (SYSTEM-WIDE)
 GATEWAY CATENARY PROFILE - WIRE N-2 & N-4
 N.B. TRACK 2 STA. 6040+50 TO STA. 6046+00

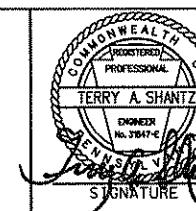
MATCH LINE DWG. OC378



Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

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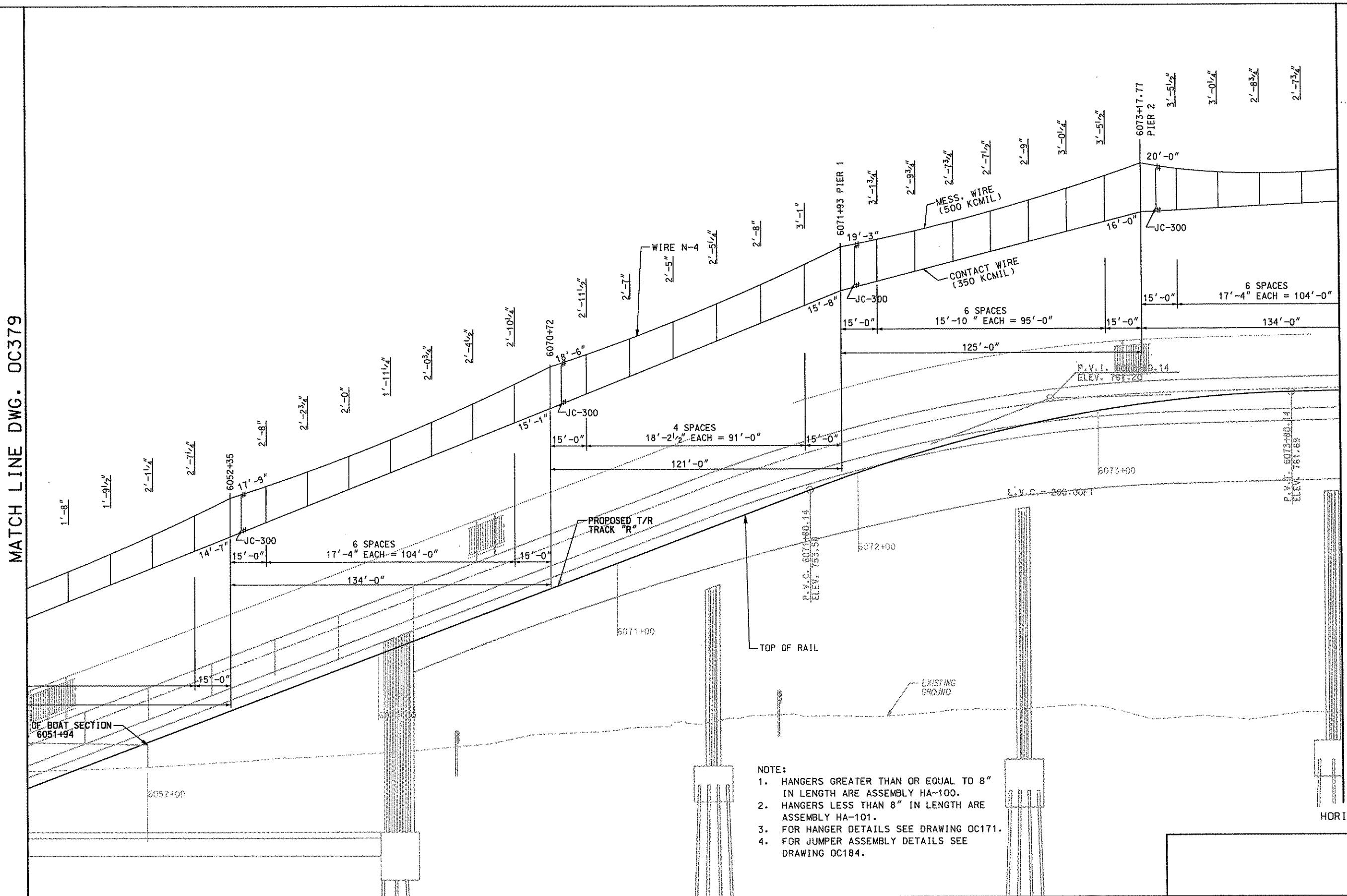


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
ENGINEER
No. 3941-P
APRIL 28, 2008
Signature
APPROVED DATE
David P. Fleming 4/28/08

DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATEINARY PROFILE - WIRE N-4
N.B. TRACK 2 STA. 6046+00 TO STA. 6051+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC378 SHT. 259

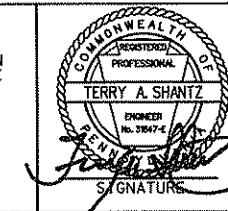
MATCH LINE DWG. DC379



Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

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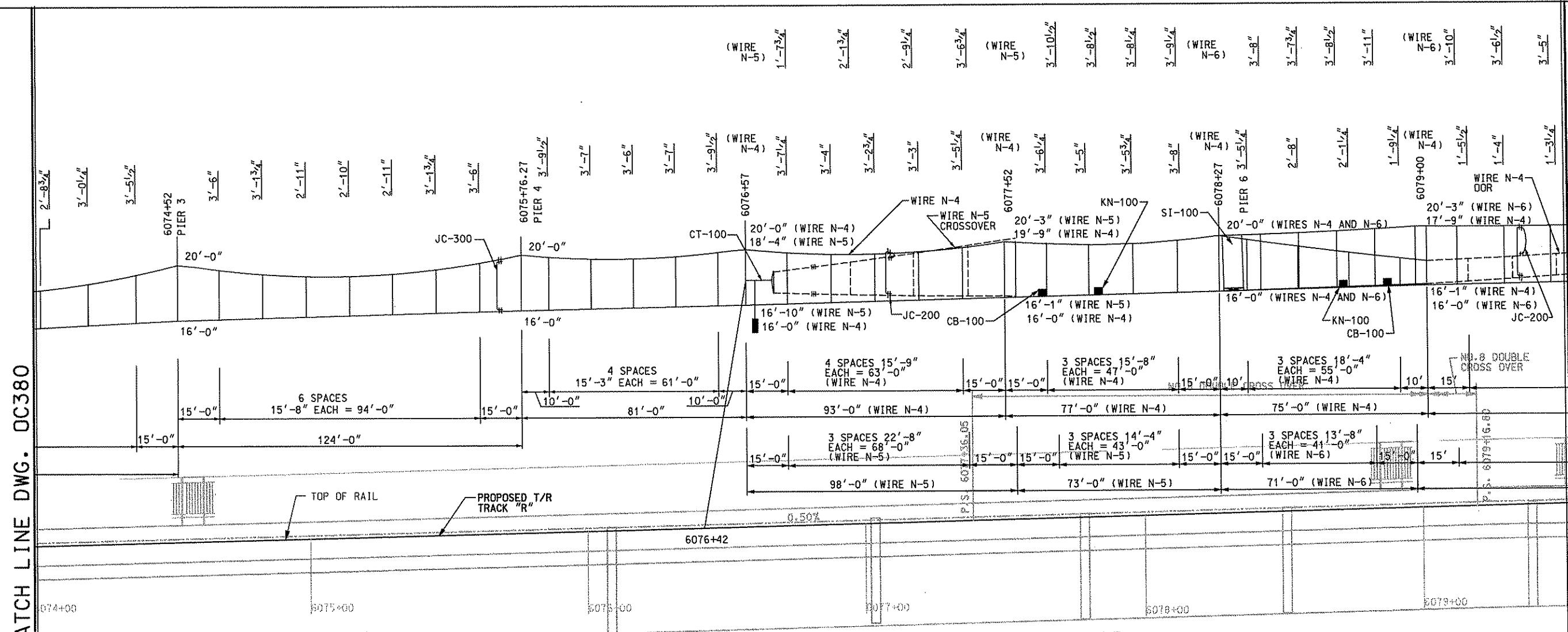


DMJM HARRIS AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
David P. Henry 4/28/08
SIGNATURE APPROVED DATE

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-4
N.B. TRACK 2 STA. 6051+50 TO STA. 6074+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC380 SHT. 260

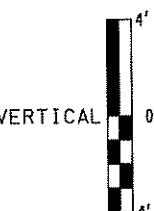
MATCH LINE DWG. DC381

MATCH LINE DWG. OC380



MATCH LINE DWG. OC382

- NOTE:
1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 1'-0" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.
 5. FOR SECTION INSULATOR DETAILS SEE DRAWING OC169.
 6. FOR BALANCE WEIGHT ANCHOR DETAILS SEE DRAWING OC167.
 7. FOR CONTACT WIRE BRIDGE AND INSULATED KNUCKLE DETAILS SEE DRAWING OC180.

