SOUNDTRANSIT
CENTRAL PUGET SOUND REGIONAL TRANSIT AUTHORITY

SYSTEMS

STANDARD DRAWINGS

DECEMBER 2024

STANDARD DRAWINGS ENSURE THE APPLICATION OF UNIFORM STANDARDS FOR THE DESIGN, FABRICATION, INSTALLATION, AND CONSTRUCTION OF SPECIFIC ITEMS OF WORK FOR THE SOUND TRANSIT LINK LIGHT RAIL, SOUNDER COMMUTER RAIL, REGIONAL EXPRESS BUS, AND STRIDE BUS RAPID TRANSIT SYSTEMS. STANDARD DRAWINGS ARE PRESCRIPTIVE DOCUMENTS FOR ALL PROJECTS.

STANDARD DRAWINGS SHALL BE USED IN THE DESIGN OF INTERFACE POINTS, PROJECT SPECIFIC ITEMS OF WORK OR AS A BASIS FOR PRESENTATION OF DESIGN INFORMATION. THE DESIGNER OF RECORD SHALL REVIEW THE STANDARD DRAWINGS IN CONJUNCTION WITH OTHER CONTRACT DOCUMENTS, AND VALIDATE, FINALIZE, STAMP, AND SIGN THESE DRAWINGS FOR INCLUSION INTO THE PROJECT CONTRACT DOCUMENTS.

IF THE DESIGNER RECOMMENDS THAT AN ASPECT OR ASPECTS OF THESE STANDARD DRAWINGS BE MODIFIED, THE DESIGNER SHALL INFORM THE DESIGN MANAGER ON THE PROJECT AND SECURE CONCURRENCE FROM ENGINEERING FOLLOWING MODIFICATION PROCESS IDENTIFIED IN ENGINEERING PROCEDURES.

THE STANDARD DRAWINGS DO NOT SUBSTITUTE FOR THE DESIGNER'S USE OF INDEPENDENT ENGINEERING JUDGEMENT AND SOUND ENGINEERING PRACTICE, NOR DO THEY RELIEVE THE DESIGN CONSULTANT FROM THE PROFESSIONAL RESPONSIBILITY OF DEVELOPING AN APPROPRIATE DESIGN AND COMPLYING WITH THE STANDARD OF CARE.

SYSTEMS STANDARD DRAWINGS
APPLICABILITY OF CURRENT VERSION
SUPERSEDES MARCH 2024 VERSION
FOR PROJECTS THAT ARE BASELINED AFTER MARCH 29, 2024

DRAWING No.:
STD-JZT001
REV:
1

DISCLAIMER FOR
Design and Engineering Design Standards Documents

Sound Transit makes these documents available on an "as is" basis. By accepting receipt of the documents, the receiver agrees to the following:

- The documents are provided for information only;
- The receiver will not utilize the documents in any way that violates or infringes on Sound Transit's intellectual property rights in such documents;
- The provided documents should not be construed to represent formal design guidance and/or direction for any project;
- Sound Transit makes no representation or warranty that the provided data is complete, appropriate, or fit for any particular purpose, stated or otherwise;
- All documents provided by Sound Transit, including any revisions, shall remain the personal and intellectual property of Sound Transit; and
- To indemnify, defend, and hold harmless Sound Transit, its consultants, and agent(s) from any and all damages and claims arising from the receiver's use of these documents.

APPLICABILITY FOR
Design and Engineering Design Standards Documents

Project teams shall refer to their executed project contracts for applicable document versions/revisions.

INDEX OF DRAWINGS

DRAWING INDEX

DRAWING NUMBER	REV	DRAWING INDEX
STD-JZT001	1	COVER SHEET
STD-JZI001	3	INDEX OF DRAWINGS
STD-JZI002	3	INDEX OF DRAWINGS
STD-JZN007	1	SIGNAL GENERAL SYMBOLS & LEGEND
STD-EFP100	2	FIRE LIFE SAFETY FIRE CONTROL ROOM FLOOR PLAN
STD-EFP101	2	FIRE LIFE SAFETY FIRE COMMAND CENTER FLOOR PLAN LAYOUT
STD-EFP102	2	FIRE LIFE SAFETY EMERGENCY RESPONDER EQUIPMENT ROOM
STD-EFE103	4	FIRE LIFE SAFETY FIRE CONTROL ROOM SECTIONS
STD-EFE104	3	FIRE LIFE SAFETY FIRE COMMAND CENTER SECTIONS
STD-EFS201	3	FIRE LIFE SAFETY FIRE ALARM PANEL INTERFACE DIAGRAM
STD-EFS202	2	FIRE LIFE SAFETY FIRE ALARM CONTROL PANEL SEQUENCE OF OPERATIONS
STD-EFS204	4	FIRE LIFE SAFETY TYPICAL STATION FACP/ DSP/PLC/EVS AND SCU INTERFACE BLOCK DIAGRAM - PREFERED OPTION
STD-EPS101	4	EQUIPMENT POWER REQUIREMENT AND COMM STATION UPS CONTROL WIRING DIAGRAM
STD-JBS502	2	BUILDING MANAGEMENT SYSTEM ENERGY MONITORING SYSTEM DIAGRAM
STD-JBS503	4	BUILDING MANAGEMENT SYSTEM BMS SUMMARY INDICATIONS
STD-JBS504	3	BUILDING MANAGEMENT SYSTEM BMS SUMMARY INDICATIONS
STD-JBS505	3	BUILDING MANAGEMENT SYSTEM BMS SUMMARY INDICATIONS
STD-JBS510	2	EMERGENCY VENTILATION SYSTEM EVS SUMMARY INDICATIONS
STD-JBS511	3	EMERGENCY VENTILATION SYSTEM EVS SUMMARY INDICATIONS
STD-JBS512	3	EMERGENCY VENTILATION SYSTEM EVS SUMMERY NOTIFICATIONS
STD-MPS130	1	DOMESTIC WATER SCHEMATIC AND DETAIL
STD-MPS131	0	PLUMBING SYSTEM CONTROL STRATEGY SCHEMATICS
STD-MHS140	1	HVAC BMS CONTROL STRATEGY SCHEMATICS
STD-JCP201	0	TUNNEL STATION - CENTER PLATFORM - S SURFACE LEVEL - COMM DEVICE LAYOUT - OVERALL
STD-JCP211	0	TUNNEL STATION - CENTER PLATFORM - B1 CONCOURSE LEVEL - OVERALL
STD-JCP212	0	TUNNEL STATION - CENTER PLATFORM - B1 CONCOURSE LEVEL - COMM DEVICE LAYOUT - LEFT
STD-JCP213	0	TUNNEL STATION - CENTER PLATFORM - B1 CONCOURSE LEVEL - COMM DEVICE LAYOUT - RIGHT
STD-JCP221	0	TUNNEL STATION - CENTER PLATFORM - B2 MECHANICAL LEVEL - OVERALL
STD-JCP222	0	TUNNEL STATION - CENTER PLATFORM - B2 MECHANICAL LEVEL - COMM DEVICE LAYOUT - LEFT
STD-JCP223	0	TUNNEL STATION - CENTER PLATFORM - B2 MECHANICAL LEVEL - COMM DEVICE LAYOUT - RIGHT
STD-JCP231	0	TUNNEL STATION - CENTER PLATFORM - P PLATFORM LEVEL - OVERALL
STD-JCP232	0	TUNNEL STATION - CENTER PLATFORM - P PLATFORM LEVEL - COMM DEVICE LAYOUT - LEFT
STD-JCP233	0	TUNNEL STATION - CENTER PLATFORM - P PLATFORM LEVEL - COMM DEVICE LAYOUT - RIGHT
STD-JCP301	0	AT-GRADE STATION - CENTER PLATFORM - P PLATFORM LEVEL - OVERALL
STD-JCP302	0	AT-GRADE STATION - CENTER PLATFORM - P PLATFORM LEVEL - COMM DEVICE LAYOUT - LEFT
STD-JCP303	0	AT-GRADE STATION - CENTER PLATFORM - P PLATFORM LEVEL - COMM DEVICE LAYOUT - RIGHT
STD-JCP311	0	AT-GRADE STATION - CENTER PLATFORM - M CONCOURSE LEVEL - OVERALL
STD-JCP312	0	AT-GRADE STATION - CENTER PLATFORM - M CONCOURSE LEVEL - COMM DEVICE LAYOUT
STD-JCP401	0	ELEVATED STATION - CENTER PLATFORM - S SURFACE LEVEL - COMM DEVICE LAYOUT - OVERALL
STD-JCP402	0	ELEVATED STATION - CENTER PLATFORM - P PLATFORM LEVEL - COMM DEVICE LAYOUT - OVERALL
STD-JRS101	2	COMMUNICATIONS RADIO OFF THE AIR BDA DISTRIBUTION SCHEMATIC
STD-JCS101	0	COMMUNICATIONS TYPICAL STATION BACKBONE TOPOLOGY TCN AND EFN
STD-JCS103	0	COMMUNICATIONS TYPICAL STATION NETWORK TOPOLOGY
STD-JCS201	2	COMMUNICATIONS TYPICAL CROSS PASSAGE DOOR INTRUSION STROBE BLOCK DIAGRAM
STD-JCS500	3	COMMUNICATIONS ELEVATOR INTERFACING BLOCK DIAGRAM
STD-JCS700	2	COMMUNICATIONS SIGNAL HOUSE INTERFACE DIAGRAM
STD-JCS701	2	COMMUNICATIONS TCS PLC I/O POINTS FOR TYPICAL EQUIPMENT
STD-JCS702	0	COMMUNICATIONS NETWORK SWITCH SCHEDULES
STD-JCD200	2	COMMUNICATIONS TYPICAL PASSENGER EMERGENCY PHONE RESTROOM CALL BOX
STD-JCD201	2	COMMUNICATIONS TYPICAL EMERGENCY TELEPHONE DETAILS
STD-JCD202	0	COMMUNICATIONS TYPICAL CUSTOMER EMERGENCY STATION DETAILS
STD-JCD203	0	COMMUNICATIONS TYPICAL CUSTOMER EMERGENCY STATION DETAILS
STD-JCD209	1	TYPICAL MAIN COMMUNICATIONS ROOM - ENLARGED PLAN - TUNNEL STATION
STD-JCD210	1	TYPICAL MAIN COMMUNICATIONS ROOM - ENLARGED PLAN - AT-GRADE/ELEVATED STATION
STD-JCD211	0	TYPICAL SMALL COMMUNICATIONS ROOM - ENLARGED PLAN - TUNNEL/AT-GRADE/ELEVATED STATION
STD-JCD301	1	COMMUNICATIONS TYPICAL CCTV DETAILS
STD-JCD395	0	COMMUNICATIONS TYPICAL CCTV DETAILS
STD-JCD603	4	COMMUNICATIONS TYPICAL STATION CABINET RACK GROUNDING SYSTEMS
STD-JCD703	0	COMMUNICATIONS TYPICAL RACK DETAILS
STD-JCX001	0	TYPICAL COMMUNICATIONS RACK INSTALLATION DETAILS
STD-JSS100	1	SIGNALS TYPICAL AUTOMATIC HIGHWAY CROSSING WARNING SYSTEMS DESIGN CRITERIA

DWG. No.	REV	TITLE
		SYSTEMS (CONTINUED)
STD-JSS101	1	SIGNALS TYPICAL AUTOMATIC HIGHWAY CROSSING WARNING SYSTEMS DESIGN CRITERIA
STD-JSS102	1	SIGNALS TYPICAL AUTOMATIC HIGHWAY CROSSING WARNING SYSTEMS DESIGN CRITERIA
STD-JSS103	0	SIGNALS STAR INTERLOCKING COMMUNICATIONS BLOCK DIAGRAM
STD-JSS104	0	SIGNALS SIGNAL HOUSE BLOCK DIAGRAM
STD-JSS105	0	SIGNALS ROUTE AND ASPECT CHART
STD-JSS106	0	SIGNALS YARD ROUTE LOCKING TABLE TYPICAL
STD-JSS107	0	SIGNALS TYPICAL LOCAL CONTROL PANEL FOR YARD
STD-JSS108	0	SIGNALS TYPICAL LOCAL CONTROL PANEL FOR MAINLINE
STD-JSS109	0	SIGNALS CONTROL LINE DIAGRAM NORMAL DIRECTION
STD-JSS110	0	SIGNALS CONTROL AND INDICATION CHART
STD-JSD100	2	SIGNALS TYPICAL SIGNAL LAYOUT WALL AND BALLASTED TRACK
STD-JSD101	2	SIGNALS TYPICAL SIGNAL LAYOUT AERIAL TRACKWAY
STD-JSD102	0	SIGNALS TYPICAL NUMERIC SIGN AND MAST LAYOUT
STD-JSD103	0	SIGNALS TYPICAL SIGNAL LAYOUT DIRECT FIXATION TRACK
STD-JSD200	2	SIGNALS TYPICAL SIGNAL HOUSE CONCRETE PIER INSTALLATION PLAN AND DETAILS
STD-JSD201	3	SIGNALS TYPICAL SIGNAL HOUSE CONCRETE SLAB INSTALLATION PLAN AND DETAILS
STD-JSD202	1	SIGNALS TYPICAL GRADE CROSSING HOUSE PLAN AND DETAILS
STD-JSD203	3	SIGNALS SIGNAL HOUSE EQUIPMENT LAYOUT (10X26)
STD-JSD204	3	SIGNALS SIGNAL HOUSE EQUIPMENT LAYOUT (10X30)
STD-JSD206	0	SIGNALS TYPICAL SLOW ORDER PANEL FACEPLATE
STD-JSD207	0	SIGNALS TYPICAL SLOW ORDER SWITCH CIRCUITS
STD-JSD208	2	SIGNALS TYPICAL SIGNAL HOUSE SIGNAL POWER DISTRIBUTION PLAN
STD-JSD209	0	SIGNALS TYPICAL AC POWER DISTRIBUTION
STD-JSD300	2	SIGNALS TYPICAL TURNOUT TRACTION ELECTRIFICATION SIGNAL BONDING
STD-JSD301	2	SIGNALS TYPICAL DOUBLE CROSSOVER BONDING
STD-JSD302	1	SIGNALS TYPICAL DIAMOND CROSSOVER
STD-JSD303	2	SIGNALS TYPICAL TRACK CIRCUIT AND SPEED COMMAND LOOP INSTALLATION LAYOUT
STD-JSD304	2	SIGNALS TYPICAL IMPEDANCE BOND INSTALLATION LAYOUT WITH NEGATIVE RETURN
STD-JSD305	0	SIGNALS TYPICAL NEGATIVE RETURN BONDING NO. 5 TURNOUT IN BALLASTED TRACK
STD-JSD306	0	SIGNALS TYPICAL YARD STORAGE TRACK CROSSBONDS INSTALLATION
STD-JSD307	0	SIGNAL SYSTEM TYPICAL UNIVERSAL INTERLOCKING LAYOUT
STD-JSD311	0	SIGNALS TYPICAL IMPEDANCE BOND INSTALLATION LAYOUT WITH GUARD RAIL
STD-JSD312	0	SIGNALS IMPEDANCE BOND CABINET - TYPE 1 WALL MOUNTED DETAILS
STD-JSD400	1	SIGNALS TWC LOOP INSTALLATION LAYOUT - CURB MOUNT
STD-JSD401	1	SIGNALS TWC LOOP INSTALLATION LAYOUT JUNCTION BOX MOUNT
STD-JSD402	1	SIGNALS TYPICAL TWC LOOP INSTALLATION LAYOUT
STD-JSD403	0	SIGNALS YARD TWC LOOP
STD-JSD404	0	SIGNALS TYPICAL TWC LOOP EMBEDDED TRACK
STD-JSD405	0	SIGNALS TYPICAL TWC LOOP INSTALLATION DIRECT FIXATION WITH GUARD RAIL
STD-JSD406	0	SIGNALS SIGNAL SYSTEM EQUIPMENT LAYOUT STORAGE TRACKS AND YARD LAYOUT
STD-JSD410	1	SIGNALS TYPICAL POCKET TRACK INTERLOCKING EQUIPMENT LAYOUT
STD-JSD411	1	SIGNALS TYPICAL DIAMOND EQUIPMENT LAYOUT
STD-JSD415	1	SIGNALS TYPICAL SWITCH MACHINE LAYOUT IN DIRECT FIXATION TRACK
STD-JSD416	0	SIGNALS TYPICAL SWITCH MACHINE LAYOUT BALLASTED TRACK
STD-JSD418	0	SIGNALS TYPICAL SWITCH MACHINE LAYOUT FOR NO. 5 SWITCH IN YARDS
STD-JSD500	0	SIGNALS TYPICAL SWITCH RAIL HEATER INSTALLATION FOR MAINLINE
STD-JSD502	0	SIGNALS TYPICAL SWITCH HEATER CONTROL PANEL INSTALLATION LAYOUT
STD-JTP200	1	TRACTION POWER TPSS EQUIPMENT LAYOUT PLAN
STD-JTE201	1	TRACTION POWER TYPICAL PREFABRICATED TPSS EXTERIOR EQUIPMENT ELEVATION
STD-JTE202	1	TRACTION POWER TYPICAL PREFABRICATED TPSS BUILDING INTERIOR ELEVATIONS
STD-JTD104	1	TRACTION POWER TRACTION POWER SUBSTATION ANCHORAGE DETAILS
STD-JTS100	2	TRACTION POWER SYSTEMS TYPICAL PREFABRICATED TPSS LINE DIAGRAM FOR 12.5KV & 26 KV TPSS
STD-JTS101	2	TRACTION POWER SYSTEMS TYPICAL PREFABRICATED TPSS ONE LINE DIAGRAM FOR 12.5KV & 26 KV TPSS
STD-JTS307	3	TRACTION POWER TPSS INTERFACE BLOCK DIAGRAM
STD-JOD100	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS CONDUCTOR CHARACTERISTICS SCAT
STD-JOD101	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS CONDUCTOR CHARACTERISTICS SCFT
STD-JOD102	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS BALLASTED TRACK BLOW OFF & MIDSPAN OFFSET
STD-JOD103	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS EMBEDDED TRACK BLOW OFF & MIDSPAN OFFSET
STD-JOD104	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS CONTACT WIRE TEMPERATURE TENSION CHARTS
STD-JOD105	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS MESSENGER WIRE TEMPERATURE TENSION CHARTS
STD-JOD106	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS VERTICAL LOADS AND WIND LOADS
STD-JOD107	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS ALONG TRACK MOVEMENT

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	12/2024	----	----	----	REVISED DRAWING
2	2/2024	----	----	----	20024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JZI001-002
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

INDEX OF DRAWINGS

DRAWING No.: **STD-JZI001**
FACILITY ID:
SHEET No.: 3
REV:

02/04/25 | 12:19 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JZI001-002.DWG

INDEX OF DRAWINGS

DWG. No.	REV	TITLE
		SYSTEMS (CONTINUED)
STD-JOD110	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS STRUCTURE CLEARANCE ENVELOPE
STD-JOD111	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS PANTOGRAPH INTERFACE
STD-JOD112	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS PANTOGRAPH CLEARANCE ENVELOPE
STD-JOD113	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS STEADY ARM CLEARANCE TO LIVE FITTINGS
STD-JOD114	1	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS PANTOGRAPH CLEARANCE TO LIVE FITTINGS
STD-JOD115	2	OVERHEAD CATENARY SYSTEM TECHNICAL SHEETS CLEARANCE FROM OVERHEAD CONDUCTORS
STD-JOD200	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT SINGLE CROSSOVER
STD-JOD201	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT UNIVERSAL CROSSOVER
STD-JOD202	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT DIAMOND CROSSOVER
STD-JOD203	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT CENTER POCKET TRACK
STD-JOD210	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT INSULATED OVERLAP CENTER POLES
STD-JOD211	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT UNINSULATED OVERLAP CENTER POLES
STD-JOD212	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT INSULATED OVERLAP IN TUNNEL
STD-JOD213	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT UNINSULATED OVERLAP IN TUNNEL
STD-JOD214	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT MIDPOINT ANCHOR ON CENTER POLES
STD-JOD215	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT MIDPOINT ANCHOR ON SIDE POLES
STD-JOD220	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT CENTER POLE CANTILEVER
STD-JOD221	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT SIDE POLE CANTILEVER
STD-JOD230	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT TWO TRACK HEADSPAN
STD-JOD231	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT THREE TRACK HEADSPAN
STD-JOD232	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT TURNOUT HEADSPAN
STD-JOD240	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT TYPICAL ANCHOR
STD-JOD250	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT STANDARD SPANS
STD-JOD251	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT OVERLAP SPANS
STD-JOD252	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT CROSSOVER SPANS
STD-JOD253	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT TERMINATION SPANS
STD-JOD254	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT TANGENT SPAN IN TUNNEL
STD-JOD255	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT CURVE SPAN IN TUNNEL
STD-JOD260	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT TAPERED TUBULAR FEEDER POLE & SURGE ARRESTER
STD-JOD261	1	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT WIDE FLANGE FEEDER POLE & SURGE ARRESTER
STD-JOD300	2	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT WIDE FLANGE POLE ASSEMBLIES WF-XXXXF
STD-JOD301	2	OVERHEAD CATENARY SYSTEM GENERAL ARRANGEMENT WIDE FLANGE POLE ASSEMBLIES WF-XXXXF
STD-JOD302	1	OVERHEAD CATENARY SYSTEM TAPERED TUBULAR POLE ASSEMBLIES POLE ASSEMBLIES PF-XXX
STD-JOD303	1	OVERHEAD CATENARY SYSTEM TAPERED TUBULAR FEEDER POLE ASSEMBLIES PF-XXX
STD-JOD304	1	OVERHEAD CATENARY SYSTEM TUBULAR BALANCE WEIGHT ANCHOR POLE ASSEMBLIES PBWA-5XX
STD-JOD310	1	OVERHEAD CATENARY SYSTEM DOWN GUY ANCHOR PLATE ASSEMBLIES AP-3 AND AP-4
STD-JOD320	1	OVERHEAD CATENARY SYSTEM TUNNEL & AERIAL SUPPORT ASSEMBLIES TSP-1 & TSP-2
STD-JOD321	1	OVERHEAD CATENARY SYSTEM TUNNEL & AERIAL SUPPORT ASSEMBLIES TSP-3, TSP-4, TSP-5
STD-JOD322	1	OVERHEAD CATENARY SYSTEM TUNNEL & AERIAL SUPPORT ASSEMBLIES TSP-6, TSP-7
STD-JOD323	1	OVERHEAD CATENARY SYSTEM BUILDING EYEBOLT ASSEMBLIES EB-1, EB-2, EB-3, EB-4 & EB-5
STD-JOD330	1	OVERHEAD CATENARY SYSTEM BRACKET ASSEMBLIES BTF, BTA, BTB, BTS, BT2, BT3 & BT4
STD-JOD331	1	OVERHEAD CATENARY SYSTEM BRACKET ASSEMBLIES BA, BB, BC, BD, BE & BH
STD-JOD332	1	OVERHEAD CATENARY SYSTEM BRACKET ASSEMBLIES BRF, BR2, BR3 & BR4
STD-JOD333	1	OVERHEAD CATENARY SYSTEM FRAMING INSERT BRACKET ASSEMBLIES BFI-1 & BFI-2
STD-JOD334	1	OVERHEAD CATENARY SYSTEM WIDE FLANGE POLE BRACKET ASSEMBLIES BR-1 &BR-2
STD-JOD335	1	OVERHEAD CATENARY SYSTEM ANCHOR BRACKET ASSEMBLIES AB-5 & AB-6
STD-JOD336	1	OVERHEAD CATENARY SYSTEM ANCHOR BRACKET ASSEMBLIES AB-7 & AB-8
STD-JOD340	1	OVERHEAD CATENARY SYSTEM POLE AND WARNING SIGN ASSEMBLIES ID-1, ID-2, SN-1, SN-2, SN-3 & SN4
STD-JOD351	1	OVERHEAD CATENARY SYSTEM SLAB ON GRADE - OCS POLE AND DOWN GUY ANCHOR SUPPORT DETAILS
STD-JOD352	2	OVERHEAD CATENARY SYSTEM OCS TYPICAL TAPERED TUBULAR POLE FOUNDATION ASSEMBLY DETAILS
STD-JOD353	2	OVERHEAD CATENARY SYSTEM OCS TYPICAL TAPERED TUBULAR FEEDER POLE FOUNDATION ASSEMBLY DETAILS
STD-JOD354	1	OVERHEAD CATENARY SYSTEM OCS TYPICAL DOWN GUY ANCHOR FOUNDATION ASSEMBLY DETAILS
STD-JOD355	1	OVERHEAD CATENARY SYSTEM OCS TYPICAL WIDE FLANGE POLE FOUNDATION ASSEMBLY DETAILS
STD-JOD400	1	OVERHEAD CATENARY SYSTEM CANTILEVER PULL-OFF ASSEMBLIES CA-01L & CL-01L
STD-JOD401	1	OVERHEAD CATENARY SYSTEM CANTILEVER PULL-OFF ASSEMBLIES CA-02L & CL-02L
STD-JOD402	1	OVERHEAD CATENARY SYSTEM CANTILEVER PULL-OFF ASSEMBLIES CA-01M, CA-01H, CL-01M, CA-01H, CL-01M & CL-01H
STD-JOD403	1	OVERHEAD CATENARY SYSTEM CANTILEVER PULL-OFF ASSEMBLIES CA02M, CA-02H, CL-02M & CL-02H
STD-JOD404	1	OVERHEAD CATENARY SYSTEM SINGLE WIRE CANTILEVER ASSEMBLIES CA-03M, CA-02H, CL-02M & CL-02H
STD-JOD405	1	OVERHEAD CATENARY SYSTEM OUT-OF-RUNNING CANTILEVER ASSEMBLIES CA-06, CA-07, CL-06 & CL-07
STD-JOD406	1	OVERHEAD CATENARY SYSTEM OVER-REACH CANTILEVER ASSEMBLIES CA-10M, CA-10H, CA-11M & CA-11H
STD-JOD407	1	OVERHEAD CATENARY SYSTEM REDUCED SYS HT CANT ASSEMBLIES CA-12L, CA-12M,, CA-12H, CA-14L, CA14M & CA-14H
STD-JOD408	1	OVERHEAD CATENARY SYSTEM REDUCED SYS HT LONG-REACH CANT ASSYS CL-12L, CL-12M, CL-12H, CL-14L, CL-14M & CL-14H

DWG. No.	REV	TITLE
		SYSTEMS (CONTINUED)
STD-JOD409	1	OVERHEAD CATENARY SYSTEM REDUCED SYS HT CANT ASSYS CA15L, CA-15M, CA-15H, CA-15E, CA-15X, CA-16L, CA-16M, CA-16H
STD-JOD410	1	OVERHEAD CATENARY SYSTEM INCREASED SYSTEM HEIGHT CANTILEVER ASSEMBLIES CA-17M, CA-17H, CA-18M & CA-18H
STD-JOD411	1	OVERHEAD CATENARY SYSTEM LONG REACH CANTILEVER ASSEMBLIES CA-21 & CA-22
STD-JOD412	1	OVERHEAD CATENARY SYSTEM UNDER BRIDGE/TUNNEL SUPPORT ASSEMBLY CA-30E
STD-JOD413	1	OVERHEAD CATENARY SYSTEM TWO TRACK CANTILEVER ASSEMBLY TTC-1 & TTC-2
STD-JOD420	1	OVERHEAD CATENARY SYSTEM SPAN WIRE ASSEMBLIES HS-00, HS-01 & HS-10 THRU HS-16
STD-JOD421	1	OVERHEAD CATENARY SYSTEM SPAN WIRE ASSEMBLIES HS-20, THRU HS-26
STD-JOD422	1	OVERHEAD CATENARY SYSTEM CROSS SPAN REGISTRATION ASSEMBLIES HR-1L, HR-1M, HR-1H, HR-2 & HR-MW
STD-JOD423	1	OVERHEAD CATENARY SYSTEM HEADSPAN REGISTRATION ASSEMBLIES HR-3L, HR-3M, HR-3H & HR-3MW
STD-JOD430	1	OVERHEAD CATENARY SYSTEM CONTACT WIRE PULL-OFF ASSEMBLIES POC-1M, POC-1H, POC-2M & POC-2H
STD-JOD431	1	OVERHEAD CATENARY SYSTEM MESSENGER WIRE PULL-OFF ASSEMBLIES FOR POM-1M, POM-1H, POM-2M & POM 2H
STD-JOD432	1	OVERHEAD CATENARY SYSTEM BRIDLE WIRE ASSEMBLIES FOR SWFT BDL-1, BDL-2 & BDL-3
STD-JOD440	1	OVERHEAD CATENARY SYSTEM TUNNEL SUPPORT ASSEMBLIES SCFT TS-1 & TS-3
STD-JOD441	1	OVERHEAD CATENARY SYSTEM TUNNEL SUPPORT ASSEMBLIES SCFT TS-6
STD-JOD442	1	OVERHEAD CATENARY SYSTEM TUNNEL SUPPORT ASSEMBLIES SCFT TS-9
STD-JOD443	1	OVERHEAD CATENARY SYSTEM TUNNEL SUPPORT ASSEMBLIES SCFT TS-11 & TS12
STD-JOD444	1	OVERHEAD CATENARY SYSTEM TUNNEL SUPPORT ASSEMBLY SCFT TS-16
STD-JOD445	1	OVERHEAD CATENARY SYSTEM TUNNEL SUPPORT ASSEMBLIES SCAT TS-17
STD-JOD446	1	OVERHEAD CATENARY SYSTEM LOW PROFILE TUNNEL SUPPORT ASSEMBLIES SCAT TS-20 & TS-21
STD-JOD500	1	OVERHEAD CATENARY SYSTEM HANGER ASSEMBLIES HA-1 & HA-2
STD-JOD501	1	OVERHEAD CATENARY SYSTEM IN-SPAN ASSEMBLIES CC-1, CC-2, KN-1, KN-2, KN-3 & KN-4
STD-JOD502	1	OVERHEAD CATENARY SYSTEM JUMPER ASSEMBLIES JC-1, JC-2, JC-3, JP-1, JP-2 & JS-1
STD-JOD503	1	OVERHEAD CATENARY SYSTEM IN-SPAN INSULATORS AND SPLICE ASSEMBLIES IN-1, IN-2, IN-3, SPL -1, & SPL-2
STD-JOD510	1	OVERHEAD CATENARY SYSTEM POLE MOUNTED FEEDER DISCONNECT ASSEMBLIES DS-1 & DS-2
STD-JOD511	1	OVERHEAD CATENARY SYSTEM POLE MOUNTED BYPASS DISCONNECT ASSEMBLIES DS-3 & DS-4
STD-JOD512	1	OVERHEAD CATENARY SYSTEM POLE MOUNTED BYPASS DISCONNECT ASSEMBLY DS-5
STD-JOD513	1	OVERHEAD CATENARY SYSTEM FEEDER CABLE ASSEMBLIES FC-1 & FC-2
STD-JOD514	1	OVERHEAD CATENARY SYSTEM FEEDER CABLE ASSEMBLIES FC-3 & FC-3
STD-JOD520	1	OVERHEAD CATENARY SYSTEM SURGE ARRESTER ASSEMBLIES SA-1, SA-2, SA-3 & SA-4
STD-JOD530	1	OVERHEAD CATENARY SYSTEM SECTION INSULATOR ASSEMBLIES SI-1, SI-2 & SI-3
STD-JOD600	1	OVERHEAD CATENARY SYSTEM BALANCE WEIGHT ANCHOR ASSEMBLY BW-1 & BW-3
STD-JOD601	1	OVERHEAD CATENARY SYSTEM BALANCE WEIGHT ANCHOR ASSEMBLY BW-2
STD-JOD602	1	OVERHEAD CATENARY SYSTEM BALANCE WEIGHT ANCHOR ASSEMBLY BW-1, BW-2, BW-3, BW-4, BW-5 & BW-6
STD-JOD603	0	OVERHEAD CONTACT SYSTEMS CONSTANT TENSION SPRING TERMINATION CTST-1,CTST-2
STD-JOD610	1	OVERHEAD CATENARY SYSTEM FIXED ANCHOR ASSEMBLIES FA-1, FA-1T, FA-2, FA-2T & FA-3
STD-JOD611	1	OVERHEAD CATENARY SYSTEM FIXED ANCHOR Y-TERMINATIONS FA-4 & FA-5
STD-JOD615	1	OVERHEAD CATENARY SYSTEM MID-POINT SPAN GUY ASSEMBLY MP-1
STD-JOD620	1	OVERHEAD CATENARY SYSTEM WIDE FLANGE POLE DOWN/HEAD GUY ASSEMBLIES DG-1, DG-2, DG-3 & HG1
STD-JOD621	1	OVERHEAD CATENARY SYSTEM TAPERED TUBULAR POLE DOWN/HEAD GUY ASSEMBLIES DG-4, DG-5, DG-6 & HG-2

No.	DATE	DSN	CHK	APP	REVISION
3	12/2024				REVISED DRAWING
2	2/2024				2024 REVISED SYSTEMS DRAWINGS
1	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019				2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JZI001-002
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

INDEX OF DRAWINGS

DRAWING No.: **STD-JZI002**
FACILITY ID:
SHEET No.: 3
REV:

01/29/25 | 10:52 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JZI001-002.DWG

SIGNALS LEGEND

SIGNAL LIGHTS

	SYMBOLS
AMBER: STOP	OR
WHITE: DIVERGE LEFT	OR
WHITE: DIVERGE RIGHT	OR
WHITE: PROCEED ON STRAIGHT ROUTE	OR

SIGNAL ORIENTATION

TRAIN APPROACH DIRECTION	

LAYOUT PLANS

DUAL CONTROL ELECTRIC SWITCH MACHINE	
Z-BOND	Z
PULLBOX	
SIGNAL, POLE MOUNTED	
SIGNAL, WALL MOUNTED	
MANHOLE	
TRAIN TO WAYSIDE COMMUNICATION ANTENNA (TWC)	
SINGLE GATE AND FLASHERS	
PED GATE AND FLASHERS	
PEDESTRIAN FLASHER	
SLIDING GATE	
PED BELL	

SINGLE LINE DIAGRAM & CONTROL LINE DIAGRAM

	SYMBOLS
TWC LOOP	
(DEFERRED) TWC LOOP	
COMM ROOM	CR
SIGNAL ROOM	SR
TRACTION POWER SUBSTATION (TPSSXX)	
BUMPER POST SIGNAL	
SIGNAL	
INSULATED JOINT BETWEEN TRACK CIRCUITS	
IMPEDANCE BOND	
NEGATIVE RETURN CONNECTION TO IMPEDANCE BOND	NR
LRT TUNNEL	
U.C. (LRV UNDERCROSSING)	
PASSENGER STATION	
RIVER, LAKE	
CROSS PASSAGE	
END OF PLATFORM	EOP
END OF TRACK	EOT
POWER DUAL- CONTROL SWITCH MACHINE	P
POINT OF ENDING	POE
POINT OF BEGINNING	POB
CROSS BOND	X / B
RECEIVE POINT LOOP	
ITALICIZED NUMBER REPRESENTS TRACK CIRCUIT NUMBER	*xxx*
GRADE CROSSING FLASHING LIGHT SIGNAL	
POINT OF EQUATION	
AUDIO FREQUENCY OVERLAY TRACK CIRCUIT	
SWITCH HEATER CASE OR TWC CASE	
PEDESTRIAN CROSSING SIGNAL	
IMPEDANCE BOND ONLY (CONTROL LINE DIAGRAM)	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

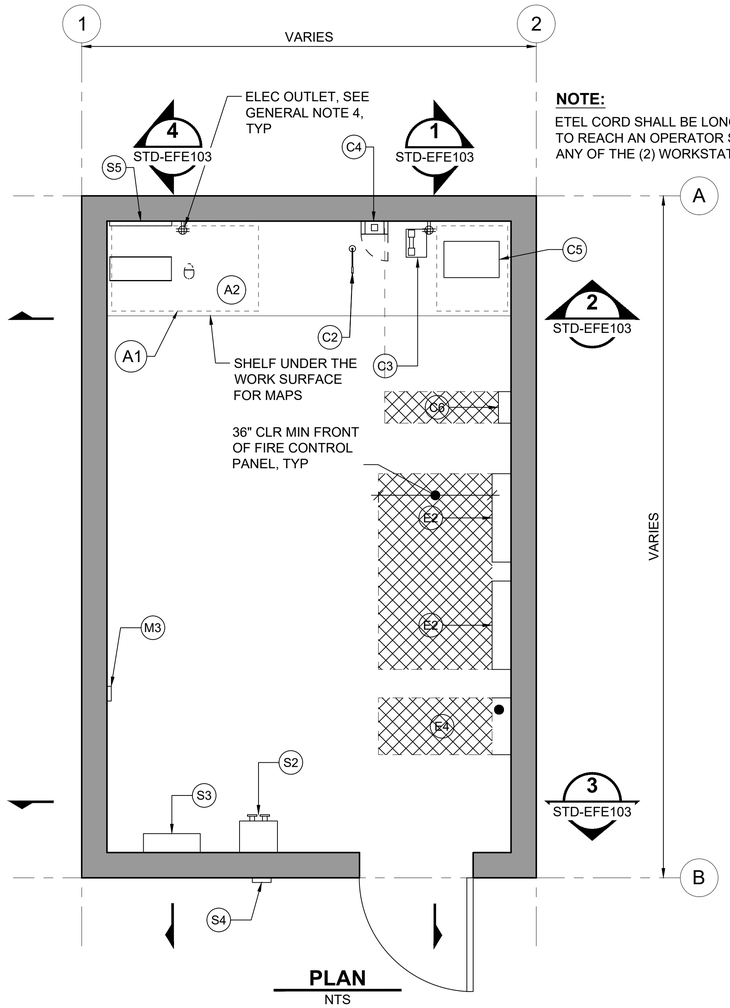
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JZN007
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNAL
GENERAL SYMBOLS & LEGEND

DRAWING No.: **STD-JZN007**
FACILITY ID:
SHEET No.: REV: 1

03/21/24 | 12:56 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JZN007.DWG

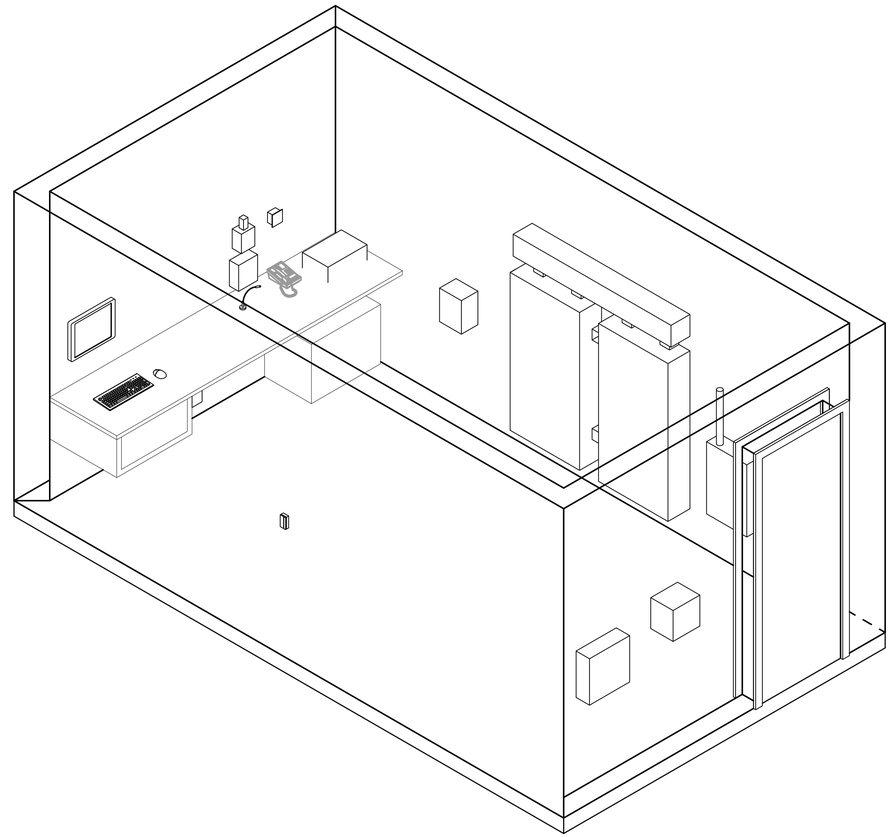


PLAN
NTS

NOTE:

ETEL CORD SHALL BE LONG ENOUGH TO REACH AN OPERATOR SITTING AT ANY OF THE (2) WORKSTATIONS.