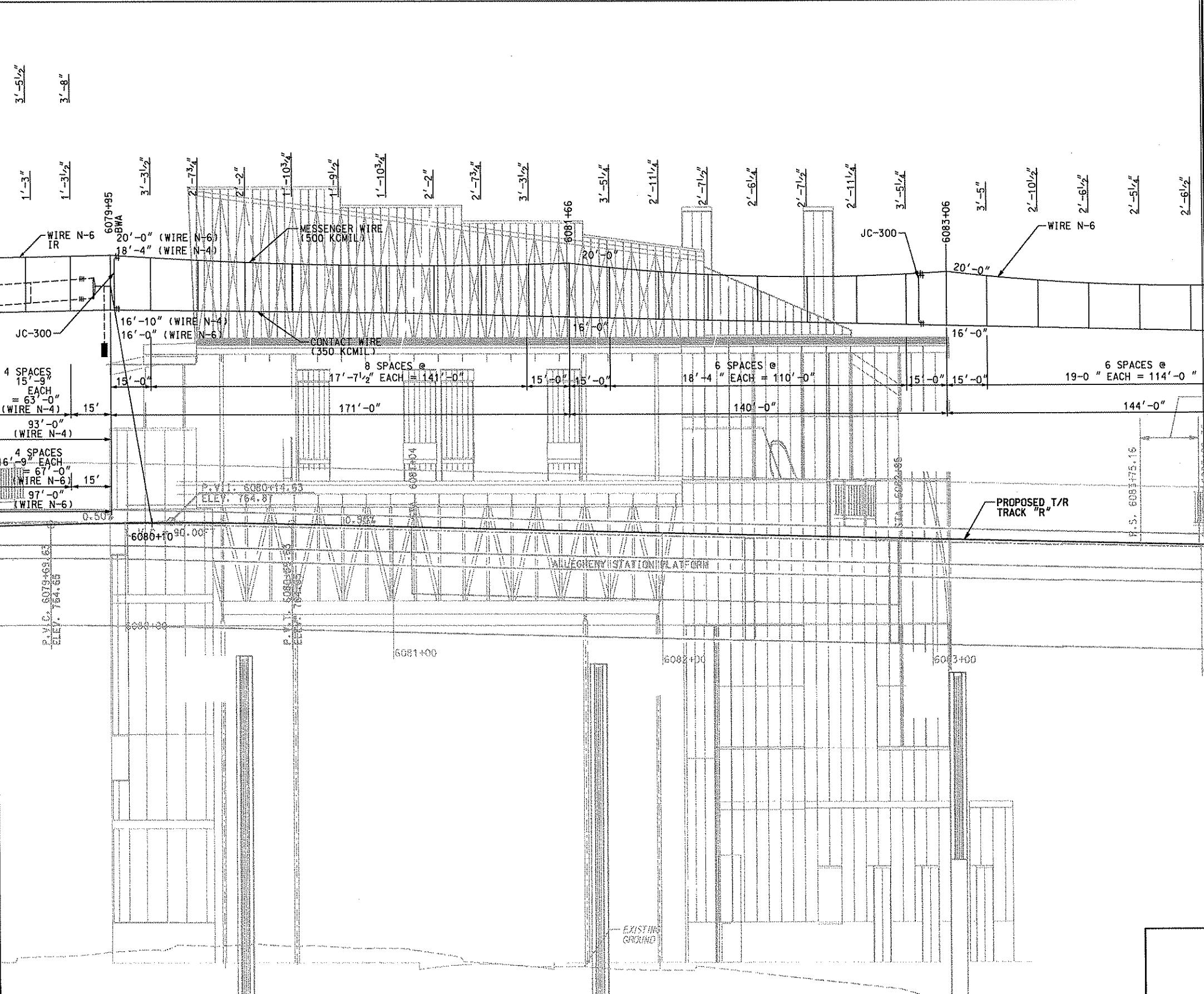


HORIZONTAL 20' 10' 0 20'

											PORT AUTHORITY OF ALLEGHENY COUNTY															
											PITTSTONIA															
											NORTH SHORE CONNECTOR															
											NSC TRAIN SYSTEM (SYSTEM-WIDE)															
Gannett Fleming Transit & Rail Systems				PROFESSIONAL	REGISTERED	TERRY A. SHANTZ	ENGINEER No. 20475	SIGNATURE	DMJM HARRIS	AECOM	DESIGNED BY SR ADKINS	DRAWN BY KA BRANDT	APPROVED BY DAVID P. HANLEY 4/28/08	CHECKED BY TA SHANTZ	IN CHARGE BY CD JONES	DATE APR. 28, 2008	SCALE AS SHOWN	DATE	PORT AUTHORITY	CONTRACT NO. NSC-009	DWG. NO. OC381	SHT. 261				
NO.	DATE	DESCRIPTION			REVISIONS																					

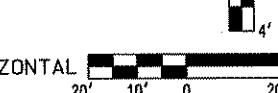
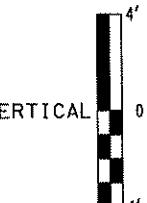
THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.

MATCH LINE DWG. OC381



MATCH LINE DWG. OC383

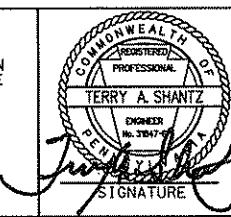
- NOTE:
1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
 2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
 3. FOR HANGER DETAILS SEE DRAWING OC171.
 4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING OC184.



Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS
-----	------	-------------	-----------