REF #	DESCRIPTION	DIMENSIONS HxWxD (INCHES)	DISCIPLINE
A1	SHELVES FOR O&M MANUALS/DRAWINGS	12x48x30	ARCH
A2	WORK SURFACE	VARIES	ARCH
A3	19" EQUIPMENT RACK (UNDER DESK)	23x21x31	ARCH
C2	PA MICROPHONE	VARIES	COMMUNICATIONS
C3	PRIVATE BRANCH EXCHANGE TELEPHONE (PBX)	VARIES	COMMUNICATIONS
C4	EMERGENCY TELEPHONE (ETEL)	VARIES	COMMUNICATIONS
C5	MULTI-UNIT, TWO-WAY RADIO CHARGER	6x17 1/2x11 1/2	COMMUNICATIONS
C6	RADIO BDA MONITORING PANEL	10x8x4	COMMUNICATIONS
E2	FIRE ALARM CONTROL PANEL (FACP)	50x62x8	ELEC
E4	AES/CELLULAR RADIO DIALER	28x18x6	ELEC
M3	THERMOSTAT	VARIES	MECH
S2	TRACTION POWER EMERGENCY TRIP STATION (ETS)	VARIES	SYSTEMS
S3	FCR SPEAKER VOLUME CONTROL REOSTAT	18x18x6	SYSTEMS
S4	ACCESS CARD READER (ACR)	VARIES	SYSTEMS
S5	BUILDING MANAGEMENT SYSTEM (BMS) LOCAL COMPUTER WORKSTATION	VARIES	SYSTEMS



GENERAL NOTES:

1. FIRE CONTROL ROOM (FCR) FOR GRADE SEPARATED STATIONS MUST NOT BE LESS THAN 140SF WITH A MINIMUM DIMENSION OF 10 FEET AND SHALL BE THE LOCATION OF THE FIRE ALARM PANEL AND WILL BE DETERMINED IN CONJUNCTION WITH THE AUTHORITY HAVING JURISDICTION.
2. ▨ - INDICATES EQUIPMENT CLEARANCE ZONE
3. ANY CONDUITS SHOWN ARE FOR REFERENCE ONLY. DESIGNER TO COORDINATE CONDUIT NEEDS AND ENSURE ROUTING DOES NOT CREATE CONFLICT FOR EQUIPMENT MOUNTING.
4. PROVIDE ADEQUATE POWER QUAD RECEPTACLES OUTLETS FOR ALL WORKSTATIONS AND PRINTER EQUIPMENT EVERY SIX FEET AND POWER FROM STATION UPS.
5. ADDITIONAL RELAY BOXES/PANELS SUPPORTING VARIOUS SYSTEMS ARE LIKELY NECESSARY. ENSURE THAT THESE ARE CONSIDERED DURING DESIGN.
6. DESIGNER SHALL VERIFY ALL EQUIPMENT DIMENSIONS. ROOM SIZE SHALL BE ADJUSTED AS NECESSARY.
7. REQUIRED SYSTEMS ARE DETERMINED BY THE TYPE OF STATION DEFINED IN THE DCM ALONG WITH AHJ REQUIREMENTS.
8. ACCESS POINTS FOR NON RELATED UTILITIES OR EQUIPMENT (I.E. SUMP HATCH) NOT SERVING THE FCR SHALL NOT BE LOCATED IN THE ROOM THAT MIGHT INTERFERE WITH FUNCTION. IF THIS IS UNAVOIDABLE, CLEARANCES FOR FCR FUNCTION SHALL NOT BE IMPEDED BY ACCESS CLEARANCES.
9. FCR ROOM SHALL NOT BE COMBINED WITH EMERGENCY RESPONDER EQUIPMENT ROOM WITHOUT ST APPROVAL.
10. LARGE EQUIPMENT AND SUPPORTING INFRASTRUCTURE ELEMENTS, SUCH AS RELAY PANELS ARE SHOWN IN ROOM FOR REFERENCE AND PLANNING PURPOSES. COORDINATE SPECIFIC LOCATIONS APPROPRIATELY WITH STATION DESIGN, IF ELEMENTS NOT INVOLVED DIRECTLY IN FIRE EMERGENCY RESPONSE.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS -S GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

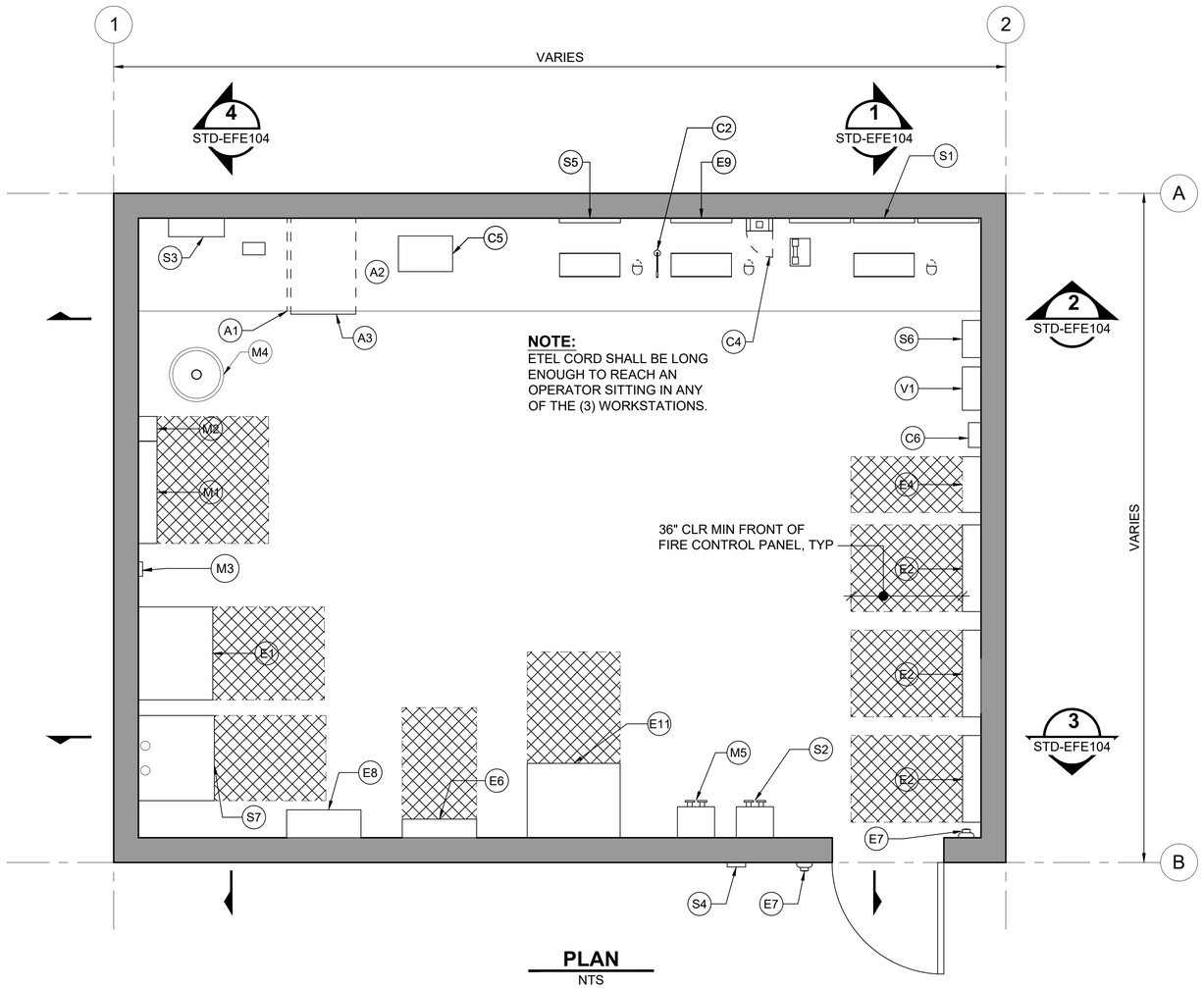
SCALE: 1/2"=1'-0"
FILENAME: STD-EFP100
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

FIRE LIFE SAFETY
FIRE CONTROL ROOM
FLOOR PLAN

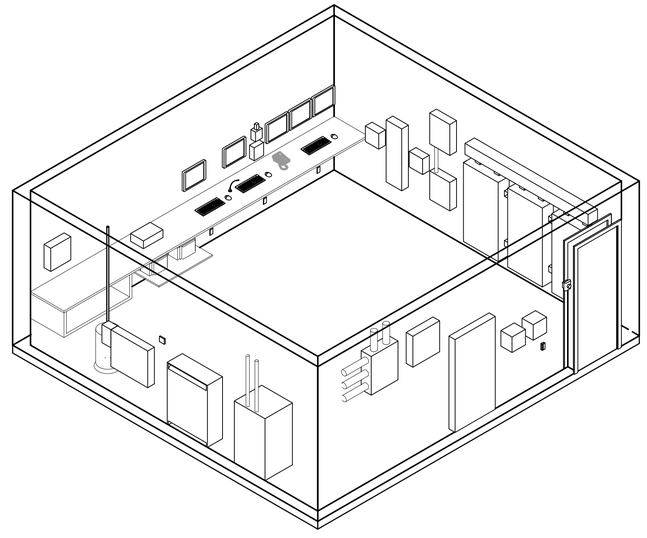
DRAWING No.: **STD-EFP100**
FACILITY ID:
SHEET No.: 2 REV:

03/21/24 | 12:40 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-EFP100.DWG



PLAN
NTS

REF #	DESCRIPTION	DIMENSIONS HxWxD (INCHES)	DISCIPLINE
A1	SHELVES FOR O&M MANUALS/DRAWINGS	12x48x30	ARCH
A2	WORK SURFACE	VARIES	ARCH
A3	19" EQUIPMENT RACK (UNDER DESK)	23x21x31	ARCH
C1	PAGING SYSTEM (NOT SHOWN - LOCATE IN EQUIPMENT RACK)	25x22 1/2x24	COMMUNICATIONS
C2	PA MICROPHONE	VARIES	COMMUNICATIONS
C3	PRIVATE BRANCH EXCHANGE TELEPHONE (PBX)	VARIES	COMMUNICATIONS
C4	EMERGENCY TELEPHONE (ETEL)	VARIES	COMMUNICATIONS
C5	MULTI-UNIT, TWO-WAY RADIO CHARGER	6x17 1/2x11 1/2	COMMUNICATIONS
C6	RADIO BDA MONITORING PANEL	10x8x4	COMMUNICATIONS
E1	EVS CABINET	72x30x24	ELEC
E2	FIRE ALARM CONTROL PANEL (FACP)	50x100x8	ELEC
E3	FACP ALARM PRINTER	VARIES	ELEC
E4	AES/CELLULAR RADIO DIALER	18x18x6	ELEC
E6	BUILDING MANAGEMENT SYSTEM (BMS) ITC	24x24x6	ELEC
E7	FIRE ALARM STROBE LIGHT (FOR CLEAN AGENT)	VARIES	ELEC
E8	EXAMPLE ELECTRICAL PULLBOX	30x24x9	ELEC
E9	FIRE ALARM HMI	VARIES	ELEC
E11	BMS CABINET	72x30X24	ELEC
E12	GENERAL PRINTER	VARIES	ELEC
M1	CLEAN AGENT PANEL	28 1/2x33x6	MECH
M2	CLEAN AGENT RELAY PANEL	14x8x6	MECH
M3	THERMOSTAT	VARIES	MECH
M4	CLEAN AGENT GAS (CA) TANK	VARIES	MECH
M5	CA MANUAL STATIONS (MANUAL RELEASE AND ABORT SWITCH	VARIES	MECH
S1	SCADA COMPUTER WORKSTATION (BMS, TCS, EVS)	VARIES	SYSTEMS
S2	TRACTION POWER EMERGENCY TRIP STATION (ETS)	VARIES	SYSTEMS
S3	PA CONTROL FCR SPEAKER VOLUME CONTROL REOSTAT	18x18x6	SYSTEMS
S4	ACCESS CARD READER (ACR)	VARIES	SYSTEMS
S5	BUILDING MANAGEMENT SYSTEM (BMS) LOCAL COMPUTER WORKSTATION	VARIES	SYSTEMS
S6	EMERGENCY VENTILATION CONTROL PANEL (EVCP)	12x12x6	SYSTEMS
S7	SYSTEM INTERFACE TERMINAL CABINET	48x27 1/2x25	SYSTEMS
V1	ELEVATOR ANNUNCIATION/CONTROL PANEL	48x14x6	VERTICAL



GENERAL NOTES:

1. FIRE COMMAND CENTER (FCC) FOR TUNNEL STATION SHALL BE NOT LESS THAN 200 SQUARE FEET WITH A MINIMUM DIMENSION OF 10' AND INCLUDE A WORK SURFACE WITH SPACE POWER AND DATA FOR MULTIPLE COMPUTER WORK STATIONS AS SHOWN.
2. - INDICATES EQUIPMENT CLEARANCE ZONE.
3. ANY CONDUITS SHOWN ARE FOR REFERENCE ONLY. DESIGNER TO COORDINATE CONDUIT NEEDS AND ENSURE ROUTING DOES NOT CREATE CONFLICT FOR EQUIPMENT MOUNTING.
4. PROVIDE ADEQUATE POWER QUAD RECEPTACLE OUTLETS FOR ALL WORKSTATIONS AND PRINTER EQUIPMENT EVERY SIX FEET AND POWER FROM STATION UPS. (SEE STD-EPS101)
5. ADDITIONAL RELAY BOXES/PANELS SUPPORTING VARIOUS SYSTEMS ARE LIKELY NECESSARY. ENSURE THAT THESE ARE CONSIDERED DURING DESIGN.
6. DESIGNER SHALL VERIFY ALL EQUIPMENT DIMENSIONS. ROOM SIZE SHALL BE ADJUSTED AS NECESSARY
7. REQUIRED SYSTEMS ARE DETERMINED BY THE TYPE OF STATION DEFINED IN THE DCM ALONG WITH AHJ REQUIREMENTS. DESIGNER TO COORDINATE SPACE FOR PHYSICAL AND FUNCTIONAL REQUIREMENTS OF ALL ELEMENTS.
8. CONFIRM ANY RADIO ANTENNA REQUIREMENTS WITH SYSTEM DESIGNER TO ENSURE ADEQUATE COVERAGE AND LOCATE APPROPRIATELY.
9. ACCESS POINTS FOR NON RELATED UTILITIES OR EQUIPMENT (I.E. SUMP HATCH) NOT SERVING THE FCC SHALL NOT BE LOCATED IN THE ROOM THAT MIGHT INTERFERE WITH FUNCTION.
10. LARGE EQUIPMENT, SUCH AS TRANSFORMER, DIST. CABINET AND CA TANK SHOWN IN ROOM FOR REFERENCE OF NEEDED COORDINATION. COORDINATE SPECIFIC LOCATIONS APPROPRIATELY WITH STATION DESIGN, IF ELEMENTS NOT INVOLVED DIRECTLY IN EMERGENCY RESPONSE.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

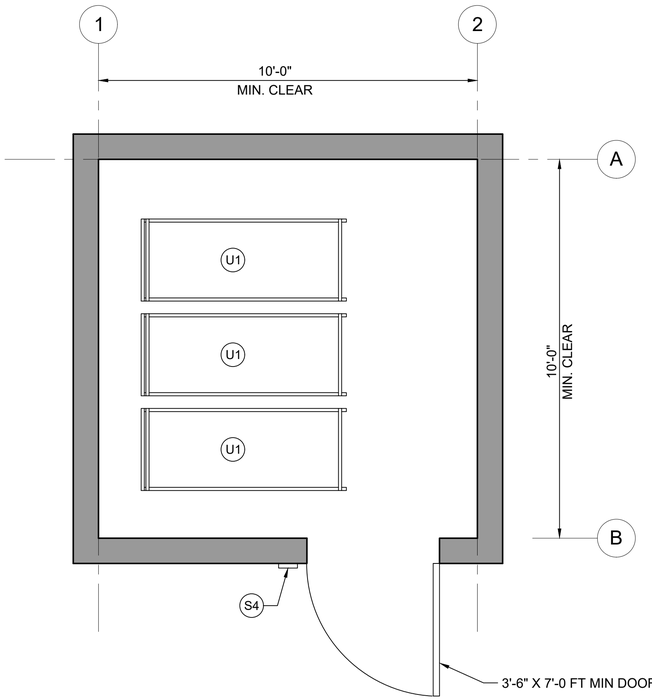
SOUNDTRANSIT

SCALE: 1/2"=1'-0"
FILENAME: STD-EFP101
CONTRACT No.: RTA/LR
DATE: 2/2024

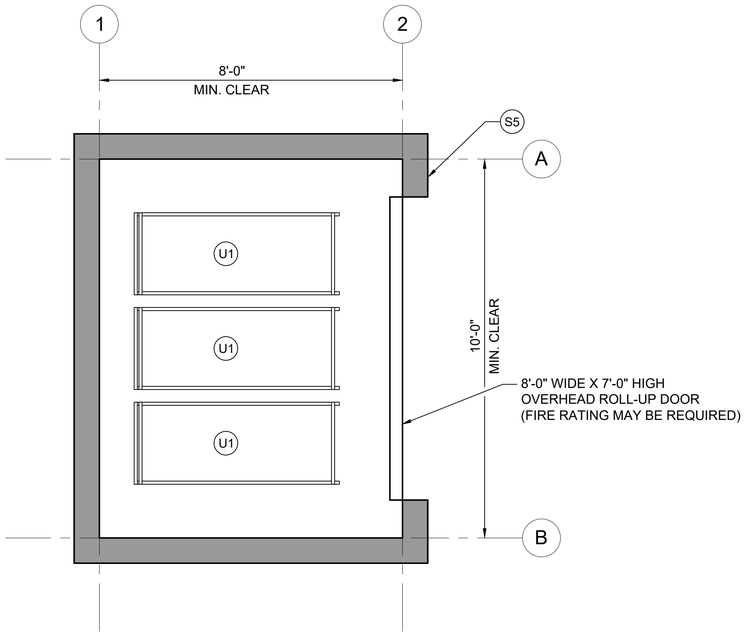
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
FIRE LIFE SAFETY
FIRE COMMAND CENTER
FLOOR PLAN LAYOUT

DRAWING No.: **STD-EFP101**
FACILITY ID:
SHEET No.: 2
REV:

03/21/24 | 12:40 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-EFP101.DWG



ERER PLAN VIEW - OPTION A (1)
SCALE: 1/2"=1'-0"



ERER PLAN VIEW - OPTION B (2)
SCALE: 1/2"=1'-0"

GENERAL NOTES:

1. SEE FIRE/LIFE SAFETY SET 601 FOR REQUIREMENTS.
2. ACCESS POINTS FOR NON RELATED UTILITIES OR EQUIPMENT (I.E. SUMP HATCH) NOT SERVING THE ERER SHALL NOT BE LOCATED IN THE ROOM THAT MIGHT INTERFERE WITH FUNCTION. CLEARANCES FOR ERER FUNCTION SHALL NOT BE IMPEDED BY ACCESS CLEARANCES.
3. EMERGENCY RESPONDER EQUIPMENT ROOM (ERER) SHALL HAVE ADEQUATE CONVENIENCE OUTLETS.

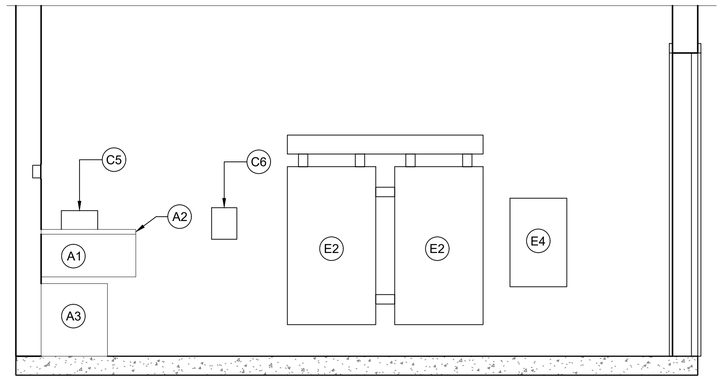
REF #	DESCRIPTION	DIMENSIONS HxWxD (INCHES)	DISCIPLINE
S4	ACCESS CARD READER (ACR)	VARIES	SYSTEMS
S5	CARD READER AND ROLL DOOR POWER CONTROLS	VARIES	SYSTEMS
U1	ERER CART	80 x 24 x60	ST PROVIDED

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS 0 GENERAL UPDATE

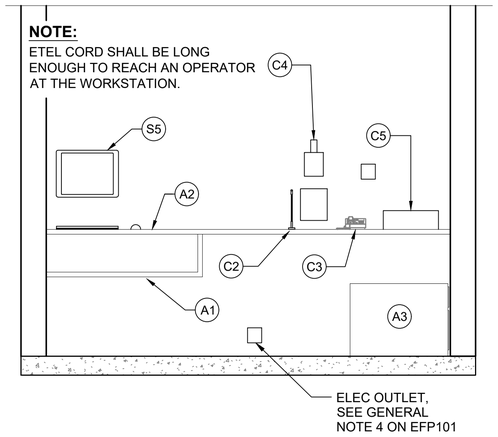
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: 1/2"=1'-0"
FILENAME: STD-EFP102
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
FIRE LIFE SAFETY
EMERGENCY RESPONDER EQUIPMENT ROOM

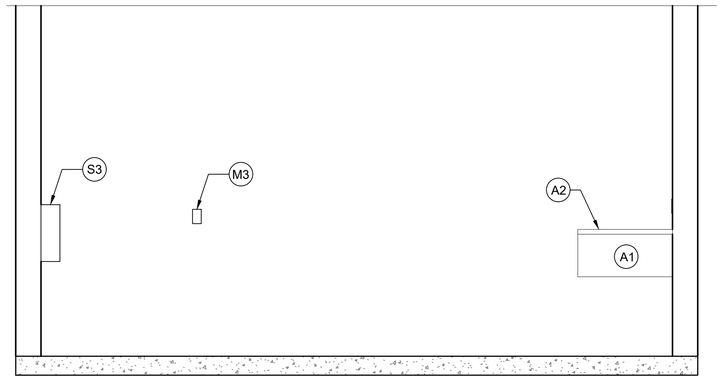
DRAWING No.: **STD-EFP102**
FACILITY ID:
SHEET No.: 2 REV:



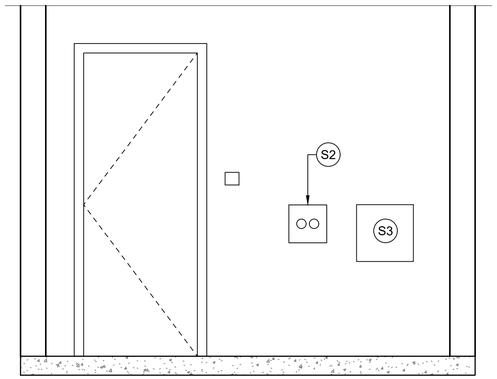
SECTION 1
SCALE: 1/2"=1'-0" STD-EFP100



SECTION 2
SCALE: 1/2"=1'-0" STD-EFP100



SECTION 3
SCALE: 1/2"=1'-0" STD-EFP100



SECTION 4
SCALE: 1/2"=1'-0" STD-EFP100

REF #	DESCRIPTION	DIMENSIONS HxWxD (INCHES)	DISCIPLINE
A1	SHELVES FOR O&M MANUALS/DRAWINGS	12x48x30	ARCH
A2	WORK SURFACE	VARIES	ARCH
A3	19" EQUIPMENT RACK (UNDER DESK)	23x21x31	ARCH
C2	PA MICROPHONE	VARIES	COMMUNICATIONS
C3	PRIVATE BRANCH EXCHANGE TELEPHONE (PBX)	VARIES	COMMUNICATIONS
C4	EMERGENCY TELEPHONE (ETEL)	VARIES	COMMUNICATIONS
C5	MULTI-UNIT, TWO-WAY RADIO CHARGER	6x17 1/2x11 1/2	COMMUNICATIONS
C6	RADIO BDA MONITORING PANEL	10x8x4	COMMUNICATIONS
E2	FIRE ALARM CONTROL PANEL (FACP)	50x62x8	ELEC
E4	AES/CELLULAR RADIO DIALER	28x18x6	ELEC
M3	THERMOSTAT	VARIES	MECH
S2	TRACTION POWER EMERGENCY TRIP STATION (ETS)	VARIES	SYSTEMS
S3	FCR SPEAKER VOLUME CONTROL REOSTAT	18x18x6	SYSTEMS
S4	ACCESS CARD READER (ACR)	VARIES	SYSTEMS
S5	BUILDING MANAGEMENT SYSTEM (BMS) LOCAL COMPUTER WORKSTATION	VARIES	SYSTEMS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
4	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
3	3/2021	----	----	----	NTD TU-1010 ELEVATOR CONTROL PANEL
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDACNE DWG REVISIONS - GENERAL UPDATE
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

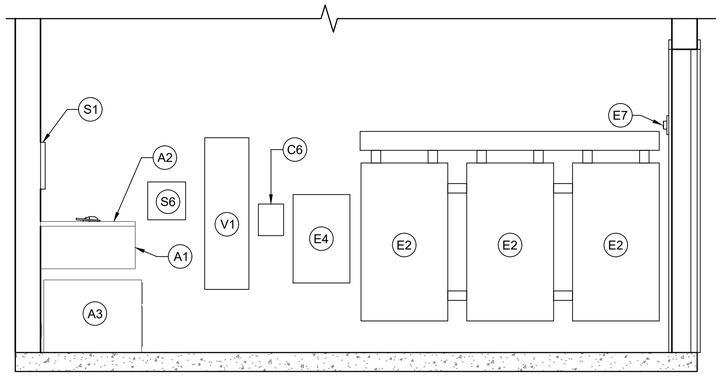
SCALE: 1/2"=1'-0"
FILENAME: STD-EFE103
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

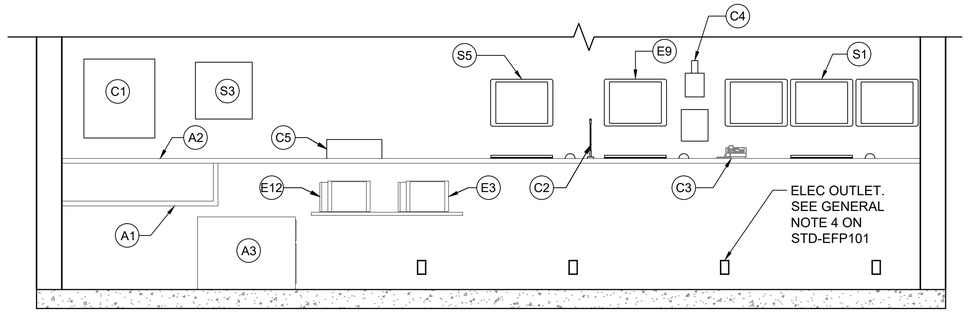
FIRE LIFE SAFETY
FIRE CONTROL ROOM
SECTIONS

DRAWING No.: **STD-EFE103**
FACILITY ID:
SHEET No.: REV: 4

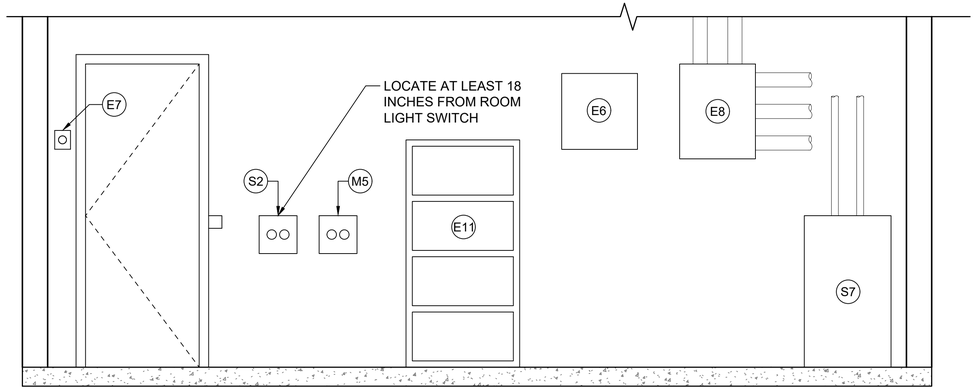
01/29/25 | 1:40 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-EFE103.DWG



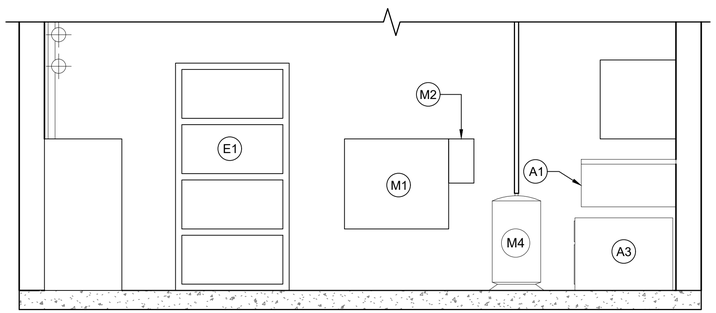
SECTION 1
SCALE: 1/2"=1'-0" STD-EFP101



SECTION 2
SCALE: 1/2"=1'-0" STD-EFP101



SECTION 3
SCALE: 1/2"=1'-0" STD-EFP101



SECTION 4
SCALE: 1/2"=1'-0" STD-EFP101

REF #	DESCRIPTION	DIMENSIONS HxWxD (INCHES)	DISCIPLINE
A1	SHELVES FOR O&M MANUALS/DRAWINGS	12x48x30	ARCH
A2	WORK SURFACE	VARIES	ARCH
A3	19" EQUIPMENT RACK (UNDER DESK)	23x21x31	ARCH
C1	PAGING SYSTEM	25x22 1/2x24	COMMUNICATIONS
C2	PA MICROPHONE	VARIES	COMMUNICATIONS
C3	PRIVATE BRANCH EXCHANGE TELEPHONE (PBX)	VARIES	COMMUNICATIONS
C4	EMERGENCY TELEPHONE (ETEL)	VARIES	COMMUNICATIONS
C5	MULTI-UNIT, TWO-WAY RADIO CHARGER	6x17 1/2x11 1/2	COMMUNICATIONS
C6	RADIO BDA MONITORING PANEL	10x8	COMMUNICATIONS
E1	EVS CABINET	72X36X6	ELEC
E2	FIRE ALARM CONTROL PANEL (FACP)	50x100x8	ELEC
E3	FACP ALARM PRINTER	VARIES	ELEC
E4	AES/CELLULAR RADIO DIALER	28x18x6	ELEC
E6	BUILDING MANAGEMENT SYSTEM (BMS) ITC	24x24x6	ELEC
E7	FIRE ALARM STROBE LIGHT (FOR CLEAN AGENT)	VARIES	ELEC
E8	EXAMPLE ELECTRICAL PULLBOX	30x24x9	ELEC
E9	FIREWORKS STATION HMI	VARIES	ELEC
E11	BMS CABINET	72x36x6	ELEC
E12	GENERAL PRINTER	VARIES	ELEC
M1	CLEAN AGENT PANEL	28 1/2x33x6	MECH
M2	CLEAN AGENT RELAY PANEL	14x8x6	MECH
M3	THERMOSTAT	VARIES	MECH
M4	CLEAN AGENT GAS (CA) TANK	VARIES	MECH
M5	CA MANUAL STATIONS (MANUAL RELEASE AND ABORT SWITCH)	VARIES	MECH
S1	SCADA COMPUTER WORKSTATION (BMS, TCS, EVS)	VARIES	SYSTEMS
S2	TRACTION POWER EMERGENCY TRIP STATION (ETS)	VARIES	SYSTEMS
S3	FCR SPEAKER VOLUME CONTROL REOSTAT	18x18x6	SYSTEMS
S4	ACCESS CARD READER (ACR)	VARIES	SYSTEMS
S5	BUILDING MANAGEMENT SYSTEM (BMS) LOCAL COMPUTER WORKSTATION	VARIES	SYSTEMS
S6	EMERGENCY VENTILATION CONTROL PANEL (EVCP)	12x12x6	SYSTEMS
S7	DISTRIBUTION CABINET	48x27 1/2x25	SYSTEMS
V1	ELEVATOR ANNUNCIATION/CONTROL PANEL	48x14x6	VERTICAL

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDACNE DWG REVISIONS - GENERAL UPDATE
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

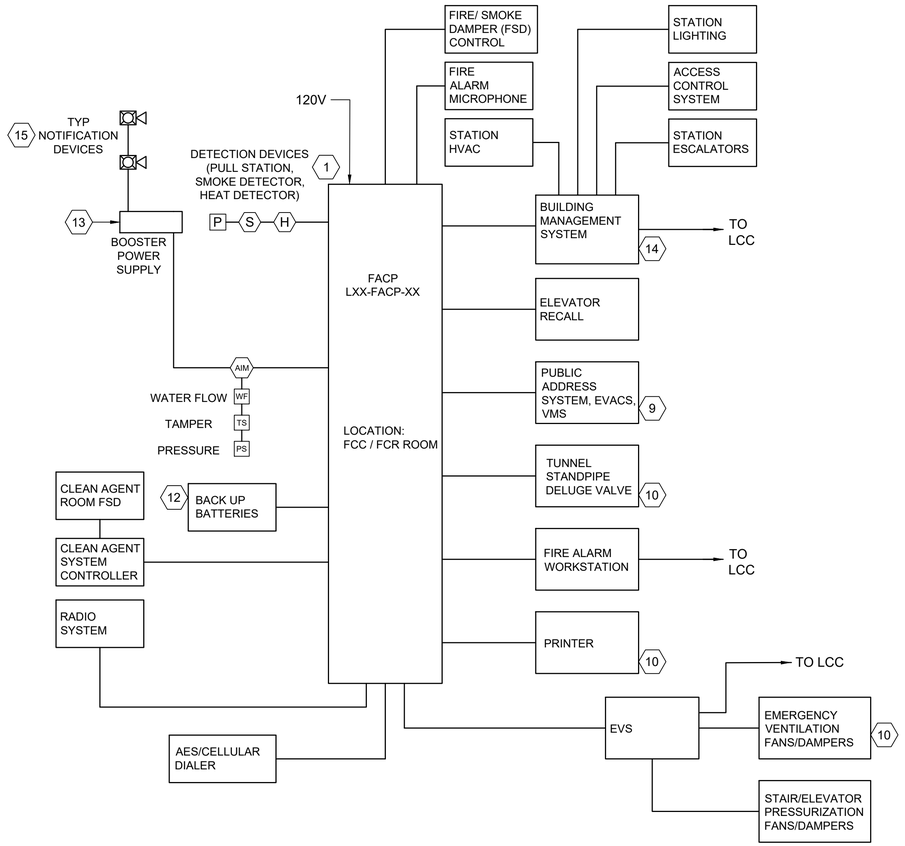
SCALE: 1/2"=1'-0"
FILENAME: STD-EFE104
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

FIRE LIFE SAFETY
FIRE COMMAND CENTER
SECTIONS

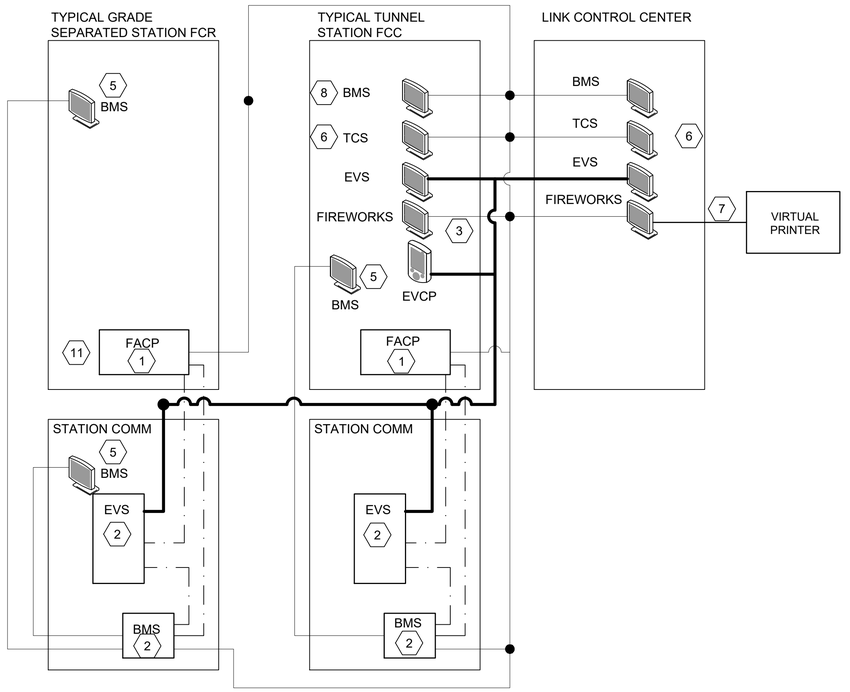
DRAWING No.: **STD-EFE104**
FACILITY ID:
SHEET No.: 3 REV:

01/29/25 | 2:32 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-EFE104.DWG



FIRE ALARM BLOCK DIAGRAM

NTS



NETWORK/CONNECTIONS LEGEND

- EFN-ETHERNET
- TCN-ETHERNET
- DRY CONTACT/SERIAL

SYSTEMS OVERVIEW

NTS

GENERAL NOTES:

1. SYSTEMS OVERVIEW PROVIDES A TYPICAL CONFIGUTRATION OF GRADE SEPARATION AND TUNNEL STATIONS FOR OPERATOR INTERFACES OF LIFE SAFETY SYSTEMS.
2. FIRE ALARM BLOCK DIAGRAM PROVIDES TYPICAL CONNECTORS OF A GRADE SEPARATED AND TUNNEL STATION FACP.
3. BMS/EVS AND FIRE ALARM HMI HEAD END PROGRAMMING SHALL BE UPDATED FOR MONITORING AND CONTROL OF EXTENSIONS.
4. SEE REQUIREMENTS FOR CIRCUIT TYPE/STYLE (E.G., CLASS A , CLASS B, CLASS N)

KEY NOTES:

1. AES RADIO OR CELLULAR OUTPUT FOR THIRD PARTY MONITORING FIRE ALARM AS REQUIRED BY AHJ AND ST.
2. NETWORK CONNECTION TO SCADA REQUIRES SIDT.
3. FIRE ALARM HMI WORKSTATION SHALL BE PROVIDE WITH LOCAL PRINTER AS REQUIRED.
4. NOT USED.
5. LOCAL BMS HMI FROM BMS VENDOR.
6. BMS, EVS, TCS SCADA HMI'S.
7. VIRTUAL PRINTER CONNECTION TO BE CONNECTED PER ST STANDARDS. MAY REQUIRE AN INTERMEDIATE DEVICE FOR CONNECTION TO DATABASE.
8. BMS WORKSTATIONS IN FCC ROOMS PROVIDED LOCALLY AND NOT INTENDED TO BE MAIN INTERFACE FOR EMERGENCY RESPONSE.
9. AUGMENTATION OR REPLACEMENT OF FIRE ALARM STATION SPEAKERS WITH PA SYSTEM SPEAKERS SHALL BE APPROVED BY LOCAL AHJ.
10. APPLICABLE TO TUNNEL STATIONS ONLY.
11. FACP TO PROVIDE REMOTE FIRE ALARM HMI OUTPUT AND ACCESS USING A TCN CONNECTION.
12. PROVIDE INTERNAL OR EXTERNAL BACK-UP BATTERIES FOR FACP PER CODE.
13. PROVIDE POWER FOR NAC SYSTEM. COORDINATE WITH FIRE PROTECTION CONTRACTOR FOR VOLTAGE REQUIREMENTS.
14. BMS MONITORS FSDs POSITION AND THE ELEVATOR CONTROLLER BUT ALL FIRE/LIFE SAFETY FUNCTIONALITY IS BY THE FACP AND EVS AS INDICATED.
15. VISUAL ALARMS (STROBES) AND BACK OF HOUSE HORNS ARE TYPICAL. SEE REQUIREMENTS AND CONFIRM WITH LOCAL AHJ.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATRE
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-EFS201
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
FIRE LIFE SAFETY
FIRE ALARM PANEL
INTERFACE DIAGRAM

DRAWING No.: **STD-EFS201**
FACILITY ID:
SHEET No.: 3 REV:

FIRE ALARM RESPONSE MATRIX

			OUTPUTS																										
			FACP											VIA BMS		VIA EVS				VIA TCN							UL MONITORING[5]		
			ALARM ANNUNCIATION AT FACP	ACTIVATE FACP AUDIBLE/VISUAL DEVICES	SUPERVISORY ALARM AT FACP	TROUBLE ALARM AT FACP	ACTIVATE EXTERNAL BELL	RELEASE FIRE DOORS	RECALL ELEVATOR TO PRIMARY LEVEL	RECALL ELEVATOR TO ALTERNATE LEVEL	TUNNEL STANDPIPE DELUGE VALVE	CLOSE PASSIVE FIRE/SMOKE DAMPERS[7]	DRY CINTACT IN ITC FOR POTENIAL TPSS POWER TRIP	FCC/FCR ROOM ACCESS UNLOCK	GENERAL HVAC SHUTDOWN[7,8]	START ELEVATOR PRESSURIZATION FANS	START STAIR PRESURIZATION FANS	INITIATE TUNNEL EMEGENCY VENTILATION	NITIAL STATON EMERGENCY VENTILATION	ACTIVE PA SYSTEM EVACS MODE	ACTIVATE PLATFORM VMS EVACUATION MESSAGE	LCC ALARM	LCC SUPERVISORY [9]	LCC TROUBLE [9]	LCC FIREWORKS TROUBLE		UL CENTRAL STATION ALARM	UL CENTRAL STATION SUPERVISORY	UL CENTRAL STATION TROUBLE
INPUTS	ALARM[1]	HEAT & SMOKE DETECTION (GENERAL)	X	X				X				X		X	X	6	6	6	6	X	X	X					X		
		PRIMARY ELEVATOR LOBBY SMOKE/HEAT DETECTION	X	X				X		X		X		X	X	6	6	6	6	X	X	X					X		
		SECONDARY LOBBY/HOISTWAY PIT/MACHINE ROOM DETECTION	X	X				X	X			X		X	X	6	6	6	6	X	X	X					X		
		ELEVATOR MACHINE ROOM HEAT DETECTION (ADJACENT SPRINKLER HEADS)[3]	X	X				X	X			X		X	X	6	6	6	6	X	X	X					X		
		CLEAN AGENT PANEL ALARM	X	X				X				X		X	X	6	6	6	6	X	X	X					X		
		SPRINKLER SYSTEM WATERFLOW	X	X			X	X				X		X	X	6	6	6	6	X	X	X					X		
		MANUAL PULL STATION	X	X				X				X		X	X	6	6	6	6	X	X	X					X		
		TPSS ROOM HEAT DETECTION	X	X				X				X	X	X	X	6	6	6	6	X	X	X					X		
		TPSS ROOM SMOKE DETECTION	X	X				X				X		X	X	6	6	6	6	X	X	X					X		
	SUPERVISORY	SPRINKLER/STANDPIPE VALVE TAMPER			X																		X					X	
		DRY-PIPE SPRINKLER SYSTEM HI/LOW AIR PRESSURE			X																		X					X	
		CLEAN AGENT SYSTEM PRE-ALARM (ONE SMOKE DETECTOR)			X																		X					X	
		CLEAN AGENT SYSTEM SUPERVISORY			X																		X					X	
		EMERGENCY RADIO SYSTEM SUPERVISORY			X																		X					X	
		DUCT SMOKE DETECTION			X																		X					X	
		HYDROGEN GAS DETECTION SYSTEM SUPERVISORY			X																		X					X	
		PA SYSTEM TROUBLE[2]			X																		X					X	
		EVS SYSTEM SUPERVISORY			X																		X					X	
		ELEVATOR SHUNT POWER MONITOR			X																		X					X	
	TROUBLE	FACP SYSTEM TROUBLE				X																		X					X
		STATION FIREWORKS SYSTEM TROUBLE				X																		X	X				
		CLEAN AGENT SYSTEM TROUBLE				X																		X					X
		HYDROGEN GAS DETECTION SYSTEM TROUBLE				X																		X					X
		PA SYSTEM TROUBLE[2]				X																		X					X
		EVS SYSTEM TROUBLE				X																		X					X
	LCC	LCC MODE LAUNCH TUNNEL									6					6	6	6	6										
		LCC MODE LAUNCH STATION														6	6	6	6										

1. HYDROGEN GAS DETECTION SYSTEM ALARMS MUST BE MONITORED BY THE BMS SYSTEM.
2. WHEN PA IS USED FOR AUDIBLE NOTIFICATION AND EVACS.
3. NOT APPLICABLE IN SEATTLE. ELEVATOR POWER SHUNT PER LOCAL RULE.
4. CLEAN AGENT, EMERGENCY RADIO, GAS DETECTION AND OTHER SUBSYSTEM ALARMS ARE SUMMARY ALARMS. PROVIDE ONE POINT ONLY REGARDLESS OF THE NUMBER OF ELEMENTS BEING MONITORED FOR SUPERVISORY OR TROUBLE CONDITIONS.
5. NOT APPLICABLE IN THE CITY OF SEATTLE WHERE THE LCC SERVES AS A PROPRIETARY CENTRAL STATION.
6. RESPONDS PER ERM WHICH IS TYPICALLY MANUAL ACTIVATION ONLY FROM THE LCC OR BY SELECTING A MODE AT THE STATION EVCP. CONFIRM WITH ST AND AHJ.
7. SEE CLEAN AGENT SYSTEM RESPONSE MATRIX FOR LOCAL HVAC SHUTDOWN AND ROOM FSDS. ROOM FSDS ARE TYPICALLY CONTROLLED DIRECTLY FROM THE CLEAN AGENT PANEL
8. GENERAL HVAC SHUT DOWN WHEN REQUIRED BY THE IMC.
9. LCC RECIEVES SUMMARY ALARM ONLY FOR EACH SIGNAL TYPE.

GENERAL NOTES:

1. PRE- ALARM:
   THE FIRST DETECTOR ASSOCIATED WITH A CLEAN AGENT SYSTEM WHICH RESULTS IN A SUPERVISORY ALARM TO THE MAIN BUILDING FOR ALARM CONTROL PANEL.
2. ALARM:
   INDICATES FULL FIRE ALARM ACTIVATION INCLUDING ALARM NOTIFICATION AND FIRE DEPARTMENT NOTIFICATION.
3. SUPERVISORY:
   A CONDITION WHICH TYPICALLY RELATES TO AN ISSUE WITH A SYSTEM, PROCESS, OR EQUIPMENT THAT IS MONITORED BY THE FIRE ALARM SYSTEM. FOR EXAMPLE, SOMETHING LIKE A SPRINKLER VALVE BEING CLOSED (OUT OF NORMAL POSITION), LOW AIR PRESSURE IN A DRY-PIPE SYSTEM, FIRE PUMP CONDITION (LOSS OF POWER, ETC.)
4. TROUBLE:
   DETECTION OF A CONDITION WHICH TYPICALLY INDICATES AN ISSUE OR FAULT (SOMETHING HAS FAILED OR IS ABOUT TO FAIL) LIKE AN ELECTRICAL COMPONENT (POWER SUPPLY) FAILURE, BATTERY CHARGER FAILURE, A GROUBD FAULT, AN OPEN CIRCUT, OR OFF SITE MONITORING FAILURE, FOR EXAMPLE.
5. FACP TO NOTIFY PA/VMS SYSTEM OF PRE-RECORDED MESSAGES PLAYED IN ASSOCIATION WITH EMERGENCY RESPONSE MODES. VMS TO DISPLAY MESSAGE ACCORDINGLY. (WHERE ALLOWED BY THE AHJ)
6. COORDINATE I/O FOR EVS AND BMS.
7. FIRE ALARM SYSTEM MATRIX SHOWN IS FOR REFERENCE. DESIGNER SHALL DEVELOP STATION SPECIFIC MATRIX AND COORDINATE WITH RESPECTIVE DISCIPLINES AND EMERGENCY RESPONSE MATRIX.

CLEAN AGENT RESPONSE MATRIX - INPUTS

			CLEAN SYSTEM ACTIONS																										TO BUILDING FACP		VIA BMS
			ALARM AT CLEAN AGENT PANEL	VISUAL ALARMS (INTERIOR) ACTIVE	VISUAL ALARM (EXTERIOR) AGENT DISCHARG WHEN TIMER COMPLETE AND FOR MANUAL RELEASE	HORNS- INTERMITTAT PULSE AT 60 BEATS PER MINUTE	HORNS- INTERMITTAT PULSE AT 120 BEATS PER MINUTE	HORNS- CONSTANT WHEN TIMER COMPLETE AND FOR MANUAL RELEASE	30 SECOND AGENT DISCHARGE TIMER START	TIMER PUASE WHEN PRESSED AND RESET TO 30 SECONDS WHEN RELEASED	AGENT RELEASE IMMEDIATE	AGENT RELEASE WHEN TIMER COMPLETE	CLOSE FIRE/SMOKE DAMPERS	RELEASE DOOR CLOSER FOR ROOM (IF PROVIDED)	CLEAN AGENT PANEL SUPERVISORY ALARM	CLEAN AGENT PANEL TROUBLE ALARM	ALARM SIGNAL TO FACP	SUPERVISORY ALARM TO FACP	TROUBLE SIGNAL TO THE FACP	SHUT DOWN ROOM HVAC
INPUTS	ALARM	FIRST SMOKE DETECTOR	X	X		X							X	X				X		X										
		SECOND SMOKE DETECTOR	X	X	X	X	X	X	X			X	X	X			X		X											
		MANUAL RELEASE STATION	X	X	X		X	X			X		X	X			X		X											
		ABORT BUTTON (DEADMAN STYLE)								X																				
	SUPERVISORY	CLEAN AGENT SYSTEM SUPERVISORY													X				X											
		CYCLINDER ACTUATION DEVICE REMOVED													X				X											
		MAINTENANCE BYPASS KEY SWITCH													X				X											
		NOTIFICATION DEVICE BYPASS (PROGRAMMABLE BUTTON)													X				X											
		FIRE ALARM RELAY BYPASS (PROGRAMMABLE BUTTON)													X				X											
		AGENT PRESSURE SWITCH													X				X											
		ABORT BUTTON ACTIVE (NO ALARMS)													X				X											
	TROUBLE	CLEAN AGENT SYSTEM TROUBLE*															X				X									
		*ONLY ACTIVATES TROUBLE IF DISCHARGE COUNTDOWN IS INACTIVE																												

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEM DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

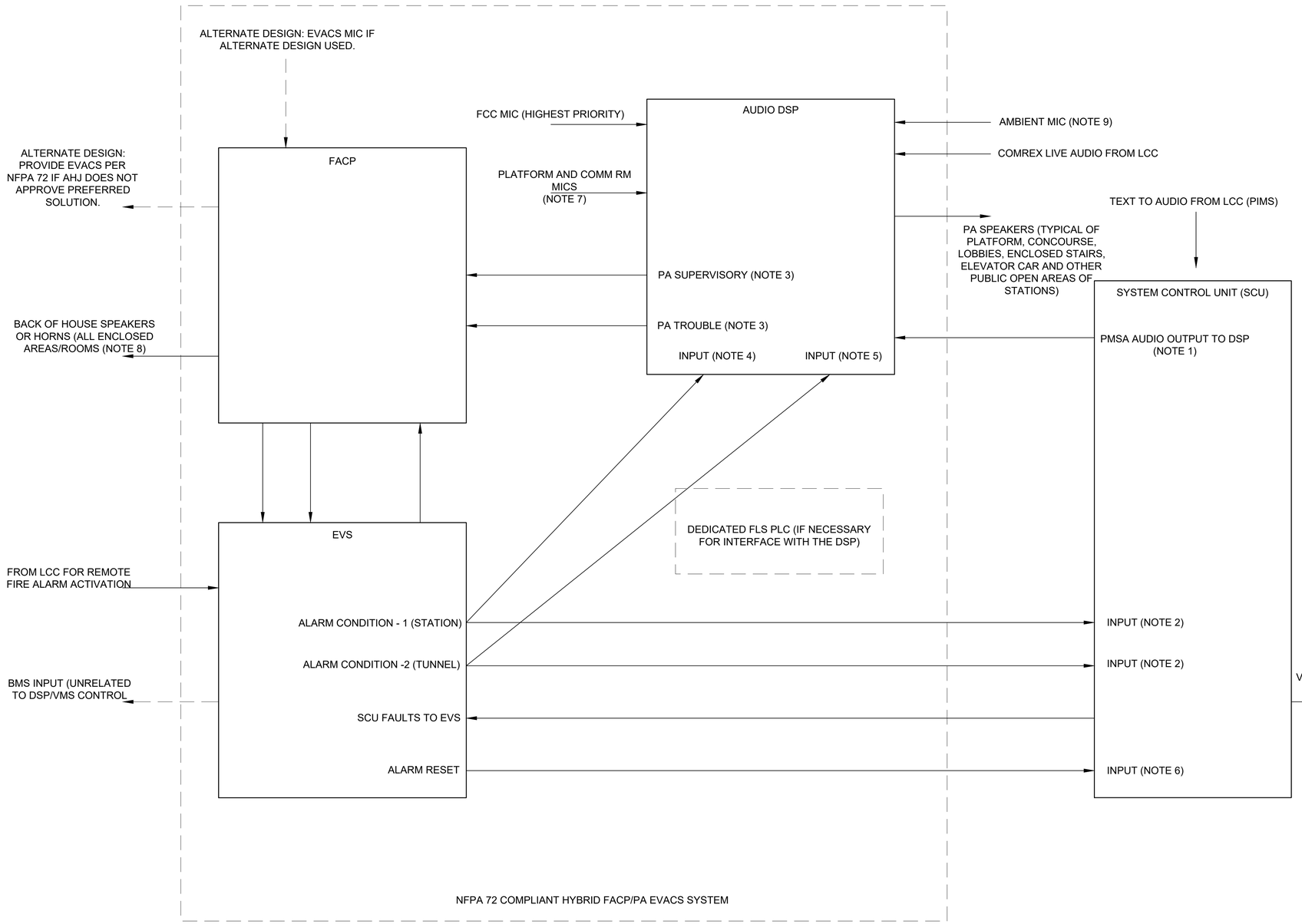
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-EFS202
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
FIRE LIFE SAFETY
FIRE ALARM CONTROL PANEL
SEQUENCE OF OPERATIONS

DRAWING No.: STD-EFS202
FACILITY ID:
SHEET No.: 2 REV:



GENERAL NOTES:

1. GENERAL: THIS INTERFACE DIAGRAM REPRESENTS THE ST PREFERRED SOLUTION. IF THIS APPROACH IS NOT POSSIBLE OR NOT ACCEPTABLE TO THE AHJ, PROVIDE A REDUNDANT EMERGENCY VOICE ALARM COMMUNICATION SYSTEM AS A COMPONENT OF THE FIRE ALARM SYSTEM PER NFPA 72 AND SIMPLY PRE-EMPT THE PA SYSTEM WHEN THE STATION IS IN ALARM. SEE REQUIREMENTS SET 601 FOR ADDITIONAL INFORMATION.
2. TEMPORAL TONE AND EMERGENCY VOICE MESSAGES ARE RESIDENT IN AUDIO DSP AND SIMPLY ENABLED DURING ALARM CONDITION. SEE THE PROJECT EMERGENCY RESPONSE MATRIX FOR MESSAGE LANGUAGE. REQUEST AUDIO FILES FROM ST.
3. VMS EMERGENCY MESSAGES ARE RESIDENT IN THE SCU.
4. AUDIO DSP INPUT PRIORITY AS FOLLOWS:
   - 4.1. FCC MIC
   - 4.2. OTHER LOCAL MICS
   - 4.3. RESIDENT TEMPORAL TONE AND EVACS
   - 4.4. LCC LIVE MESSAGES VIA COMMEX
   - 4.5. SCU NORMAL MESSAGE
5. AUDIO DSP FAULTS (SUPERVISORY AND TROUBLE ALARMS PER NFPA 72) MUST BE DIRECTLY MONITORED BY THE FACP VIA FACP SUPERVISED CIRCUITS. INDIRECT MONITORING THROUGH A DEDICATE FIRE/LIFE SAFETY PLC IS PERMITTED.
6. EVS INPUTS MAY BE DIRECT TO AUDIO PLC OR INDIRECT VIA A DEDICATED FLS PLC
7. THE FACP, EVS, FLS PLC, AND THE DSP SERVE AS THE EVACS FOR THE STATION. THE PLCS AND SCU MUST BE CONFIGURED TO FAIL SAFE TO FAVOR THIS FUNCTIONALITY. THE FLS PLC MUST BE E BE VERY SIMPLE AND DEDICATED TO THIS FUNCTION.

KEY NOTES:

1. PRE-EMPTED WHEN FACP IN ALARM
2. CHANGE VMS TO CORRESPONDING EMERGENCY MESSAGE (STATIC DISPLAY PREFERRED...NO SCROLLING)
3. SUMMARY ALARM FOR EACH CONDITION. SUPERVISORY: LOSS OF AC POWER AND NOTIFICATION CIRCUIT FAULT. TROUBLE: DSP AND AMPLIFIER FAULT. DIRECT FROM DSP TO FACP PREFERRED BU INDIRECT VIA PLC IS PERMITTED
4. FACP TO PLC INPUT FOR SCU PREEMPTION AND DSP LAUNCH. CONDITION 1 = STATION FIRE CONDITION OR HAZMAT
5. FACP TO PLC FOR SCU PREEMPTION AND DSP LAUNCH. CONDITION 2 = TUNNEL FIRE CONDITION
6. RESET DSP AND SCU AND RETURN TO SCU PMS AUDIO AND VMS MESSAGE
7. PLATFORM MICS FOR STATIONS SERVING MAJOR EVENT VENUES ONLY
8. TEMPORAL TONE ONLY - NO VES OR FACP MIC NEEDED
9. AMBIENT MIC AFFECTS SCU (PMS) AND COMREX LIVE AUDIO ONLY. TEMPORAL TONE AND EMERGENCY MESSAGES SOUND PRESSURE MUST BE STATIC AND REFLECT CODE REQUIRED SOUND PRESSURE.

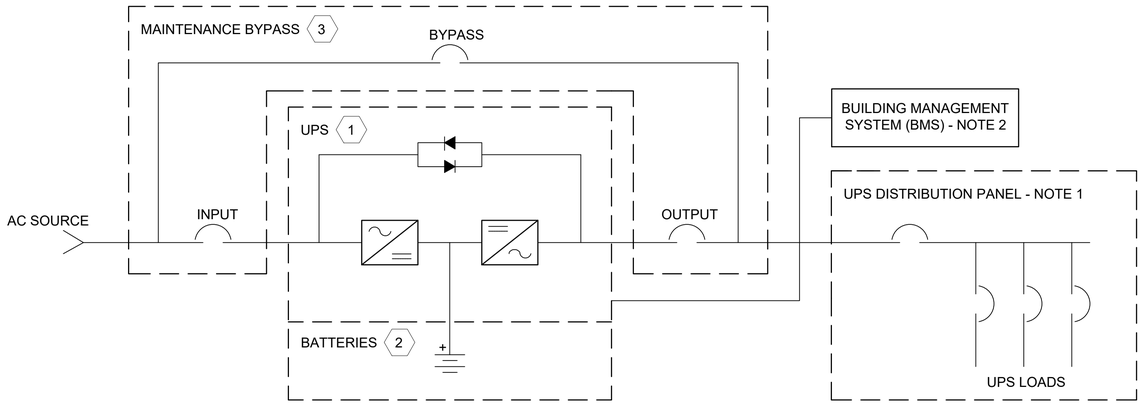
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
4	12/2024	----	----	----	REVISED DRAWING
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2018 GUIDANCE DWG REVISIONS - GENERAL UPDATE
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY: -
DRAWN BY: -
CHECKED BY: -
APPROVED BY: -
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-EFS204
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
FIRE LIFE SAFETY
TYPICAL STATION FACP/ DSP/PLC/EVS AND SCU INTERFACE BLOCK DIAGRAM - PREFERED OPTION

DRAWING No.: **STD-EFS204**
FACILITY ID: -
SHEET No.: - REV: 4

01/09/25 | 9:44 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-EFS204.DWG



UPS SCHEMATIC

GENERAL NOTES:

1. TABLE OUTLINES POWER SOURCE FOR KEY SYSTEMS AND EQUIPMENT AT A TYPICAL ST STATION.

NOTES:

1. EXTERNAL UPS DISTRIBUTION PANEL REQUIRED. NO DISTRIBUTION EQUIPMENT INSIDE UPS ENCLOSURE.
2. PROVIDE RELAY CARD WITH CONTACT CLOSURES TO BMS. SEE STD-JBS505 FOR TYPICAL POINTS REQUIRED. PROVIDE NETWORK CARD WITH BACnet CONNECTION TO TRAIN CONTROL NETWORK (TCN) SWITCH.

TYPICAL STATION EQUIPMENT - POWER SOURCE (GENERAL NOTE 1)

EQUIPMENT / SYSTEMS	STATION UPS	COMM UPS	DEDICATED BATTERY BACKUP	NOTES
LIGHTING				
EMERGENCY LIGHTS / EXIT SIGNS	X			
ESCALATOR SKIRT LIGHTS	X			
FIRE/LIFE SAFETY SYSTEMS				
FIRE ALARM CONTROL PANEL (FACP)			X	FACP ALSO INCLUDES LOCAL BATTERY PER NFPA 72
CLEAN AGENT (CAG) CONTROL PANEL			X	CAG ALSO INCLUDES LOCAL BATTERY PER NFPA 72
FIRE ALARM BOOSTER POWER SUPPLY FOR NOTIFICATION CIRCUITS			X	
OTHER FIRE RELEASING PANELS			X	PREACTION, DELUGE, ETC.
PUBLIC ADDRESS (PA) SYSTEM		X		PA EQUIPMENT INCLUDING CONTROLLERS, POWER SUPPLIES, AMPLIFIERS, COMMUNICATION EQUIPMENT
RADIO SYSTEMS			X	
VARIABLE MESSAGE SIGNS (VMS)		X		
OTHER				
QUAD RECEPTACLES IN FCC ROOM		X		RECEPTACLES USED FOR BMS, EVS, FIRE ALARM WORKSTATIONS
ELEVATOR AND ESCALATOR INDICATOR LIGHT		X		
POWER DISTRIBUTION				
AC / DC SWITCHGEAR CONTROLS			X	
SYSTEMS				
EMERGENCY VENTILATION SYSTEM (EVS)		X		EVS PROGRAMMABLE LOGIC CONTROLLERS (PLC), INPUT/OUTPUT MODULES, NETWORK SWITCHES, ROUTERS/COMMUNICATION EQUIPMENT
BUILDING MANAGEMENT SYSTEM (BMS)		X		BMS PROGRAMMABLE LOGIC CONTROLLERS (PLC), INPUT/OUTPUT MODULES, NETWORK SWITCHES, ROUTERS/COMMUNICATION EQUIPMENT
ACCESS CONTROL SYSTEM (ACS)		X		ACS CONTROLLERS, POWER SUPPLIES, COMMUNICATION EQUIPMENT
CCTV SYSTEM		X		CCTV EQUIPMENT INCLUDING CONTROLLERS, POWER SUPPLIES, COMMUNICATION EQUIPMENT
PASSENGER INFORMATION SYSTEMS (PIMS)		X		PIMS EQUIPMENT INCLUDING CONTROLLERS, POWER SUPPLIES, COMMUNICATION EQUIPMENT
DEVICES				
PASSENGER EMERGENCY TELEPHONES (PET)		X		
EMERGENCY TELEPHONES (ETEL)		X		
CUSTOMER EMERGENCY STATION (BLUE LIGHT)		X		

KEY EQUIPMENT CRITERIA

1	- ON-LINE DOUBLE CONVERSION UPS - UL924, UL1778 - MODULAR CONSTRUCTION WITH DRAW OUT ASSEMBLIES - STATIC BYPASS - LCD DISPLAY - RELAY CARD AND BACnet COMPATIBLE NETWORK ADAPTER
2	- EXTERNAL BATTERY CABINET - MODULAR BATTERY SYSTEM USING DC QUICK DISCONNECTS - VALVE REGULATED LEAD ACID (VRLA) BATTERIES - 90 MINUTE DURATION (MIN), SCALABLE - THERMAL RUNAWAY CONTROL
3	- EXTERNAL MAINTENACE BYPASS REQUIRED. WALL MOUNT PREFERRED, SIDECAR ACCEPTABLE.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
4	12/2024	----	----	----	REVISED DRAWING
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEM DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISION - GENERAL UPDATES
0	8/2017	----	----	----	GUIDANCE DRAWINGS

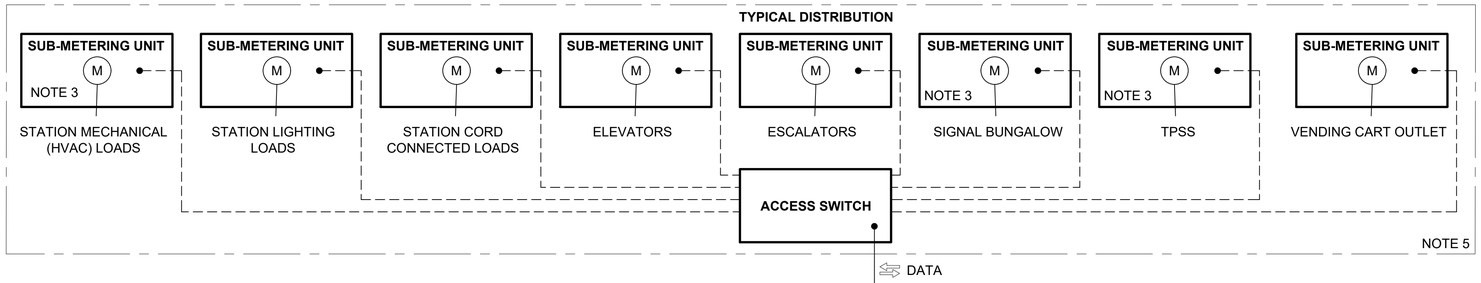
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-EPS101
CONTRACT No.: RTA/LR
DATE: 2/2024

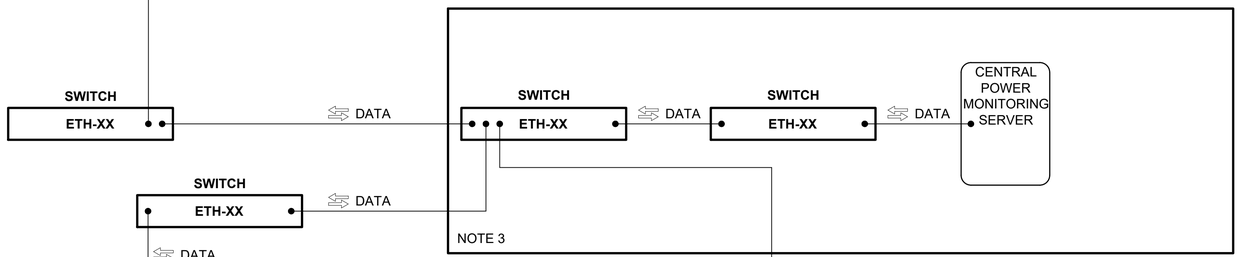
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
ELECTRICAL
EQUIPMENT POWER REQUIREMENT AND COMM STATION UPS CONTROL WIRING DIAGRAM

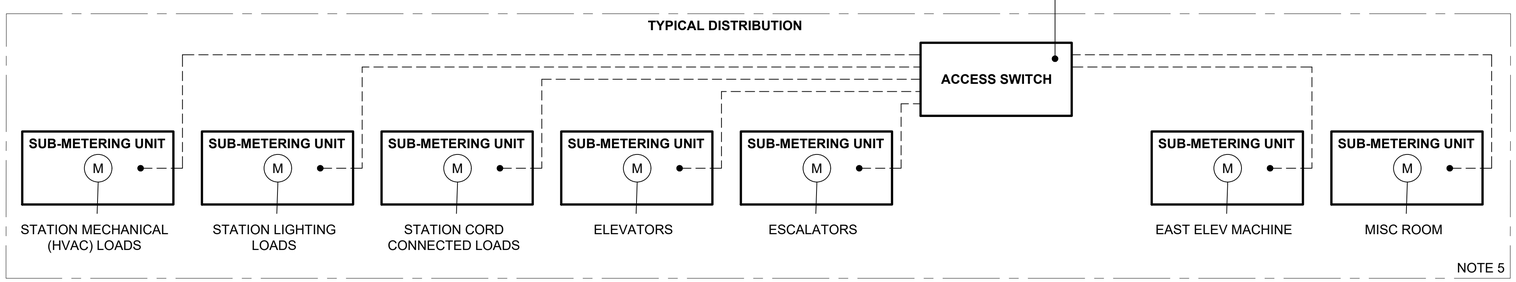
DRAWING No.: **STD-EPS101**
FACILITY ID:
SHEET No.: 4
REV:

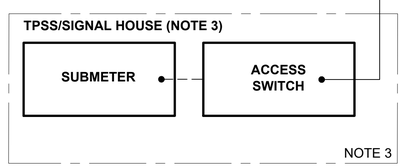
GENERAL NOTES:

1. THE INTERFACES SHOWN ARE TYPICAL FOR STATION ELECTRICAL SYSTEM SUB-METERING EQUIPMENT. FOR REQUIRED FUNCTIONALITY AND OPERATIONAL PARAMETERS, COORDINATE SPECIFIC FUNCTION WITH ST. NOT ALL IMPLEMENTATIONS WILL UTILIZE ALL THE COMPONENTS SHOWN.
2. SIGNAL COMMUNICATIONS BETWEEN CENTRAL POWER MONITORING SERVER AND METERING EQUIPMENT SHALL BE COORDINATED BY DESIGN TEAM, AS WELL AS PHYSICAL LOCATIONS.
3. IF SIGNALS OR TPSS POWER COMES FROM STATION POWER, AN ADDITIONAL SUBMETER IS REQUIRED.
4. FOLLOW APPLICABLE ENERGY CODE REQUIREMENTS FOR HVAC SYSTEM AND DOMESTIC HOT WATER (DHW) ENERGY USE.
5. SCHEMATIC IS SHOWN FOR CONCEPT AND GENERAL GROUPING OF DISTRIBUTION LOADS. END USE METERING IS DEPENDENT ON ELECTRICAL DESIGN AND MUST MEET APPLICABLE ENERGY CODES.









No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEM DIRECTIVE DRAWINGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JBS502
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

BUILDING MANAGEMENT SYSTEM
ENERGY MONITORING SYSTEM
DIAGRAM

DRAWING No.: **STD-JBS502**
FACILITY ID:
SHEET No.: 2
REV:

BMS-SCADA POINTS LIST

SYSTEM	EQUIPMENT TYPE	EQUIP ID	PLC I/O DESCRIPTION	POINT TYPE	PLC TAG		LOCAL BMS		REMOTE BMS SCADA (LCC)		NOTES
					TEMPLATE	EXAMPLE	INDICATE /ALARM INPUT	CONTROL OUTPUT	INDICATE /ALARM INPUT	CONTROL OUTPUT	
SECURITY	ACCESS CARD READER	ACR	ACR ROOM/DOOR OPEN	DI	LXX_ACR_ZZ_OPEN_DI	E09_ACR_06_OPEN_DI	X		X		
SECURITY	ACCESS CARD READER	ACR	ACR DOOR ALARM	DI	LXX_ACR_ZZ_ALARM_DI	N11_ACR_06_ALARM_DI	X		X		
SECURITY	ACCESS CARD READER	ACR	ACR REQUEST TO EXIT / UNLOCK	DO	LXX_ACR_ZZ_REX_DO	N09_ACR_07_REX_DO		X		X	
HVAC	AIR CONDITIONING UNIT	ACU	SUPPLY AIR TEMPERATURE	MB/TCP	LXX_ACU_ZZ_SA_TEMP_AI	E09_ACU_01_SA_TEMP_AI	X				
HVAC	AIR CONDITIONING UNIT	ACU	OUTSIDE AIR TEMPERATURE	MB/TCP	LXX_ACU_ZZ_OA_TEMP_AI	E09_ACU_01_OA_TEMP_AI	X				
HVAC	AIR CONDITIONING UNIT	ACU	RETURN AIR (DRY BULB) TEMPERATURE	MB/TCP	LXX_ACU_ZZ_RA_DB_TEMP_AI	E09_ACU_01_RA_DB_TEMP_AI	X				
HVAC	AIR CONDITIONING UNIT	ACU	RETURN AIR (WET BULB) TEMPERATURE	MB/TCP	LXX_ACU_ZZ_RA_WB_TEMP_AI	E09_ACU_01_RA_WB_TEMP_AI	X				
HVAC	AIR CONDITIONING UNIT	ACU	ROOM TEMPERATURE	AI	LXX_ACU_ZZ_THRM_YYYY_AI	E09_ACU_02_THRM_S10_AI	X		X		
HVAC	AIR CONDITIONING UNIT	ACU	FILTER DIFF PRESSURE HIGH / DIRTY	DI	LXX_ACU_ZZ_PRESS_N_HIGH_DI	N09_ACU_02_PRESS_2_HIGH_DI	X		X		
HVAC	AIR CONDITIONING UNIT	ACU	ZONE TEMPERATURE	MB/TCP	LXX_ACU_ZZ_ZONE_TEMP_AI	N07_ACU_01_ZONE_TEMP_AI	X				
HVAC	AIR CONDITIONING UNIT	ACU	ZONE TEMPERATURE SETPOINT	MB/TCP	LXX_ACU_ZZ_ZONE_TEMP_SP_AO	N07_ACU_01_ZONE_TEMP_SP_AO		X			
HVAC	AIR CONDITIONING UNIT	ACU	ACU RUNNING	DI	LXX_ACU_ZZ_RUNNING_DI	N09_ACU_02_RUNNING_DI	X		X		
HVAC	AIR CONDITIONING UNIT	ACU	ACU HOA SWITCH IN AUTO	DI	LXX_ACU_ZZ_IN_AUTO_DI	E09_ACU_02_IN_AUTO_DI	X				
HVAC	AIR CONDITIONING UNIT	ACU	ACU TROUBLE ALARM	DI	LXX_ACU_ZZ_TROUBLE_DI	N09_ACU_02_TROUBLE_DI	X		X		
HVAC	AIR CONDITIONING UNIT	ACU	ACU ENABLE COMMAND	DO	LXX_ACU_ZZ_ENABLE_DO	N11_ACU_03_ENABLE_DO		X			
HVAC	AIR CONDITIONING UNIT	ACU	ACU LEAD COMMAND	DO	LXX_ACU_ZZ_LEAD_DO	N07_ACU_02_LEAD_DO		X			
HVAC	AIR HANDLING UNIT	AHU	OUTSIDE AIR TEMPERATURE	MB/TCP	LXX_AHU_ZZ_OA_TEMP_AI		X				
HVAC	AIR HANDLING UNIT	AHU	SUPPLY AIR TEMPERATURE	MB/TCP	LXX_AHU_ZZ_SA_TEMP_AI		X				
HVAC	AIR HANDLING UNIT	AHU	VFD SPEED	MB/TCP	LXX_AHU_ZZ_VFD_SPD_AI		X				
HVAC	AIR HANDLING UNIT	AHU	OUTSIDE AIR DAMPER POSITION	MB/TCP	LXX_AHU_ZZ_OA_DMP_POS_AI		X				
HVAC	AIR HANDLING UNIT	AHU	EXHAUST AIR DAMPER POSITION	MB/TCP	LXX_AHU_ZZ_EA_DMP_POS_AI		X				
HVAC	AIR HANDLING UNIT	AHU	RETURN AIR DAMPER POSITION	MB/TCP	LXX_AHU_ZZ_RA_DMP_POS_AI		X				
HVAC	AIR HANDLING UNIT	AHU	AVERAGE ZONE TEMP	MB/TCP	LXX_AHU_ZZ_ZONE_TEMP_AI		X				
HVAC	AIR HANDLING UNIT	AHU	AHU RUNNING	DI	LXX_AHU_ZZ_RUNNING_DI	N09_AHU_03_RUNNING_DI	X		X		
HVAC	AIR HANDLING UNIT	AHU	VFD FAULT	MB/TCP	LXX_AHU_ZZ_VFD_FAULT_DI		X		X		
HVAC	AIR HANDLING UNIT	AHU	VFD READY	MB/TCP	LXX_AHU_ZZ_VFD_RDY_DI		X				
HVAC	AIR HANDLING UNIT	AHU	FILTER DIFF PRESSURE HIGH / DIRTY	DI	LXX_AHU_ZZ_PRESS_N_HIGH_DI	N07_AHU_01_PRESS_1_HIGH_DI	X		X		
HVAC	AIR HANDLING UNIT	AHU	AHU TROUBLE ALARM	DI	LXX_AHU_ZZ_TROUBLE_DI	N11_AHU_01_TROUBLE_DI	X		X		
HVAC	AIR HANDLING UNIT	AHU	SUPPLY AIR TEMPERATURE SETPOINT	MB/TCP	LXX_AHU_ZZ_SA_TEMP_SP_AO			X			
HVAC	AIR HANDLING UNIT	AHU	AHU ENABLE COMMAND	DO	LXX_AHU_ZZ_ENABLE_DO	N09_AHU_02_ENABLE_DO		X			
BMS	BMS PLC / REMOTE IO	PLC	POWER SUPPLY FAIL	DI	LXX_PLC_ZZ_PSFAIL_DI		X		X		
BMS	BMS PLC / REMOTE IO	PLC	RACK/SLOT OK	DI	LXX_PLC_ZZ_RACKSLT_STATUS_DI		X		X		
BMS	BMS PLC / REMOTE IO	PLC	RACK/SLOT POWER	DI	LXX_PLC_ZZ_RACKPWR_STATUS_DI		X				
BMS	BMS PLC / REMOTE IO	PLC	HARDWARE STATUS	DI	LXX_PLC_ZZ_CPU_STATUS_DI		X				
BMS	BMS PLC / REMOTE IO	PLC	HEARTBEAT EVS	DI	LXX_PLC_ZZ_HB_DI		X				
HVAC	CHILLER PRESSURE TRANSMITTER	PT	CHILLED WATER PRESSURE TRANSMITTER	AI	LXX_PT_ZZ_PRESSURE_AI	N07_PT_07_PRESSURE_AI	X		X		
SECURITY	DOOR INTRUSION DEVICE	DID	DOOR OPEN INTRUSION ALARM	DI	LXX_DID_ZZ_OPEN_DI	N09_DID_28_OPEN_DI	X		X		
ELEC	ELECTRICAL SWITCHGEAR	SWGR	MAIN BREAKER OPEN	DI	LXX_SWGR_ZZ_MAIN_OPEN_DI	E03_SWGR_01_MAIN_OPEN_DI	X		X		
ELEC	ELECTRICAL SWITCHGEAR	SWGR	MAIN BREAKER CLOSED	DI	LXX_SWGR_ZZ_MAIN_CLOSED_DI	E03_SWGR_01_MAIN_CLOSED_DI	X		X		
ELEC	ELECTRICAL SWITCHGEAR	SWGR	GENERATOR BREAKER OPEN	DI	LXX_SWGR_ZZ_GBKR_OPEN_DI	E03_SWGR_01_GBKR_OPEN_DI	X		X		
ELEC	ELECTRICAL SWITCHGEAR	SWGR	GENERATOR BREAKER CLOSED	DI	LXX_SWGR_ZZ_GBKR_CLOSED_DI	E03_SWGR_01_GBKR_CLOSED_DI	X		X		
ELEC	ELECTRICAL SWITCHGEAR	SWGR	MAIN BREAKER REMOTE CLOSE COMMAND	DO	LXX_SWGR_ZZ_MAIN_CLOSE_DO	E03_SWGR_01_MAIN_CLOSE_DO		X		X	
ELEC	ELECTRICAL SWITCHGEAR	SWGR	MAIN BREAKER REMOTE TRIP COMMAND	DO	LXX_SWGR_ZZ_MAIN_TRIP_DO	E03_SWGR_01_MAIN_TRIP_DO		X		X	
ELEC	ELECTRICAL SWITCHGEAR	SWGR	GENERATOR BREAKER REMOTE CLOSE COMMAND	DO	LXX_SWGR_ZZ_GBKR_CLOSE_DO	E03_SWGR_01_GBKR_CLOSE_DO		X		X	
ELEC	ELECTRICAL SWITCHGEAR	SWGR	GENERATOR BREAKER REMOTE TRIP COMMAND	DO	LXX_SWGR_ZZ_GBKR_TRIP_DO	E03_SWGR_01_GBKR_TRIP_DO		X		X	
PLUMB	AUTOMATIC DRAIN VALVE	ADV	VALVE POSITION	AI	LXX_ADV_ZZ_POSITION _AI	N25_ADV_ZZ_POSITION _AI	X		X		FOR THREE WAY VALVES, COORDINATE INPUT SIGNAL WITH VALVE POSITION
PLUMB	AUTOMATIC DRAIN VALVE	ADV	VALVE TROUBLE/FAULT	DI	LXX_ADV_ZZ_FAULT_DI	N25_ADV_ZZ_FAULT_DI	X		X		
PLUMB	AUTOMATIC DRAIN VALVE	ADV	VALVE MANUAL OVERRIDE	DI	LXX_ADV_ZZ_OVERRIDE_DI	N25_ADV_ZZ_OVERRIDE_DI					LOCAL PUSHBUTTON TO OVERRIDE VALVE TO SUPPLY
PLUMB	AUTOMATIC DRAIN VALVE	ADV	VALVE SUPPLY COMMAND	DO	LXX_ADV_ZZ_SUPPLY_DO	N25_ADV_ZZ_SUPPLY_DO		X		X	

GENERAL NOTES:

1. CONTRACTOR RESPONSIBLE TO PROVIDE A COMPLETE POINTS AND SIDT LIST BASED ON EQUIPMENT TO BE INSTALLED AT EACH FACILITY. EACH TYPICAL EQUIPMENT TYPE MAY NOT BE REQUIRED AT A FACILITY.
2. THIS IS A SAMPLE POINTS LIST, ADDITIONAL POINTS MAY BE REQUIRED TO IMPLEMENT A WORKING SYSTEM. DESIGNER TO COORDINATE MINIMUM LIST FOR CONTRACT SPECIFIC LIST.
3. PROVIDE SOFT I/O POINTS AS REQUIRED TO MEET THE FUNCTIONAL REQUIREMENTS OF EQUIPMENT WITH A COMMUNICATIONS INTERFACE.
4. PROVIDE MAP OF ALL ADDRESS INFORMATION FOR LOCAL BMS HMI AND REMOTE SCADA LCC INTERFACE. DEMONSTRATE MAPPING AND CROSS-REFERENCE INFORMATION IS CORRECT.
5. CONTRACTOR SHALL PROVIDE 25% HARDWARE I/O SPARES.
6. DESIGNER TO DETERMINE WHICH POINTS ARE SUPERVISED CIRCUITS FROM FACP.
7. DESIGNER TO COORDINATE POINTS WITH ALL SEQUENCE OF OPERATIONS, INCLUDING BUT NOT LIMITED TO MECHANICAL, ELECTRICAL, FIRE ALARM AND COMMUNICATIONS SYSTEMS.
8. BDA POINTS WIRED TO FACP FOR ALL OTHER FACILITIES.

TAG LEGEND

L	LINK SEGEMENT {C-CENTERAL, N-NORTH, S-SOUTH, E-EAST}
XX	STATION/ FACILITY NUMBER {01, 03, 05 ETC.}
ZZ	EQUIPMENT/ DEVICE NUMBER
YY	ROOM/ LOCATION ID
N	NUMBER INSTANCE

No.	DATE	DSN	CHK	APP	REVISION
4	12/2024				REVISED DRAWING
3	2/2024				2024 REVISED STANDARD DRAWINGS
2	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019				2019 GUIDANCE DW REVISIONS - GENERAL UPDATE
0	8/2017				GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JBS503
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
BUILDING MANAGEMENT SYSTEM
BMS SUMMARY INDICATIONS

DRAWING No.: **STD-JBS503**
FACILITY ID:
SHEET No.: 4
REV:

BMS-SCADA POINTS LIST (CONT)

SYSTEM	EQUIPMENT TYPE	EQUIP ID	PLC I/O DESCRIPTION	POINT TYPE	PLC TAG		LOCAL BMS		REMOTE BMS SCADA (LCC)		NOTES
					TEMPLATE	EXAMPLE	INDICATE /ALARM INPUT	CONTROL OUTPUT	INDICATE /ALARM INPUT	CONTROL OUTPUT	
HVAC	EXHAUST FAN	EFAN	EXHAUST FAN RUNNING	DI	LXX_EFAN_ZZ_RUNNING_DI	N07_EFAN_01_RUNNING_DI	X		X		
HVAC	EXHAUST FAN	EFAN	DIFFERENTIAL PRESSURE SWITCH LOW	DI	LXX_EFAN_ZZ_PRESS_LOW_DI	N07_EFAN_01_PRESS_LOW_DI	X		X		
HVAC	EXHAUST FAN	EFAN	EXHAUST FAN FAULT	DI	LXX_EFAN_ZZ_FAULT_DI	N07_EFAN_01_FAULT_DI	X		X		
HVAC	EXHAUST FAN	EFAN	AIR FLOW SWITCH	DI	LXX_EFAN_ZZ_FLOW_DI		X		X		FOR UPS ROOM - FAN DISCHARGE DUCT
HVAC	EXHAUST FAN	EFAN	EXHAUST FAN CALL TO RUN	DO	LXX_EFAN_ZZ_CALL_RUN_DO	N07_EFAN_01_CALL_RUN_DO		X			
EVS	EVS PLC	PLC	EVS PLC STATUS	DI	LXX_EVS_ZZ_PLC_OK_DI	N07_EVS_PLC_OK_DI	X		X		
FIRE	FIRE ALARM	FACP	HAZMAT INDICATION	DI	LXX_FACP_ZZ_HAZMAT_DI	N07_FACP_01_HAZMAT_DI	X		X		
FIRE	FIRE ALARM	FACP	STATION FIRE ALARM ACTIVE (BOH)	DI	LXX_FACP_ZZ_ALARM_DI	N07_FACP_01_ALARM_DI	X		X		
FIRE	FIRE ALARM	FACP	PLATFORM ZONE ALARM ACTIVE	DO	LXX_FACP_ZZ_PLATFORM_NN_DI	N07_FACP_01_PLATFORM_01_DI	X		X		
FIRE	FIRE ALARM	FACP	ERM MODE LXX_MM ACTIVE	DO	LXX_FACP_ZZ_MODE_LXX_MM_DI	N09_FACP_01_MODE_N06_11_DI	X		X		Quantity and designation of EVS Modes are specified by the ERM for each Station
FIRE	FIRE/SMOKE DAMPERS	FSD	DAMPER OPEN	DI	LXX_FSD_ZZ_OPEN_DI	N09_FSD_55_OPEN_DI	X		X		
FIRE	FIRE/SMOKE DAMPERS	FSD	DAMPER CLOSED	DI	LXX_FSD_ZZ_CLOSED_DI	N09_FSD_55_CLOSED_DI	X		X		
PLUMB	HEAT TRACE CONTROLLER	HTCC	HEAT TRACE CONTROLLER FAULT	DI	LXX_HTCC_ZZ_FAULT_DI		X				
HVAC	HYDROGEN GAS SENSOR	HGS	HYDROGEN LEVEL HIGH ALARM	DI	LXX_HGS_ZZ_HAH_DI	N07_HGS_02_HAH_DI	X		X		
HVAC	HYDROGEN GAS SENSOR	HGS	HYDROGEN LEVEL HIGH-HIGH ALARM	DI	LXX_HGS_ZZ_HAHH_DI	N07_HGS_02_HAHH_DI	X		X		
HVAC	HYDROGEN GAS SENSOR	HGS	HYDROGEN ALARM BEACON INSIDE ROOM	DO	LXX_HB_ZZA_HAHH_DI	N07_HB_02A_HAHH_DO		X			
HVAC	HYDROGEN GAS SENSOR	HGS	HYDROGEN ALARM BEACON OUTSIDE ROOM	DO	LXX_HB_ZZB_HAHH_DI	N07_HB_02B_HAHH_DO		X			

GENERAL NOTES:

1. CONTRACTOR RESPONSIBLE TO PROVIDE A COMPLETE POINTS AND SIDT LIST BASED ON EQUIPMENT TO BE INSTALLED AT EACH FACILITY. EACH TYPICAL EQUIPMENT TYPE MAY NOT BE REQUIRED AT A FACILITY.
2. THIS IS A SAMPLE POINTS LIST, ADDITIONAL POINTS MAY BE REQUIRED TO IMPLEMENT A WORKING SYSTEM. DESIGNER TO COORDINATE MINIMUM LIST FOR CONTRACT SPECIFIC LIST.
3. PROVIDE SOFT I/O POINTS AS REQUIRED TO MEET THE FUNCTIONAL REQUIREMENTS OF EQUIPMENT WITH A COMMUNICATIONS INTERFACE.
4. PROVIDE MAP OF ALL ADDRESS INFORMATION FOR LOCAL BMS HMI AND REMOTE SCADA LCC INTERFACE. DEMONSTRATE MAPPING AND CROSS-REFERENCE INFORMATION IS CORRECT.
5. CONTRACTOR SHALL PROVIDE 25% HARDWARE I/O SPARES.
6. DESIGNER TO DETERMINE WHICH POINTS ARE SUPERVISED CIRCUITS FROM FACP.
7. DESIGNER TO COORDINATE POINTS WITH ALL SEQUENCE OF OPERATIONS, INCLUDING BUT NOT LIMITED TO MECHANICAL, ELECTRICAL, FIRE ALARM AND COMMUNICATIONS SYSTEMS.
8. BDA POINTS WIRED TO FACP FOR ALL OTHER FACILITIES.

TAG LEGEND

L	LINK SEGEMENT {C-CENTERAL, N-NORTH, S-SOUTH, E-EAST}
XX	STATION/ FACILITY NUMBER {01, 03, 05 ETC.}
ZZ	EQUIPMENT/ DEVICE NUMBER
YY	ROOM/ LOCATION ID
N	NUMBER INSTANCE

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEM DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

LINE IS 1" AT FULL SCALE

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

SCALE: NTS
FILENAME: STD-JBS504
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
BUILDING MANAGEMENT SYSTEM
BMS SUMMARY INDICATIONS

DRAWING No.: **STD-JBS504**
FACILITY ID:
SHEET No.: 3 REV:

BMS-SCADA POINTS LIST (CONT)

SYSTEM	EQUIPMENT TYPE	EQUIP ID	PLC I/O DESCRIPTION	POINT TYPE	PLC TAG		LOCAL BMS		REMOTE BMS SCADA (LCC)		NOTES
					TEMPLATE	EXAMPLE	INDICATE /ALARM INPUT	CONTROL OUTPUT	INDICATE /ALARM INPUT	CONTROL OUTPUT	
LIGHTING	LIGHTING CONTROL PANEL	LCP	LCP REVENUE PERIOD LIGHTS ON COMMAND	DO	LXX_LCP_ZZ_REVENUE_ON_DO	N11_LCP_05_REVENUE_ON_DO		X			
LIGHTING	LIGHTING CONTROL PANEL	LCP	LCP EXTERIOR LIGHTS ON COMMAND	DO	LXX_LCP_ZZ_EXT_LIGHTS_ON_DO	N09_LCP_B2S2_EXT_LIGHTS_ON_DO		X		X	
LIGHTING	LIGHTING CONTROL PANEL	LCP	LCP INTERIOR LIGHTS ON COMMAND	DO	LXX_LCP_ZZ_INT_LIGHTS_ON_DO	N09_LCP_B2S2_INT_LIGHTS_ON_DO		X		X	
HVAC	MOTORIZED DAMPER	MDPR	DAMPER POSITION COMMAND	AO	LXX_MDPR_ZZ_POSITION_AO	N09_MDPR_02_POSITION_AO		X			FOR MODULATING UNITS
HVAC	MOTORIZED DAMPER	MDPR	DAMPER POSITION	AI	LXX_MDPR_ZZ_POSITION_AI	N09_MDPR_02_POSITION_AI	X				FOR MODULATING UNITS
HVAC	MOTORIZED DAMPER	MDPR	DAMPER OPEN	DI	LXX_MDPR_ZZ_OPEN_DI	N09_MDPR_01_OPEN_DI	X				
HVAC	MOTORIZED DAMPER	MDPR	DAMPER CLOSED	DI	LXX_MDPR_ZZ_CLOSED_DI	N09_MDPR_01_CLOSED_DI	X				
HVAC	MOTORIZED DAMPER	MDPR	DAMPER CALL OPEN COMMAND	DO	LXX_MDPR_ZZ_CALL_OPEN_DO	N09_MDPR_01_CALL_OPEN_DO		X			FOR NORMALLY CLOSED UNITS
HVAC	MOTORIZED DAMPER	MDPR	DAMPER CALL CLOSE COMMAND	DO	LXX_MDPR_ZZ_CALL_CLOSE_DO	N09_MDPR_01_CALL_CLOSE_DO		X			FOR NORMALLY OPEN UNITS
COMMS	NETWORK VIDEO RECORDER	NVR	NVR FAULT	DI	LXX_NVR_ZZ_FAULT_DI		X		X		
SECURITY	OH COILING DOOR/ROLL-UP GRILLE	RD/GRL	OPEN	DI	LXX_RD/GRL_ZZ_OPEN_DI	N09_RD_03_OPEN_DI	X		X		
SECURITY	OH COILING DOOR/ROLL-UP GRILLE	RD/GRL	CLOSED	DI	LXX_RD/GRL_ZZ_CLOSED_DI	N09_RD_03_CLOSED_DI	X		X		
SECURITY	OH COILING DOOR/ROLL-UP GRILLE	RD/GRL	INTRUSION ALARM	DI	LXX_RD/GRL_ZZ_DID_DI		X				
SECURITY	OH COILING DOOR/ROLL-UP GRILLE	RD/GRL	PERMISSIVE COMMAND	DO	LXX_RD/GRL_ZZ_PERM_DO	N09_RD_03_PERM_DO		X			
SECURITY	OH COILING DOOR/ROLL-UP GRILLE	RD/GRL	OPEN COMMAND	DO	LXX_RD/GRL_ZZ_OPEN_DO	N09_RD_03_OPEN_DO		X		X	
SECURITY	OH COILING DOOR/ROLL-UP GRILLE	RD/GRL	CLOSE COMMAND	DO	LXX_RD/GRL_ZZ_CLOSE_DO	N09_RD_03_CLOSE_DO		X			
BMS	PLC DC POWER SUPPLY	PS	POWER SUPPLY FAIL A	DI	LXX_PLC_ZZA_PSFAIL_DI		X		X		
BMS	PLC DC POWER SUPPLY	PS	POWER SUPPLY FAIL B	DI	LXX_PLC_ZZB_PSFAIL_DI		X		X		
COMMS	RADIO BI-DIRECTIONAL AMPLIFIER	BDA	BDA ANTENNA FAILURE ALARM	DI	LXX_BDA_ZZ_ANT_FAIL_DI		X				STATIONS ONLY (Note 8)
COMMS	RADIO BI-DIRECTIONAL AMPLIFIER	BDA	BDA FAILURE ALARM	DI	LXX_BDA_ZZ_FAIL_DI		X		X		STATIONS ONLY (Note 8)
COMMS	RADIO BI-DIRECTIONAL AMPLIFIER	BDA	BDA AC POWER SUPPLY FAILURE	DI	LXX_BDA_ZZ_ACPWR_FAIL_DI		X				STATIONS ONLY (Note 8)
COMMS	RADIO BI-DIRECTIONAL AMPLIFIER	BDA	BDA BATTERY CHARGER FAILURE	DI	LXX_BDA_ZZ_BATT_CHG_FAIL_DI		X				STATIONS ONLY (Note 8)
COMMS	RADIO BI-DIRECTIONAL AMPLIFIER	BDA	BDA BATTERY CAPACITY LOW	DI	LXX_BDA_ZZ_BATT_LOW_DI		X				STATIONS ONLY (Note 8)
HVAC	ROOM HEATER	HTR	HEATER CALL ON COMMAND	DO	LXX_HTR_ZZ_CALL_ON_DO	N09_HTR_06_CALL_ON_DO		X			
HVAC	ROOM TEMPERATURE SENSOR	THRM	ROOM TEMPERATURE	AI	LXX_THRM_YYYY_TEMP_AI	N09_THRM_B218_TEMP_AI	X		X		
PLUMB	SUMP PUMP CONTROLLER	SPC	SUMP HIGH HIGH LEVEL ALARM	DI	LXX_SPC_ZZ_LEVEL_HIGH_DI	N09_SPC_01_LEVEL_HIGH_DI	X		X		
PLUMB	SUMP PUMP CONTROLLER	SPC	SUMP PUMP CONTROLLER TROUBLE ALARM	DI	LXX_SPC_ZZ_FAULT_DI	N09_SPC_01_FAULT_DI	X		X		
HVAC	SUPPLY FAN	SFAN	SFAN HOA SWITCH IN AUTO	AO	LXX_SFAN_ZZ_IN_AUTO_DI	N09_SFAN_03_IN_AUTO_DI	X				
HVAC	SUPPLY FAN	SFAN	SFAN VFD SPEED COMMAND	AO	LXX_SFAN_ZZ_SPEED_AO	N09_SFAN_03_SPEED_AO		X			
HVAC	SUPPLY FAN	SFAN	SUPPLY FAN RUNNING STATUS	DI	LXX_SFAN_ZZ_RUNNING_DI	N09_SFAN_03_RUNNING_DI	X		X		
HVAC	SUPPLY FAN	SFAN	SUPPLY FAN CALL TO RUN	DO	LXX_SFAN_ZZ_CALL_RUN_DO	N07_SFAN_03_CALL_RUN_DO		X			
HVAC	SUPPLY FAN	SFAN	SFAN DIFFERENTIAL PRESSURE SWITCH LOW	DI	LXX_SFAN_ZZ_PRESS_LOW_DI	N07_SFAN_02_PRESS_LOW_DI	X		X		
HVAC	SUPPLY FAN	SFAN	SFAN CONTROLLER FAULT	DI	LXX_SFAN_ZZ_FAULT_DI	N09_SFAN_03_FAULT_DI	X		X		
ELEC	UNINTERRUPTIBLE POWER SUPPLY	UPS	UPS ACTIVE	DI	LXX_UPS_ZZ_ACTIVE_DI	E03_UPS_01_ACTIVE_DI	X		X		
ELEC	UNINTERRUPTIBLE POWER SUPPLY	UPS	UPS READY	DI	LXX_UPS_ZZ_READY_DI	E03_UPS_01_READY_DI	X		X		FOR FUTURE USE: PROVIDE CONDUCTORS, DO NOT TERMINATE
ELEC	UNINTERRUPTIBLE POWER SUPPLY	UPS	UPS LOAD ON BYPASS	DI	LXX_UPS_ZZ_BYPASS_DI	E03_UPS_01_BYPASS_DI	X		X		
ELEC	UNINTERRUPTIBLE POWER SUPPLY	UPS	UPS SUMMARY ALARM	DI	LXX_UPS_ZZ_ALARM_DI	E03_UPS_01_ALARM_DI	X		X		
ELEC	UNINTERRUPTIBLE POWER SUPPLY	UPS	UPS MAINTENANCE BYPASS CLOSED	DI	LXX_UPS_ZZ_MAINT_DI	E03_UPS_01_MAINT_DI	X				
HVAC	VARIABLE AIR VOLUME CONTROLLER	VAV	VAV TEMPERATURE SETPOINT	AO	LXX_VAV_ZZ_TEMP_SP_AO	N11_VAV_03_TEMP_SP_AO		X			
HVAC	VARIABLE AIR VOLUME CONTROLLER	VAV	VAV TROUBLE ALARM	DI	LXX_VAV_ZZ_TROUBLE_DI	N11_VAV_03_TROUBLE_DI	X		X		

GENERAL NOTES:

1. CONTRACTOR RESPONSIBLE TO PROVIDE A COMPLETE POINTS AND SIDT LIST BASED ON EQUIPMENT TO BE INSTALLED AT EACH FACILITY. EACH TYPICAL EQUIPMENT TYPE MAY NOT BE REQUIRED AT A FACILITY.
2. THIS IS A SAMPLE POINTS LIST, ADDITIONAL POINTS MAY BE REQUIRED TO IMPLEMENT A WORKING SYSTEM. DESIGNER TO COORDINATE MINIMUM LIST FOR CONTRACT SPECIFIC LIST.
3. PROVIDE SOFT I/O POINTS AS REQUIRED TO MEET THE FUNCTIONAL REQUIREMENTS OF EQUIPMENT WITH A COMMUNICATIONS INTERFACE.
4. PROVIDE MAP OF ALL ADDRESS INFORMATION FOR LOCAL BMS HMI AND REMOTE SCADA LCC INTERFACE. DEMONSTRATE MAPPING AND CROSS-REFERENCE INFORMATION IS CORRECT.
5. CONTRACTOR SHALL PROVIDE 25% HARDWARE I/O SPARES.
6. DESIGNER TO DETERMINE WHICH POINTS ARE SUPERVISED CIRCUITS FROM FACP.
7. DESIGNER TO COORDINATE POINTS WITH ALL SEQUENCE OF OPERATIONS, INCLUDING BUT NOT LIMITED TO MECHANICAL, ELECTRICAL, FIRE ALARM AND COMMUNICATIONS SYSTEMS.
8. BDA POINTS WIRED TO FACP FOR ALL OTHER FACILITIES.