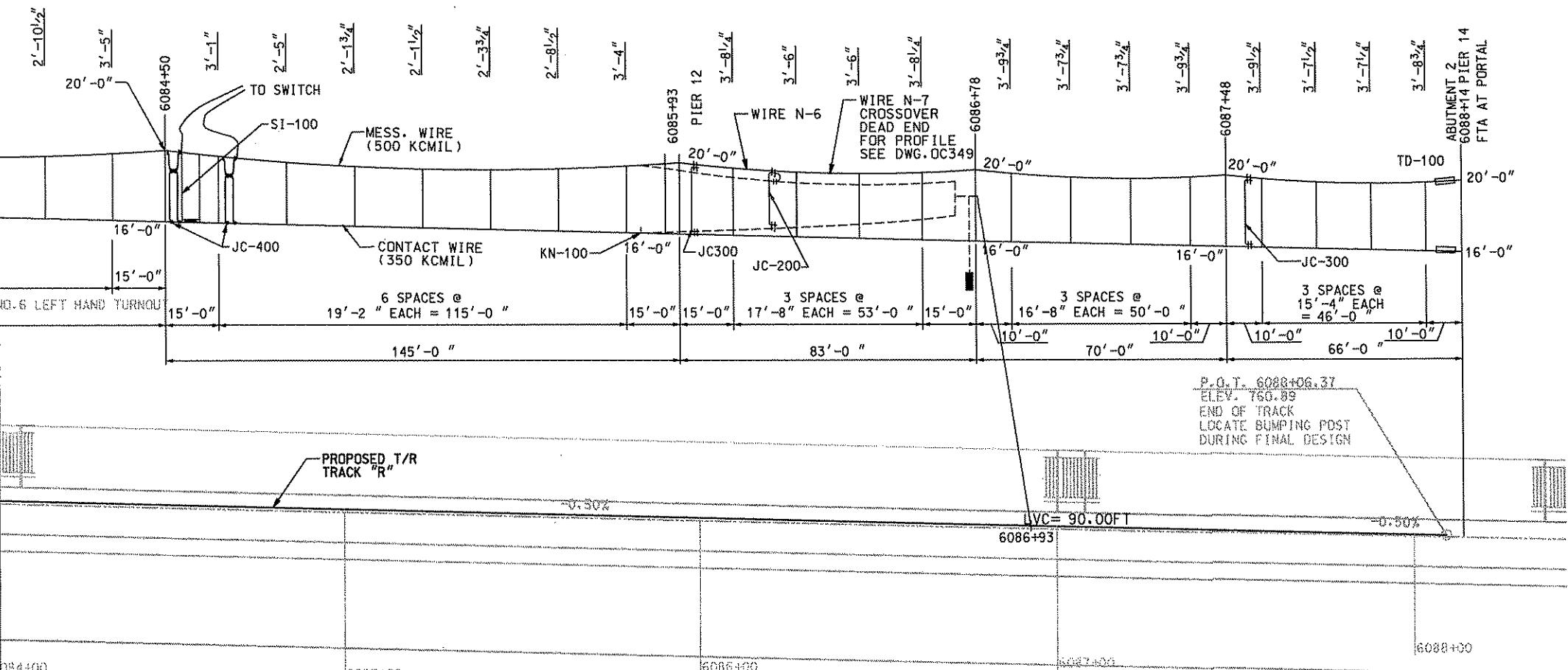
THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.



DMJM HARRIS AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
DRAFTED BY
CHECKED BY TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN
APPROVED
SIGNATURE
APPROVED
DATE
[Handwritten signatures]

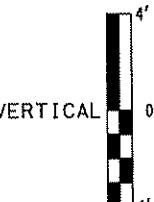
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-6
N.B. TRACK 2 STA. 6079+50 TO STA. 6084+00
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC382 SHT. 262

MATCH LINE DWG. OC382



NOTE:

1. HANGERS GREATER THAN OR EQUAL TO 8" IN LENGTH ARE ASSEMBLY HA-100.
2. HANGERS LESS THAN 8" IN LENGTH ARE ASSEMBLY HA-101.
3. FOR HANGER DETAILS SEE DRAWING DC171.
4. FOR JUMPER ASSEMBLY DETAILS SEE DRAWING DC184.
5. FOR SECTION INSULATOR DETAILS SEE DRAWING OC169.
6. FOR FIXED TERMINATION ASSEMBLY DETAILS SEE DRAWING OC182.



VERTICAL

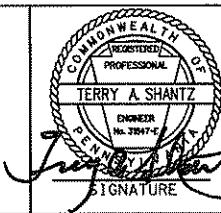
HORIZONTAL

20' 10' 0 20'

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

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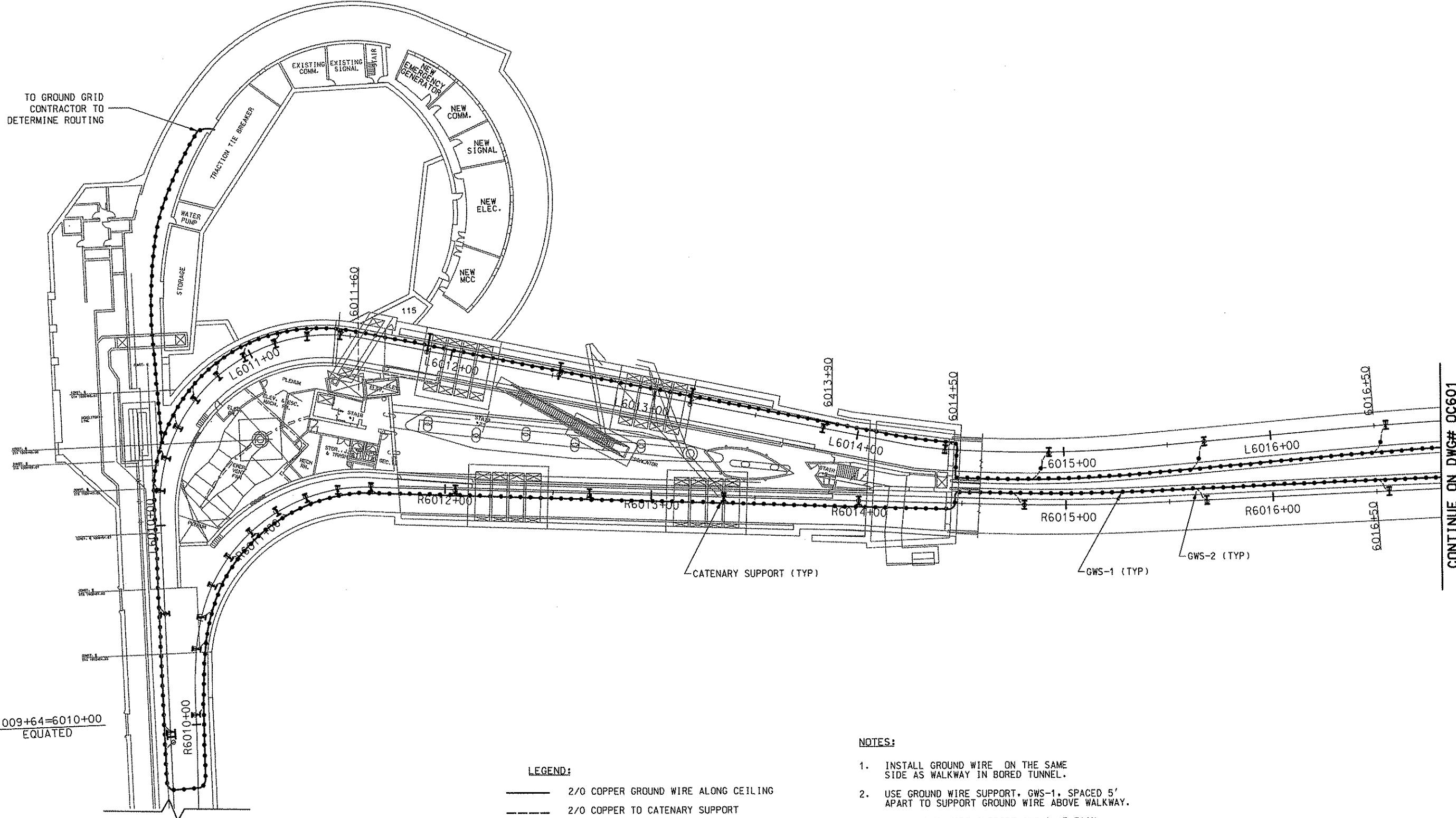
DESIGNED SR ADKINS
DRAWN KA BRANDT
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE AS SHOWN

APPROVED DATE

David F. Harris 4/28/08

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM-WIDE)
GATEWAY CATENARY PROFILE - WIRE N-6
N.B. TRACK 2 STA. 6084+00 TO STA. 6088+14