TAG LEGEND

L	LINK SEGMENT {C-CENTRAL, N-NORTH, S-SOUTH, E-EAST}
XX	STATION/ FACILITY NUMBER {01, 03, 05 ETC.}
ZZ	EQUIPMENT/ DEVICE NUMBER
YY	ROOM/ LOCATION ID
N	NUMBER INSTANCE

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISION - GENERAL UPDATE
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JBS505
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
BUILDING MANAGEMENT SYSTEM
BMS SUMMARY INDICATIONS

DRAWING No.: STD-JBS505
FACILITY ID:
SHEET No.: 3
REV:

EVS-SCADA POINTS LIST

SYSTEM	EQUIPMENT TYPE	EQUIP ID	PLC I/O DESCRIPTION	POINT TYPE	PLC TAG		LOCAL EVS		REMOTE SCADA (LCC)		NOTES
					TEMPLATE	EXAMPLE	INDICATE /ALARM INPUT	CONTROL OUTPUT	INDICATE /ALARM INPUT	CONTROL OUTPUT	
BMS	BMS STATUS	BMS	BMS UPS OK FROM BMS PLC	DI	LXX_BMS_UPS_OK_DI		X		X		
BMS	BMS STATUS	BMS	VENTILATION EQUIPMENT FAULT ALARM FROM BMS PLC	DI	LXX_BMS_VENT_ALARM_DI		X		X		
BMS	BMS STATUS	BMS	EVS PLC STATUS TO BMS	DO	LXX_EVS_PLC_OK_DO			X	X		
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ LOCAL CONTROL MODE SWITCH	DI	LXX_EMBD_ZZ_LOCAL_MODE_DI	N09_EMBD_05_LOCAL_MODE_DI	X		X		
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ CALL OPEN COMMAND	DO	LXX_EMBD_ZZ_CALL_OPEN_DO	N09_EMBD_02_CALL_OPEN_DI		X		X	USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ CALL CLOSE COMMAND	DO	LXX_EMBD_ZZ_CALL_CLOSE_DO	N09_EMBD_05_CALL_CLOSE_DI		X		X	USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ SECTION N ACTUATOR FULLY OPEN	DI	LXX_EMBD_ZZ_SNA_OPEN_DI	N09_EMBD_02_S2A_OPEN_DI	X				USE FOR FAIL CLOSE DAMPER
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ SECTION N ACTUATOR FULLY CLOSED	DI	LXX_EMBD_ZZ_SNA_CLOSED_DI	N09_EMBD_05_S1A_CLOSED_DI	X				USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ SECTION N FULLY OPEN	DI	LXX_EMBD_ZZ_SN_OPEN_DI	N09_EMBD_05_S1_OPEN_DI	X		X		
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ SECTION N FULLY CLOSED	DI	LXX_EMBD_ZZ_SN_CLOSED_DI	N09_EMBD_05_S1_CLOSED_DI	X		X		
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ SECTION N FULLY OPEN INDICATION	DO	LXX_EMBD_ZZ_SN_OPEN_IND_DO	N09_EMBD_05_S1_OPEN_IND_DO		X			USE FOR LOCAL EVCP PANEL LIGHTS
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ SECTION N FULLY CLOSED INDICATION	DO	LXX_EMBD_ZZ_SN_CLOSED_IND_DO	N09_EMBD_05_S1_CLOSED_IND_DO		X			USE FOR LOCAL EVCP PANEL LIGHTS
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ EMERGENCY MODE COMMAND	DO	LXX_EMBD_ZZ_EMERG_MODE_DO	N09_EMBD_05_EMERG_MODE_DO		X			
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ LOCAL OPEN REQUEST SWITCH	DI	LXX_EMBD_ZZ_LOCAL_OPEN_REQ_DI	N09_EMBD_02_LOCAL_OPEN_REQ_DI	X				USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY BYPASS DAMPER	EMBD	DAMPER ZZ LOCAL CLOSE REQUEST SWITCH	DI	LXX_EMBD_ZZ_LOCAL_CLOSE_REQ_DI	N09_EMBD_05_LOCAL_CLOSE_REQ_DI	X				USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY FAN	EMFN	FAN ZZ EXHAUST CONTACTOR ENERGIZED (FORWARD)	DI	LXX_EMFN_ZZ_EXH_RUN_DI	N09_EMFN_01_EXH_RUN_DI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ SUPPLY CONTACTOR ENERGIZED (REVERSE)	DI	LXX_EMFN_ZZ_SUP_RUN_DI	N09_EMFN_01_SUP_RUN_DI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ BYPASS CONTACTOR ENERGIZED	DI	LXX_EMFN_ZZ_BYPASS_DI	N09_EMFN_01_BYPASS_DI	X		X		USE FOR SOFT-START MOTOR CONTROLLERS
HVAC	EMERGENCY FAN	EMFN	FAN ZZ MOTOR HEATER ON	DI	LXX_EMFN_ZZ_HTR_ON_DI	N09_EMFN_01_HTR_ON_DI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ EXHAUST AIR FLOW SWITCH	DI	LXX_EMFN_ZZ_EXH_AIR_DI	N09_EMFN_01_EXH_AIR_DI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ SUPPLY AIR FLOW SWITCH	DI	LXX_EMFN_ZZ_SUP_AIR_DI	N09_EMFN_01_SUP_AIR_DI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ EXHAUST RUN COMMAND	DO	LXX_EMFN_ZZ_CALL_EXH_DO	N09_EMFN_01_CALL_EXH_DO		X		X	
HVAC	EMERGENCY FAN	EMFN	FAN ZZ SUPPLY RUN COMMAND	DO	LXX_EMFN_ZZ_CALL_SUP_DO	N09_EMFN_01_CALL_SUP_DO		X		X	
HVAC	EMERGENCY FAN	EMFN	FAN ZZ DRIVE-END BEARING VIBRATION (INBOARD)	AI	LXX_EMFN_ZZ_DRV_BRG_VIB_AI	N09_EMFN_02_DRV_BRG_VIB_AI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ OPPOSITE-DRIVE-END BEARING VIBRATION (OUTBOARD)	AI	LXX_EMFN_ZZ_ODE_BRG_VIB_AI	N09_EMFN_02_ODE_BRG_VIB_AI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ DRIVE-END BEARING TEMPERATURE (INBOARD)	AI	LXX_EMFN_ZZ_DRV_BRG_TEMP_AI	N09_EMFN_02_DRV_BRG_TEMP_AI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ OPPOSITE-DRIVE-END BEARING TEMPERATURE (OUTBOARD)	AI	LXX_EMFN_ZZ_ODE_BRG_TEMP_AI	N09_EMFN_02_ODE_BRG_TEMP_AI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ PHASE A MOTOR WINDING TEMPERATURE	AI	LXX_EMFN_ZZ_WIND_A_TEMP_AI	N09_EMFN_02_WIND_A_TEMP_AI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ PHASE B MOTOR WINDING TEMPERATURE	AI	LXX_EMFN_ZZ_WIND_B_TEMP_AI	N09_EMFN_02_WIND_B_TEMP_AI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ PHASE C MOTOR WINDING TEMPERATURE	AI	LXX_EMFN_ZZ_WIND_C_TEMP_AI	N09_EMFN_02_WIND_C_TEMP_AI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ MOTOR CONTROLLER ENCLOSURE TEMPERATURE	AI	LXX_EMFN_ZZ_CNTLR_ENCL_TEMP_AI	N09_EMFN_02_CNTLR_ENCL_TEMP_AI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ EMERGENCY MODE COMMAND	DO	LXX_EMFN_ZZ_EMERG_MODE_DO	N09_EMFN_01_EMERG_MODE_DO		X			
HVAC	EMERGENCY FAN	EMFN	FAN ZZ EXHAUST RUN INDICATION	DO	LXX_EMFN_ZZ_EXH_RUN_IND_DO	N09_EMFN_01_EXH_RUN_IND_DO		X			
HVAC	EMERGENCY FAN	EMFN	FAN ZZ SUPPLY RUN INDICATION	DO	LXX_EMFN_ZZ_SUP_RUN_IND_DO	N09_EMFN_01_SUP_RUN_IND_DO		X			
HVAC	EMERGENCY FAN	EMFN	FAN ZZ OFF INDICATION	DO	LXX_EMFN_ZZ_OFF_IND_DO	N09_EMFN_01_OFF_IND_DO		X			
HVAC	EMERGENCY FAN	EMFN	FAN ZZ LOCAL CONTROL PERMISSIVE INDICATION	DO	LXX_EMFN_ZZ_LOCAL_CNTRL_PERM_DO	N09_EMFN_01_LOCAL_CNTRL_PERM_DO		X			
HVAC	EMERGENCY FAN	EMFN	FAN ZZ LOCAL EXHAUST REQUEST SWITCH	DI	LXX_EMFN_ZZ_LOCAL_EXH_REQ_DI	N09_EMFN_01_LOCAL_EXH_REQ_DI	X				
HVAC	EMERGENCY FAN	EMFN	FAN ZZ LOCAL SUPPLY REQUEST SWITCH	DI	LXX_EMFN_ZZ_LOCAL_SUP_REQ_DI	N09_EMFN_01_LOCAL_SUP_REQ_DI	X				
HVAC	EMERGENCY FAN	EMFN	FAN ZZ REMOTE CONTROL MODE SWITCH	DI	LXX_EMFN_ZZ_REMOTE_MODE_DI	N09_EMFN_01_REMOTE_MODE_DI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ LOCAL ISOLATION SWITCH	DI	LXX_EMFN_ZZ_ISOL_SWITCH_DI	N09_EMFN_01_ISOL_SWITCH_DI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ FDCP POWER AVAILABLE	DI	LXX_EMFN_ZZ_FDCP_POWER_DI	N09_EMFN_01_FDCP_POWER_DI	X		X		
HVAC	EMERGENCY FAN	EMFN	FAN ZZ MOTOR CONTROLLER POWER AVAILABLE	DI	LXX_EMFN_ZZ_CNTLR_POWER_DI	N09_EMFN_01_CNTLR_POWER_DI	X		X		USE FOR VFD AND SOFT-START MOTOR CONTROLLERS
HVAC	EMERGENCY FAN	EMFN	FAN ZZ MOTOR CONTROLLER STATUS NORMAL	DI	LXX_EMFN_ZZ_CNTLR_NORMAL_DI	N09_EMFN_01_CNTLR_NORMAL_DI	X		X		USE FOR SOFT-START MOTOR CONTROLLERS
HVAC	EMERGENCY FAN	EMFN	FAN ZZ MOTOR STATUS NORMAL	DI	LXX_EMFN_ZZ_MTR_NORMAL_DI	N09_EMFN_01_MTR_NORMAL_DI	X		X		USE FOR SOFT-START MOTOR CONTROLLERS
HVAC	EMERGENCY FAN	EMFN	FAN ZZ MOTOR ENERGIZED	DI	LXX_EMFN_ZZ_MOTOR_RUN_DI	N07_EMFN_03_MOTOR_RUN_DI	X		X		USE FOR VFD MOTOR CONTROLLERS
HVAC	EMERGENCY FAN	EMFN	FAN ZZ VARIABLE FREQ DRIVE READY	DI	LXX_EMFN_ZZ_VFD_READY_DI	N07_EMFN_03_VFD_READY_DI	X		X		USE FOR VFD MOTOR CONTROLLERS
HVAC	EMERGENCY FAN	EMFN	FAN ZZ VARIABLE FREQ DRIVE FAULT	DI	LXX_EMFN_ZZ_VFD_FAULT_DI	N07_EMFN_03_VFD_FAULT_DI	X		X		USE FOR VFD MOTOR CONTROLLERS
HVAC	EMERGENCY FAN	EMFN	FAN ZZ MOTOR SPEED	AI	LXX_EMFN_ZZ_SPEED_AI	N07_EMFN_03_SPEED_AI	X		X		USE FOR VFD MOTOR CONTROLLERS
HVAC	EMERGENCY FAN	EMFN	FAN ZZ MOTOR SPEED INDICATION	AO	LXX_EMFN_ZZ_SPEED_IND_AO	N07_EMFN_03_SPEED_IND_AO	X		X		USE FOR VFD MOTOR CONTROLLERS

GENERAL NOTES:

1. CONTRACTOR RESPONSIBLE TO PROVIDE A COMPLETE POINTS AND SIDT LIST BASED ON EQUIPMENT TO BE INSTALLED AT EACH FACILITY. EACH TYPICAL EQUIPMENT TYPE MAY NOT BE REQUIRED AT A FACILITY.
2. THIS IS A SAMPLE POINTS LIST, ADDITIONAL POINTS MAY BE REQUIRED TO IMPLEMENT A WORKING SYSTEM. DESIGNER TO COORDINATE MINIMUM LIST FOR CONTRACT SPECIFIC LIST.
3. PROVIDE SOFT I/O POINTS AS REQUIRED TO MEET THE FUNCTIONAL REQUIREMENTS OF EQUIPMENT WITH A COMMUNICATIONS INTERFACE.
4. PROVIDE MAP OF ALL ADDRESS INFORMATION FOR LOCAL BMS HMI AND REMOTE SCADA LCC INTERFACE. DEMONSTRATE MAPPING AND CROSS-REFERENCE INFORMATION IS CORRECT.
5. CONTRACTOR SHALL PROVIDE 25% HARDWARE I/O SPARES.
6. DESIGNER TO DETERMINE WHICH POINTS ARE SUPERVISED CIRCUITS FROM FACP.
7. DESIGN TEAM TO DEVELOP EMERGENCY RESPONSE MATRIX FOR COORDINATION OF MULTIPLE SYSTEMS.

TAG LEGEND

L	LINK SEGEMENT {C-CENTERAL, N-NORTH, S-SOUTH, E-EAST}
XX	STATION/ FACILITY NUMBER {01, 03, 05 ETC.}
ZZ	EQUIPMENT/ DEVICE NUMBER
YY	ROOM/ LOCATION ID
MM	EVS EMERGENCY RESPONSE MODE ID
N	NUMBER INSTANCE

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JBS510
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
EMERGENCY VENTILATION SYSTEM
EVS SUMMARY INDICATIONS

DRAWING No.: **STD-JBS510**
FACILITY ID:
SHEET No.: REV: 2

EVS-SCADA POINTS LIST

SYSTEM	EQUIPMENT TYPE	EQUIP ID	PLC I/O DESCRIPTION	POINT TYPE	PLC TAG		LOCAL EVS		REMOTE SCADA (LCC)		NOTES
					TEMPLATE	EXAMPLE	INDICATE /ALARM INPUT	CONTROL OUTPUT	INDICATE /ALARM INPUT	CONTROL OUTPUT	
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ LOCAL CONTROL MODE SWITCH	DI	LXX_EMFD_ZZ_LOCAL_MODE_DI	N07_EMFD_02_LOCAL_MODE_DI	X		X		
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ CALL OPEN COMMAND	DO	LXX_EMFD_ZZ_CALL_OPEN_DO	N07_EMFD_02_CALL_OPEN_DI		X		X	USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ CALL CLOSE COMMAND	DO	LXX_EMFD_ZZ_CALL_CLOSE_DO	N07_EMFD_03_CALL_CLOSE_DI		X		X	USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ SECTION N ACTUATOR FULLY OPEN	DI	LXX_EMFD_ZZ_SNA_OPEN_DI	N07_EMFD_02_S2A_OPEN_DI	X				USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ SECTION N ACTUATOR FULLY CLOSED	DI	LXX_EMFD_ZZ_SNA_CLOSED_DI	N07_EMFD_03_S1A_CLOSED_DI	X				USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ SECTION N FULLY OPEN	DI	LXX_EMFD_ZZ_SN_OPEN_DI	N07_EMFD_03_S1_OPEN_DI	X		X		
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ SECTION N FULLY CLOSED	DI	LXX_EMFD_ZZ_SN_CLOSED_DI	N07_EMFD_03_S1_CLOSED_DI	X		X		
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ SECTION N FULLY OPEN INDICATION	DO	LXX_EMFD_ZZ_SN_OPEN_IND_DO	N07_EMFD_03_S1_OPEN_IND_DO		X			USE FOR LOCAL EVCP PANEL LIGHTS
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ SECTION N FULLY CLOSED INDICATION	DO	LXX_EMFD_ZZ_SN_CLOSED_IND_DO	N07_EMFD_03_S1_CLOSED_IND_DO		X			USE FOR LOCAL EVCP PANEL LIGHTS
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ EMERGENCY MODE COMMAND	DO	LXX_EMFD_ZZ_EMERG_MODE_DO	N07_EMFD_01_EMERG_MODE_DO		X			
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ LOCAL OPEN REQUEST SWITCH	DI	LXX_EMFD_ZZ_LOCAL_OPEN_REQ_DI	N07_EMFD_01_LOCAL_OPEN_REQ_DI	X				USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY FAN DAMPER	EMFD	DAMPER ZZ LOCAL CLOSE REQUEST SWITCH	DI	LXX_EMFD_ZZ_LOCAL_CLOSE_REQ_DI	N07_EMFD_03_LOCAL_CLOSE_REQ_DI	X				USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ LOCAL CONTROL MODE SWITCH	DI	LXX_EMTD_ZZ_LOCAL_MODE_DI	N09_EMTD_04_LOCAL_MODE_DI	X		X		
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ CALL OPEN COMMAND	DO	LXX_EMTD_ZZ_CALL_OPEN_DO	N09_EMTD_04_CALL_OPEN_DI		X		X	USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ CALL CLOSE COMMAND	DO	LXX_EMTD_ZZ_CALL_CLOSE_DO	N07_EMTD_02_CALL_CLOSE_DI		X		X	USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ SECTION N ACTUATOR FULLY OPEN	DI	LXX_EMTD_ZZ_SNA_OPEN_DI	N09_EMTD_04_S2A_OPEN_DI	X				USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ SECTION N ACTUATOR FULLY CLOSED	DI	LXX_EMTD_ZZ_SNA_CLOSED_DI	N07_EMTD_02_S3A_CLOSED_DI	X				USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ SECTION N FULLY OPEN	DI	LXX_EMTD_ZZ_SN_OPEN_DI	N09_EMTD_04_S2_OPEN_DI	X		X		
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ SECTION N FULLY CLOSED	DI	LXX_EMTD_ZZ_SN_CLOSED_DI	N09_EMTD_04_S2_CLOSED_DI	X		X		
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ SECTION N FULLY OPEN INDICATION	DO	LXX_EMTD_ZZ_SN_OPEN_IND_DO	N09_EMTD_04_S2_OPEN_IND_DO		X			USE FOR LOCAL EVCP PANEL LIGHTS
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ SECTION N FULLY CLOSED INDICATION	DO	LXX_EMTD_ZZ_SN_CLOSED_IND_DO	N09_EMTD_04_S2_CLOSED_IND_DO		X			USE FOR LOCAL EVCP PANEL LIGHTS
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ EMERGENCY MODE COMMAND	DO	LXX_EMTD_ZZ_EMERG_MODE_DO	N09_EMTD_04_EMERG_MODE_DO		X			
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ LOCAL OPEN REQUEST SWITCH	DI	LXX_EMTD_ZZ_LOCAL_OPEN_REQ_DI	N09_EMTD_04_LOCAL_OPEN_REQ_DI	X				USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY TUNNEL DAMPER	EMTD	DAMPER ZZ LOCAL CLOSE REQUEST SWITCH	DI	LXX_EMTD_ZZ_LOCAL_CLOSE_REQ_DI	N07_EMTD_02_LOCAL_CLOSE_REQ_DI	X				USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ LOCAL CONTROL MODE SWITCH	DI	LXX_EMSD_ZZ_LOCAL_MODE_DI	N09_EMSD_01_LOCAL_MODE_DI	X		X		
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ CALL OPEN COMMAND	DO	LXX_EMSD_ZZ_CALL_OPEN_DO	N09_EMSD_01_CALL_OPEN_DI		X		X	USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ CALL CLOSE COMMAND	DO	LXX_EMSD_ZZ_CALL_CLOSE_DO	N09_EMSD_03_CALL_CLOSE_DI		X		X	USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ SECTION N ACTUATOR FULLY OPEN	DI	LXX_EMSD_ZZ_SNA_OPEN_DI	N09_EMSD_01_S3A_OPEN_DI	X				USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ SECTION N ACTUATOR FULLY CLOSED	DI	LXX_EMSD_ZZ_SNA_CLOSED_DI	N09_EMSD_03_S1A_CLOSED_DI	X				USE FOR FAIL OPEN DAMPERS
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ SECTION N FULLY OPEN	DI	LXX_EMSD_ZZ_SN_OPEN_DI	N09_EMSD_01_S3_OPEN_DI	X		X		
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ SECTION N FULLY CLOSED	DI	LXX_EMSD_ZZ_SN_CLOSED_DI	N09_EMSD_01_S3_CLOSED_DI	X		X		
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ SECTION N FULLY OPEN INDICATION	DO	LXX_EMSD_ZZ_SN_OPEN_IND_DO	N09_EMSD_01_S3_OPEN_IND_DO		X			USE FOR LOCAL EVCP PANEL LIGHTS
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ SECTION N FULLY CLOSED INDICATION	DO	LXX_EMSD_ZZ_SN_CLOSED_IND_DO	N09_EMSD_01_S3_CLOSED_IND_DO		X			USE FOR LOCAL EVCP PANEL LIGHTS
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ EMERGENCY MODE COMMAND	DO	LXX_EMSD_ZZ_EMERG_MODE_DO	N09_EMSD_01_EMERG_MODE_DO		X			
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ LOCAL OPEN REQUEST SWITCH	DI	LXX_EMSD_ZZ_LOCAL_OPEN_REQ_DI	N09_EMSD_01_LOCAL_OPEN_REQ_DI	X				USE FOR FAIL CLOSE DAMPERS
HVAC	EMERGENCY STATION DAMPER	EMSD	DAMPER ZZ LOCAL CLOSE REQUEST SWITCH	DI	LXX_EMSD_ZZ_LOCAL_CLOSE_REQ_DI	N09_EMSD_03_LOCAL_CLOSE_REQ_DI	X				USE FOR FAIL OPEN DAMPERS
FIRE	FIRE ALARM	FACP	STATION AUTOMATIC FIRE ALARM ACTIVE	DI	LXX_FACP_ZZ_ALARM_DI	N07_FACP_01_ALARM_DI	X		X		
FIRE	FIRE ALARM	FACP	FIRE ALARM CONTROL PANEL SILENCE MESSAGE PUSHBUTTON	DI	LXX_FACP_ZZ_PA_VMS_SIL_DI	E09_FACP_01_PA_VMS_SIL_DI	X		X		
FIRE	FIRE ALARM	FACP	FIRE ALARM SUMMARY SUPERVISORY ALARM	DI	LXX_FACP_ZZ_SUPERVISORY_DI	N07_FACP_01_SUPERVISORY_DI	X		X		
FIRE	FIRE ALARM	FACP	FIRE ALARM SUMMARY TROUBLE ALARM	DI	LXX_FACP_ZZ_TROUBLE_DI	N07_FACP_01_TROUBLE_DI	X		X		
FIRE	FIRE ALARM	FACP	SET FIRE PANEL IN ALARM	DO	LXX_FACP_ZZ_SETALM_DO	N09_FACP_01_SETALM_DO		X		X	
FIRE	FIRE ALARM	FACP	CLEAN AGENT ALARM	DI	LXX_FACP_ZZ_CA_YY_ALARM_DI	N07_FACP_01_CA_01_ALARM_DI	X		X		
FIRE	FIRE ALARM	FACP	CLEAN AGENT PRE-ALARM	DI	LXX_FACP_ZZ_CA_YY_PRE_ALARM_DI	N07_FACP_01_CA_01_PRE_ALARM_DI	X		X		
FIRE	FIRE ALARM	FACP	CLEAN AGENT TROUBLE ALARM	DI	LXX_FACP_ZZ_CA_YY_TROUBLE_DI	N07_FACP_01_CA_01_TROUBLE_DI	X		X		
FIRE	FIRE ALARM	FACP	ACTIVATE ERM MODE LXX_MM CONTROL	DO	LXX_FACP_ZZ_MODE_LXX_MM_DO	N09_FACP_01_MODE_N06_11_DO		X		X	QUANTITY AND DESIGNATION OF EVS MODES ARE SPECIFIED BY THE ERM FOR EACH STATION

GENERAL NOTES:

1. CONTRACTOR RESPONSIBLE TO PROVIDE A COMPLETE POINTS AND SIDT LIST BASED ON EQUIPMENT TO BE INSTALLED AT EACH FACILITY. EACH TYPICAL EQUIPMENT TYPE MAY NOT BE REQUIRED AT A FACILITY.
2. THIS IS A SAMPLE POINTS LIST, ADDITIONAL POINTS MAY BE REQUIRED TO IMPLEMENT A WORKING SYSTEM. DESIGNER TO COORDINATE MINIMUM LIST FOR CONTRACT SPECIFIC LIST.
3. PROVIDE SOFT I/O POINTS AS REQUIRED TO MEET THE FUNCTIONAL REQUIREMENTS OF EQUIPMENT WITH A COMMUNICATIONS INTERFACE.
4. PROVIDE MAP OF ALL ADDRESS INFORMATION FOR LOCAL BMS HMI AND REMOTE SCADA LCC INTERFACE. DEMONSTRATE MAPPING AND CROSS-REFERENCE INFORMATION IS CORRECT.
5. CONTRACTOR SHALL PROVIDE 25% HARDWARE I/O SPARES.
6. DESIGNER TO DETERMINE WHICH POINTS ARE SUPERVISED CIRCUITS FROM FACP.
7. DESIGN TEAM TO DEVELOP EMERGENCY RESPONSE MATRIX FOR COORDINATION OF MULTIPLE SYSTEMS.

TAG LEGEND

L	LINK SEGEMENT {C-CENTERAL, N-NORTH, S-SOUTH, E-EAST}
XX	STATION/ FACILITY NUMBER {01, 03, 05 ETC.}
ZZ	EQUIPMENT/ DEVICE NUMBER
YY	ROOM/ LOCATION ID
MM	EVS EMERGENCY RESPONSE MODE ID
N	NUMBER INSTANCE

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWING
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISION - GENERAL UPDATE
0	8/2017	----	----	----	GUIADANCE DRAWINGS

DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JBS511
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
EMERGENCY VENTILATION SYSTEM
EVS SUMMARY INDICATIONS

DRAWING No.: STD-JBS511
FACILITY ID:
SHEET No.: REV: 3

EVS-SCADA POINTS LIST

SYSTEM	EQUIPMENT TYPE	EQUIP ID	PLC I/O DESCRIPTION	POINT TYPE	PLC TAG		LOCAL EVS		REMOTE SCADA (LCC)		NOTES
					TEMPLATE	EXAMPLE	INDICATE /ALARM INPUT	CONTROL OUTPUT	INDICATE /ALARM INPUT	CONTROL OUTPUT	
HVAC	JET FAN	JEFN	BEARING VIBRATION INBOARD	MB/TCP	LXX_JEFN_ZZ_VIBIB_AI		X		X		
HVAC	JET FAN	JEFN	BEARING VIBRATION OUTBOARD	MB/TCP	LXX_JEFN_ZZ_VIBOB_AI		X		X		
HVAC	JET FAN	JEFN	WINDING TEMPERATURE A1 HI ALARM	MB/TCP	LXX_JEFN_ZZ_WTEMP1_AI		X		X		
HVAC	JET FAN	JEFN	WINDING TEMPERATURE B1 HI ALARM	MB/TCP	LXX_JEFN_ZZ_WTEMP2_AI		X		X		
HVAC	JET FAN	JEFN	WINDING TEMPERATURE C1 HI ALARM	MB/TCP	LXX_JEFN_ZZ_WTEMP3_AI		X		X		
HVAC	JET FAN	JEFN	WINDING TEMPERATURE A2 ALARM	MB/TCP	LXX_JEFN_ZZ_WTEMP4_AI		X		X		
HVAC	JET FAN	JEFN	WINDING TEMPERATURE B2 ALARM	MB/TCP	LXX_JEFN_ZZ_WTEMP5_AI		X		X		
HVAC	JET FAN	JEFN	WINDING TEMPERATURE C2 ALARM	MB/TCP	LXX_JEFN_ZZ_WTEMP6_AI		X		X		
HVAC	JET FAN	JEFN	BEARING TEMPERATURE 1	MB/TCP	LXX_JEFN_ZZ_BTEMPIB_AI		X		X		
HVAC	JET FAN	JEFN	BEARING TEMPERATURE 2	MB/TCP	LXX_JEFN_ZZ_BTEMPOB_AI		X		X		
HVAC	JET FAN	JEFN	AIR TEMPERATURE 1	MB/TCP	LXX_JEFN_ZZ_AIREMP1_AI		X		X		
HVAC	JET FAN	JEFN	AIR TEMPERATURE 2	MB/TCP	LXX_JEFN_ZZ_AIREMP2_AI		X		X		
HVAC	JET FAN	JEFN	FAN REMOTE / LOCAL	DI	LXX_JEFN_ZZ_REMLOC_DI		X		X		
HVAC	JET FAN	JEFN	RUNNING FORWARD	DI	LXX_JEFN_ZZ_RNFW_DI		X		X		
HVAC	JET FAN	JEFN	RUNNING REVERSE	DI	LXX_JEFN_ZZ_RNRV_DI		X		X		
HVAC	JET FAN	JEFN	FORWARD CONFIRMED	DI	LXX_JEFN_ZZ_FWCNF_DI		X		X		
HVAC	JET FAN	JEFN	REVERSE CONFIRMED	DI	LXX_JEFN_ZZ_RVCNF_DI		X		X		
HVAC	JET FAN	JEFN	MOTOR HEATER ON	DI	LXX_JEFN_ZZ_HTON_DI		X		X		
HVAC	JET FAN	JEFN	FAULT	DI	LXX-JEFN_ZZ_FLT_DI		X		X		
HVAC	JET FAN	JEFN	AT SPEED	DI	LXX-JEFN_ZZ_TOR_DI		X		X		
HVAC	JET FAN	JEFN	CALL START	DO	LXX_JEFN_ZZ_START_DO			X		X	
HVAC	JET FAN	JEFN	CALL FORWARD	DO	LXX_JEFN_ZZ_CALLFWD_DO			X		X	
HVAC	JET FAN	JEFN	CALL REVERSE	DO	LXX_JEFN_ZZ_CALLREV_DO			X		X	
HVAC	JET FAN	JEFN	CALL STOP	DO	LXX_JEFN_ZZ_CALLSTOP_DO			X		X	
COMMS	PUBLIC ADDRESS SYSTEM	PA	PA SYSTEM SUMMARY TROUBLE ALARM	DI	LXX_PA_ZZ_TRBL_DI	E09_PA_01_TRBL_DI	X		X		
EVS/EVCP/FDCP	POWER SUPPLY/PLC HEALTH	DCPS	DCPS ZZ DC POWER SUPPLY FAULT	DI	LXX_DCPS_YYYY_ZZ_FAULT_DI	N09_DCPS_B342_01A_FAULT_DI	X		X		
EVS/EVCP/FDCP	POWER SUPPLY/PLC HEALTH	DCPS	DCPS ZZ PANEL DC POWER SUPPLY FAULT	DI	LXX_DCPS_(PANEL)_ZZ_FAULT_DI	N07_DCPS_EVCP_A_FAULT_DI	X		X		
COMMS	STATION CONTROL UNIT	SCU	INTERRUPT NORMAL MESSAGE ROUTING	DO	LXX_SCU_ZZ_INTRPT_NORM_MSG_DO	E09_SCU_01_INTRPT_NORM_MSG_DO		X		X	
COMMS	STATION CONTROL UNIT	SCU	SILENCE MESSAGES TO SCU	DO	LXX_SCU_ZZ_MSG_SIL_DO	E09_SCU_01_MSG_SIL_DO		X		X	
COMMS	STATION CONTROL UNIT	SCU	PLAY EMERGENCY MESSAGE NN	DO	LXX_SCU_ZZ_MSG_NN_DO	E09_SCU_01_MSG_A2_DO		X		X	QUANTITY AND DESIGNATION OF MESSAGES ARE SPECIFIED BY THE ERM FOR EACH STATION
HVAC	STAIR PRESSURE SUPPLY FAN	SPSF	STAIR PRESSURE SUPPLY FAN RUNNING	DI	LXX_SPSF_ZZ_RUNNING_DI	E15_SPSF_01_RUNNING_DI	X		X		
HVAC	STAIR PRESSURE SUPPLY FAN	SPSF	STAIR PRESSURE SUPPLY FAN FAULT	DI	LXX_SPSF_ZZ_FAULT_DI	E15_SPSF_01_FAULT_DI	X		X		
HVAC	STAIR PRESSURE SUPPLY FAN	SPSF	STAIR PRESSURE SUPPLY FAN TROUBLE	DI	LXX_SPSF_ZZ_TROUBLE_DI	E15_SPSF_01_TROUBLE_DI	X				
HVAC	STAIR PRESSURE SUPPLY FAN	SPSF	STAIR PRESSURE SUPPLY FAN HAND	DI	LXX_SPSF_ZZ_HAND_DI	E15_SPSF_01_HAND_DI	X				
HVAC	STAIR PRESSURE SUPPLY FAN	SPSF	STAIR PRESSURE SUPPLY FAN AUTO	DI	LXX_SPSF_ZZ_AUTO_DI	E15_SPSF_01_AUTO_DI	X				
HVAC	STAIR PRESSURE SUPPLY FAN	SPSF	STAIR PRESSURE SUPPLY FAN RUN COMMAND	DO	LXX_SPSF_ZZ_START_DO	E15_SPSF_01_START_DO		X			
HVAC	STAIR PRESSURE SUPPLY FAN	SPSF	STAIR PRESSURE SUPPLY FAN SPEED	AI	LXX_SPSF_ZZ_SPEED_AI	E15_SPSF_01_SPEED_AI	X				
HVAC	STAIR PRESSURE SUPPLY FAN	SPSF	STAIR PRESSURE SUPPLY FAN SPEED CONTROL	AO	LXX_SPSF_ZZ_SPEED_AO	E15_SPSF_01_SPEED_AO		X			
HVAC	STAIR PRESSURE RELIEF DAMPER	SPRD	STAIR PRESSURE RELIEF DAMPER CLOSED	DI	LXX_SPRD_ZZ_CLOSED_DI	E15_SPRD_01_CLOSED_DI	X		X		
HVAC	STAIR PRESSURE RELIEF DAMPER	SPRD	STAIR PRESSURE RELIEF DAMPER FAULT	DI	LXX_SPRD_ZZ_FAULT_DI	E15_SPRD_01_FAULT_DI	X		X		
HVAC	STAIR PRESSURE RELIEF DAMPER	SPRD	STAIR PRESSURE RELIEF POSITION FEEDBACK	AI	LXX_SPRD_ZZ_POSITION_AI	E15_SPRD_01_POSITION_AI	X				
HVAC	STAIR PRESSURE RELIEF DAMPER	SPRD	STAIR PRESSURE RELIEF POSITION COMMAND	AO	LXX_SPRD_ZZ_POSITION_AO	E15_SPRD_01_POSITION_AO		X			
HVAC	STAIR PRESSURE SYSTEM	SPS	STAIR PRESSURE SYSTEM ACTIVE	DI	LXX_SPS_ZZ_ACTIVE_DI	E15_SPS_01_ACTIVE_DI	X		X		
HVAC	STAIR PRESSURE SYSTEM	SPS	STAIR PRESSURE SYSTEM FAULT	DI	LXX_SPS_ZZ_FAULT_DI	E15_SPS_01_FAULT_DI	X		X		
HVAC	STAIR PRESSURE SYSTEM	SPS	STAIR PRESSURE SYSTEM AUTO	DI	LXX_SPS_ZZ_AUTO_DI	E15_SPS_01_AUTO_DI	X				
HVAC	STAIR PRESSURE SYSTEM	SPS	STAIR PRESSURE SYSTEM HAND	DI	LXX_SPS_ZZ_HAND_DI	E15_SPS_01_HAND_DI	X				
HVAC	STAIR PRESSURE SYSTEM	SPS	STAIR PRESSURE SYSTEM START	DO	LXX_SPS_ZZ_START_DO	E15_SPS_01_START_DO		X		X	

GENERAL NOTES:

1. CONTRACTOR RESPONSIBLE TO PROVIDE A COMPLETE POINTS AND SIDT LIST BASED ON EQUIPMENT TO BE INSTALLED AT EACH FACILITY. EACH TYPICAL EQUIPMENT TYPE MAY NOT BE REQUIRED AT A FACILITY.
2. THIS IS A SAMPLE POINTS LIST, ADDITIONAL POINTS MAY BE REQUIRED TO IMPLEMENT A WORKING SYSTEM. DESIGNER TO COORDINATE MINIMUM LIST FOR CONTRACT SPECIFIC LIST.
3. PROVIDE SOFT I/O POINTS AS REQUIRED TO MEET THE FUNCTIONAL REQUIREMENTS OF EQUIPMENT WITH A COMMUNICATIONS INTERFACE.
4. PROVIDE MAP OF ALL ADDRESS INFORMATION FOR LOCAL BMS HMI AND REMOTE SCADA LCC INTERFACE. DEMONSTRATE MAPPING AND CROSS-REFERENCE INFORMATION IS CORRECT.
5. CONTRACTOR SHALL PROVIDE 25% HARDWARE I/O SPARES.
6. DESIGNER TO DETERMINE WHICH POINTS ARE SUPERVISED CIRCUITS FROM FACP.
7. DESIGN TEAM TO DEVELOP EMERGENCY RESPONSE MATRIX FOR COORDINATION OF MULTIPLE SYSTEMS.

TAG LEGEND

L	LINK SEGEMENT {C-CENTERAL, N-NORTH, S-SOUTH, E-EAST}
XX	STATION/ FACILITY NUMBER {01, 03, 05 ETC.}
ZZ	EQUIPMENT/ DEVICE NUMBER
YY	ROOM/ LOCATION ID
MM	EVS EMERGENCY RESPONSE MODE ID
N	NUMBER INSTANCE

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISION - GENEREAL UPDATE
0	8/2017	----	----	----	GUIDANCE DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

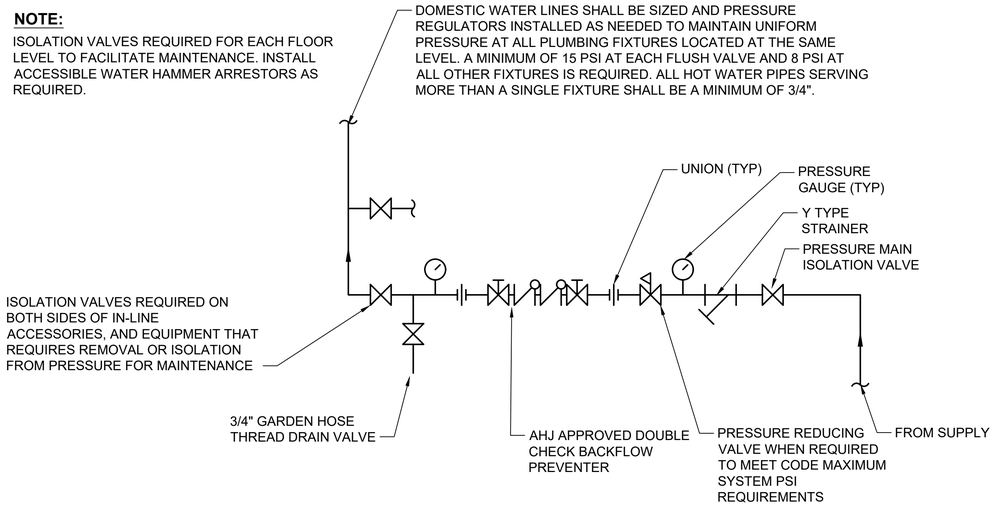
SCALE: NTS
FILENAME: STD-JBS512
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
EMERGENCY VENTILATION SYSTEM
EVS SUMMERY NOTIFICATIONS

DRAWING No.: STD-JBS512
FACILITY ID:
SHEET No.: 3
REV:

NOTE:

ISOLATION VALVES REQUIRED FOR EACH FLOOR LEVEL TO FACILITATE MAINTENANCE. INSTALL ACCESSIBLE WATER HAMMER ARRESTORS AS REQUIRED.

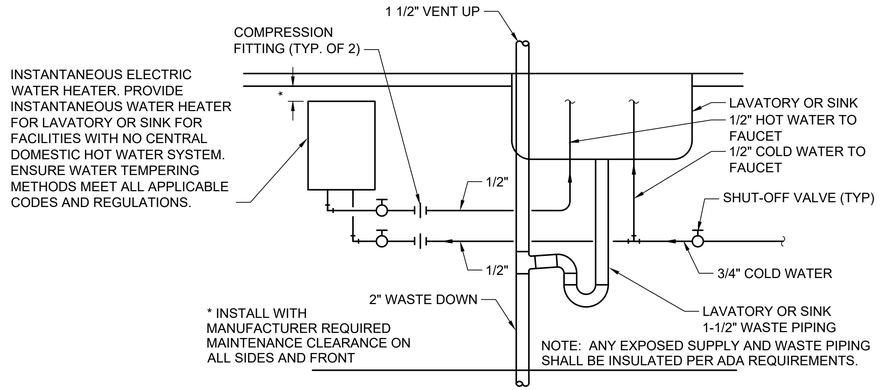


BACKFLOW PREVENTER DETAIL

NTS

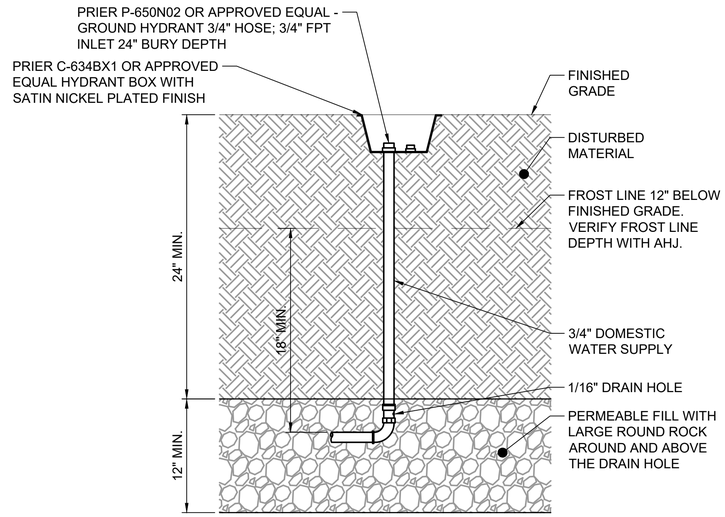
GENERAL NOTES:

1. SIZING IS FOR REFERENCE ONLY, DESIGNER TO DETERMINE SIZE BASED ON CODE AND FIXTURE REQUIREMENT.
2. DRAWING IS INTENDED TO COMMUNICATE TYPICAL CONFIGURATION, DESIGN SHALL BE DEVELOPED FOR FACILITY REQUIREMENTS.



INSTANTANEOUS ELECTRIC WATER HEATER

NTS



FLOOR MOUNTED HYDRANT DETAIL

NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	NEW - ARCH DIRECTIVE AND STANDARD DWGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

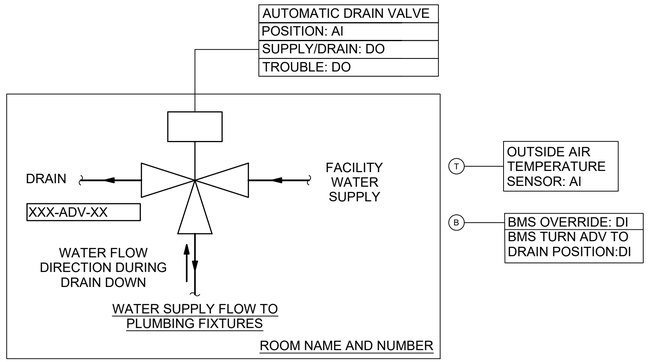
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-MPS130
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

DOMESTIC WATER
SCHEMATIC AND DETAIL

DRAWING No.: **STD-MPS130**
FACILITY ID:
SHEET No.: REV: 1

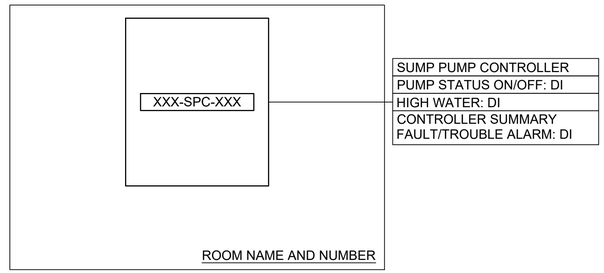


SEQUENCE OF OPERATION:

1. BMS MONITORS THE OUTDOOR AIR TEMPERATURE BY MEANS OF AN ANALOG TEMPERATURE TRANSMITTER.
2. ACTUATED DRAIN VALVE IS COMMANDED VIA DIGITAL INPUT FROM BMS TO DRAIN IN RESPONSE TO OUTSIDE AIR TEMPERATURE DROPPING BELOW SETPOINT (37 F ADJUSTABLE).
3. ACTUATED DRAIN VALVE POSITION IS MONITORED BY BMS, BY MEANS OF 4-20 MA SIGNAL .
4. ACTUATOR PROVIDES A DIGITAL INPUT TO BMS TO INDICATE TROUBLE/FAULT STATUS.
5. PROVIDE 2 OPTIONS TO RESET DRAIN VALVE TO "SUPPLY":
   - 5.1. INPUT REMOTELY BY OPERATIONS AS REQUESTED BY ON-SITE MAINTENANCE STAFF TO SEND DIGITAL INPUT TO BMS WHICH TEMPORARILY OVERRIDES SYSTEM AND PLACES VALVE IN "SUPPLY" FOR DURATION OF 60 MINUTES BEFORE RETUNING TO AUTOMATIC SETPOINT CONTROL. REFER TO BMS-SCADA POINT LIST ON STD-JBS503.
   - 5.2. ON-SITE STATION OPERATION STAFF PUSH MOMENTARY PUSH BUTTON TO SEND DIGITAL INPUT TO BMS WHICH TEMPORARILY OVERRIDES SYSTEM AND PLACES VALVE IN "SUPPLY" FOR DURATION OF 60 MINUTES BEFORE RETUNING TO AUTOMATIC SETPOINT CONTROL. REFER TO BMS-SCADA POINT LIST ON STD-JBS503.
6. LOW POINTS IN THE SYSTEM SHALL BE PROVIDED WITH THERMOSTATIC DRAIN VALVES TO ALLOW DISCHARGE OF ISOLATED PORTIONS OF THE SYSTEM.

ACTUATED DRAIN VALVE FOR LIGHT RAIL ELEVATED STATIONS ONLY- BMS SCHEMATIC

NTS



SEQUENCE OF OPERATION:

1. LOCAL PUMP CONTROLLER TO BE DESIGNED WITH APPROPRIATE FLOAT SWITCHES AND INDICATIONS TO MANAGE WATER LEVELS INDEPENDENTLY OF BMS. PROVIDE INTERFACING POINTS TO BMS FOR REMOTE MONITORING.
2. SUMP PUMP CONTROLLER PROVIDES DIGITAL INPUT TO BMS INDICATING HIGH SUMP WATER LEVEL ALARM CORRESPONDING TO FLOAT SWITCH FEEDBACK.
3. SUMP PUMP CONTROLLER PROVIDES DIGITAL INPUT TO BMS INDICATING SUMP PUMP CONTROLLER FAULT/TROUBLE ALARM STATUS.

SUMP PUMP CONTROLLER - BMS SCHEMATIC

NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

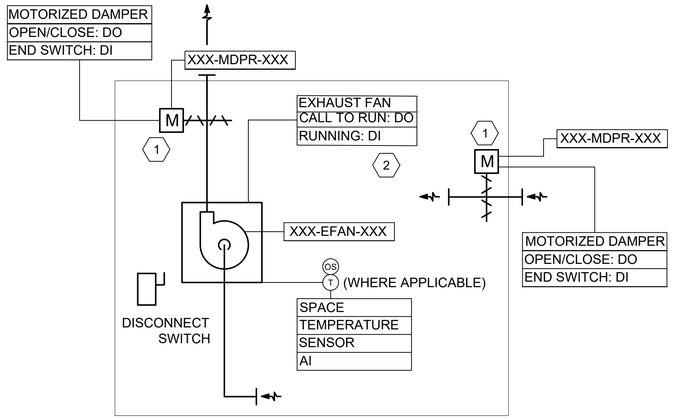
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-MPS131
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
PLUMBING SYSTEM CONTROL STRATEGY SCHEMATICS

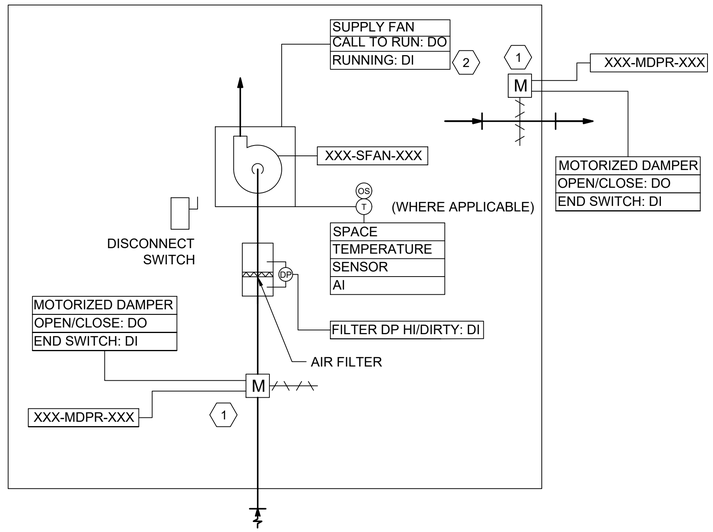
DRAWING No.: **STD-MPS131**
FACILITY ID:
SHEET No.: REV: 0

02/03/25 | 11:26 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-MPS131.DWG



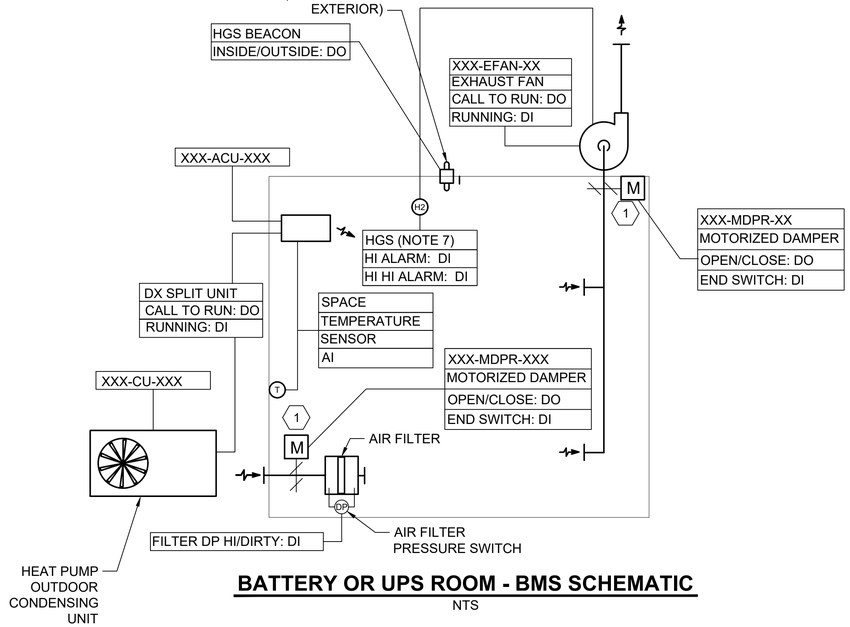
EXHAUST FAN - BMS SCHEMATIC

NTS



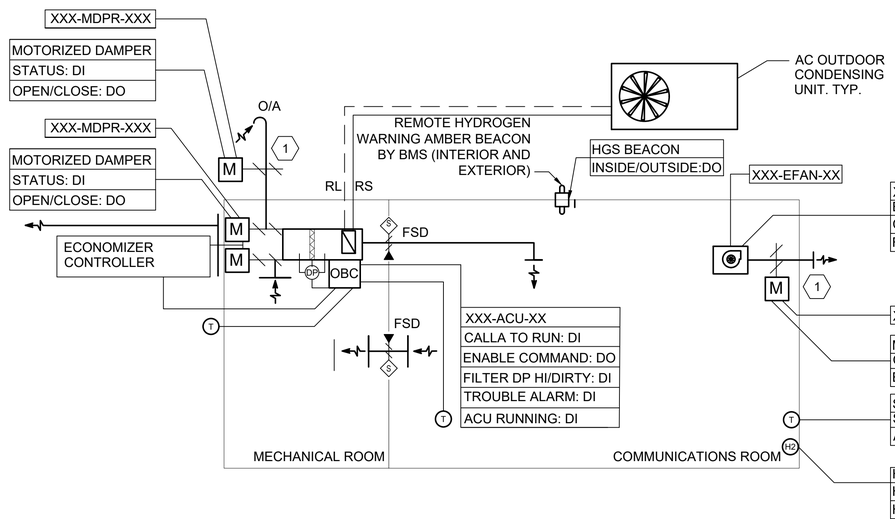
SUPPLY FAN - BMS SCHEMATIC

NTS



BATTERY OR UPS ROOM - BMS SCHEMATIC

NTS



3 COMMUNICATION ROOM - BMS SCHEMATIC

NTS

GENERAL NOTES:

1. BMS CONTINUOUSLY MONITOR BUILDING ENVIRONMENTAL CONDITIONS AND EQUIPMENT OPERATION.
2. BMS COMPARES BUILDING ENVIRONMENTAL CONDITIONS AND EQUIPMENT OPERATION TO ACCEPTABLE BUILDING ENVIRONMENTAL VALUES AND OPERATING SCHEDULES.
3. BMS ACTIVATES OR DEACTIVATES BUILDING EQUIPMENT AS REQUIRED TO MAINTAIN ACCEPTABLE BUILDING ENVIRONMENTAL VALUES AND OPERATING SCHEDULES.
4. BMS REGISTERS FAULT SIGNALS FOR BUILDING EQUIPMENT UNABLE TO MAINTAIN ACCEPTABLE BUILDING ENVIRONMENTAL VALUES AND OPERATING SCHEDULES.
5. BMS COMMUNICATES FAULTS TO LCC FOR STATIONS AND ST FACILITIES MAINTENANCE FOR GARAGES.
6. BMS MANAGES FIRE ALARM RESPONSE FOR MECHANICAL EQUIPMENT BASED ON FACP INPUT.
7. BMS SHOULD USE HYDROGEN (H2) SENSORS TO MONITOR H2 CONCENTRATION LEVELS IN ROOMS CONTAINING LEAD-ACID BATTERIES WHEN REQUIRED BY THE WA FIRE CODE. INTERMITTENT VENTILATION SHOULD LIMIT MAXIMUM CONCENTRATION OF H2 TO LESS THAN 1% OF THE TOTAL ROOM VOLUME IN ACCORDANCE WITH WA FIRE CODE.
8. INSTRUMENTATION SHOWN FOR REFERENCE, BUT DESIGNER SHALL COORDINATE APPROPRIATE SENSOR OR INSTRUMENTATION FOR FUNCTIONALITY OF SELF-CONTROLLED EQUIPMENT AND BMS CONTROLLED EQUIPMENT.
9. PROVIDE FAULT DETECTION AND DIAGNOSTIC (FDD) FOR ACU AS REQUIRED BY CURRENT WSEC.

KEY NOTE:

1. PROVIDE MDPR AS REQUIRED BY AHJ
2. BMS START/STOP FAN BASED ON FACP INPUT. SEE NOTE 6 ABOVE.
3. LINK STATION COMMUNICATIONS ROOM PROTECTED BY CLEAN AGENT.

   FSD OPEN/CLOSE BY FACP PER NFPA; ACU/EFAN SHUTDOWN BY BMS PER IMC.

   FACILITY COMMUNICATIONS ROOM NOT PROTECTED BY CLEAN AGENT.

   FSD OPEN/CLOSE BY FACP PER IBC; ACU/EFAN SHUTDOWN PER IMC.

   SEE FLS 601 FOR CONTROL OF FIRE SMOKE DAMPERS (FSD)

LEGEND:

FSD FIRE AND SMOKE DAMPER

OS OCCUPANCY SENSOR

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	NEW - ARCH DIRECTIVE AND STANDARD DWGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-MHS140
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

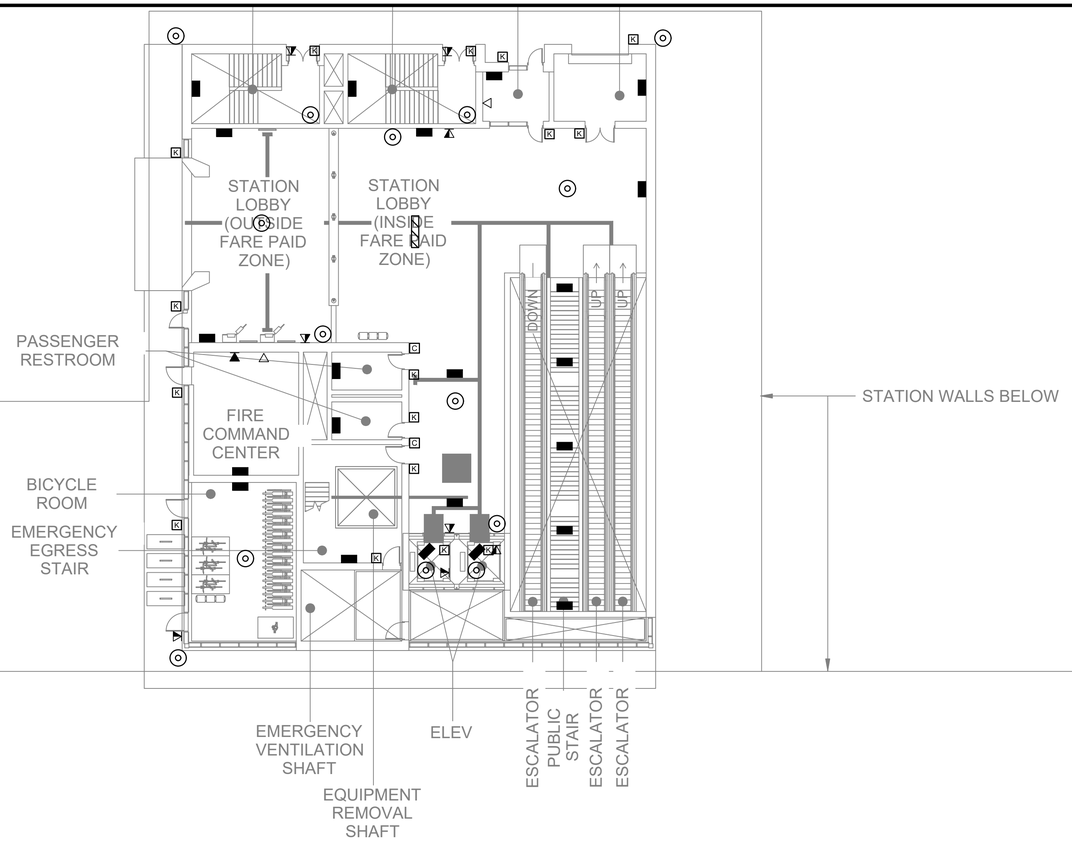
HVAC BMS CONTROL STRATEGY SCHEMATICS

DRAWING No.: **STD-MHS140**
FACILITY ID:
SHEET No.: REV: 1

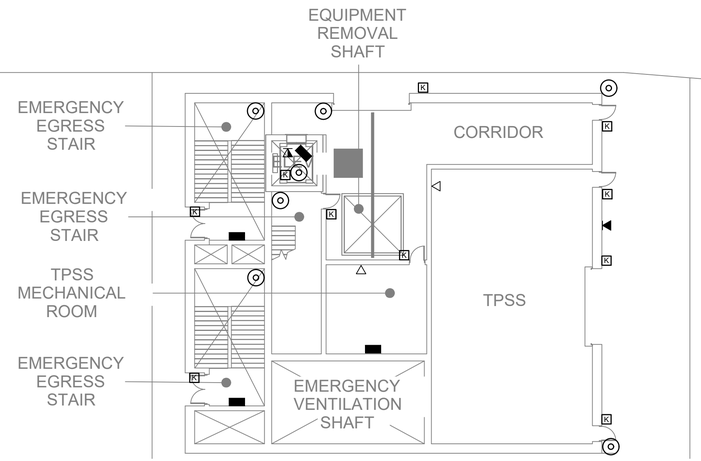
03/21/24 | 12:56 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-MHS140.DWG

COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C



SURFACE LEVEL - OVERALL (1)
SCALE: 1/16" = 1'-0"



GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024	----	----	----	NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

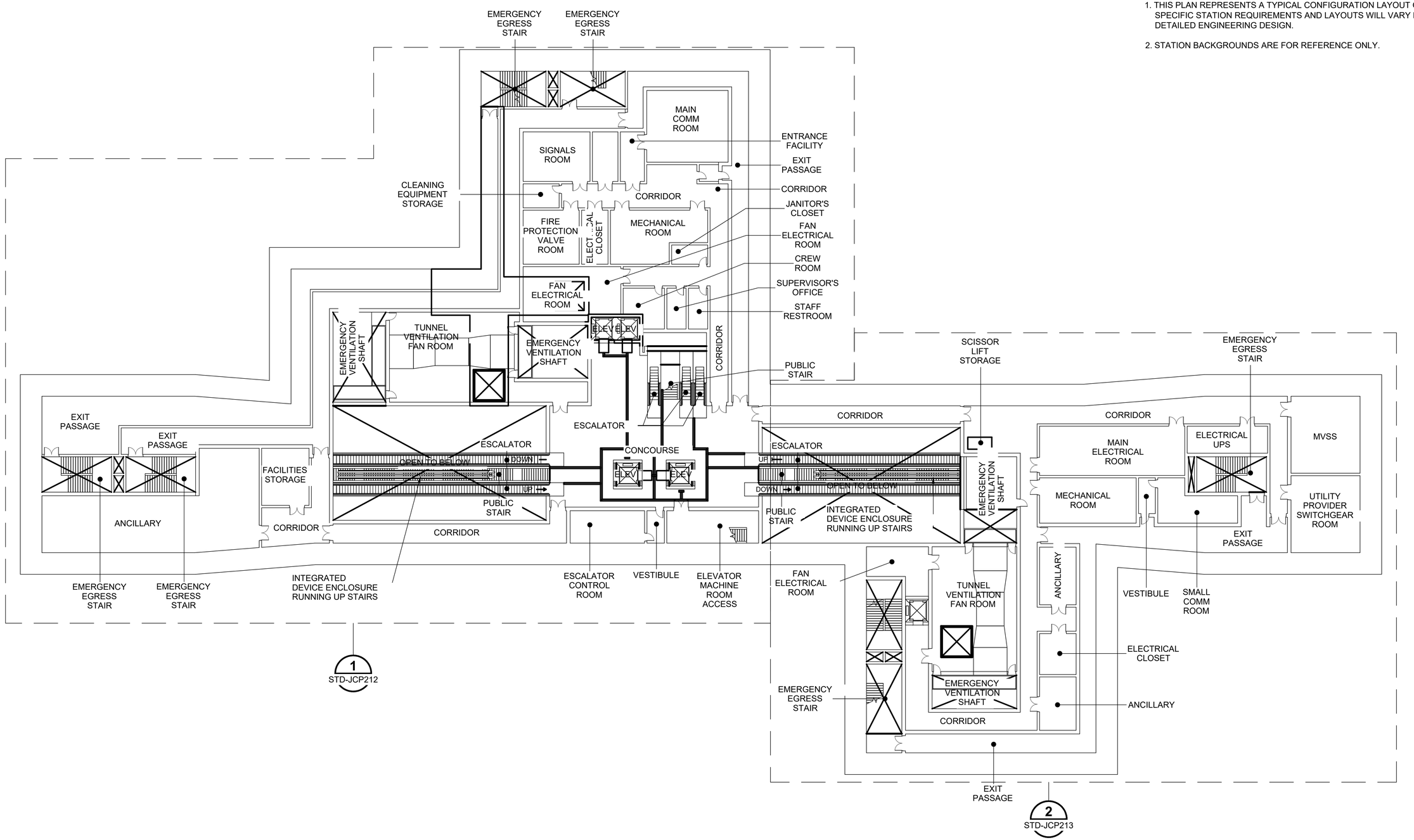
SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP201
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM
S SURFACE LEVEL - COMM DEVICE LAYOUT - OVERALL

DRAWING No.: STD-JCP201
FACILITY ID:
SHEET No.: REV: 0

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.



No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1" = 20'-0"
FILENAME: STD-JCP211-213
CONTRACT No.: RTA/LR
DATE: 12/2024

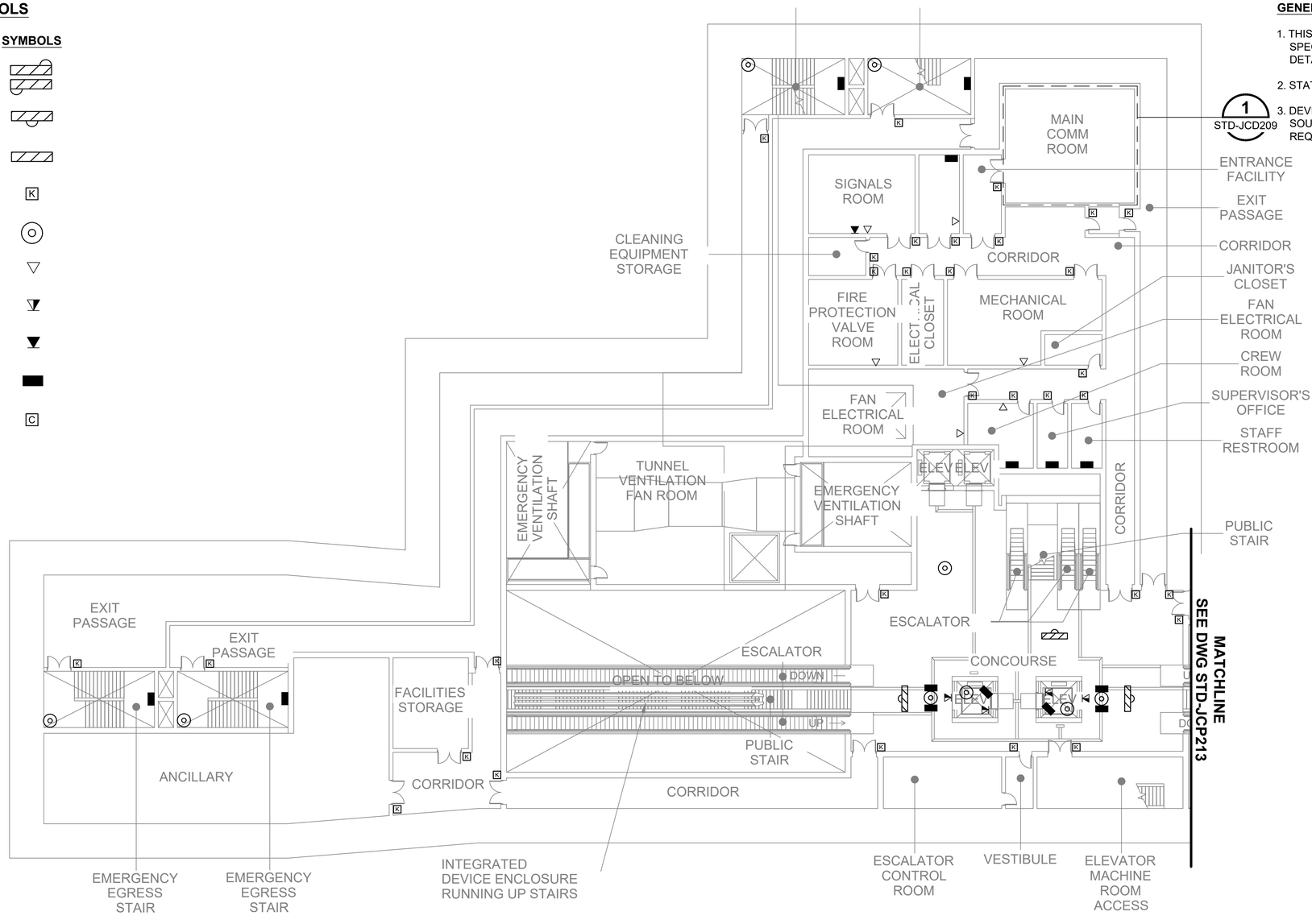
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM - B1 CONCOURSE LEVEL - OVERALL

DRAWING No.: **STD-JCP211**
FACILITY ID:
SHEET No.: REV: 0

01/29/25 | 10:01 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JCP211-213.DWG

COMMUNICATIONS SYMBOLS

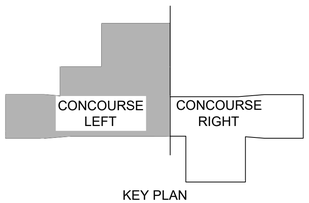
DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C



1 STD-JCD209

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.



KEY PLAN

CONCOURSE LEVEL - LEFT 1

SCALE: 1/16" = 1'-0" STD-JCP211

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: DATE: REVIEWED BY: DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

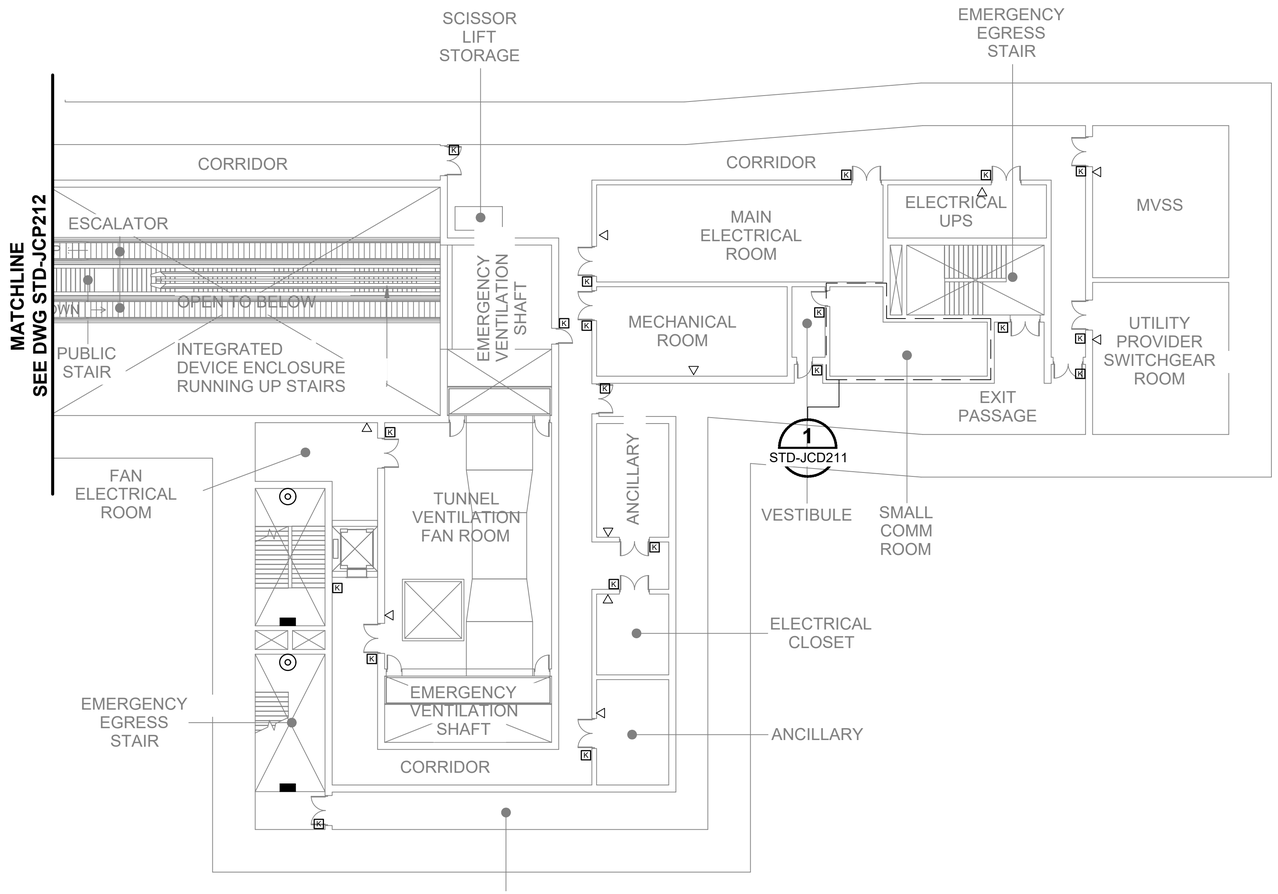
SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP211-213
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM -
B1 CONCOURSE LEVEL - LEFT

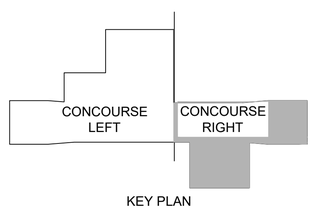
DRAWING No.: STD-JCP212
FACILITY ID:
SHEET No.: REV: 0

COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C



CONCOURSE LEVEL - RIGHT 2
SCALE: 1/16" = 1'-0" STD-JCP211



KEY PLAN

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

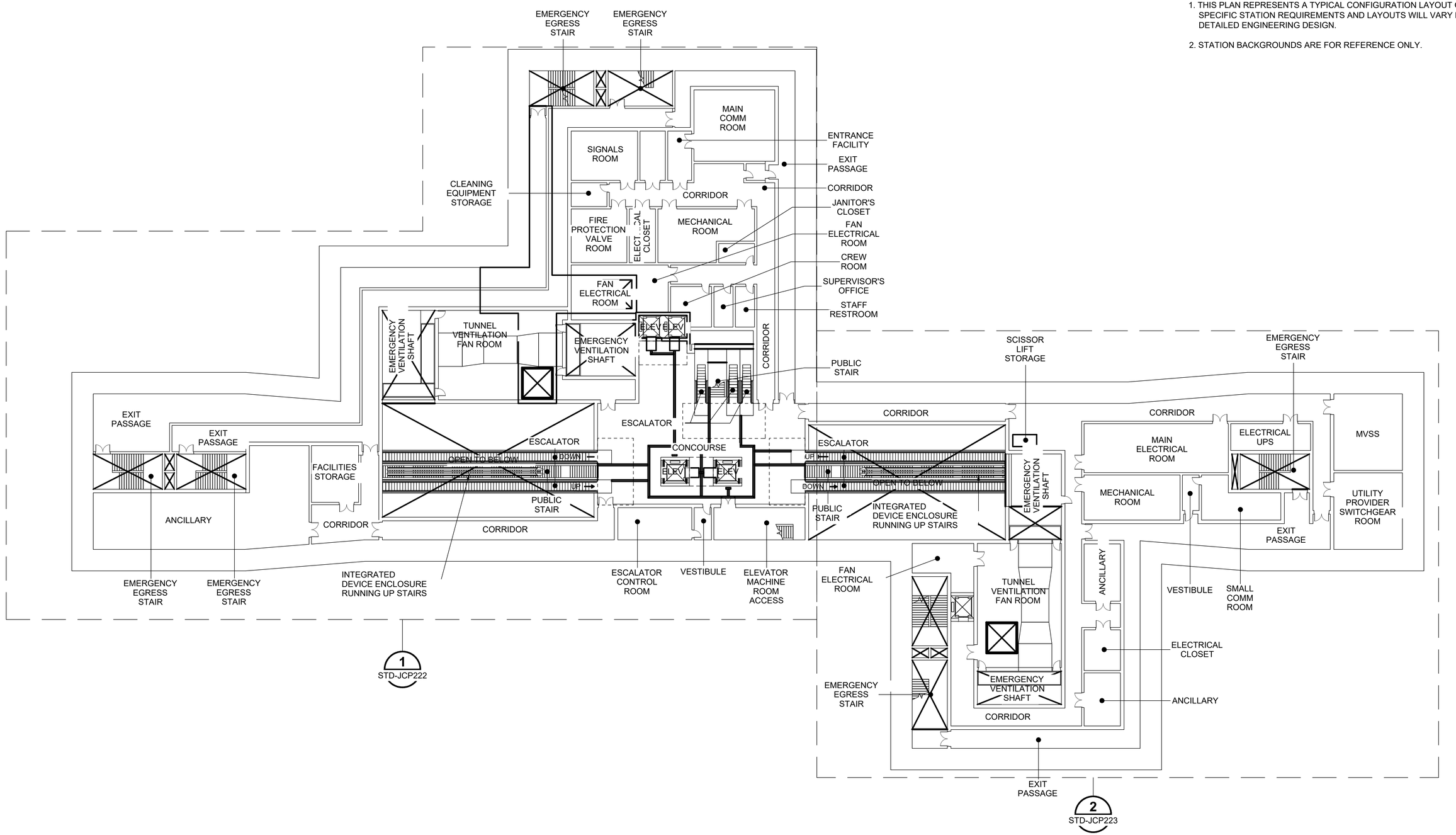
SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP211-213
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM -
B1 CONCOURSE LEVEL - RIGHT

DRAWING No.: **STD-JCP213**
FACILITY ID:
SHEET No.: REV: 0

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.



No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1" = 20'-0"
FILENAME: STD-JCP221-223
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

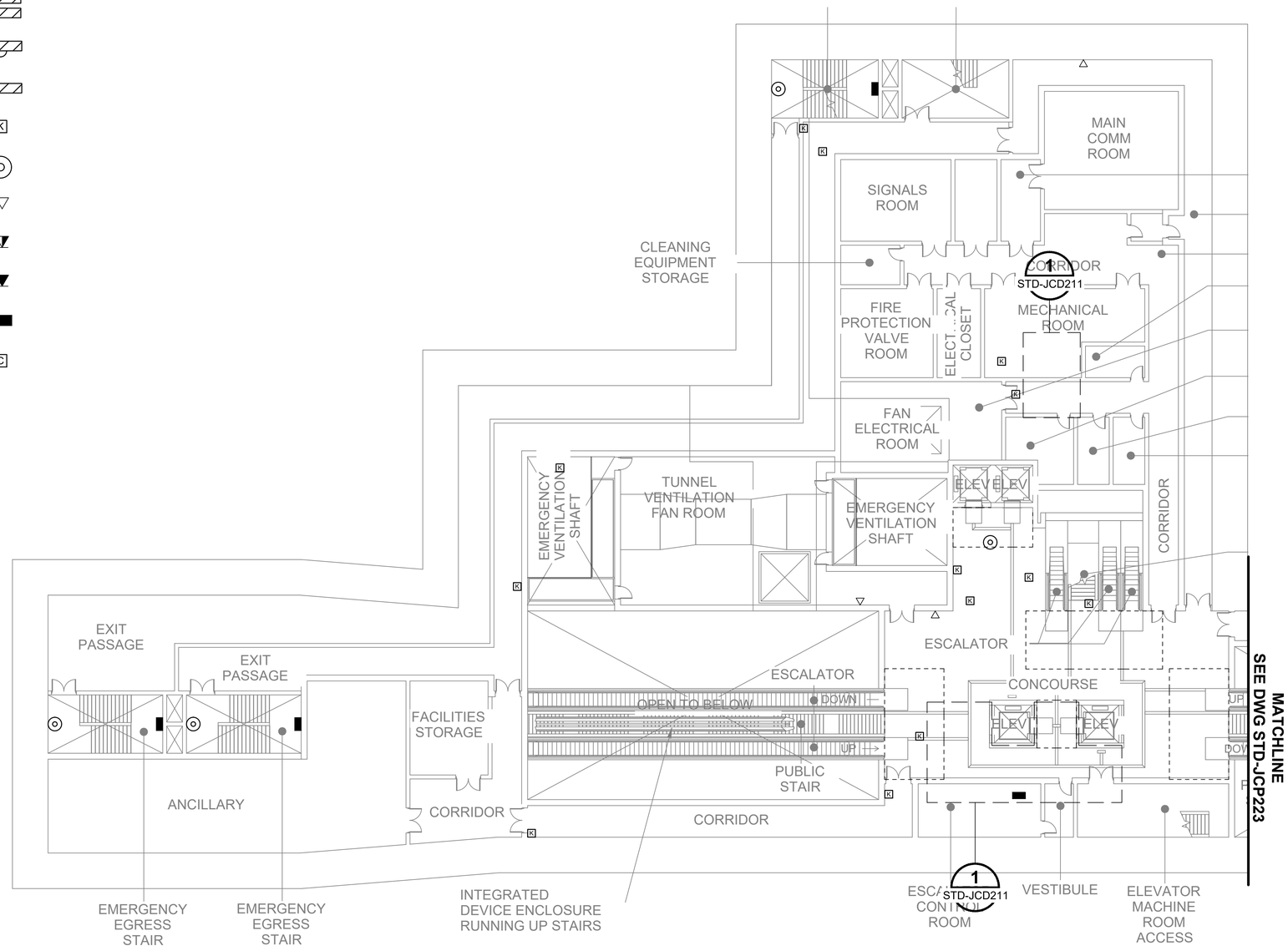
COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM -
B2 MECHANICAL LEVEL - OVERALL

DRAWING No.: **STD-JCP221**
FACILITY ID:
SHEET No.: REV: 0

01/29/25 | 10:01 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JCP221-223.DWG

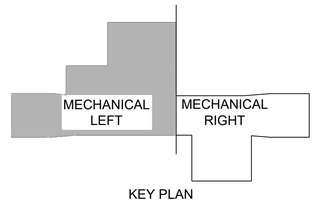
COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C



MECHANICAL LEVEL - LEFT (1 / STD-JCP221)

SCALE: 1/16" = 1'-0"



KEY PLAN

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

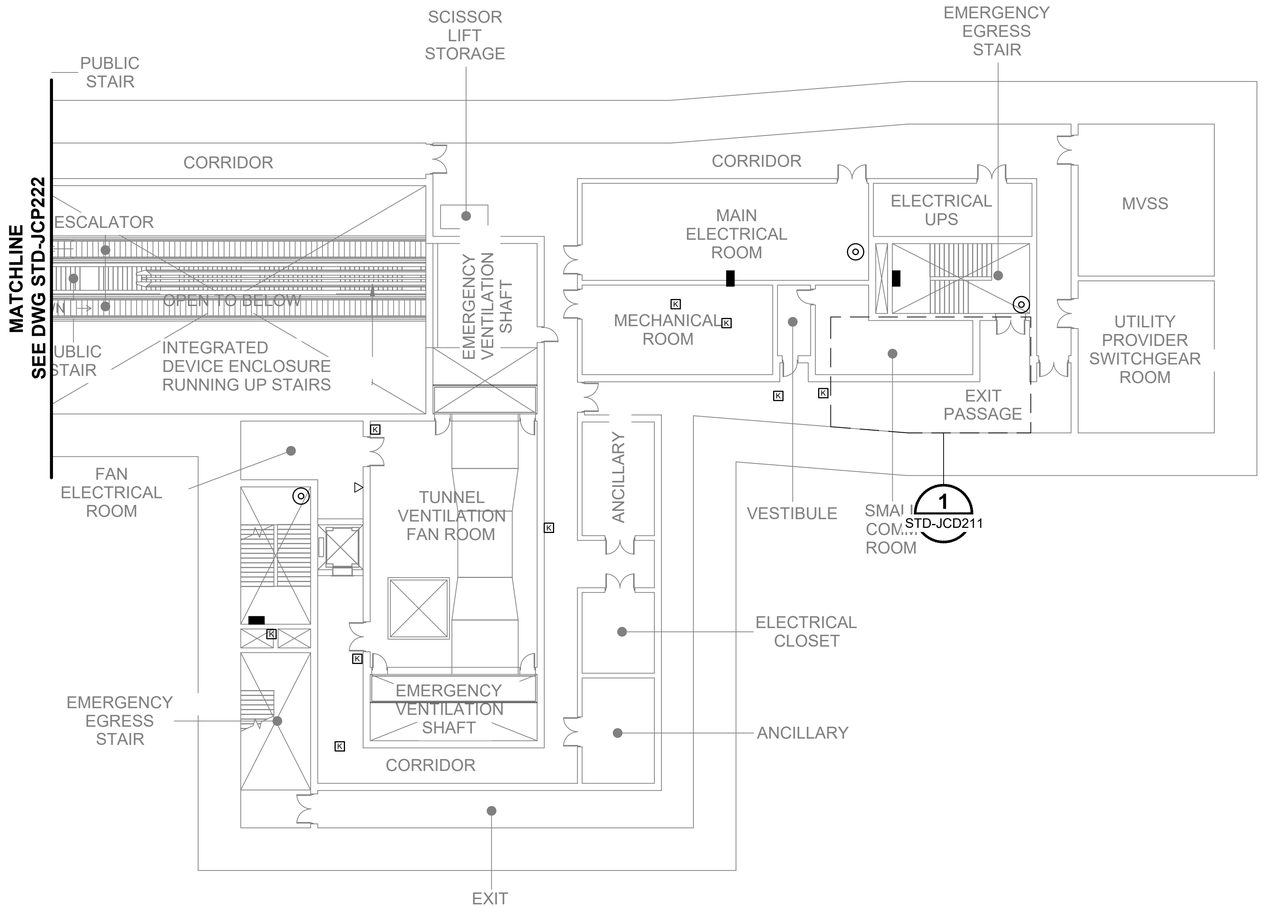
SCALE: 1/16" - 1'-0"
FILENAME: STD-JCP221-223
CONTRACT No.: RTA/LR
DATE: 12/2024

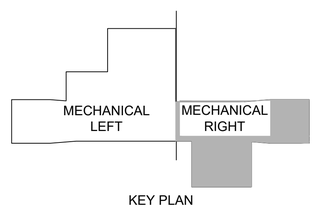
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM -
B2 MECHANICAL LEVEL - LEFT

DRAWING No.: **STD-JCP222**
FACILITY ID:
SHEET No.: REV: 0

COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C





KEY PLAN

MECHANICAL LEVEL - RIGHT (2)
SCALE: 1/16" = 1'-0" STD-JCP221

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP221-223
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM -
B2 MECHANICAL LEVEL - RIGHT

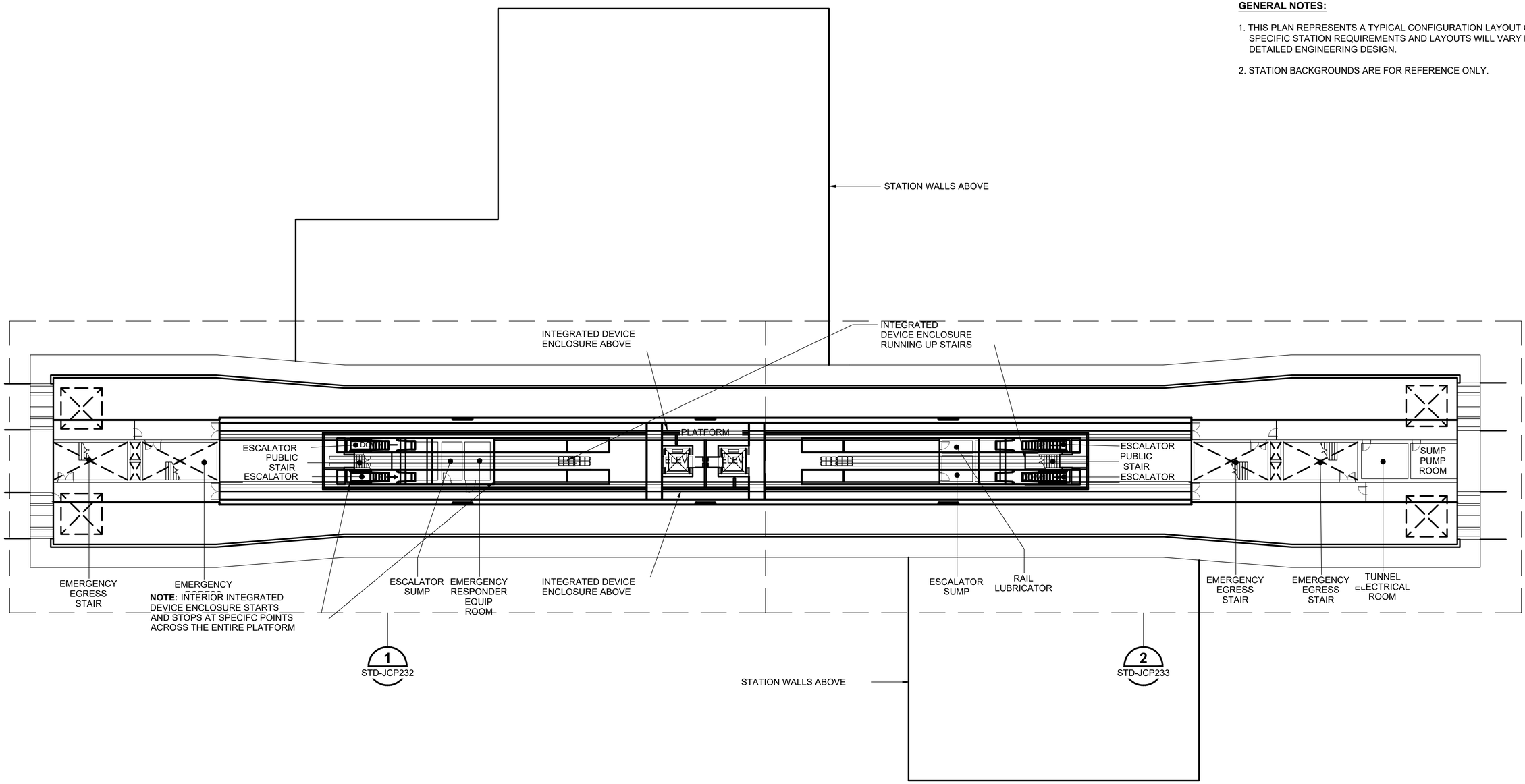
DRAWING No.: **STD-JCP223**
FACILITY ID:
SHEET No.: REV: 0

01/29/25 | 10:01 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JCP221-223.DWG

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.

2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.



No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1" = 20'-0"
FILENAME: STD-JCP231-233
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM -
P PLATFORM LEVEL - OVERALL

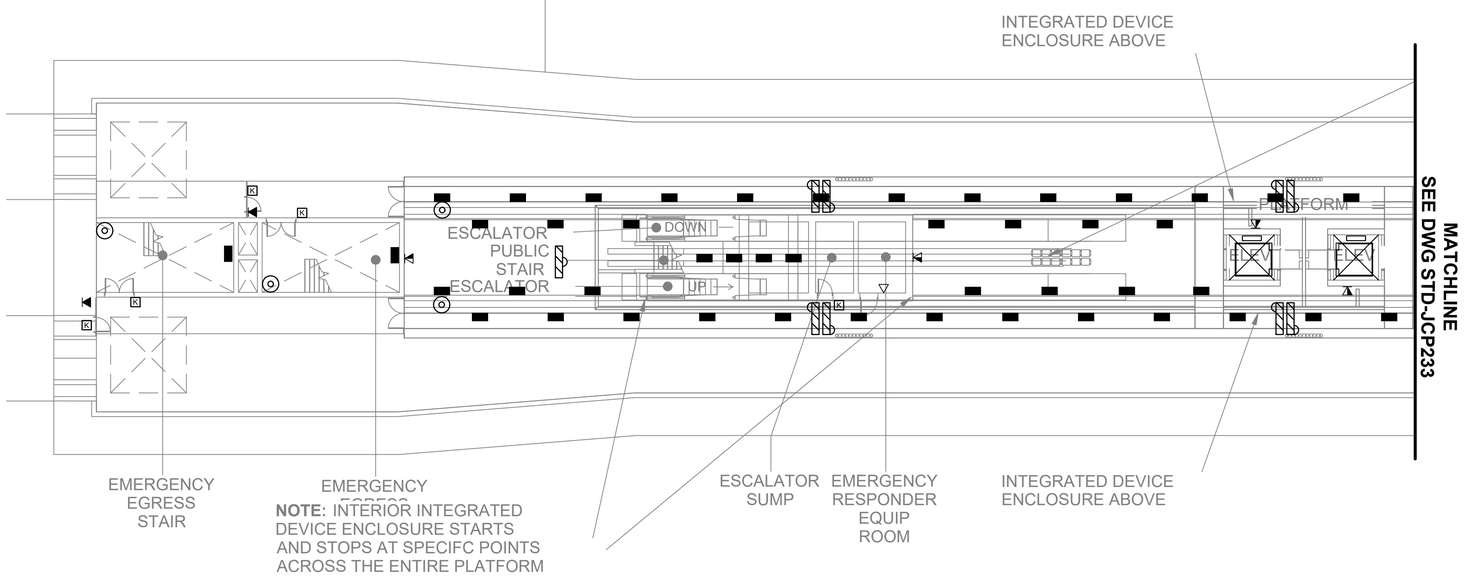
DRAWING No.: **STD-JCP231**
FACILITY ID:
SHEET No.: REV: 0

COMMUNICATIONS SYMBOLS

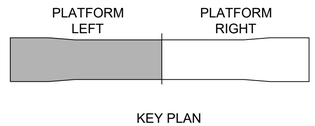
DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.