Port Authority	CONTRACT NO. NSC-009
DWG. NO. OC383	SH. 263



LEGEND:

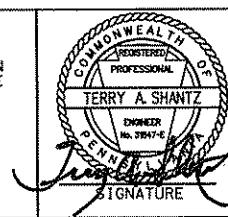
- 2/0 COPPER GROUND WIRE ALONG CEILING
- 2/0 COPPER TO CATENARY SUPPORT
- GWS-1 GROUND WIRE SUPPORT ASSEMBLY
- GWS-2 GROUND WIRE SUPPORT ASSEMBLY

NOTES:

1. INSTALL GROUND WIRE ON THE SAME SIDE AS WALKWAY IN BORED TUNNEL.
2. USE GROUND WIRE SUPPORT, GWS-1, SPACED 5' APART TO SUPPORT GROUND WIRE ABOVE WALKWAY.
3. USE GROUND WIRE SUPPORT GWS-2 AT EACH CATENARY SUPPORT.
4. FOR GROUND WIRE LOCATION SEE CROSS SECTIONS ON DRAWING OC605.
5. GROUND CONDUIT AND WALKWAY EVERY 500 FEET. SEE DETAIL ON DRAWING OC605.

NO.	DATE	DESCRIPTION	REVISIONS

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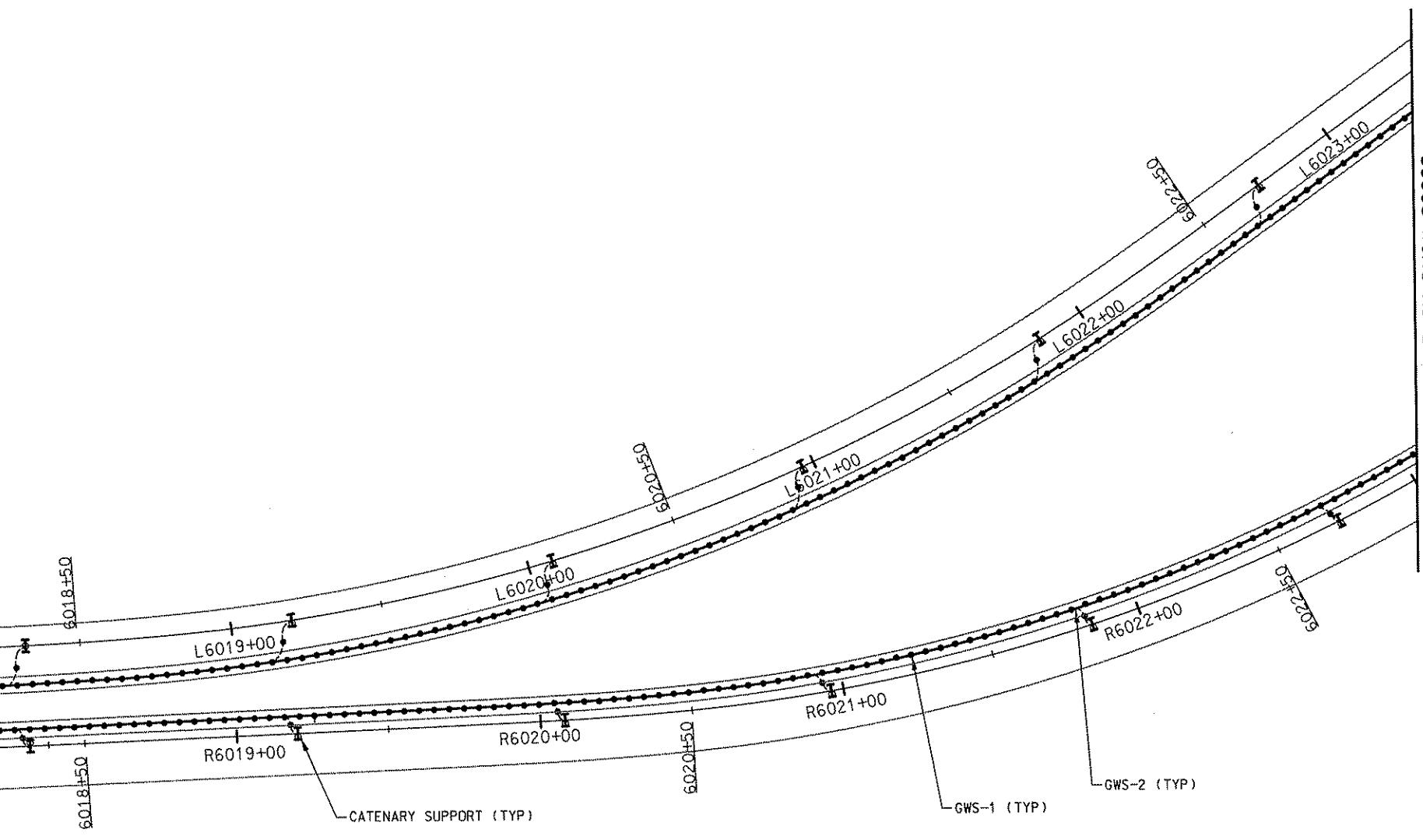


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
APPROVED DATE 4/28/08

DESIGNED M PATCHA
DRAWN M PATCHA
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSGURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
BONDING AND GROUNDING PLAN
GATEWAY STATION TO TUNNEL
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC600 SHT. 264

CONTINUE ON DWG# DC600



CONTINUE ON DWG# DC602

LEGENDS:

- 2/0 COPPER GROUND WIRE ALONG CEILING
- 2/0 COPPER TO CATENARY SUPPORT
- GWS-1 GROUND WIRE SUPPORT ASSEMBLY
- GWS-2 GROUND WIRE SUPPORT ASSEMBLY

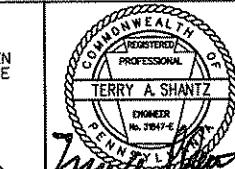
NOTES:

1. INSTALL GROUND WIRE ON THE SAME SIDE AS WALKWAY IN BORED TUNNEL.
2. USE GROUND WIRE SUPPORT, GWS-1, SPACED 5' APART TO SUPPORT GROUND WIRE ABOVE WALKWAY.
3. USE GROUND WIRE SUPPORT GWS-2 AT EACH CATENARY SUPPORT.
4. FOR GROUND WIRE LOCATION SEE CROSS SECTIONS ON DRAWING OC605.
5. GROUND CONDUIT AND WALKWAY EVERY 500 FEET. SEE DETAIL ON DRAWING OC605.