STATI



KEY PLAN

PLATFORM LEVEL - LEFT (1) STD-JCP231
SCALE: 1/16" = 1'-0"

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

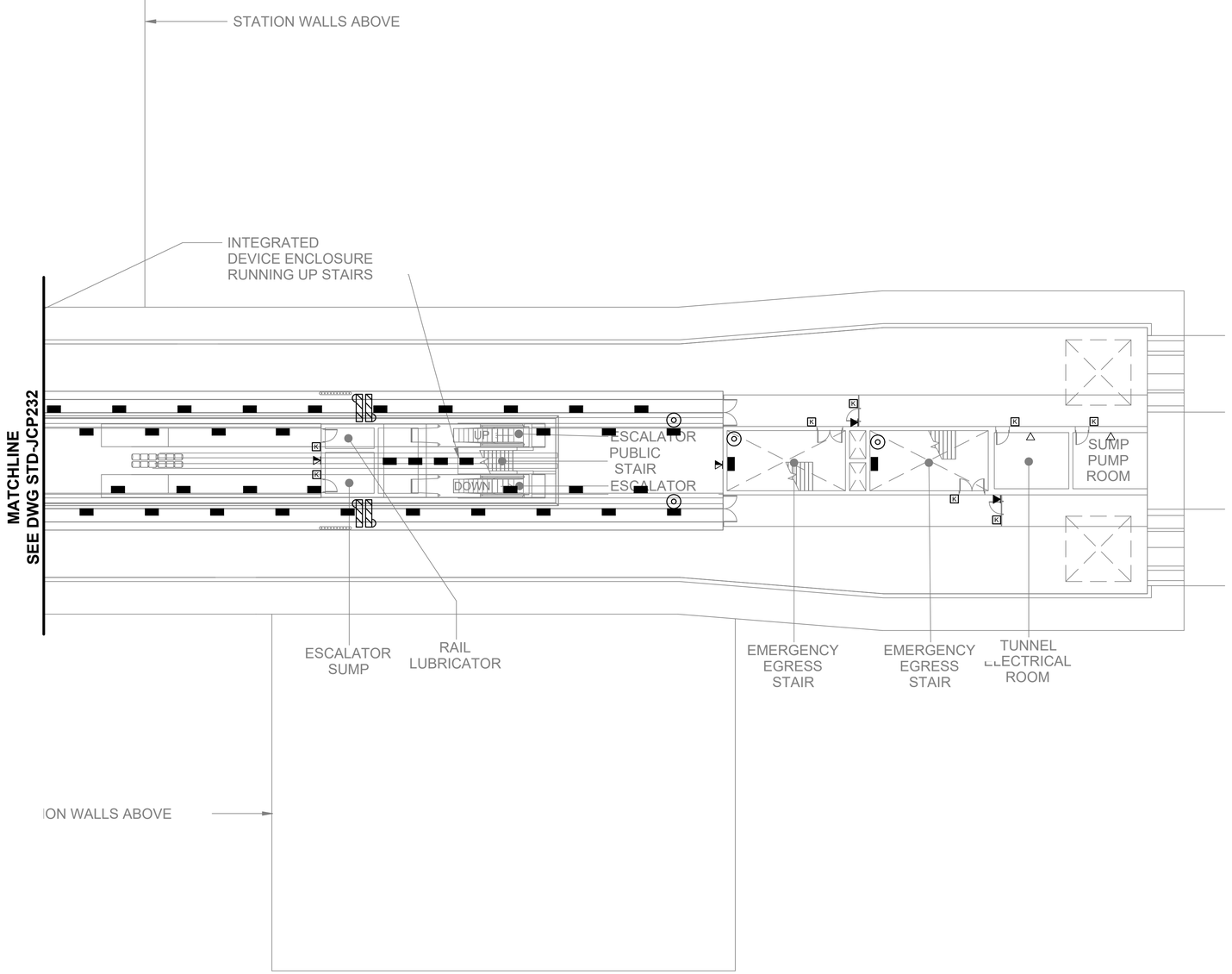
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP231-233
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM -
P PLATFORM LEVEL - COMM DEVICE LAYOUT - LEFT

DRAWING No.: **STD-JCP232**
FACILITY ID:
SHEET No.: REV: 0

COMMUNICATIONS SYMBOLS

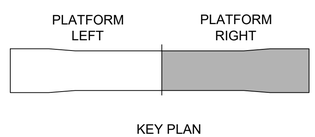
DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C



PLATFORM LEVEL - RIGHT 2
SCALE: 1/16" = 1'-0" STD-JCP231

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.



KEY PLAN

No.	DATE	DSN	CHK	APP	REVISION
	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: DATE: REVIEWED BY: DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1/16" - 1'-0"
FILENAME: STD-JCP231-233
CONTRACT No.: RTA/LR
DATE: 12/2024

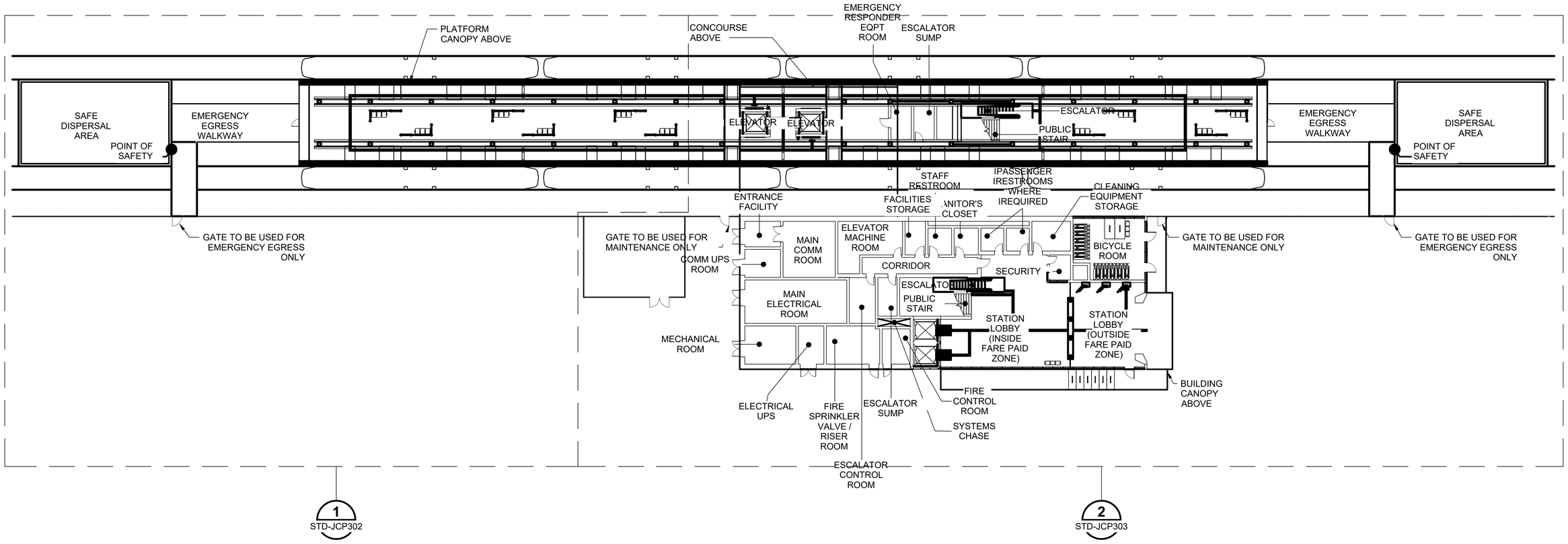
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TUNNEL STATION - CENTER PLATFORM -
P PLATFORM LEVEL - COMM DEVICE LAYOUT - RIGHT

DRAWING No.: STD-JCP233
FACILITY ID:
SHEET No.: REV: 0

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.

2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.



No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SCALE: 1" = 20'-0"
FILENAME: STD-JCP301-303
CONTRACT No.: RTA/LR
DATE: 12/2024

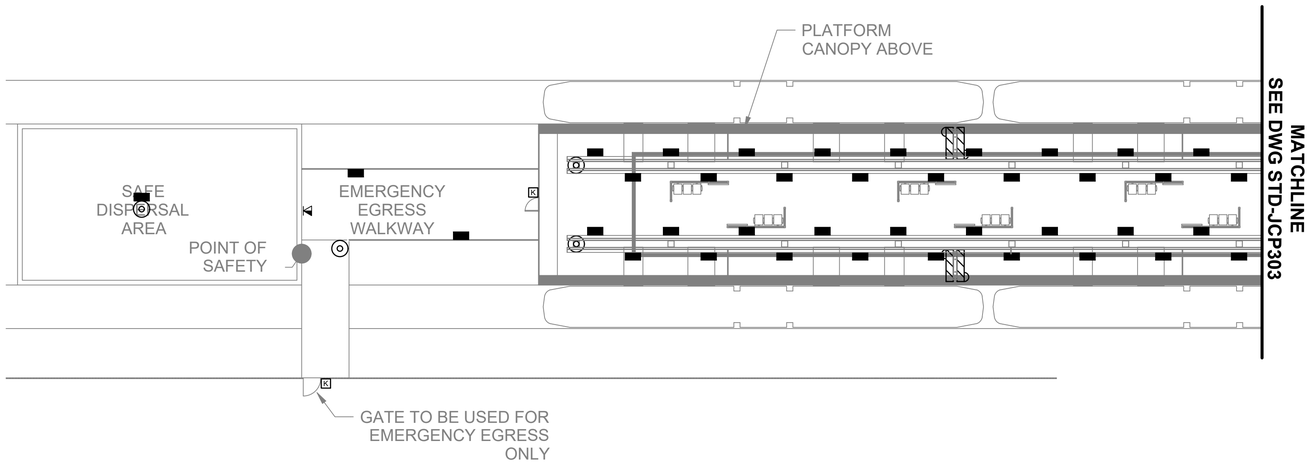
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

COMMUNICATIONS
AT-GRADE STATION - CENTER PLATFORM -
P PLATFORM LEVEL - OVERALL

DRAWING No.: **STD-JCP301**
FACILITY ID:
SHEET No.: REV: 0

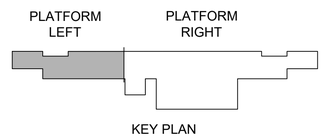
COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C



GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.



PLATFORM LEVEL - LEFT (1)
SCALE: 1/16" = 1'-0" STD-JCP301

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP301-303
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
AT-GRADE STATION - CENTER PLATFORM -
P PLATFORM LEVEL - COMM DEVICE LAYOUT - LEFT

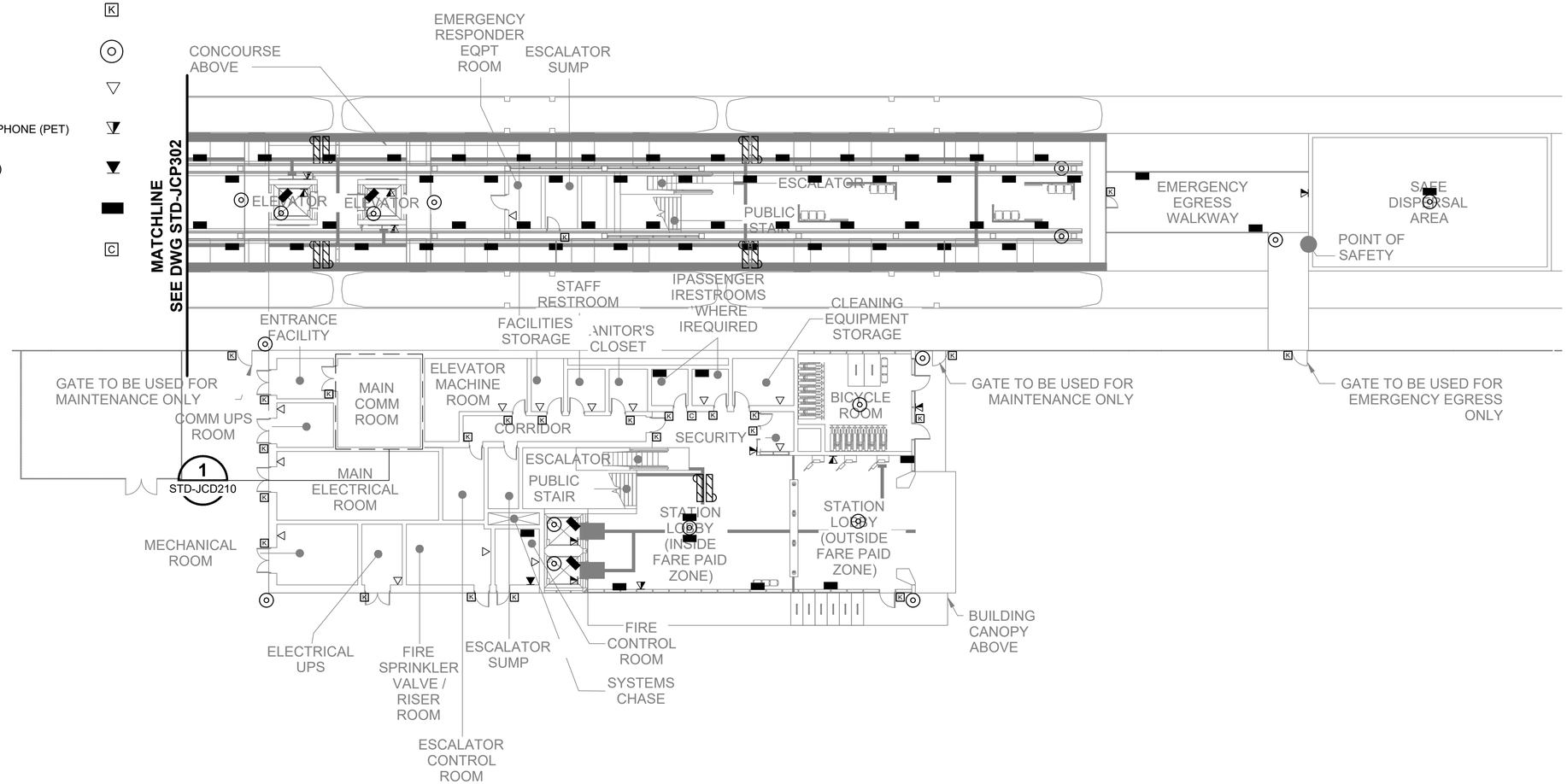
DRAWING No.: **STD-JCP302**
FACILITY ID:
SHEET No.: REV: 0

COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C

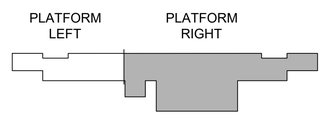
GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.



PLATFORM LEVEL - RIGHT 2

SCALE: 1/16" = 1'-0" STD-JCP301



KEY PLAN

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: DATE: REVIEWED BY: DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP301-303
CONTRACT No.: RTA/LR
DATE: 12/2024

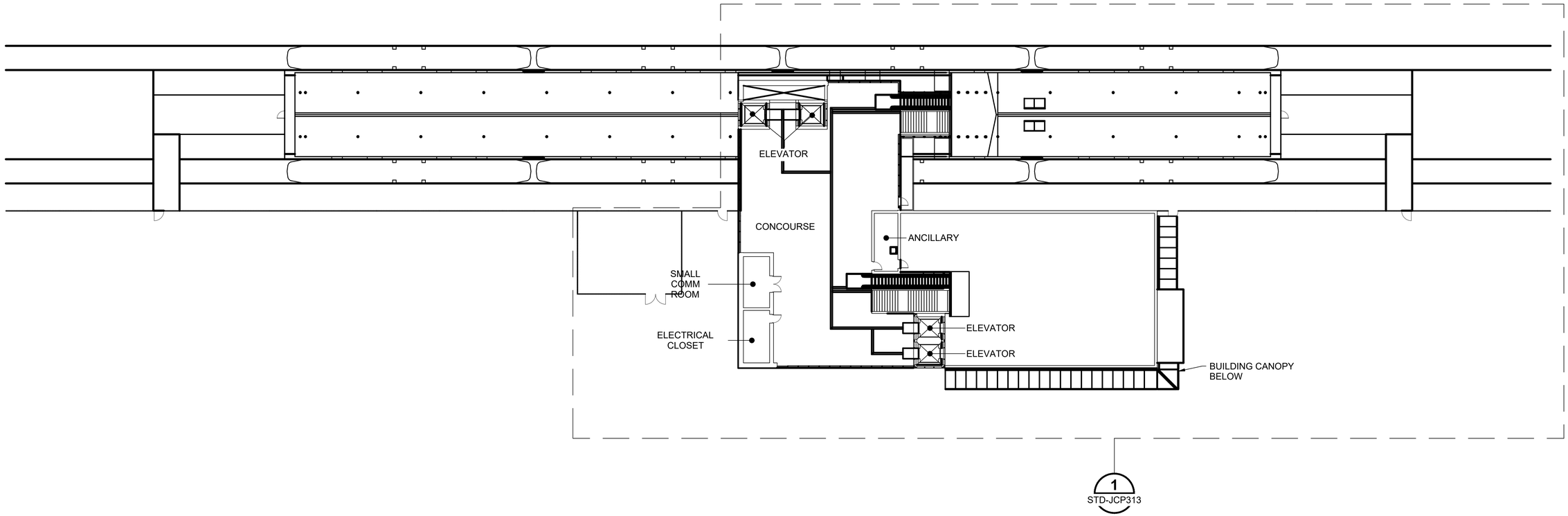
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
AT-GRADE STATION - CENTER PLATFORM -
P PLATFORM LEVEL - COMM DEVICE LAYOUT - RIGHT

DRAWING No.: **STD-JCP303**
FACILITY ID:
SHEET No.: REV: 0

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.

2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.



1
STD-JCP313

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1" = 20'-0"
FILENAME: STD-JCP311-312
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

COMMUNICATIONS
AT-GRADE STATION - CENTER PLATFORM -
M CONCOURSE LEVEL - OVERALL

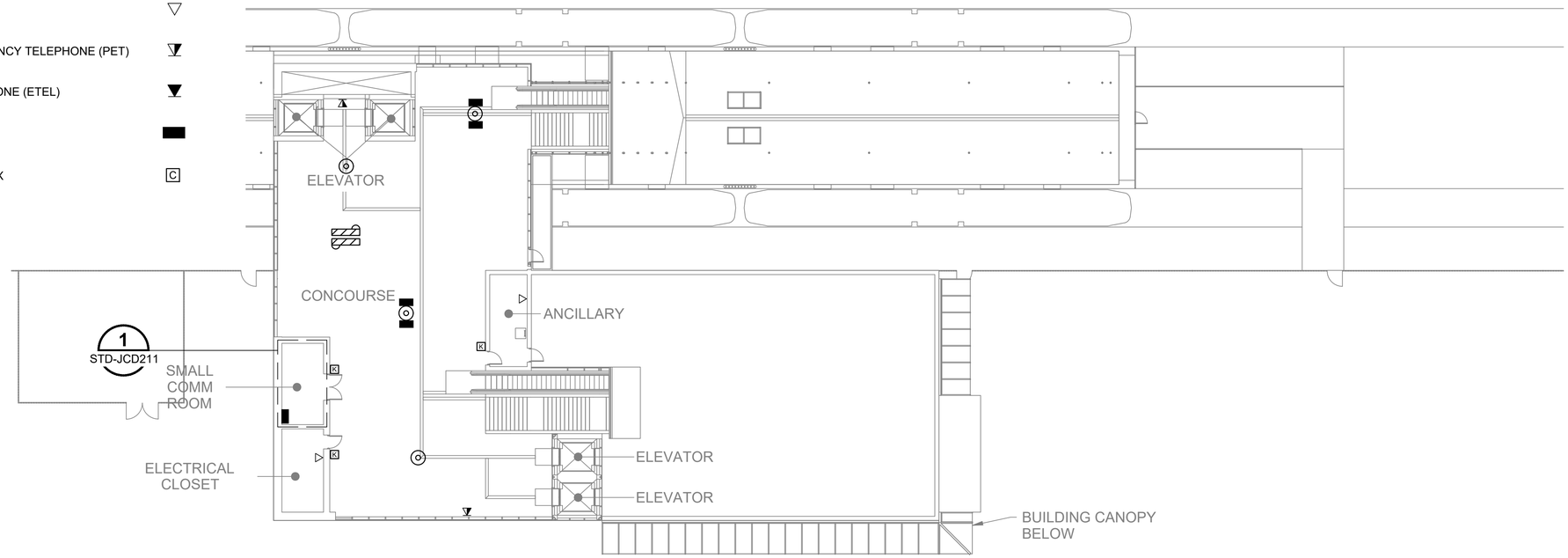
DRAWING No.: **STD-JCP311**
FACILITY ID:
SHEET No.: REV: 0

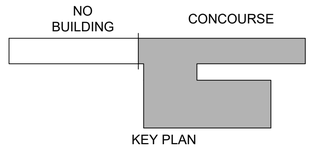
COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.





CONCOURSE LEVEL (1) STD-JCP311
SCALE: 1/16" = 1'-0"

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP311-312
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
AT-GRADE STATION - CENTER PLATFORM -
M CONCOURSE LEVEL - COMM DEVICE LAYOUT

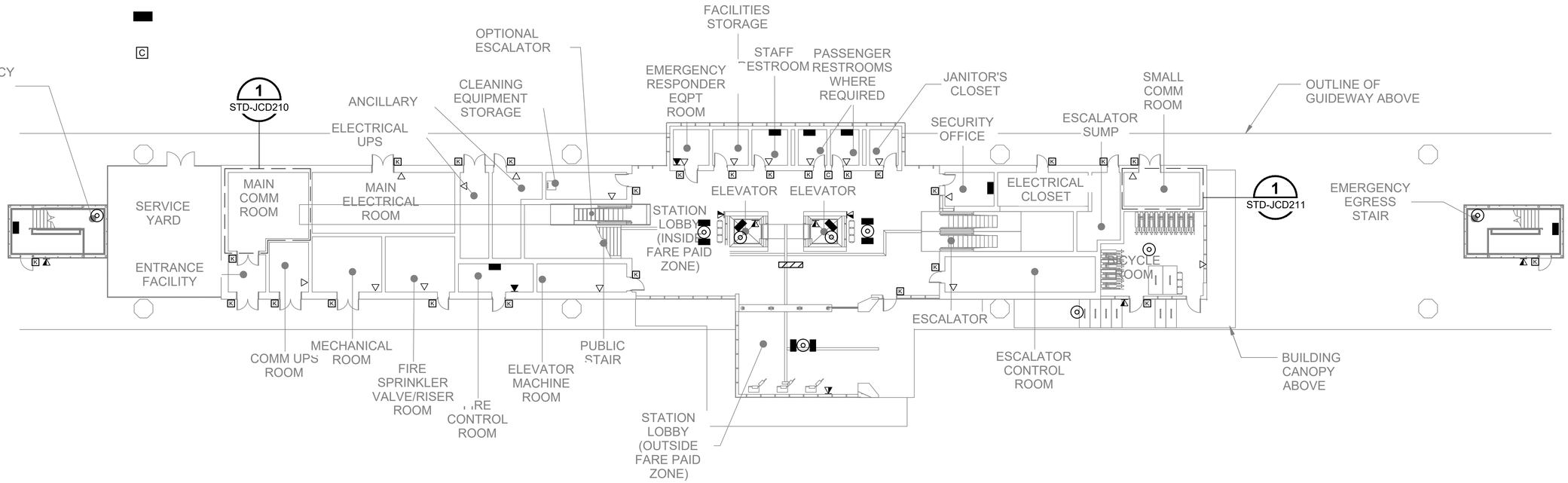
DRAWING No.: **STD-JCP312**
FACILITY ID:
SHEET No.: REV: 0

COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.



SURFACE LEVEL - OVERALL (1)
SCALE: 1/16" = 1'-0"

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP401
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
ELEVATED STATION - CENTER PLATFORM -
S SURFACE LEVEL - COMM DEVICE LAYOUT - OVERALL

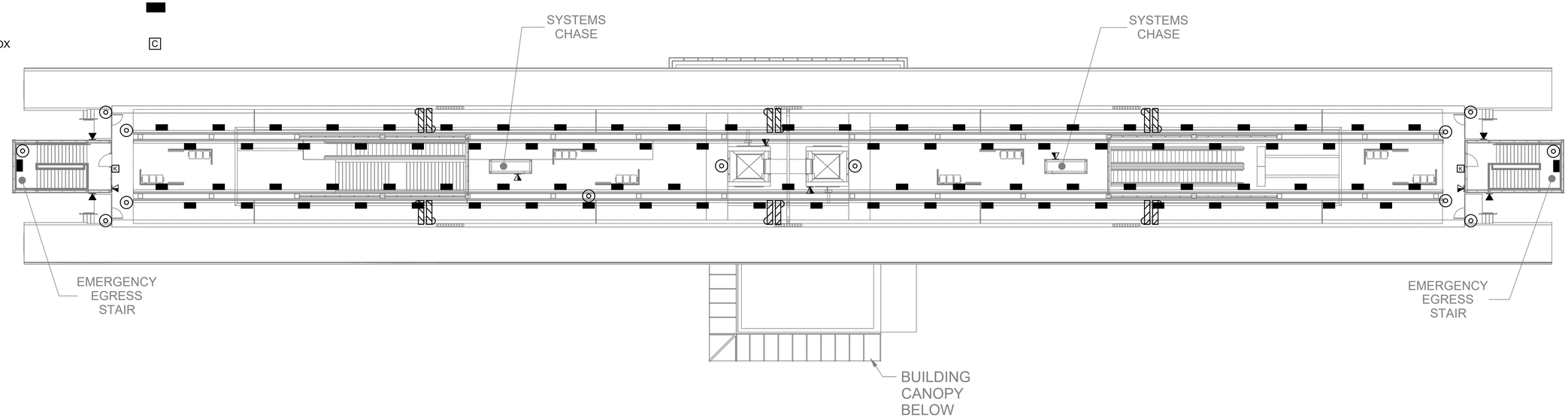
DRAWING No.: **STD-JCP401**
FACILITY ID:
SHEET No.: REV: 0

COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TWO VMS DISPLAY WITH (2) FIXED CAMERAS	
VMS DISPLAY WITH FIXED CAMERA	
FLAT PANEL TELEVISION	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
TELEPHONE (PBX)	
PASSENGER EMERGENCY TELEPHONE (PET)	
EMERGENCY TELEPHONE (ETEL)	
PA SPEAKER	
PASSENGER CALL BOX	C

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. STATION BACKGROUNDS ARE FOR REFERENCE ONLY.
3. DEVICE QUANTITIES SHOWN ARE TYPICAL. DESIGNER SHALL REFER TO SOUND TRANSIT REQUIREMENTS MANUAL FOR SPECIFIC SUB-SYSTEM REQUIREMENTS.



PLATFORM LEVEL - OVERALL (1 / -)
SCALE: 1/16" = 1'-0"

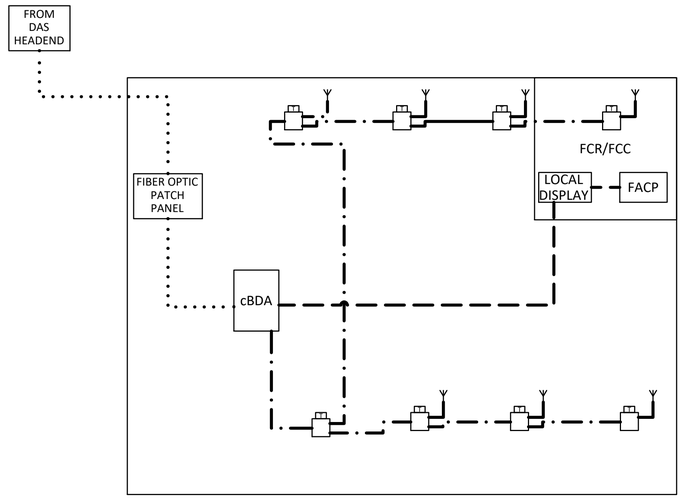
No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: 1/16" = 1'-0"
FILENAME: STD-JCP402
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
ELEVATED STATION - CENTER PLATFORM -
P PLATFORM LEVEL - COMM DEVICE LAYOUT - OVERALL

DRAWING No.: **STD-JCP402**
FACILITY ID:
SHEET No.: REV: 0

01/29/25 | 10:09 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JCP402.DWG



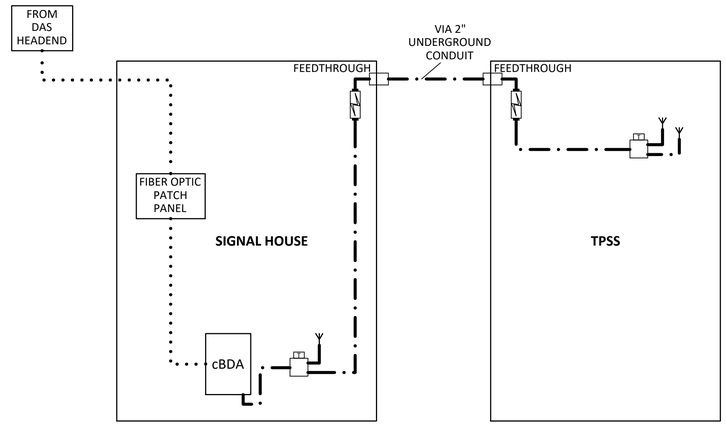
BASIC INDOOR RF SIGNAL ENHANCEMENT

NTS

LEGEND

- LIGHTNING ARRESTOR
- COAXIAL CABLE
- DIRECTIONAL COUPLER
- INDOOR ANTENNA
- MONITORED SIGNAL CABLE
- FIBER OPTIC

cBDA = CHANNELIZED BDA



TPSS AND SIGNAL HOUSE RF SIGNAL ENHANCEMENT

NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED DIRECTIVE DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEM DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

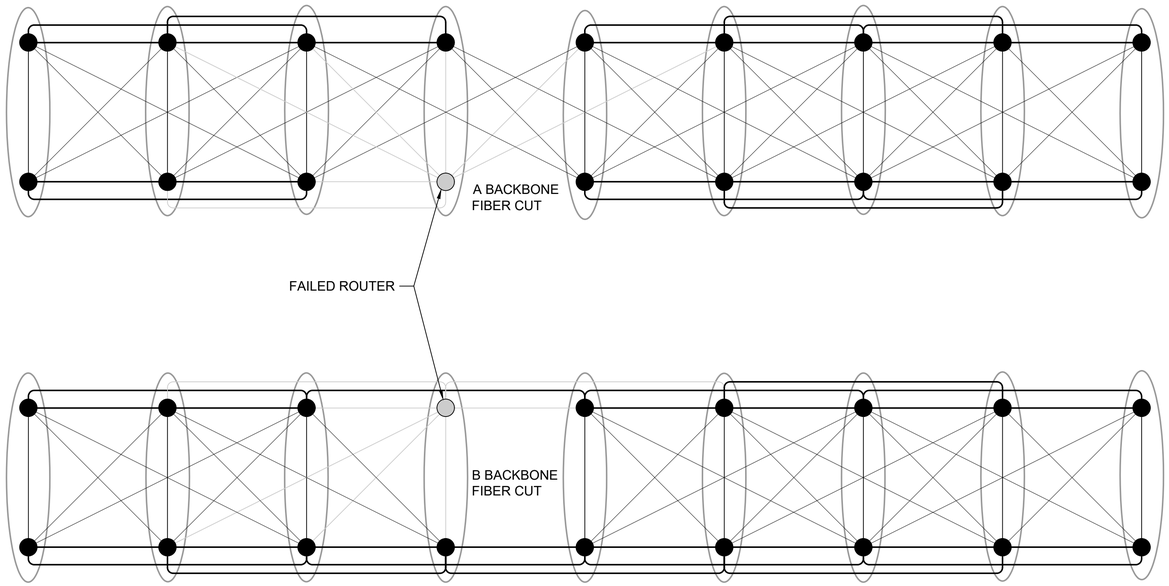
SCALE: NTS
FILENAME: STD-JRS101
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

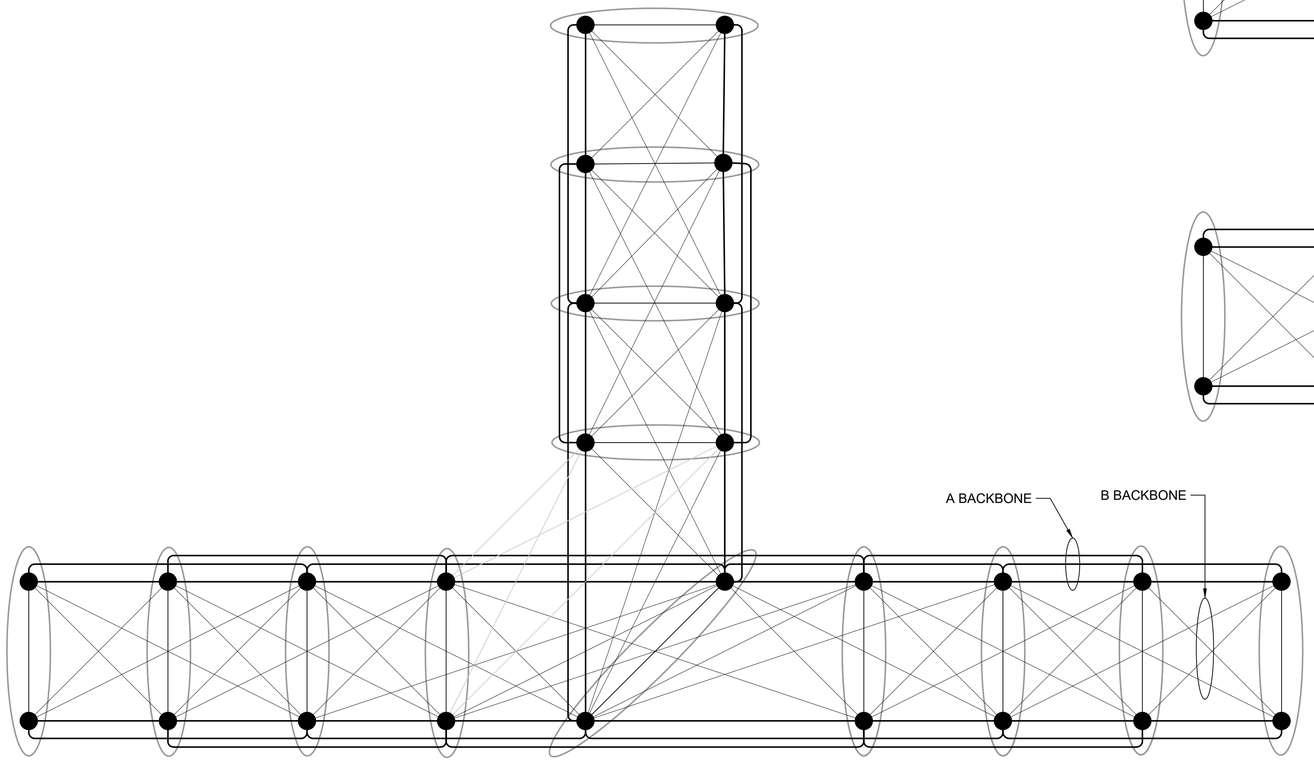
COMMUNICATIONS
RADIO OFF THE AIR BDA DISTRIBUTION
SCHEMATIC

DRAWING No.: **STD-JRS101**
FACILITY ID:
SHEET No.: 2 REV:

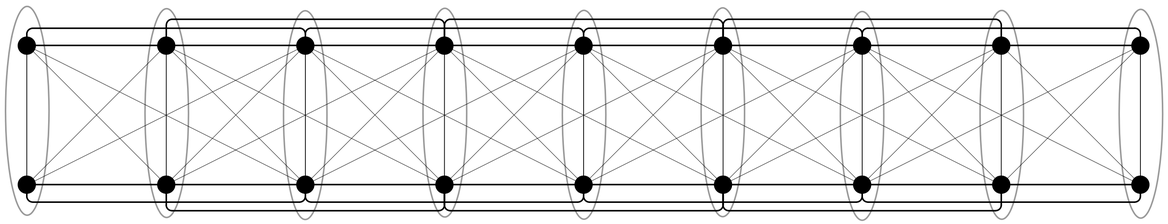
03/21/24 | 1:18 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JRS101.DWG



EXAMPLES OF FAULT DOMAINS 3
SCALE: NTS



TYPICAL TOPOLOGY AT INTERSECTION 2
SCALE: NTS



TYPICAL TOPOLOGY IN SERIES 1
SCALE: NTS

NOTES:

DESIGN OBJECTIVES:

1. MUST BE ABLE TO EXPAND THE NETWORK IN ANY DIRECTION AT ANY TIME, ONE STATION AT A TIME, WITHOUT THE NEED TO PULL FIBER BACK ALONG THE ALIGNMENT AT EXISTING STATIONS.
2. MUST NOT CONTAIN ANY SINGLE POINT OF FAILURE AND BE ABLE TO WITHSTAND FAILURES THAT ARE ADJACENT TO EACH OTHER. FOR EXAMPLE, THE BACKBONE FIBER CUT AND ROUTER THAT ARE RELATED TO EACH OTHER.
3. FAILURE OF ANY COMPONENT SHOULD NOT RESULT IN AN INCREASE IN LATENCY.
4. THIS DRAWING IS AN EXAMPLE OF STATION BACKBONE TOPOLOGY TCN AND EFN. THIS IS THE MINIMUM REQUIRED DETAILS.

   THIS IS AN EXAMPLE AND NOT AS-BUILT.

LEGEND
- A BACKBONE
- B BACKBONE
- ROUTER
- FAILED ROUTER
- FAILED ROUTER LINK

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

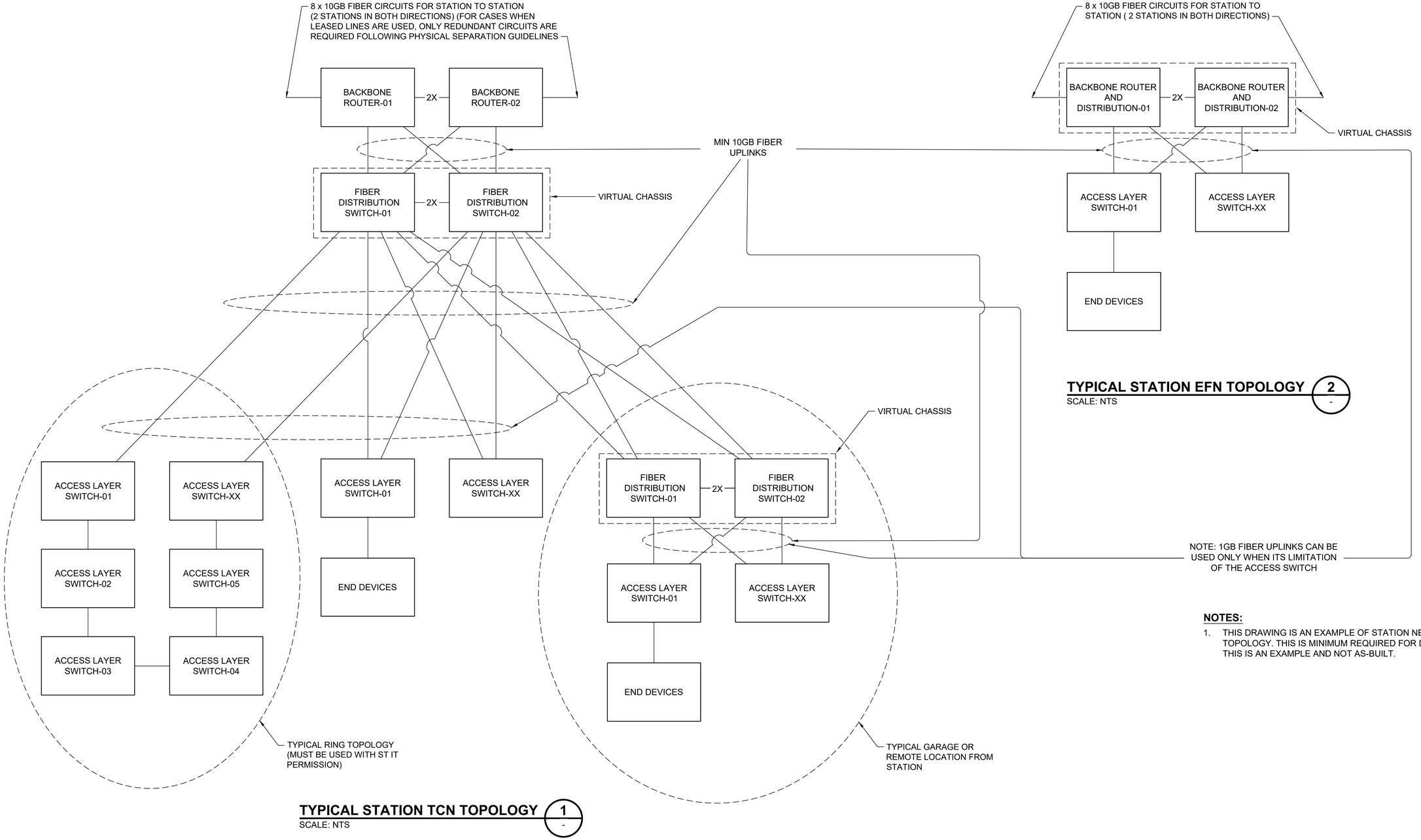
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCS101
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

COMMUNICATIONS
TYPICAL STATION BACKBONE TOPOLOGY
TCN AND EFN

DRAWING No.: **STD-JCS101**
FACILITY ID:
SHEET No.: REV: 0



TYPICAL STATION TCN TOPOLOGY 1
SCALE: NTS

TYPICAL STATION EFN TOPOLOGY 2
SCALE: NTS

NOTES:

1. THIS DRAWING IS AN EXAMPLE OF STATION NETWORK TOPOLOGY. THIS IS MINIMUM REQUIRED FOR DETAILS. THIS IS AN EXAMPLE AND NOT AS-BUILT.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

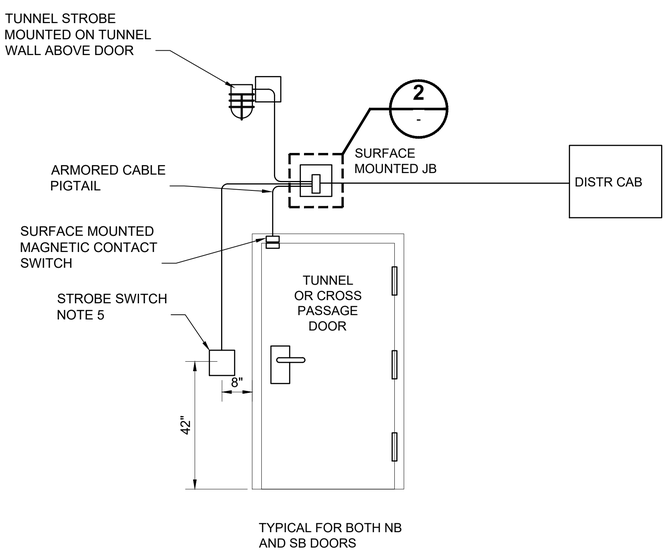
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JCS103
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TYPICAL STATION NETWORK TOPOLOGY

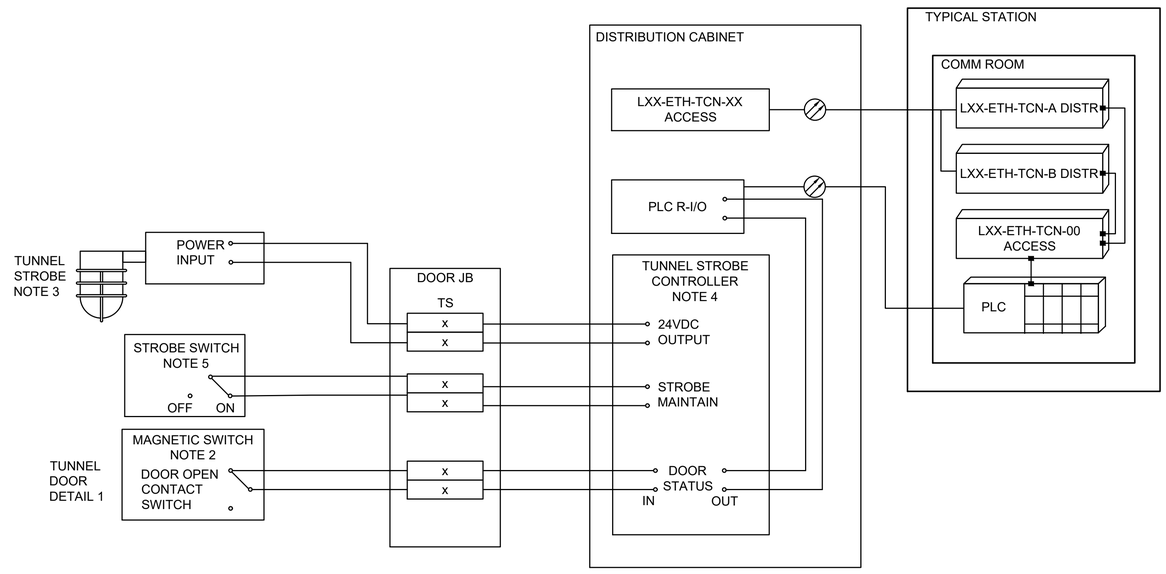
DRAWING No.: **STD-JCS103**
FACILITY ID:
SHEET No.: REV: 0

GENERAL NOTES:

1. COORDINATE WITH TUNNEL PLANS AND DOOR SCHEDULE.
2. DOOR CONTACTS SHALL BE CLOSED WHEN DOOR IS IN THE CLOSED POSITION.
3. ALL TUNNEL OR CROSS PASSAGE DOORS SHALL BE EQUIPPED WITH 90 FLASHES PER MINUTE YELLOW STROBE ABOVE DOOR.
4. TUNNEL DOOR CONTACT WILL INITIATE A SIGNAL TO A STROBE CONTROLLER RELAY WITH A VARIABLE TIMER TO OPERATE THE STROBE.
5. PROVIDE A TWO POSITION SWITCH FOR OPERATIONS PERSONNEL TO MAINTAIN STROBE OPERATION FOR EXTENDED WORK PERIODS.
6. THE DEPICTED CONNECTION FROM PLC TO PLC E-I/O IS A LOGICAL CONNECTION, THE PHYSICAL CONNECTION IS TO BE PROVIDED VIA THE FIBER OPTIC CABLE FROM THE COMM ROOM TO THE DISTRIBUTION CABINET.



TUNNEL OR CROSS PASSAGE DOOR 1
NTS



DOOR WIRING DETAIL - TUNNEL OR CROSS PASSAGE DOOR 2
NTS

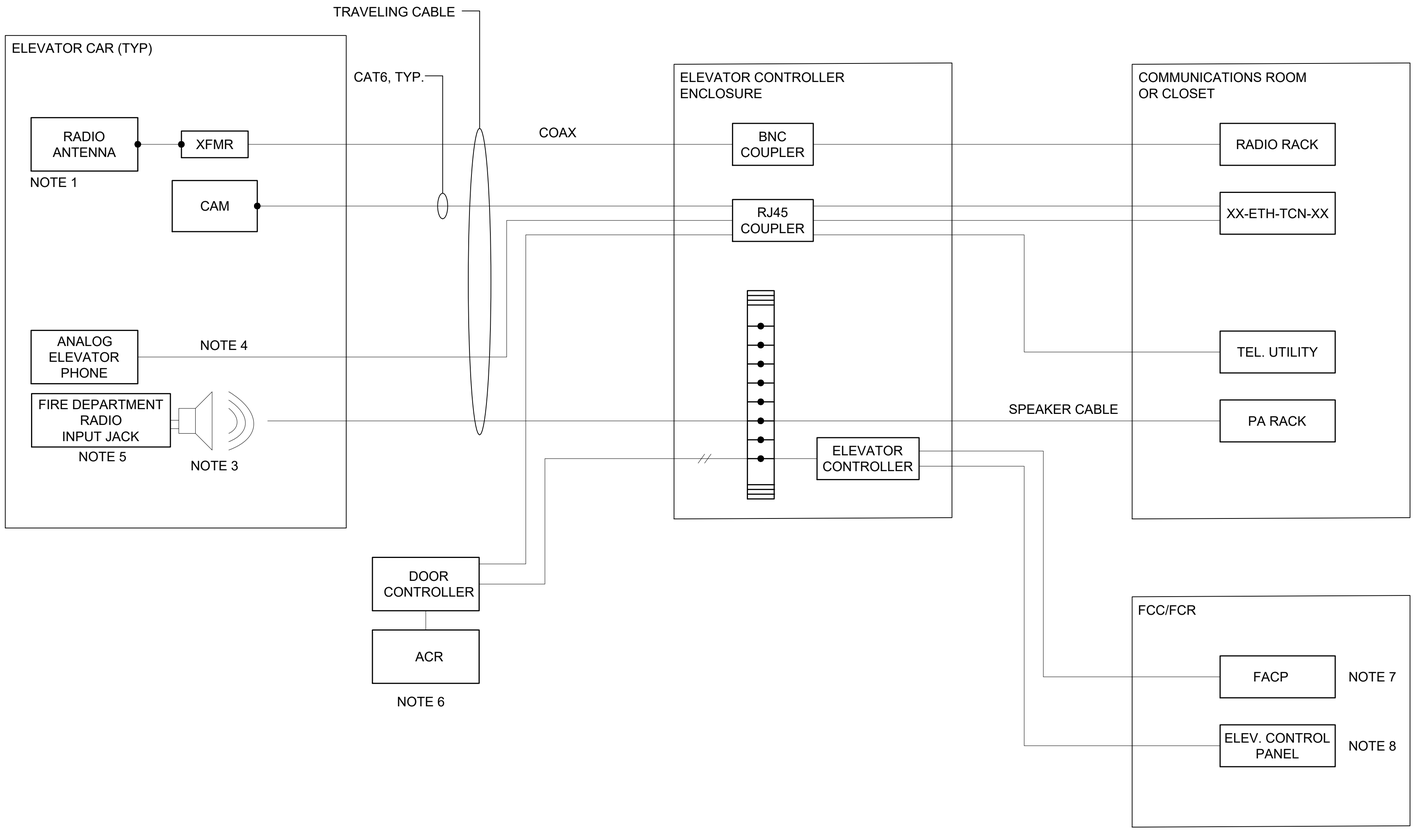
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWNGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JCS201
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TYPICAL CROSS PASSAGE DOOR INTRUSION
STROBE BLOCK DIAGRAM

DRAWING No.: **STD-JCS201**
FACILITY ID:
SHEET No.: 2
REV:

03/21/24 | 12:44 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JCS201.DWG



GENERAL NOTES:

1. COORDINATE MOUNTING METHODS FOR ANTENNA WITH CIVIL DESIGNER AND CONTRACTOR.
2. TERMINATE EACH CABLE ON A TERMINATION RATED FOR THE INTENDED USE.
3. SPEAKER IN ELEVATOR CAB IN STATION ELEVATORS ONLY (NOT IN GARAGE) OR NON-STATION FACILITY.
4. TELEPHONE LINE SHALL BE MONITORED VIA ELEV CONTROLLER.
5. COORDINATE WITH ST, AHJ AND ARCHITECTURE TO IDENTIFY ADDITIONAL REQUIREMENTS SUCH AS AN FIRE DEPARTMENT RADIO INPUT JACK.
6. ACCESS CONTROL CARD READER LOCATION(S) TO BE DETERMINED BASED ON STATION/ GARAGE CONFIGURATION.
7. RECALL FUNCTIONALITY AS REQUIRED BY CODE. TYPICAL RECALL TRIGGER BY HEAT OR SMOKE IN ELEVATOR SHAFT, HEAT IN LOBBY OR SMOKE IN ELEVATOR MACH ROOM.
8. AS REQUIRED BY AHJ AND AS SHOWN IN FCC/ FCR DRAWINGS.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWGD REVISION - GENERAL UPDATE
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCS500
CONTRACT No.: RTA/LR
DATE: 2/2024

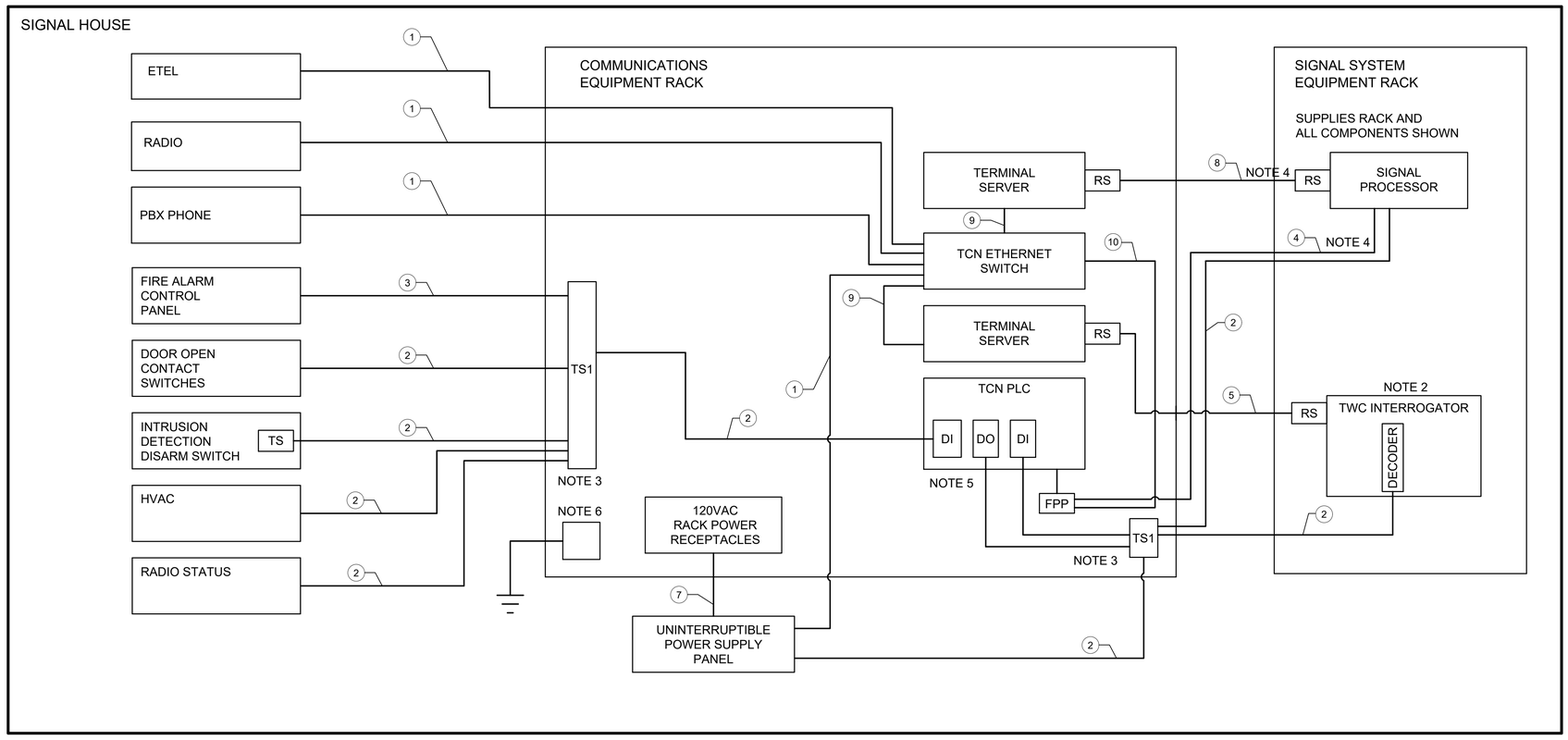
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

COMMUNICATIONS
ELEVATOR INTERFACING
BLOCK DIAGRAM

DRAWING No.: **STD-JCS500**
FACILITY ID:
SHEET No.: REV: 3

GENERAL NOTES:

1. RACK POWER RECEPTACLES SUPPLY POWER TO COMMUNICATIONS EQUIPMENT IN THE SIGNAL HOUSE INCLUDING RACK MOUNTED COMPONENTS, AND PBX PHONE.
2. LOCATIONS SHALL INCLUDE ONE OR MULTIPLE TWC INTERROGATORS.
3. PROVIDE TERMINAL STRIP 1 (TS1) ON A DIN RAIL AT THE TOP OF THE RACK. SEE SPECIFICATION INTERFACE TABLES FOR TS1 CONFIGURATION.
4. THIS DRAWING SHOWS TYPICAL INTERFACE FOR SIGNAL HOUSE WITH NON-REDUNDANT PROCESSORS. ADDITIONAL SELECTION LOGIC IS NECESSARY FOR REDUNDANT PROCESSORS.
5. SEE TCS I/O POINTS LIST DRAWING. COORDINATE AND CONFIRM FOR THE LOCATION AND APPLICATION WITH ST.
6. PROVIDE GROUND BUS ON COMM RACK USING 6 AWG MINIMUM WIRE TO BUNGALOW GROUND.



WIRE / CABLE TABLE

ITEM	TYPE
1	CAT 6
2	LOW VOLTAGE CONDUCTOR
3	FIRE ALARM WIRE
4	FIBER PATCH CORDS, SINGLE MODE,
	ORANGE WITH SC CONNECTOR ON FIBER
	PATCH PANEL END
5	EIA-232 SERIAL CABLE
6	18 FIBER PRECONNECTORIZED PIGTAIL
7	LOW VOLTAGE CONDUCTOR
8	EIA-232 SERIAL CABLE
9	CAT 6
10	FIBER PATCH CORD, SINGLE MODE

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JCS700
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
SIGNAL HOUSE
INTERFACE DIAGRAM

DRAWING No.: **STD-JCS700**
FACILITY ID:
SHEET No.: 2
REV:

TCS PLC I/O POINTS FOR TYPICAL EQUIPMENT

EQUIPMENT TYPE	PLC I/O DESCRIPTION	POINT TYPE	PLC TAG TEMPLATE	NOTES
OCS DISCONNECT	SWITCH OPEN	DI	EXX_OCSD_XX_OPEN_DI	EXX IS LOCATION, XX IS EQUIPMENT INSTANCE NUMBER
SIGNAL HOUSE	FIRE ALARM	DI	EXX_SIG_XX_FACP_ALARM_DI	
	DOOR OPEN	DI	EXX_SIG_XX_DOOR_OPEN_DI	
	INTRUSION DISARM	DI	EXX_SIG_XX_INTRUSION_DISARM_DI	
	TWC DECODER OUTPUT	DI	EXX_SIG_XX_TWC_XX_DI	
	MAINTENANCE RADIO FAULT	DI	EXX_SIG_XX_RADIO_FAULT_DI	
	UPS TROUBLE	DI	EXX_SIG_XX_UPS_TROUBLE_DI	
	POWER FAULT	DI	EXX_SIG_XX_POWER_FAIL_DI	
	HVAC FAULT	DI	EXX_SIG_XX_HVAC_TROUBLE_DI	
	HIGH ROOM TEMPERATURE	DI	EXX_SIG_XX_ROOM_TEMP_DI	
	SWITCH HEATER ON 1	DI	EXX_SIG_XX_HTR_XX_ON_DI	
	SWITCH HEATER ON 2	DI	EXX_SIG_XX_HTR_XX_ON_DI	
	SWITCH HEATER ON 3	DI	EXX_SIG_XX_HTR_XX_ON_DI	
	SWITCH HEATER ON 4	DI	EXX_SIG_XX_HTR_XX_ON_DI	
SIGNAL ROOM	TWC DECODER OUTPUT	DI	EXX_SIG_XX_TWC_XX_DI	
	UPS TROUBLE	DI	EXX_SIG_XX_UPS_TROUBLE_DI	
	POWER FAULT	DI	EXX_SIG_XX_POWER_FAIL_DI	
	HVAC FAULT	DI	EXX_SIG_XX_HVAC_TROUBLE_DI	
	HIGH ROOM TEMPERATURE	DI	EXX_SIG_XX_ROOM_TEMP_DI	
TIDS	INTRUSION	DI	EXX_TIDS_XX_INTRUSION_DI	
	TIDS TROUBLE	DI	EXX_TIDS_XX_TROUBLE_DI	
	STROBE ACTIVATE	DO	EXX_TIDS_XX_STROBE_DO	
	SPEAKER ACTIVATE	DO	EXX_TIDS_XX_SPEAKER_DO	
TPSS	DOOR OPEN	DI	EXX_TPSS_XX_DOOR_01_DI	
	DOOR OPEN	DI	EXX_TPSS_XX_DOOR_02_DI	
	INTRUSION ALARM	DI	EXX_TPSS_XX_INTRUSION_01_DI	
	INTRUSION ALARM	DI	EXX_TPSS_XX_INTRUSION_02_DI	
	ENCLOSURE DOOR SWITCH	DI	EXX_TPSS_XX_ENC_OPEN_DI	
	DC POWER SUPPLY FAULT 1	DI	EXX_TPSS__XX_DCPS_01_FAULT_DI	
	DC POWER SUPPLY FAULT 2	DI	EXX_TPSS_XX_DCPS_02_FAULT_DI	
	SPARE INPUT 01	DI	EXX_TPSS_XX_SPARE_01_DI	
	SPARE INPUT 02	DI	EXX_TPSS_XX_SPARE_02_DI	
	SPARE INPUT 03	DI	EXX_TPSS_XX_SPARE_03_DI	
	SPARE INPUT 04	DI	EXX_TPSS_XX_SPARE_04_DI	

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE TO PROVIDE A COMPLETE POINTS AND SIDT LIST BASED ON EQUIPMENT TO BE INSTALLED AT EACH FACILITY. EACH TYPICAL EQUIPMENT TYPE MAY NOT BE REQUIRED AT A FACILITY.
2. CONTRACTOR TO PROVIDE 25% WIRED HARDWARE I/O SPARES FOR EACH TCS CONTROLLER.
3. THIS IS THE MINIMUM POINTS LIST, ADDITIONAL POINTS MAY BE REQUIRED TO IMPLEMENT A WORKING SYSTEM.
4. PROVIDE SOFT I/O POINTS AS REQUIRED TO MEET THE FUNCTIONAL REQUIREMENTS OF EQUIPMENT WITH A COMMUNICATIONS INTERFACE.
5. DISPLAY STATUS AND ALARMS FOR EACH PLC POINT AT LCC.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JCS701
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TCS PLC I/O POINTS FOR TYPICAL EQUIPMENT

DRAWING No.: **STD-JCS701**
FACILITY ID:
SHEET No.: 2
REV:

LOCATION	ROOM NUMBER	SWITCH NAME	CABINET	TYPE	MINIMUM COPPER PORT COUNT	MINIMUM FIBER PORT COUNT	# OF UPLINK PORTS	APPROX. # OF PORTS PoE/PoE+ (15W/30W)	BMS VLAN	TCS VLAN	CCTV VLAN	PA/VMS VLAN	PM VLAN	FCN A VLAN	FCN B VLAN	ACCCESS CONTROL VLAN	PBX B VLAN	ETEL VLAN	ST IT VLAN	EVS VLAN	PARKING MGMT VLAN
SHORELINE SOUTH / 145TH STATION	N15S06	N15-ETH-TCN-01	DC-01	ACCESS	41	2	2	41	X	X	X					X	X	X	X		
SHORELINE SOUTH / 145TH STATION	N15S06	N15-ETH-TCN-DISTR	NETWORK RACK	DISTRIBUTION	2	13	13	N/A	X	X	X	X	X	X	X	X	X	X	X	X	X

GENERAL NOTES:

1. FOLLOW SOUND TRANSIT STANDARDS FOR EQUIPMENT NAMING.
2. THE TABLE SHOWN IS EXAMPLE ONLY. THE CONTRACTOR SHALL PROVIDE NETWORK SWITCH SCHEDULE PER THE ACTUAL. THE TABLE WILL BE REVIEWED BY SOUND TRANSIT TO PROCURE AND CONFIGURE NETWORK SWITCHES.
3. ALL NETWORK EQUIPMENT INSTALLED IN UNCONDITIONED SPACE SHALL HAVE EXTENDED TEMPERATURE RANGE.

03/21/24 | 12:45 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JCS702.DWG

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

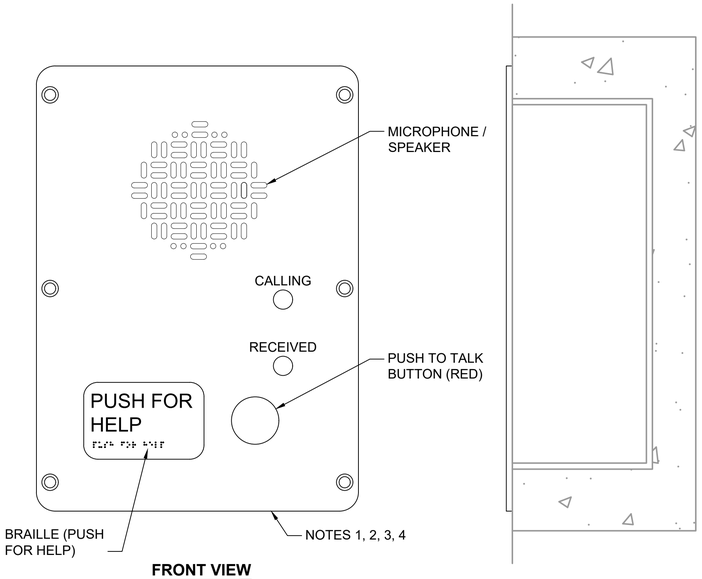
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCS702
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
NETWORK SWITCH
SCHEDULES

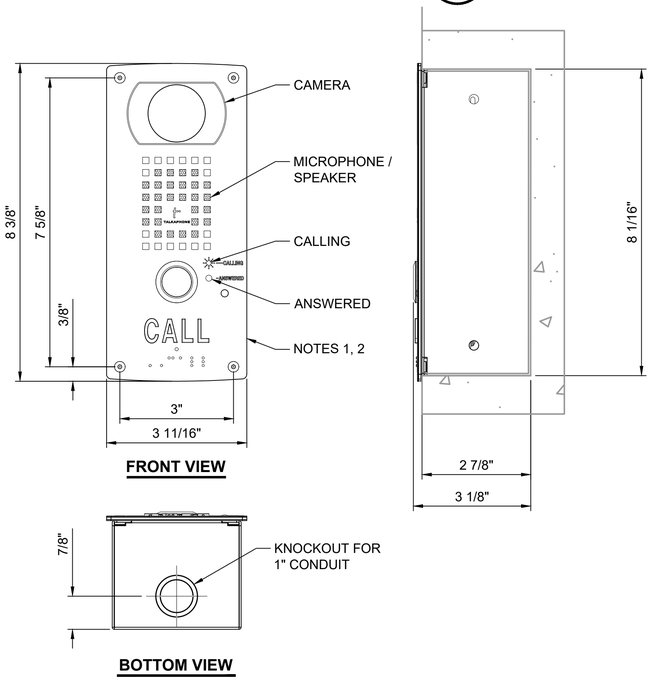
DRAWING No.: **STD-JCS702**
FACILITY ID:
SHEET No.: REV: 0



FRONT VIEW

TYPICAL PET 1

SCALE: NTS



FRONT VIEW

BOTTOM VIEW

TYPICAL RESTROOM CALL BOX 2

SCALE: 6" = 1'-0"

NOTES:

1. INSTALL AT PREFERRED DISTANCE ABOVE FLOOR OF 42", AS PER ADA LIMITS OF 36", LOWEST TO 54", HIGHEST.
2. LOCATION TO BE COORDINATED WITH SOUND TRANSIT.
3. PET SHALL BE COVERED BY A VIDEO CAMERA VIEW OF THE CCTV SYSTEM.
4. PET ENCLOSURE MUST BE RED.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

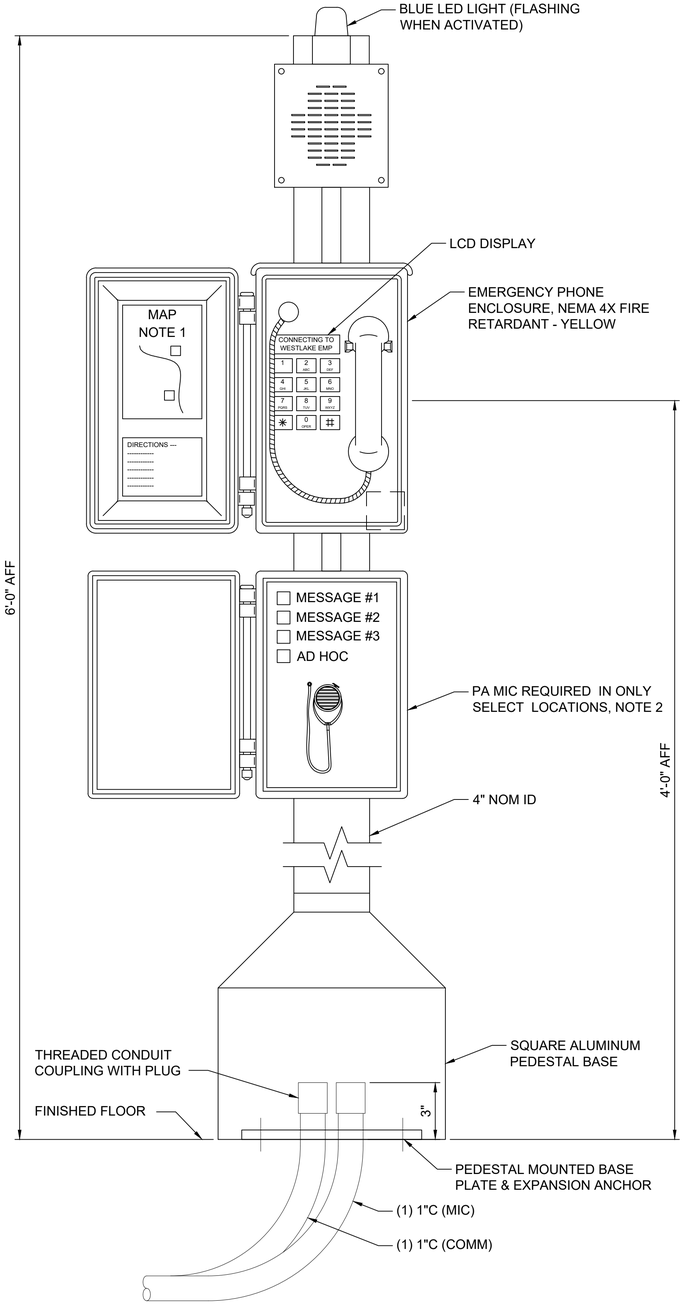
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCD200
CONTRACT No.: RTA/LR
DATE: 2/2024

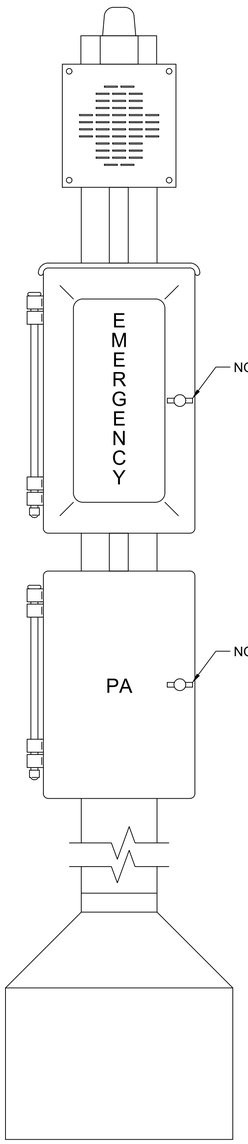
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TYPICAL PASSENGER EMERGENCY PHONE
RESTROOM CALL BOX

DRAWING No.: **STD-JCD200**
FACILITY ID:
SHEET No.: 2 REV:

03/21/24 | 12:42 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JCD200.DWG



FRONT VIEW - DOOR OPEN



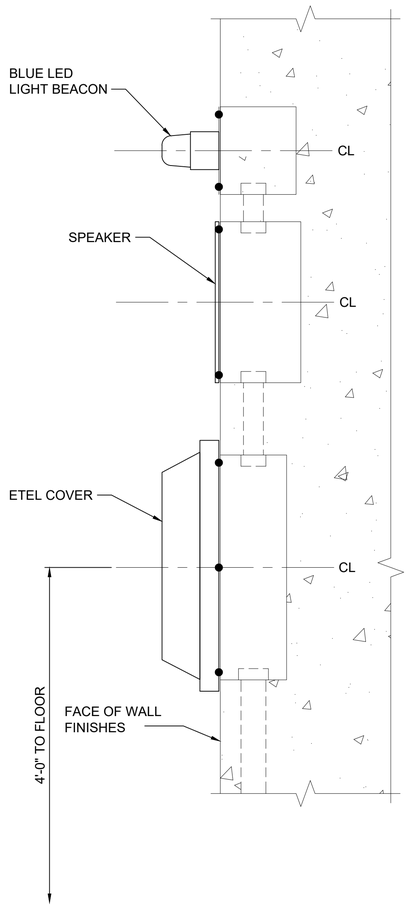
FRONT VIEW - DOOR CLOSED

TYPICAL PEDESTAL MOUNTED ETEL

NTS

1

-



TYPICAL PROVISIONS FOR PUBLIC AREA WALL MOUNTED ETEL

NTS

2

-

GENERAL NOTES:

1. INSTALL STATION MAP AND DIRECTORY WITH ALL ETEL EXTENSION NUMBERS FOR THAT STATION. INSTALL DIRECTIONS FOR ETEL USE.
2. AT THE END OF EACH STATION PLATFORM PROVIDE PA JACK FIELD AND REMOVABLE PA MIC. PROVIDE STORAGE CABINET FOR MIC.
3. DESIGNER TO COORDINATE POWER FOR ETEL, SUCH AS:
   - ISOLATED DC SUPPLY PER ETEL OF XX DCV.
   - HI POWER POE (ISOLATED OR NOT AT XX DCV).
4. SECURED FOR RAIL MAINTENANCE PERSONNEL, SECURITY AND FIRST RESPONDERS.
5. ETEL ENCLOSURE MUST BE YELLOW.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

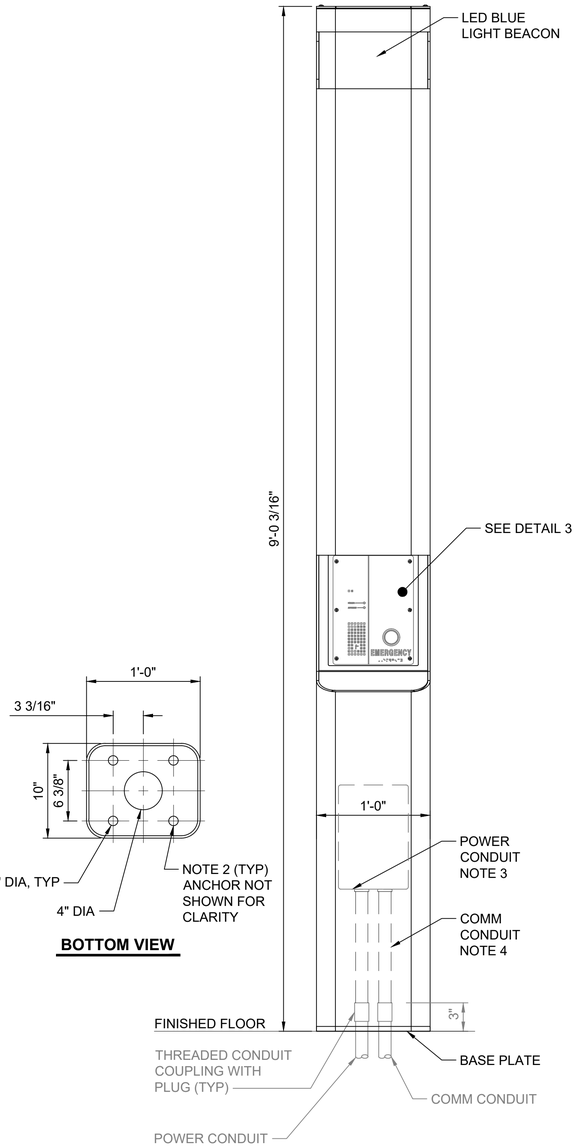
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCD201
CONTRACT No.: RTA/LR
DATE: 2/2024

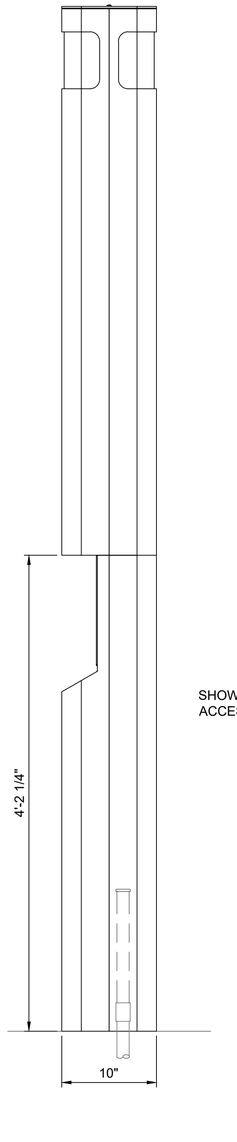
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

COMMUNICATIONS
TYPICAL EMERGENCY TELEPHONE DETAILS

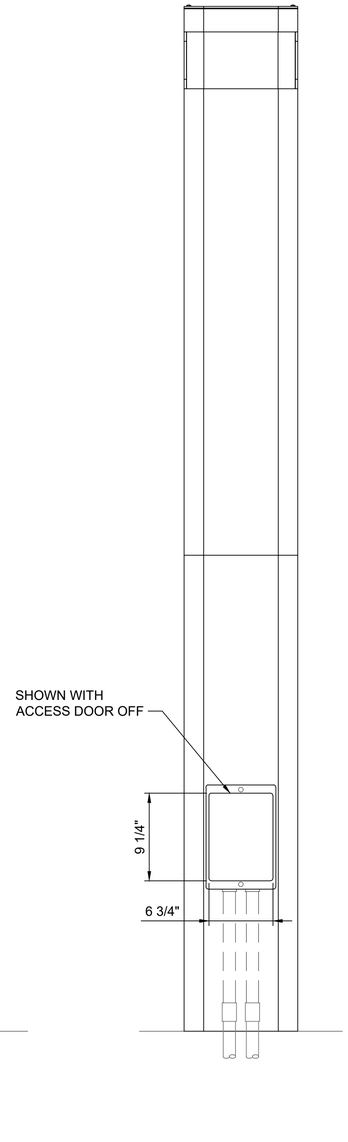
DRAWING No.: **STD-JCD201**
FACILITY ID:
SHEET No.: 2
REV:



BOTTOM VIEW

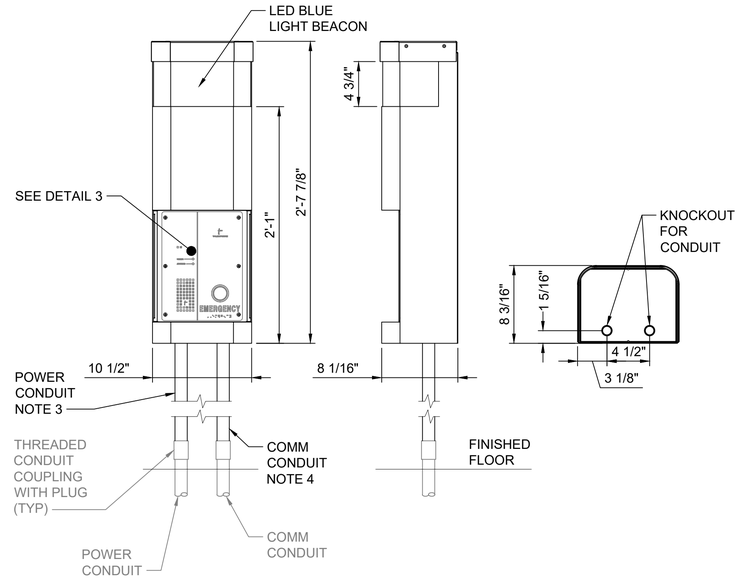


SIDE VIEW



BACK VIEW

TYPICAL PEDESTAL MOUNTED CES 1
SCALE: 1 1/2" = 1'-0"

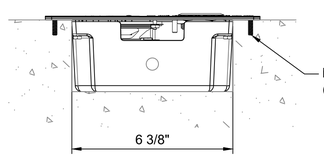


FRONT VIEW **SIDE VIEW** **BOTTOM VIEW**

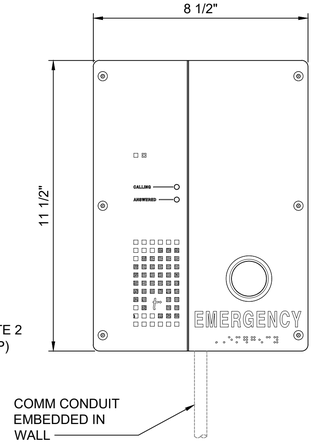
TYPICAL WALL MOUNTED CES 2
SCALE: 1 1/2" = 1'-0"

NOTES:

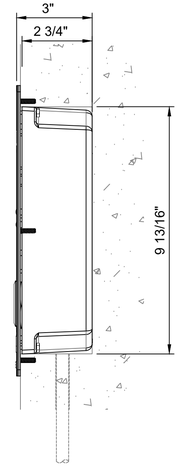
1. INSTALL STATION MAP AND DIRECTORY WITH ALL CES EXTENSION NUMBERS FOR THE GARAGE. INSTALL DIRECTIONS FOR CES USE.
2. ANCHOR BOLTS SHALL BE INSTALLED TO MEET ZONE 3 SEISMIC STANDARDS.
3. SIZE POWER CONDUIT PER NEC REQUIREMENTS.
4. MATCH COMMUNICATIONS CONDUIT STUB-UP SIZE.



BOTTOM VIEW



FRONT VIEW



SIDE VIEW

TYPICAL EMBEDDED CES 3
SCALE: 4"=1'-0"

No.	DATE	DSN	CHK	APP	REVISION
0	2/2024				2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCD202
CONTRACT No.: RTA/LR
DATE: 2/2024

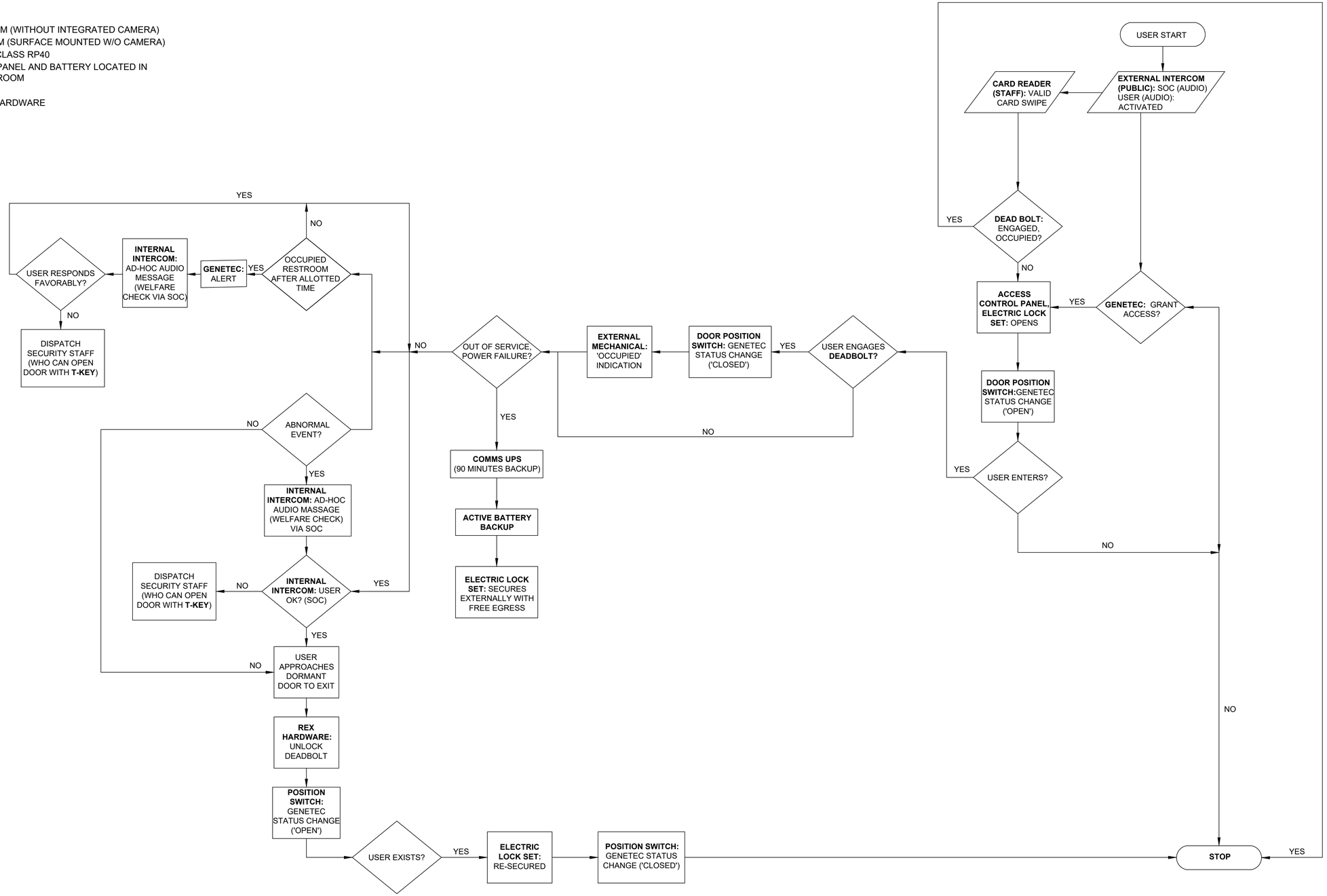
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

COMMUNICATIONS
TYPICAL CUSTOMER EMERGENCY STATION
DETAILS

DRAWING No.: STD-JCD202
FACILITY ID:
SHEET No.: REV: 0

NOTES:

1. EXTERNAL INTERCOM (WITHOUT INTEGRATED CAMERA)
2. INTERNAL INTERCOM (SURFACE MOUNTED W/O CAMERA)
3. CARD READER HD iCLASS RP40
4. ACCESS CONTROL PANEL AND BATTERY LOCATED IN COMMUNICATIONS ROOM
5. VIDEO CAMERA
6. REQUEST TO EXIT HARDWARE



No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCD203
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SYSTEMS
OPERATIONS FLOW DIAGRAM
FOR ACCESS CONTROL

DRAWING No.: **STD-JCD203**
FACILITY ID:
SHEET No.: REV: 0

01/29/25 | 10:29 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JCD203.DWG

RESTRICTIONS:

1. NO UPS IN COMM ROOM
2. NO WALL OR POLE MOUNTED EQUIPMENT
3. NO TELECOM ENCLOSURE IN COMM ROOM
4. 5 KW/RACK LOAD

KEY NOTES:

1. FRONT AND BACK ACCESS TO EACH RACK IS REQUIRED.
2. 3 FOOT 6 INCH MINIMUM CLEARANCE FOR EACH RACK.
3. TOW SPARE RACKS ARE PROVISIONED FOR FUTURE IN ADDITION TO 10% SPARE SPACE.
4. BOND ALL TELECOM DEVICES, CABLE TRAY, AND CABINETS TO PBB.
5. FOLLOW MANUFACTURERS REQUIREMENTS FOR SEISMIC PLACEMENT AND BRACING EQUIPMENT.
6. NO SWING OUT RACK ALLOWED IN COMM. ROOMS WITHOUT PRIOR APPROVAL FROM SOUND TRANSIT.
7. REFER TO SOUND TRANSIT REQUIREMENTS MANUAL SET 815-TELECOMMUNICATION SPACES FOR MINIMUM COMMUNICATIONS ROOM SIZE.

COMM ROOM AREA:

40% - RESERVED FOR BACKBONE CABLING

10% - RESERVED SPACE FOR FUTURE EXPANSION

ABBREVIATIONS:

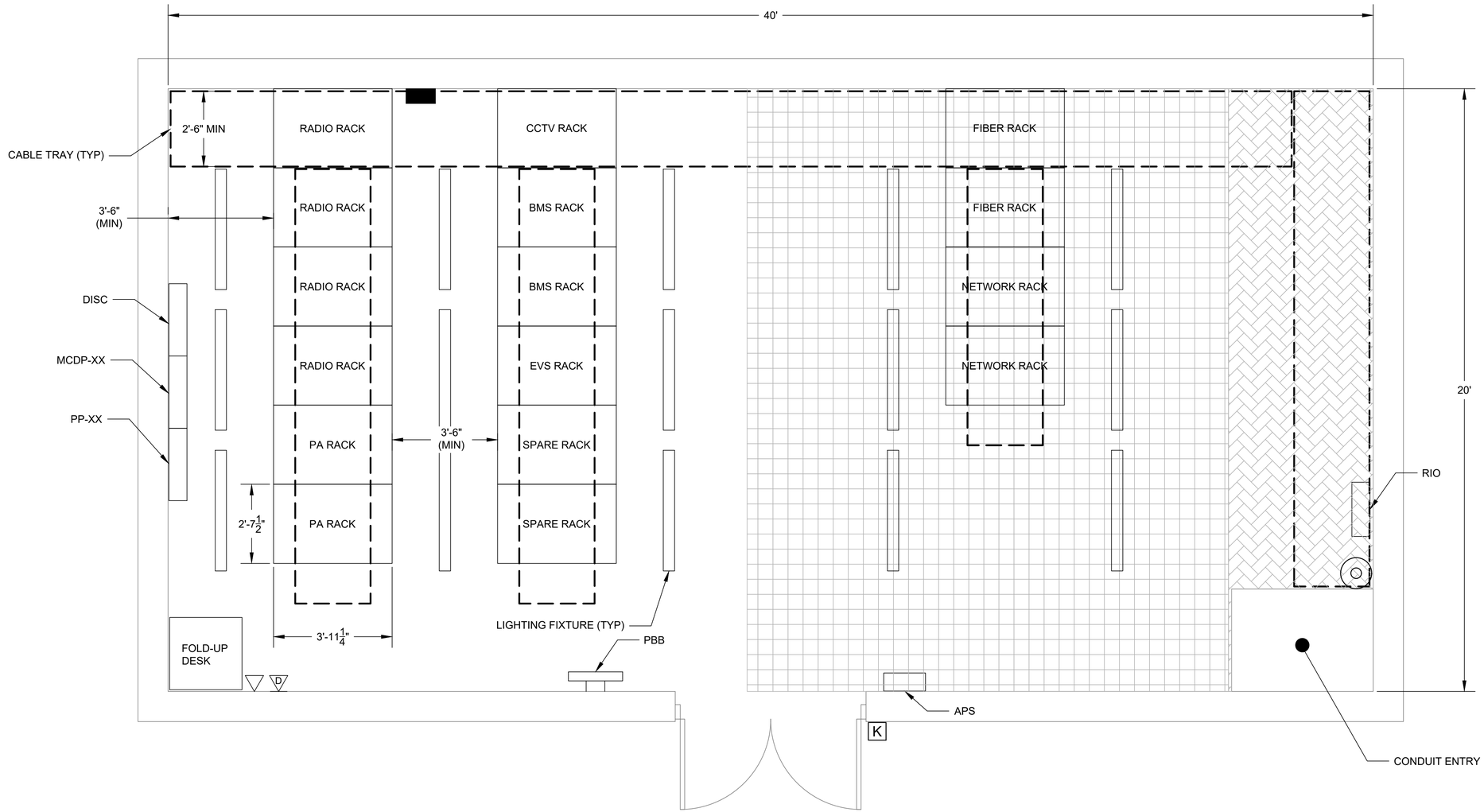
APS	ACCESS POWER SUPPLY
BMS	BUILDING MANAGEMENT SYSTEM
CCTV	CLOSED-CIRCUIT TELEVISION
DISC	DISCONNECT SWITCH
EVS	EMERGENCY VENTILATION SYSTEM
MCDP	MAIN COMMUNICATIONS DISTRIBUTION PANEL
MIN	MINIMUM
PA	PUBLIC ADDRESS
PBX	PRIVATE BRANCH EXCHANGE TELEPHONE
PP	POWER PANEL
RIO	RADIO I/O PANEL
PBB	PRIMARY BONDING BUSBAR
TYP	TYPICAL

COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TELEPHONE (PBX)	◁
DATA OUTLET	◁ D
CARD READER	K
FIXED CCTV CAMERA (CAM)	◎
PA SPEAKER	▬

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. LIGHTING TO BE 9' ABOVE FINISHED FLOOR AT MINIMUM AND NOT TO BE COINCIDENT TO CABLE TRAY LOCATIONS.