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION	REVISIONS

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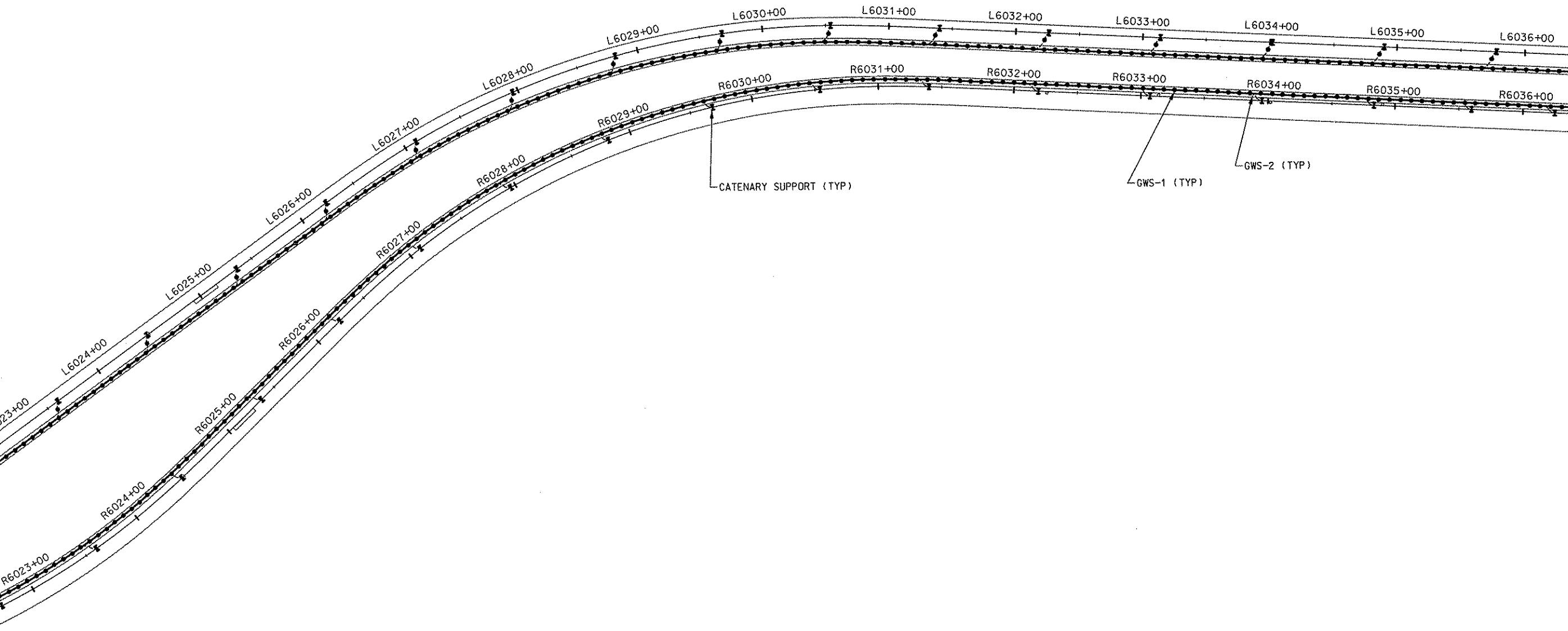


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
[Signature]
APPROVED DATE
David P. Henry 4/28/08

DESIGNED M PATCHA
DRAWN M PATCHA
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
BONDING AND GROUNDING PLAN
TUNNEL SECTION
Contract No. NSC-009
DWG. NO. OC601 SHT. 265

CONTINUE ON DWG# OC601



CONTINUE ON DWG# OC603

LEGEND:

- 2/0 COPPER GROUND WIRE ALONG CEILING
- 2/0 COPPER TO CATENARY SUPPORT
- GWS-1 GROUND WIRE SUPPORT ASSEMBLY
- GWS-2 GROUND WIRE SUPPORT ASSEMBLY

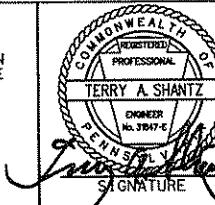
NOTES:

1. INSTALL GROUND WIRE ON THE SAME SIDE AS WALKWAY IN BORED TUNNEL.
2. USE GROUND WIRE SUPPORT, GWS-1, SPACED 5' APART TO SUPPORT GROUND WIRE ABOVE WALKWAY.
3. USE GROUND WIRE SUPPORT GWS-2 AT EACH Catenary SUPPORT.
4. FOR GROUND WIRE LOCATION SEE CROSS SECTIONS ON DRAWING OC605.
5. GROUND CONDUIT AND WALKWAY EVERY 500 FEET. SEE DETAIL ON DRAWING OC605.

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

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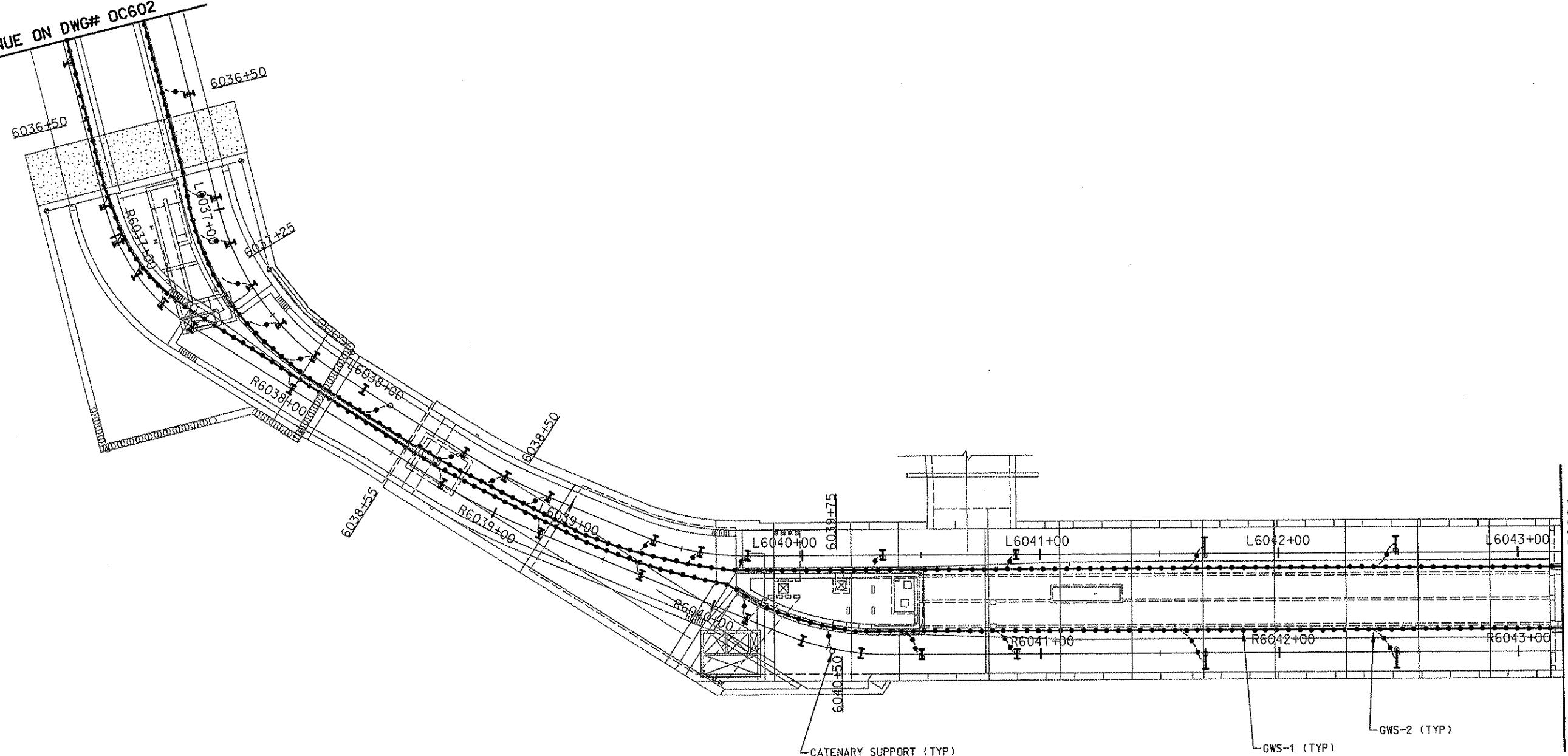


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
Daniel J. Harrington 4/28/08
APPROVED DATE

DESIGNED M PATCHA
DRAWN M PATCHA
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
BONDING AND GROUNDING PLAN
TUNNEL SECTION
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC602 SHT. 266

CONTINUE ON DWG# DC602



CONTINUE ON DWG# OC604

LEGEND:

- 2/0 COPPER GROUND WIRE ALONG CEILING
- 2/0 COPPER TO CATENARY SUPPORT
- GWS-1 GROUND WIRE SUPPORT ASSEMBLY
- GWS-2 GROUND WIRE SUPPORT ASSEMBLY

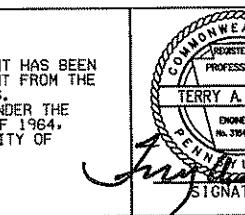
NOTES:

1. INSTALL GROUND WIRE ON THE SAME SIDE AS WALKWAY IN BORED TUNNEL.
2. USE GROUND WIRE SUPPORT, GWS-1, SPACED 5' APART TO SUPPORT GROUND WIRE ABOVE WALKWAY.
3. USE GROUND WIRE SUPPORT GWS-2 AT EACH CATENARY SUPPORT.
4. FOR GROUND WIRE LOCATION SEE CROSS SECTIONS ON DRAWING OC605.
5. GROUND CONDUIT AND WALKWAY EVERY 500 FEET. SEE DETAIL ON DRAWING OC605.

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Transit & Rail Systems

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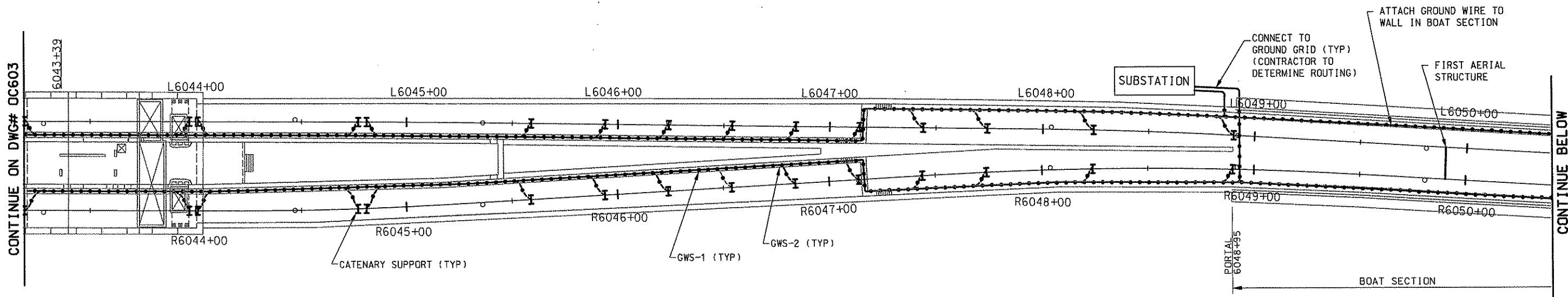


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
DRAFTER
NO. 3347-1
PENNSYLVANIA
APPROVED
DATE
Signature
4/28/08

DESIGNED M PATCHA
DRAWN M PATCHA
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS
Signature
APPROVED DATE
4/28/08

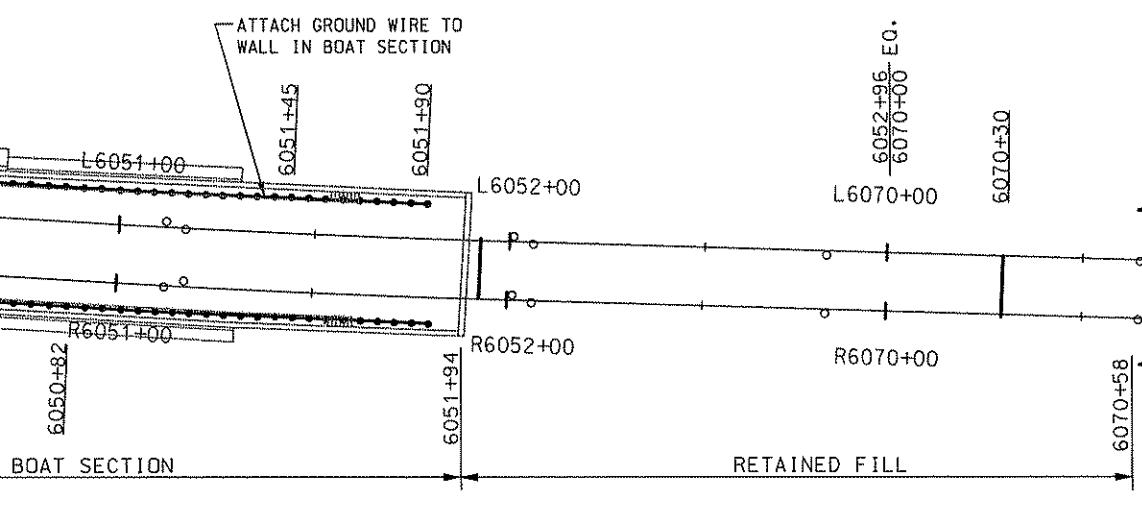
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
PENNSYLVANIA
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
BONDING AND GROUNDING PLAN
NORTH SIDE STATION
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC603 SHT. 267

CONTINUE ON DWG# DC603



CONTINUE BELOW

CONTINUE ABOVE



NOTES:

1. INSTALL GROUND WIRE ON THE SAME SIDE AS WALKWAY IN BORED TUNNEL.
2. INSTALL GROUND WIRE ALONG TOP OF WALL IN BOAT SECTION.
3. USE GROUND WIRE SUPPORT, GWS-1, SPACED 5' APART TO SUPPORT GROUND WIRE ABOVE WALKWAY.
4. USE GROUND WIRE SUPPORT GWS-2 AT EACH CATENARY SUPPORT.
5. FOR GROUND WIRE LOCATION SEE CROSS SECTIONS ON DRAWING DC605.
6. GROUND CONDUIT AND WALKWAY EVERY 500 FEET. SEE DETAIL ON DRAWING DC605.

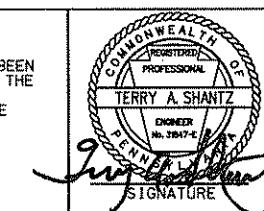
LEGEND:

- 2/0 COPPER GROUND WIRE ALONG CEILING
- 2/0 COPPER TO CATENARY SUPPORT
- GWS-1 GROUND WIRE SUPPORT ASSEMBLY
- GWS-2 GROUND WIRE SUPPORT ASSEMBLY

Gannett Fleming
Transit & Rail Systems

NO.	DATE	DESCRIPTION
REVISIONS		

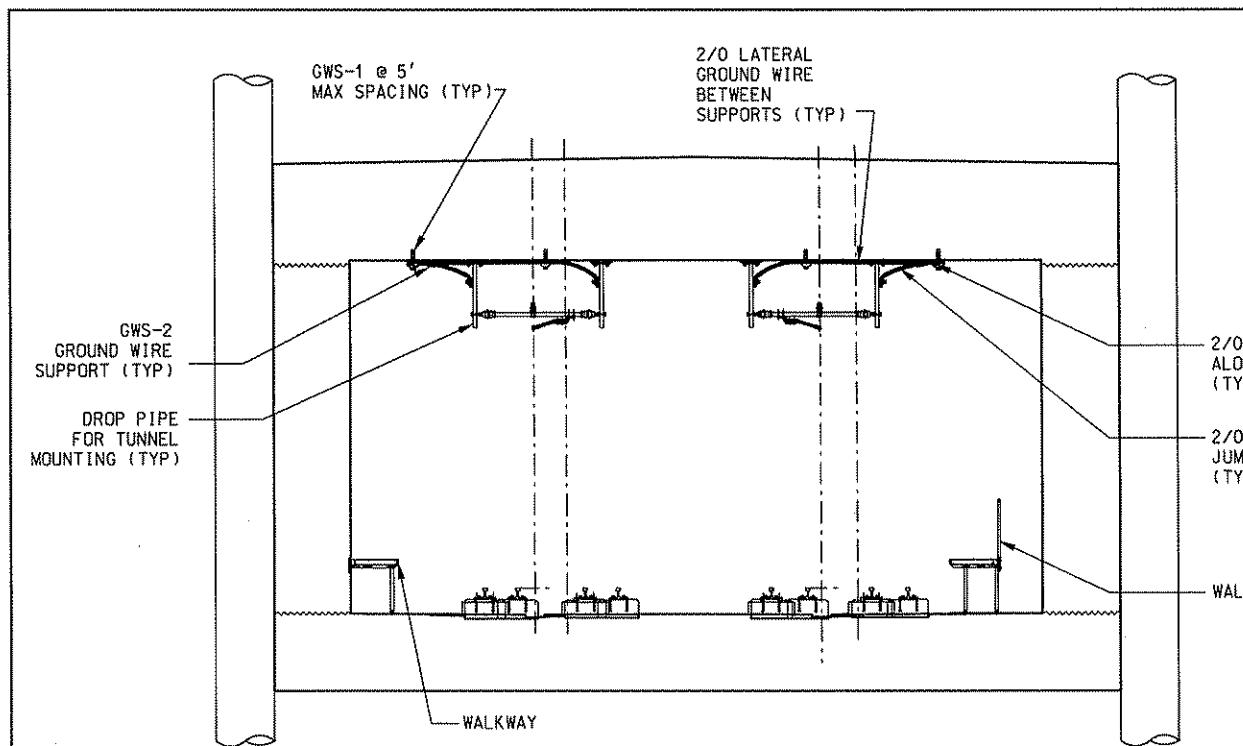
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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
TERRY A. SHANTZ
ENGINEER
No. 3547-4
PENNSYLVANIA
SIGNATURE
APPROVED
DATE
Jung J. Shantz
David P. Harris
4/28/08

DESIGNED M PATCHA
DRAWN M PATCHA
CHECKED TA SHANTZ
IN CHARGE CD JONES
DATE APR. 28, 2008
SCALE NTS

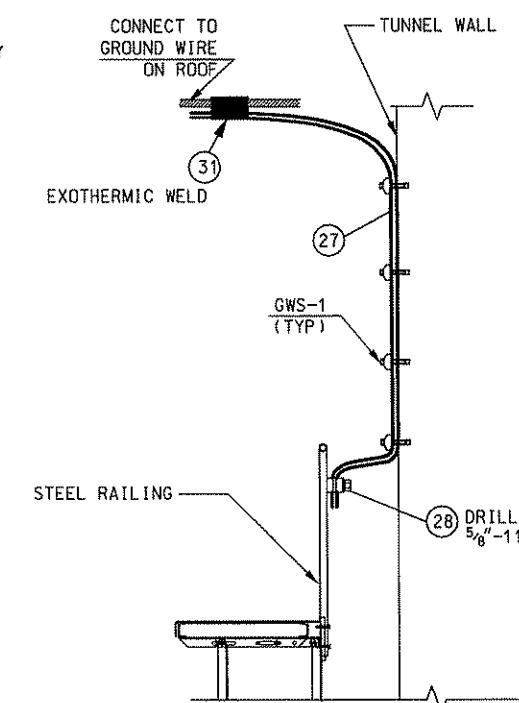
PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
BONDING AND GROUNDING PLAN
NORTH SIDE STATION TO ALLEGHENY STATION
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC604 SHT. 268



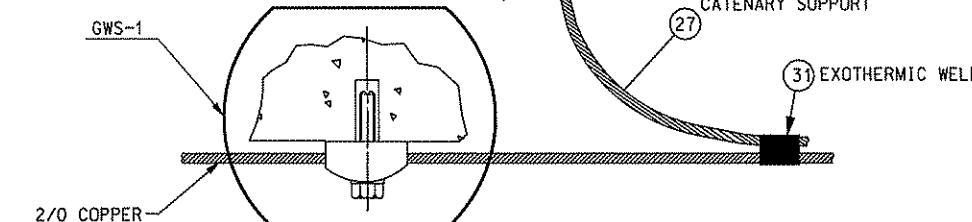
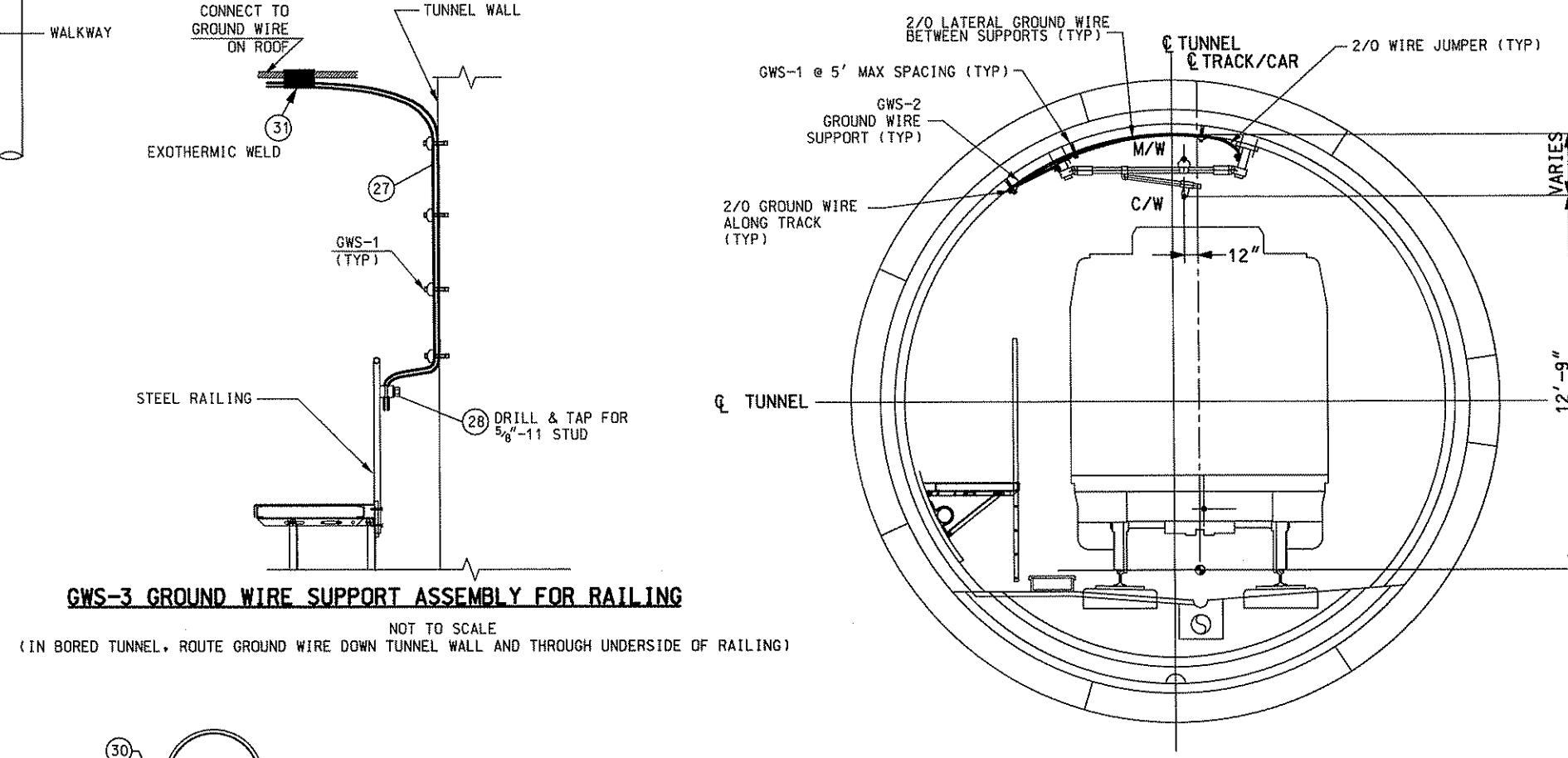
TYPICAL GROUNDING CONNECTION AT NORTH SIDE TUNNELS

ITEM NO.	DESCRIPTION	MANUFACTURER	PART NO.	QTY.			
				GWS-1	GWS-2	GWS-3	GWS-4
1	KWIK BOLT 3, STS STL, $\frac{1}{2}$ " x $3\frac{3}{4}$ " LONG	HILTI	00282558	1	-	4	-
9	TAP, CABLE WEDGE, 2/0 TO 2/0	AMP	1-257187-5	-	-	-	1
11	CARTRIDGE AMPACT, WHITE	AMP	69338-5	-	-	-	1
21	GROUND CLAMP FOR CABLE TO FLAT SURFACE	ANDERSON	GC-141-07	1	-	4	-
27	SIZE 2/0 COPPER CABLE			*	*	*	*
28	SERVIT POST CONNECTOR, $5\frac{1}{8}$ "-11 x $3\frac{1}{4}$ " STUD	BURNDY	KC28	*	1	1	-
29	GROUND TERMINAL	OZ GEDNEY	GWD-25B	-	-	-	1
30	GROUND CLAMP FOR LARGE PIPE, BRONZE	OZ GEDNEY	TYPE G	-	-	-	1
31	PARALLEL HORIZONTAL WELD CONNECTION, 2/0 - 2/0	ERIC	PTC-2G2G	-	1	1	-

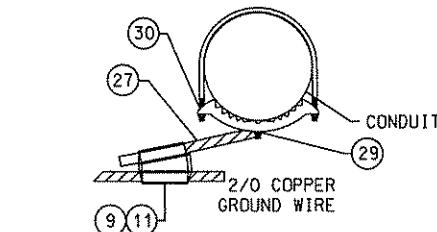
* = QUANTITY AS REQUIRED.



GWS-1 GROUND WIRE SUPPORT ASSEMBLY



GWS-2 GROUND WIRE SUPPORT ASSEMBLY FOR CONCRETE BEAMS

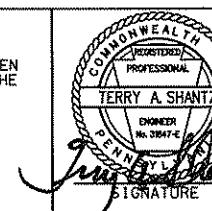


GWS-4 CONDUIT BONDING
(MULTIPLE CONDUITS AT LOCATION)

NOTES:

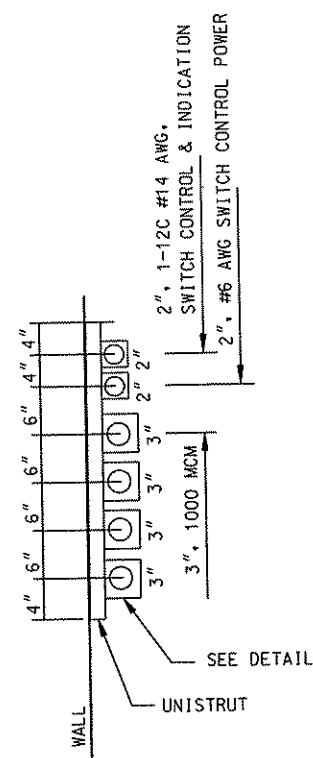
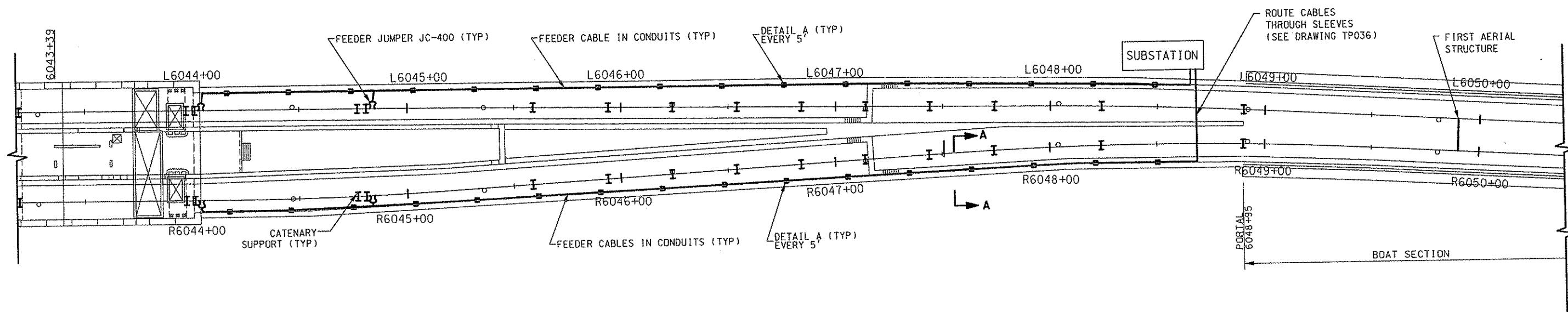
1. INSTALL GROUND WIRE ON THE SAME SIDE AS WALKWAY IN BORED TUNNEL.
2. USE GROUND WIRE SUPPORT, GWS-1, SPACED 5' APART TO SUPPORT GROUND WIRE ABOVE WALKWAY.
3. USE GROUND WIRE SUPPORT GWS-2 AT EACH CATENARY SUPPORT.
4. GROUND CONDUIT AND WALKWAY EVERY 500'.

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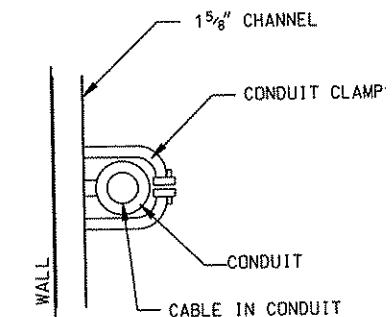


DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
APPROVED DATE
APR. 28, 2008

DESIGNED	M PATCHA	PORT AUTHORITY OF ALLEGHENY COUNTY
DRAWN	M PATCHA	PITTSBURGH
CHECKED	TA SHANTZ	NORTH SHORE CONNECTOR
IN CHARGE	CD JONES	NSC TRAIN SYSTEM (SYSTEM WIDE)
DATE	APR. 28, 2008	BONDING AND GROUNDING DETAIL
SCALE	NTS	TUNNEL SECTION
Port Authority		CONTRACT NO. NSC-009
		DWG. NO. OC605
		SHT. 269



SECTION A-A



DETAIL A

NOTES:

1. RUN FEEDER CABLES IN CONDUITS ALONG TUNNEL WALL.
ARRANGEMENT IS SHOWN IN SECTION A-A.
2. REFER TO SECTIONALIZING DIAGRAM FOR
STATION NUMBERS FOR TIE-IN POINTS TO OCS SYSTEM.
3. CABLE SUPPORTS TO BE SPACED EVERY (5) FIVE FEET.

Gannett Fleming Transit & Rail Systems		
NO.	DATE	DESCRIPTION
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DMJM HARRIS | AECOM
FOUR GATEWAY CENTER
20TH FLOOR
PITTSBURGH, PA. 15222
[Handwritten signatures over stamp]
APPROVED DATE
4/28/08

DESIGNED BY M PATCHA
DRAWN BY M PATCHA
CHECKED BY TA SHANTZ
IN CHARGE BY CD JONES
DATE APR. 28, 2008
SCALE NTS

PORT AUTHORITY OF ALLEGHENY COUNTY
Pittsburgh
NORTH SHORE CONNECTOR
NSC TRAIN SYSTEM (SYSTEM WIDE)
FEEDER PLAN AND DETAILS
NORTH SIDE STATION
Port Authority
CONTRACT NO. NSC-009
DWG. NO. OC606 SH. 270