TYPICAL MAIN COMMUNICATIONS ROOM - ENLARGED PLAN - TUNNEL STATION (1 / STD-JCP212)

SCALE: 1/2" = 1'-0"

No.	DATE	DSN	CHK	APP	REVISION
1	12/2024				REVISED DRAWING
0	2/2024				2024 NEW GUIDANCE DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1/2" = 1'-0"
FILENAME: STD-JCD209-211
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
MAIN COMMUNICATIONS ROOM - ENLARGED PLAN
TUNNEL STATION

DRAWING No.: **STD-JCD209**
FACILITY ID:
SHEET No.: 1 REV:

02/03/25 | 11:37 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JCD209-211.DWG

RESTRICTIONS:

1. NO UPS IN COMM ROOM
2. NO WALL OR POLE MOUNTED EQUIPMENT
3. NO TELECOM ENCLOSURE IN COMM ROOM
4. 5 KW/RACK LOAD

KEY NOTES:

1. FRONT AND BACK ACCESS TO EACH RACK IS REQUIRED.
2. 3 FOOT 6 INCH MINIMUM CLEARANCE FOR EACH RACK.
3. TOW SPARE RACKS ARE PROVISIONED FOR FUTURE IN ADDITION TO 10% SPARE SPACE.
4. BOND ALL TELECOM DEVICES, CABLE TRAY, AND CABINETS TO PBB.
5. FOLLOW MANUFACTURERS REQUIREMENTS FOR SEISMIC PLACEMENT AND BRACING EQUIPMENT.
6. NO SWING OUT RACK ALLOWED IN COMM. ROOMS WITHOUT PRIOR APPROVAL FROM SOUND TRANSIT.
7. REFER TO SOUND TRANSIT REQUIREMENTS MANUAL SET 815-TELECOMMUNICATION SPACES FOR MINIMUM COMMUNICATIONS ROOM SIZE.

COMM ROOM AREA:

40% - RESERVED FOR BACKBONE CABLING

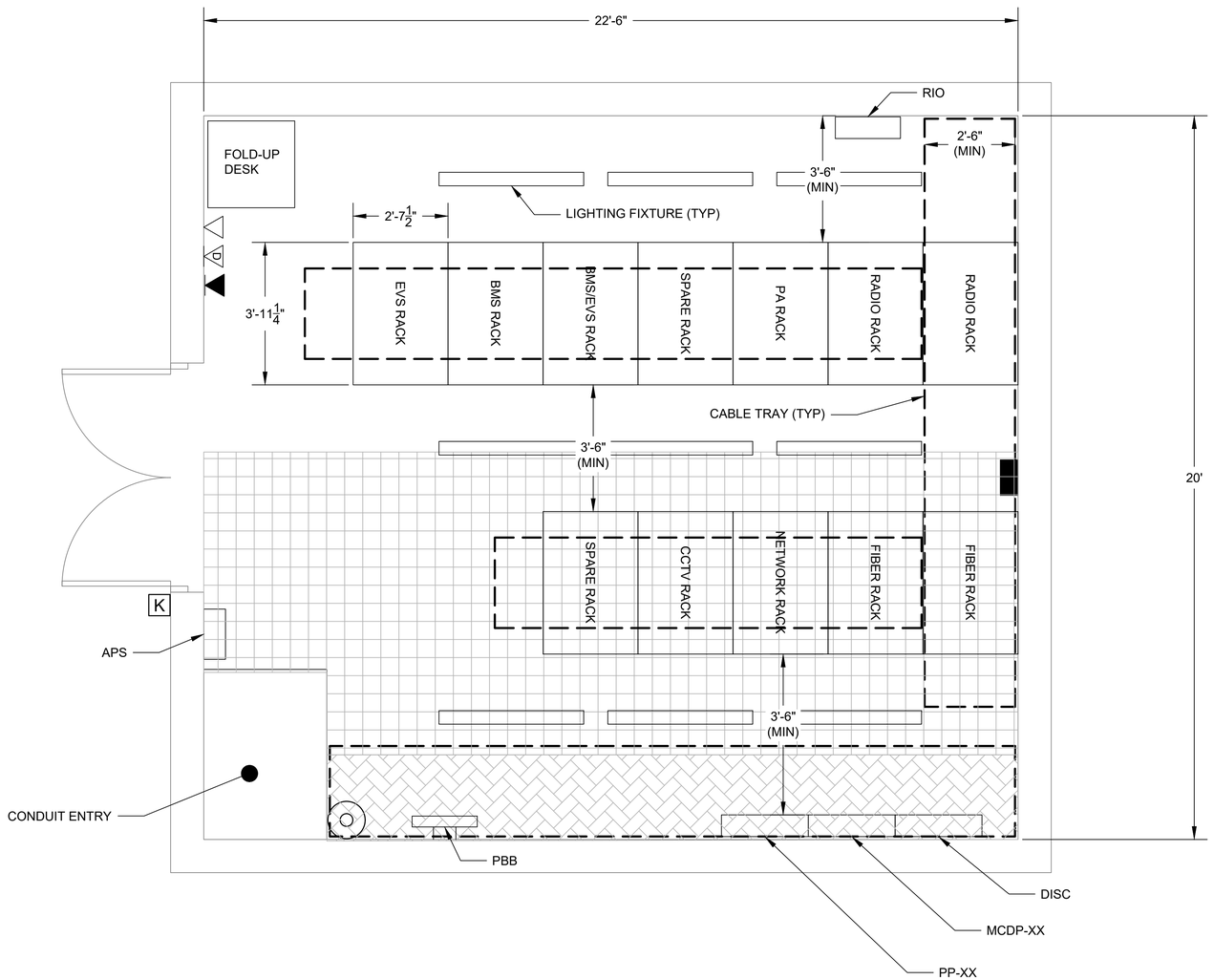
10% - RESERVED SPACE FOR FUTURE EXPANSION

ABBREVIATIONS:

APS	ACCESS POWER SUPPLY
BMS	BUILDING MANAGEMENT SYSTEM
CCTV	CLOSED-CIRCUIT TELEVISION
DISC	DISCONNECT SWITCH
EVS	EMERGENCY VENTILATION SYSTEM
MCDP	MAIN COMMUNICATIONS DISTRIBUTION PANEL
MIN	MINIMUM
PA	PUBLIC ADDRESS
PBX	PRIVATE BRANCH EXCHANGE TELEPHONE
PP	POWER PANEL
RIO	RADIO I/O PANEL
PBB	PRIMARY BONDING BUSBAR
TYP	TYPICAL

COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TELEPHONE (PBX)	
DATA OUTLET	
EMERGENCY TELEPHONE (ETEL)	
CARD READER	K
FIXED CCTV CAMERA (CAM)	
PA SPEAKER	



TYPICAL MAIN COMMUNICATIONS ROOM - ENLARGED PLAN - AT-GRADE/ELEVATED STATION

SCALE: 1/2" = 1'-0"

1
STD-JCP303
STD-JCP401

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. LIGHTING TO BE 9' ABOVE FINISHED FLOOR AT MINIMUM AND NOT TO BE COINCIDENT TO CABLE TRAY LOCATIONS.

No.	DATE	DSN	CHK	APP	REVISION
1	12/2024				REVISED DRAWING
0	2/2024				2024 NEW GUIDANCE DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 1/2" = 1'-0"
FILENAME: STD-JCD209-211
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
MAIN COMMUNICATIONS ROOM - ENLARGED PLAN
AT-GRADE/ELEVATED STATION

DRAWING No.: **STD-JCD210**
FACILITY ID:
SHEET No.:
REV: 0

RESTRICTIONS:

1. NO UPS IN COMM ROOM
2. NO WALL OR POLE MOUNTED EQUIPMENT
3. NO TELECOM ENCLOSURE IN COMM ROOM
4. 5 KW/RACK LOAD

KEY NOTES:

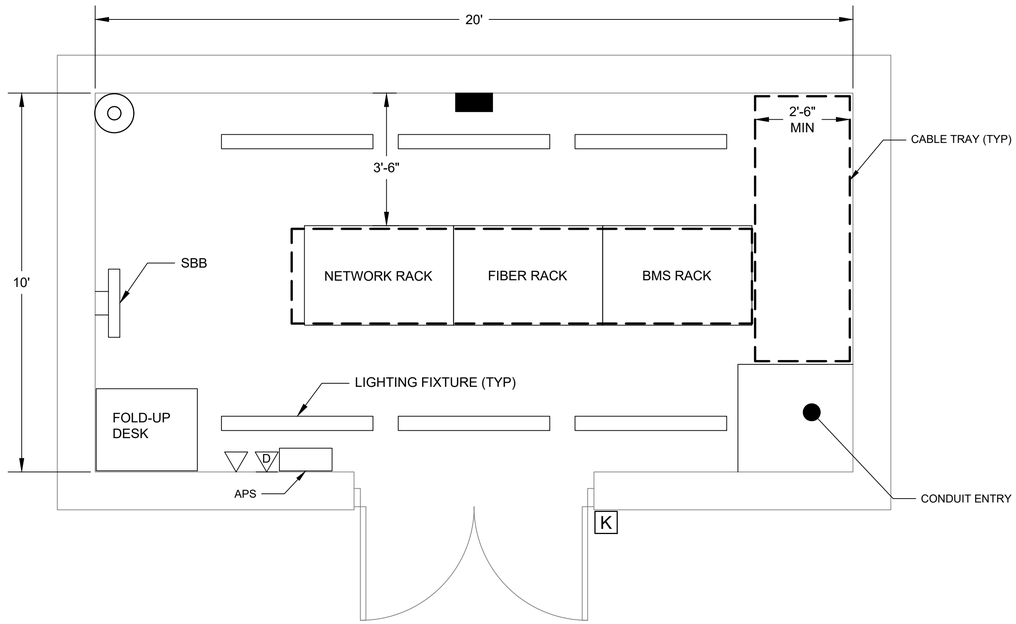
1. FRONT AND BACK ACCESS TO EACH RACK IS REQUIRED.
2. 3 FOOT 6 INCH MINIMUM CLEARANCE FOR EACH RACK.
3. TOW SPARE RACKS ARE PROVISIONED FOR FUTURE IN ADDITION TO 10% SPARE SPACE.
4. BOND ALL TELECOM DEVICES, CABLE TRAY, AND CABINETS TO PBB.
5. FOLLOW MANUFACTURERS REQUIREMENTS FOR SEISMIC PLACEMENT AND BRACING EQUIPMENT.
6. NO SWING OUT RACK ALLOWED IN COMM. ROOMS WITHOUT PRIOR APPROVAL FROM SOUND TRANSIT.
7. REFER TO SOUND TRANSIT REQUIREMENTS MANUAL SET 815-TELECOMMUNICATION SPACES FOR MINIMUM COMMUNICATIONS ROOM SIZE.

ABBREVIATIONS:

APS	ACCESS POWER SUPPLY
BMS	BUILDING MANAGEMENT SYSTEM
CCTV	CLOSED-CIRCUIT TELEVISION
DISC	DISCONNECT SWITCH
EVS	EMERGENCY VENTILATION SYSTEM
MCDP	MAIN COMMUNICATIONS DISTRIBUTION PANEL
MIN	MINIMUM
PA	PUBLIC ADDRESS
PBX	PRIVATE BRANCH EXCHANGE TELEPHONE
PP	POWER PANEL
RIO	RADIO I/O PANEL
SBB	SECONDARY BONDING BUSBAR
TYP	TYPICAL

COMMUNICATIONS SYMBOLS

DESCRIPTION	SYMBOLS
TELEPHONE (PBX)	◁
DATA OUTLET	◁
CARD READER	K
FIXED CCTV CAMERA (CAM)	○
PA SPEAKER	▬



TYPICAL SMALL COMMUNICATIONS ROOM - ENLARGED PLAN - TUNNEL/AT-GRADE/ELEVATED STATION

SCALE: 1/2" = 1'-0"

1

STD-JCP213
STD-JCP222
STD-JCP223
STD-JCP313
STD-JCP401

GENERAL NOTES:

1. THIS PLAN REPRESENTS A TYPICAL CONFIGURATION LAYOUT ONLY. SPECIFIC STATION REQUIREMENTS AND LAYOUTS WILL VARY DURING DETAILED ENGINEERING DESIGN.
2. LIGHTING TO BE 9' ABOVE FINISHED FLOOR AT MINIMUM AND NOT TO BE COINCIDENT TO CABLE TRAY LOCATIONS.

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

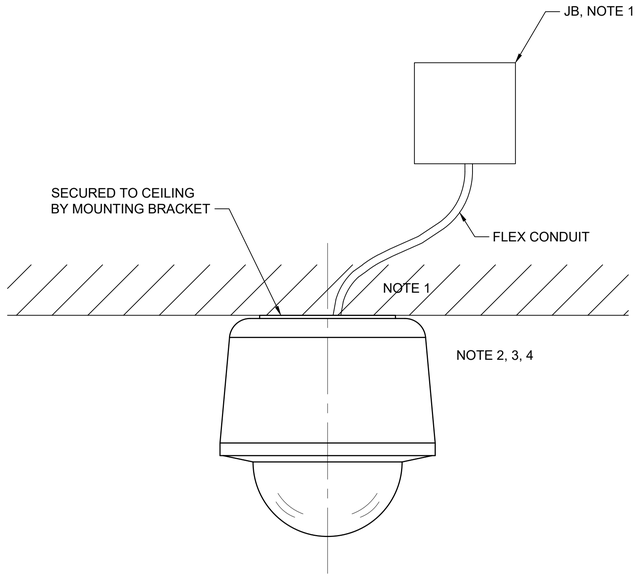
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

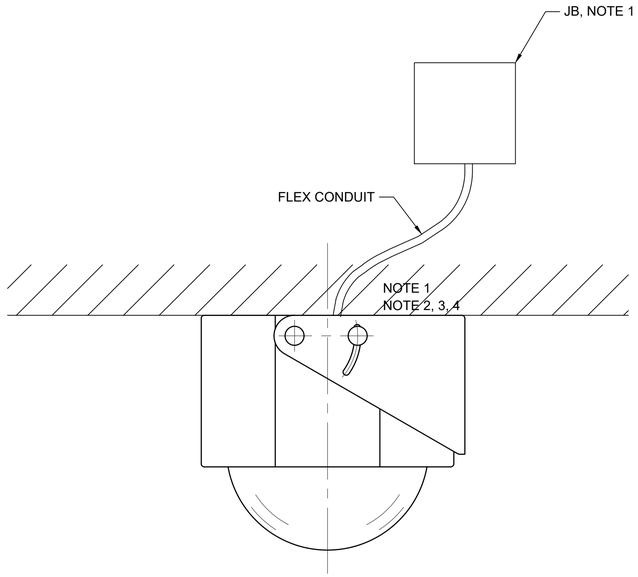
SCALE: 1/2" = 1'-0"
FILENAME: STD-JCD209-211
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
SMALL COMMUNICATIONS ROOM - ENLARGED PLAN
TUNNEL/AT-GRADE/ELEVATED STATION

DRAWING No.: **STD-JCD211**
FACILITY ID:
SHEET No.: REV: 0



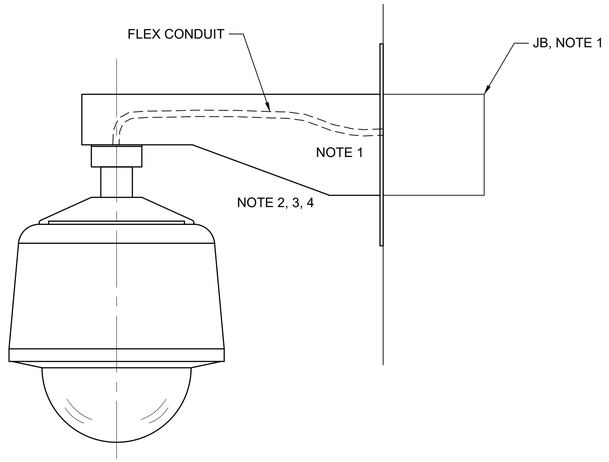
CEILING MOUNT



CEILING MOUNT

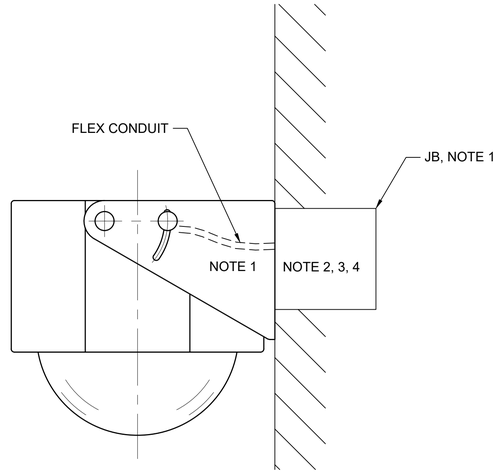
GENERAL NOTES:

1. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL DRAWING FOR SPECIFIC MOUNTING LOCATION.
2. ST SECURITY PREFERS FIXED CAMERAS.
3. CAMERA LOCATIONS AND VIEWS TO BE ACCEPTED BY SOUND TRANSIT SECURITY.
4. ALL PASSENGER EMERGENCY TELEPHONES (PET) SHALL BE COVERED BY A CAMERA.



WALL MOUNT

TYPICAL PTZ DOME 2
NTS -



WALL MOUNT

TYPICAL FIXED CAMERA 3
NTS -

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	-	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCD301
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

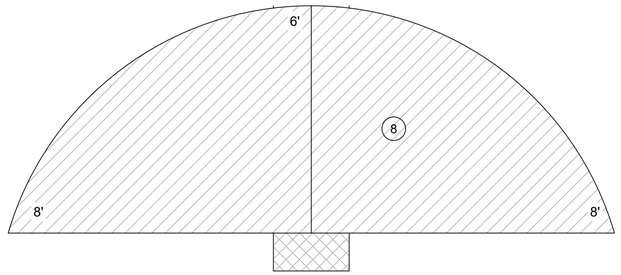
COMMUNICATIONS
TYPICAL CCTV
DETAILS

DRAWING No.: **STD-JCD301**
FACILITY ID:
SHEET No.: REV: 1

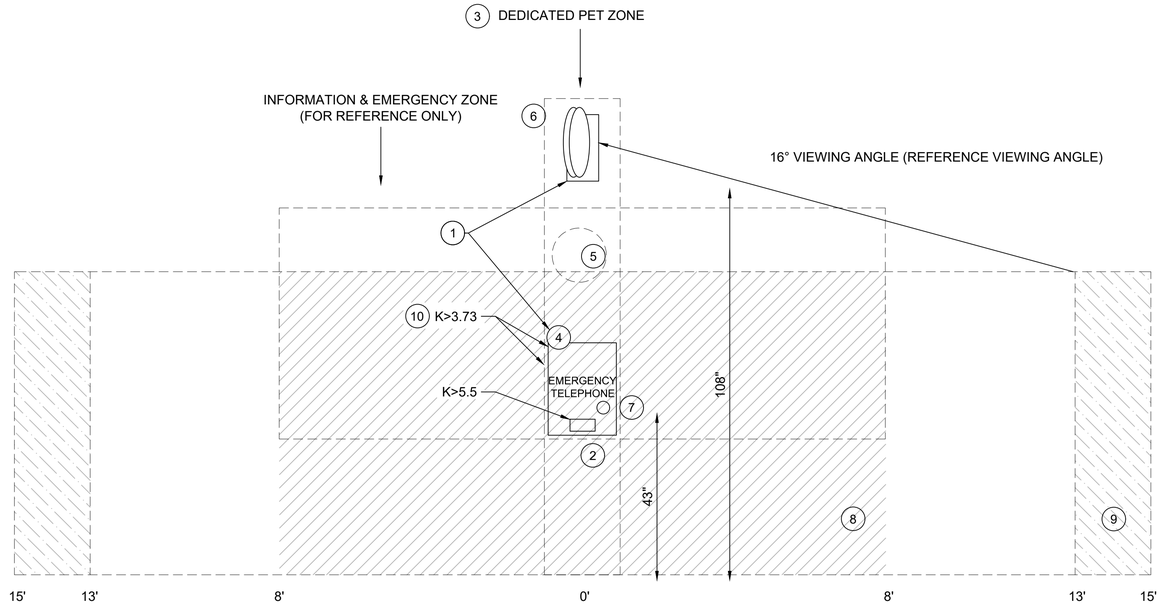
UNOBSTRUCTED VIEWING REGION FOR PASSENGER EMERGENCY TELEPHONE

PASSENGER EMERGENCY TELEPHONE

UNOBSTRUCTED VIEWING REGION FOR FLAG SIGN



PLAN VIEW



ELEVATION VIEW

NOTES:

1. NO RELATIVE LATERAL OFFSET
2. REFERENCE POINT - LABEL (CONTRAST CALCULATION IS BETWEEN LETTERING AND LEVEL BACKGROUND)
3. DEDICATED COLUMN SPACE (120" H X 16.5" W) EXTENDS 3" TO THE LEFT AND RIGHT OF PASSENGER EMERGENCY TELEPHONE
4. DEVICE SIGN
5. FASCIA SIGN
6. FLAG SIGN
7. PUSH BUTTON
8. UNOBSTRUCTED VIEWING REGION FOR PASSENGER EMERGENCY TELEPHONE
9. UNOBSTRUCTED VIEWING REGION FOR FLAG SIGN
10. CONTRAST RATIO: K=Lo/Lu

    Lu - LUMINANCE, BACKGROUND, AT LEAST 3" SURROUNDING DEVICE

    Lo - LUMINANCE, DEVICE BORDER

    K - CONTRAST

PET = PASSENGER EMERGENCY TELEPHONE

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT RTA/LR

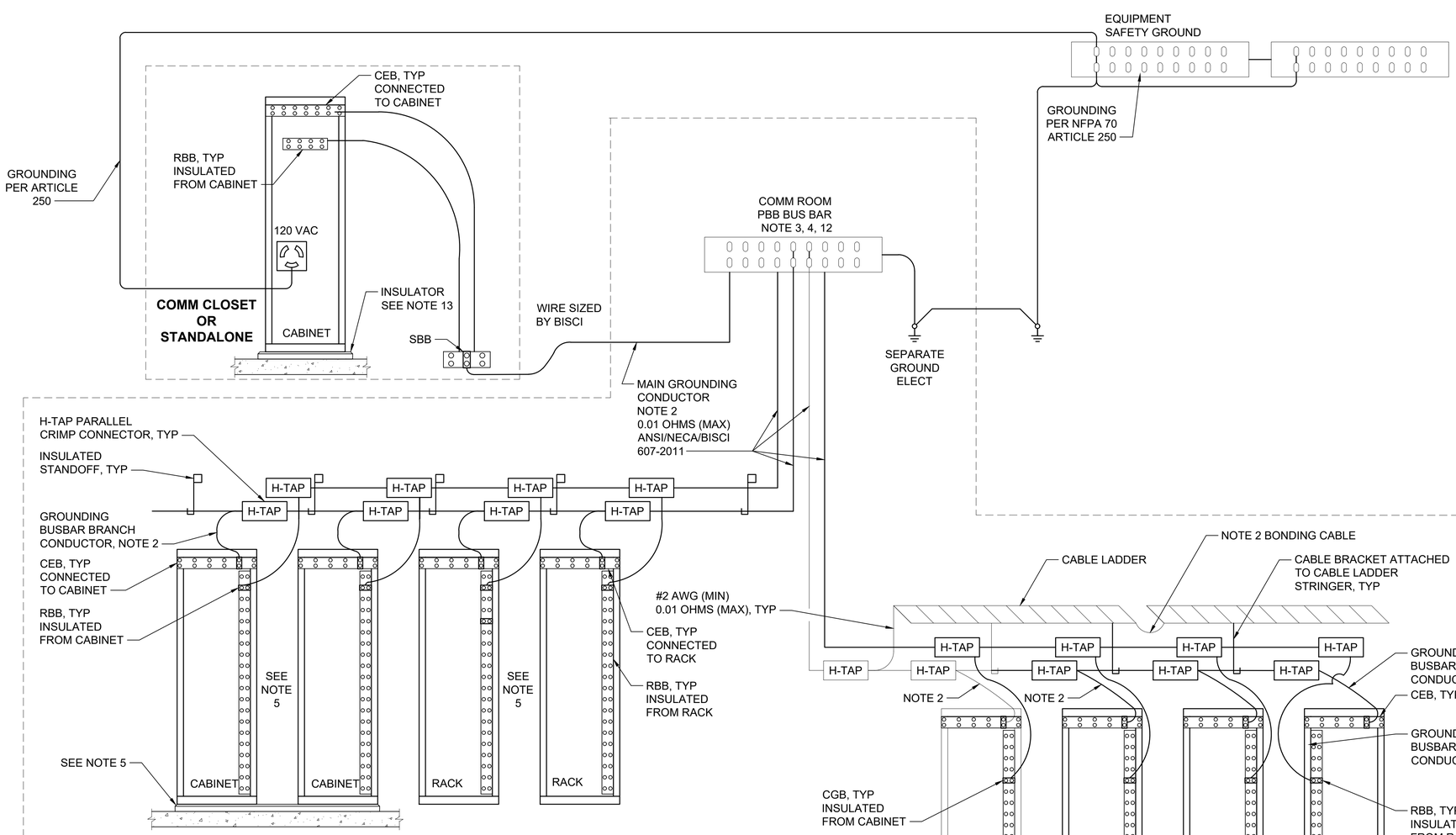
DATE: 12/2024

SCALE:
FILENAME: STD-JCD395
CONTRACT No.:
DATE: NTS

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SYSTEMS
EMERGENCY TELEPHONE ZONE
NON-PEDEDSTAL MOUNT

DRAWING No.: **STD-JCD395**
FACILITY ID:
SHEET No.: REV: 0



WITHOUT OVERHEAD CABLE LADDER USING WALL MOUNTED GROUNDING CONDUCTOR

WITH OVERHEAD CABLE LADDER

COMMUNICATION ROOM NOTE 15

GENERAL NOTES:

1. CABLE TRAY IN ROOMS BY CONTRACTOR TO PROVIDE FOR COMM EQUIPMENT CONNECTION.
2. BONDING CONDUCTORS SHALL BE A MINIMUM OF #2 AWG COPPER UNLESS SIZING IN ACCORDANCE WITH CHAPTER 8 OF BICSI TDMM INDICATES A SMALLER GAUGE IS ACCEPTABLE. THE CALCULATIONS SHALL BE SUBMITTED FOR REVIEW.
3. TWO HOLE GROUNDING COMPRESSION LUGS SHALL BE USED IN MAKING CONNECTIONS TO FLAT SURFACES (BUSBARS, STRUCTURAL STEEL, CABINETS, ETC.) EACH CONNECTOR SHALL BE INSTALLED WITH DEDICATED BOLTS. MULTIPLE CONNECTORS SHALL NOT BE SECURED BY THE SAME BOLT ASSEMBLIES."
4. APPLY ELECTRICAL GRADE DE-OXIDIZING GREASE (NO-OX-ID) TO ALL GROUND BAR CONNECTIONS.
5. ADJACENT COMMUNICATION RACKS AND CABINETS SHOULD BE PHYSICALLY & ELECTRICALLY ISOLATED FROM EACH OTHER, THE FLOOR AND EARTH GROUND.
6. ALL COMMUNICATION CABINETS TO HAVE TWO GROUND BUSBARS: ONE FOR RACK BONDING BUSBAR (RBB) AND ONE FOR COMMUNICATIONS EQUIPMENT GROUND BUS (CEB).
7. LADDER RACK TO BE GROUNDED AT SINGLE POINT GROUND PATH WITH RETURN TO PRIMARY BONDIDNG BUSBAR (PBB). DO NOT CONNECT TO ANY OTHER GROUND PATHS. CABLE LADDER SHALL BE GROUNDED BY RUNNING AN EXPOSED STRANDED COPPER CONDUCTOR WITH GREEN INSULATION WITH A YELLOW TRACER FROM ONE END OF CABLE TRAY TO PBB USING H-TAP. THE SURFACE OF THE GALVANIZED CABLE LADDER SHALL BE TREATED WITH PENETROX OXIDE INHIBITING COMPOUND. TERMINALS SHALL BE ATTACHED USING ¼" SILICONE BRONZE HARDWARE (BOLTS, FLAT WASHERS, LOCK WASHERS AND NUTS.
8. EQUIPMENT RACKS AND CABINETS SHALL BE GROUNDED BY RUNNING EXPOSED STRANDED COPPER CONDUCTORS WITH GREEN INSULATION FROM EACH RACK/CABINET TO THE MAIN GROUND CONDUCTOR USING H-TAP CRIMP AND COVERS.
9. NON-COMMUNICATIONS GROUNDS SUCH AS CONDUITS OR BUILDING GROUNDS MUST BE CONNECTED TO ELECTRICAL GROUND GRID (EARTH GROUND) ONLY-BUILDING STRUCTURE OR GROUND GRID. ELECTRICAL GROUNDS CANNOT BE MIXED WITH COMMUNICATION GROUND POINTS.
10. "DO NOT DISCONNECT" TAGS SHALL BE PROVIDED AT BOTH ENDS OF ALL GROUNDING SYSTEM CONDUCTORS AT STRUCTURAL STEEL AND GROUNDING POINTS WHEN THE CONDUCTOR IS A LUG OR OTHER DISCONNECTIBLE DEVICE.WHEN LADDER HAS SECTIONS, BONDING JUMPERS SHALL BE USED TO BOND EACH SECTION.
11. GROUNDS IN EACH ROOM AND AT EACH CASE LOCATION SHALL BE TESTED AND SHALL NOT EXCEED 5 OHMS.
12. RUN 2/0 COPPER GROUND WIRE TO GROUND BUS ON POWER ENTRANCE TO FACILITY.
13. CABINETS ARE PHYSICALLY & ELECTRICALLY ISOLATED FROM THE FLOOR.
14. TELECOMMUNICATIONS GROUND WIRES SHALL BE GREEN WITH YELLOW TRACER XHHW INSULATED WIRE (ARTICLE 800).
15. COMMUNICATION ROOM GROUNDING PER NFPA70 ARTICLE 800.

GLOSSARY:

BICSI - BUILDING INDUSTRY CONSULTING SERVICE INTERNATIONAL
CEB - COMMUNICATION EQUIPMENT BUS
RBB - RACK BONDING BUSBAR
SBB - SECONDARY BONDING BUSBAR (MIN 2" WIDE)
PBB - PRIMARY BONDING BUDBAR (MIN 4" WIDE)

TYPICAL STATION EQUIPMENT RACKS/CABINETS GROUNDING SYSTEM

1 / -

NTS

No.	DATE	DSN	CHK	APP	REVISION
4	12/2024				REVISED DRAWING
3	2/2024				2024 REVISED STANDARD DRAWINGS
2	8/2019				REVISED SYSTEMS DIRECTOVE DRAWINGS
1	1/2019				2019 GUIDANCE DWG REVISIONS - GENERAL UPDTE
0	8/2017				GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

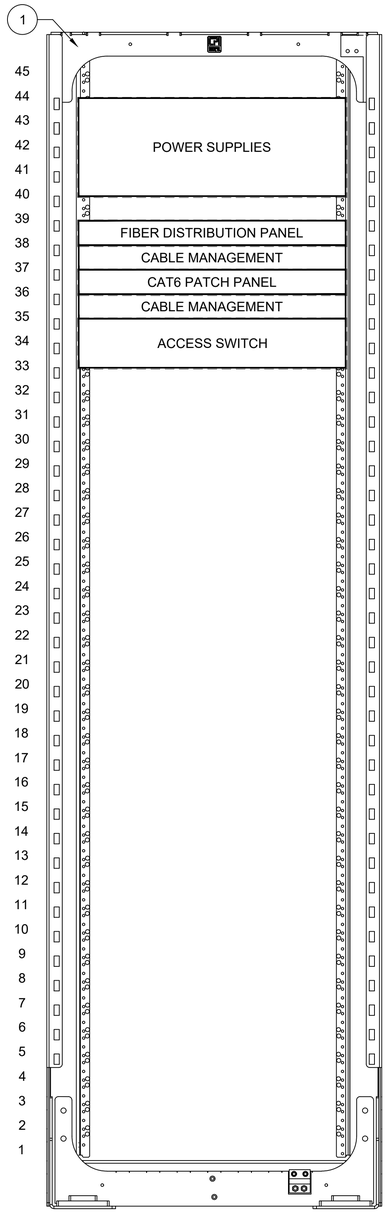
SCALE: NTS
FILENAME: STD-JCD603
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

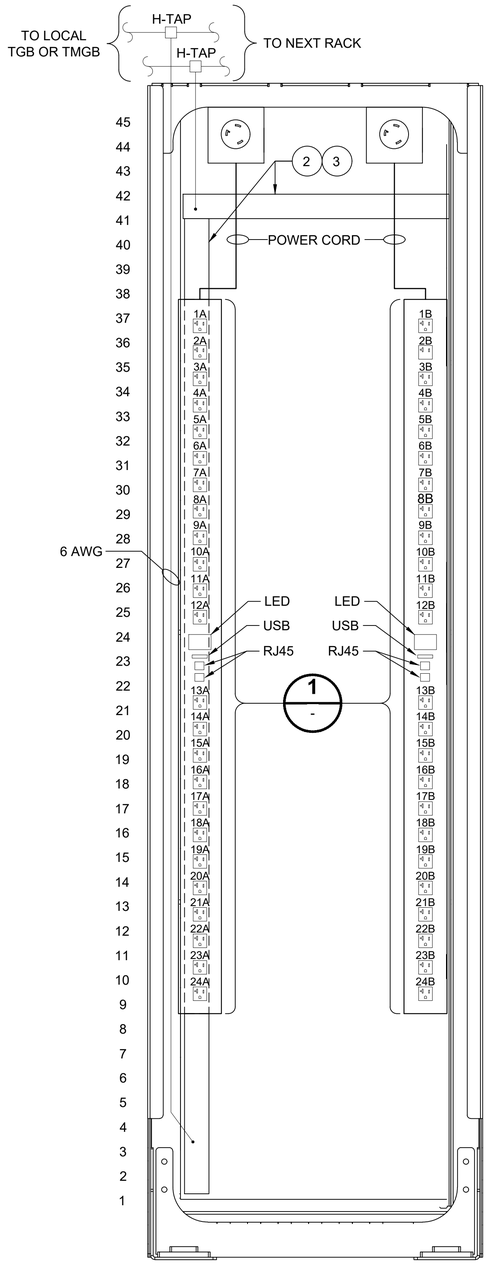
COMMUNICATIONS
TYPICAL STATION CABINET RACK
GROUNDING SYSTEMS

DRAWING No.: STD-JCD603
FACILITY ID:
SHEET No.: 4
REV:

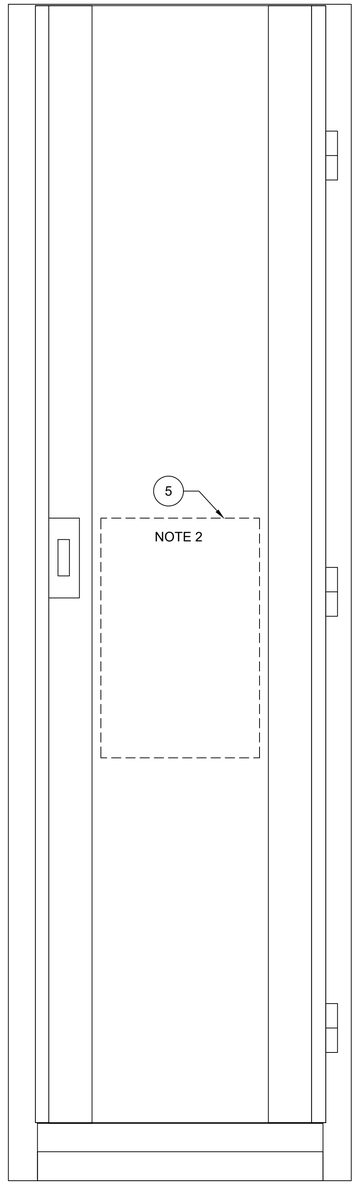
02/04/25 | 11:59 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JCD603.DWG



FRONT ELEVATION (OPEN)



REAR ELEVATION (OPEN)



FRONT ELEVATION (CLOSED)

RACK MATERIAL LIST

ITEM	QUANTITY	BOM REF#	PART NUMBER	DESCRIPTION
1	1			CABINET SEISMIC
2	2			GROUND BUS BAR
3	4			RACK BUSBAR INSULATOR BLOCK
* 4	2			BONDING JUMPER
5	1			METAL DOOR POCKET
* 6	2			FAN
7	2			HORIZONTAL CABLE MANAGER

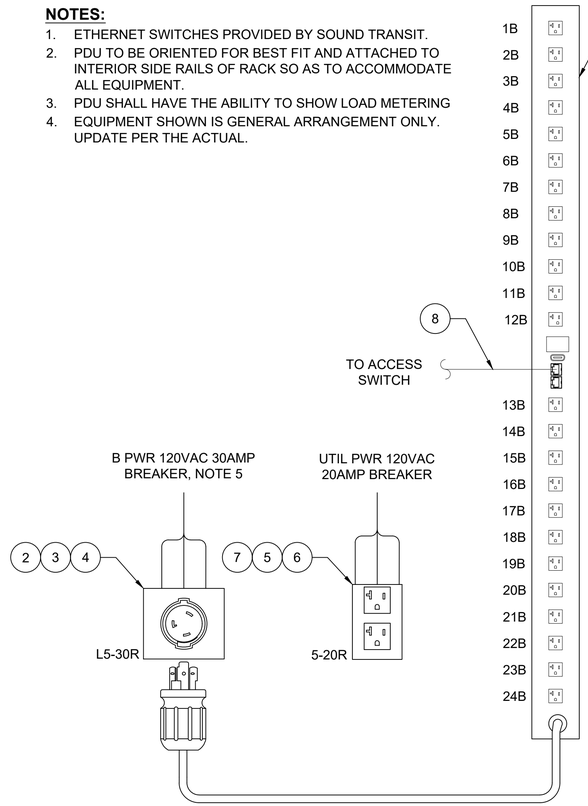
* NOT SHOWN

POWER STRIP MATERIAL LIST

ITEM	QUANTITY	BOM REF#	PART NUMBER	DESCRIPTION
1	2			SUPERVISED POWER DISTRIBUTION UNIT
2	2			SQUARE ELECTRICAL BOX
3	2			COVER TWIST LOCK SIMPLEX RECEPTACLE
4	2			NEMA L5-30R SIMPLEX RECEPTACLE
5	1			ELECTRICAL BOX 1-GANG
6	1			NEMA 5-20R DUPLEX RECEPTACLE
7	1			COVER DUPLEX RECEPTACLE 1-GANG
8	2			CAT6 PATCH CORD

NOTES:

1. ETHERNET SWITCHES PROVIDED BY SOUND TRANSIT.
2. PDU TO BE ORIENTED FOR BEST FIT AND ATTACHED TO INTERIOR SIDE RAILS OF RACK SO AS TO ACCOMMODATE ALL EQUIPMENT.
3. PDU SHALL HAVE THE ABILITY TO SHOW LOAD METERING
4. EQUIPMENT SHOWN IS GENERAL ARRANGEMENT ONLY. UPDATE PER THE ACTUAL.



RACK POWER STRIP 1/-
NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCD703
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

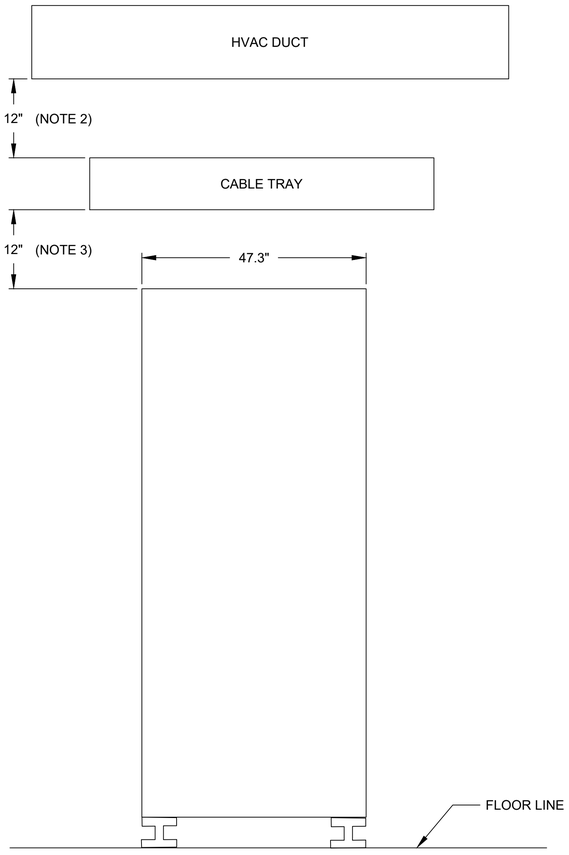
COMMUNICATIONS
TYPICAL RACK DETAILS
DETAILS

DRAWING No.: **STD-JCD703**
FACILITY ID:
SHEET No.: REV: 0

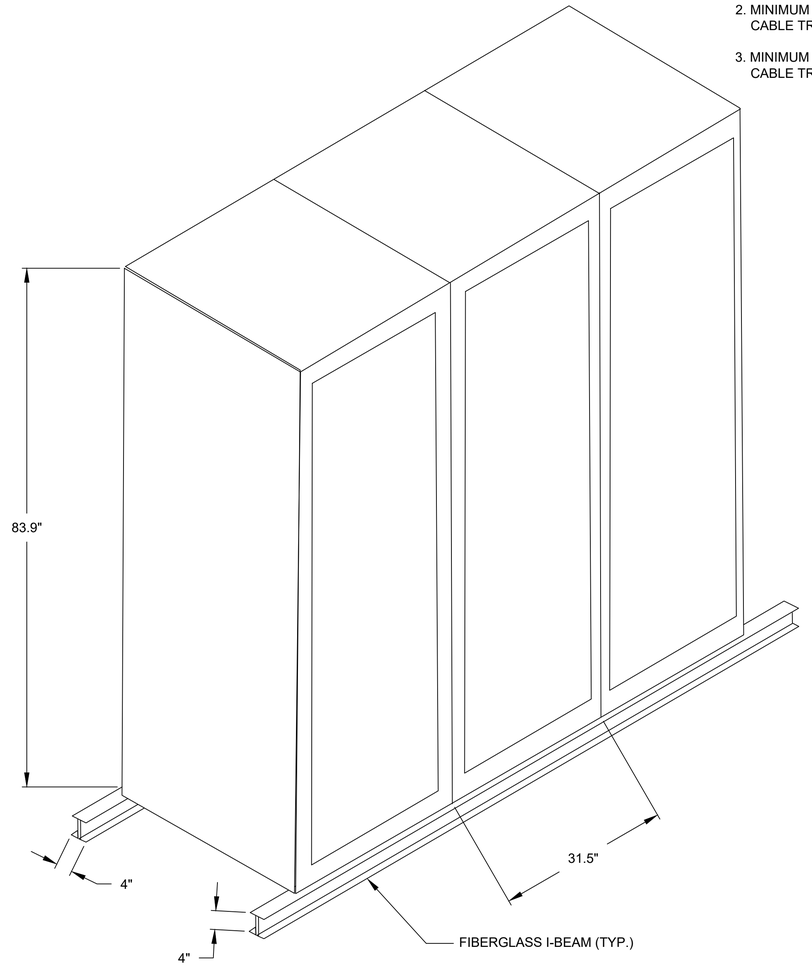
03/21/24 | 12:43 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JCD703.DWG

GENERAL NOTES:

1. ANCHOR BOLTS SHALL BE INSTALLED TO MEET ZONE 4 SEISMIC STANDARDS.
2. MINIMUM 12" CLEARANCE FROM BOTTOM HVAC DUCT AND TOP OF CABLE TRAY.
3. MINIMUM 12" CLEARANCE BETWEEN TOP OF THE RACK AND BOTTOM OF CABLE TRAY.



SIDE VIEW



ISOMETRIC VIEW

TYPICAL COMMUNICATIONS RACK INSTALLATION DETAIL

No.	DATE	DSN	CHK	APP	REVISION
0	12/2024				NEW DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

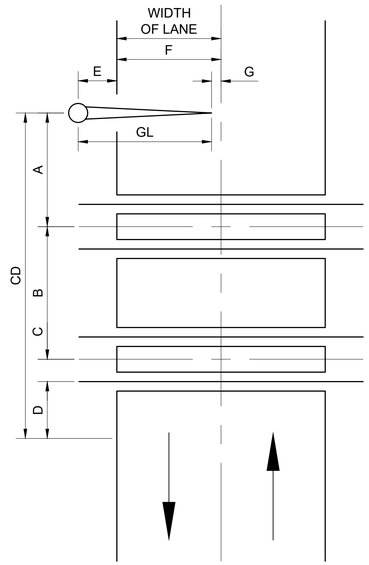
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JCX001
CONTRACT No.: RTA/LR
DATE: 12/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
COMMUNICATIONS
TYPICAL COMMUNICATIONS RACK INSTALLATION DETAIL

DRAWING No.: **STD-JCX001**
FACILITY ID:
SHEET No.: REV: 0



GENERAL NOTE:

1. CROSSING WARNING DESIGNS SHALL ALSO CONFORM TO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES REQUIREMENTS PLUS ANY COMMENTS OF THE AUTHORITY HAVING JURISDICTION

I. CRITERIA FOR DETERMINING CLEARANCE DISTANCE (CD)

CD = A + B + C + D WHERE A = DISTANCE FROM CENTERLINE OF SIGNAL MAST TO CENTERLINE OF NEAR TRACK: 12 FEET MIN, 15 FEET MAX
B = TRACK SPREAD
C = ONE HALF OF GAGE: 4 FT 8 1/2 IN/2 = SAY 2.5 FEET
D = CLEAR DISTANCE BEYOND FAR RAIL: MIN 6 FEET

II. CRITERIA FOR DETERMINING WARNING TIME (WT)

MIN CD = 35 FT
ADD'L CD = -- FT

MIN WT = 20 SECS
ADD'L WT = 1 SEC FOR EACH ADD'L 10 FEET ABOVE MIN CD

EXAMPLE: 1)
A = 12 FT
B = 14 FT
C = 2.5 FT
D = 6 FT
CD = 34.5 FT
ONLY MIN WT REQD = 20 SECS

EXAMPLE: 2)
A = 12 FT
B = 32 FT
C = 2.5 FT
D = 6 FT
CD = 52.5 FT
MIN VALUES = 35 FT
= 17.5 FT

20 SECS
2 SECS
TOTAL WT = 22 SECS

III. CRITERIA FOR DETERMINING GATE LENGTH (GL)

GL = E + F - G WHERE E = DISTANCE FROM CL SIGNAL MAST TO EDGE OF ROADWAY, OR INSIDE FACE OF CURB: MIN 4 FT-1 INCH
F = WIDTH OF LANE: TYP 11'-0"
G = DISTANCE FROM CL ROAD TO TIP OF GATE: MAX 1 FT

EXAMPLE:
E = 4 FT 1 INCH
F = 11 FT (TYP)
G = 1 FT
GL = 14 FT 1 INCH

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

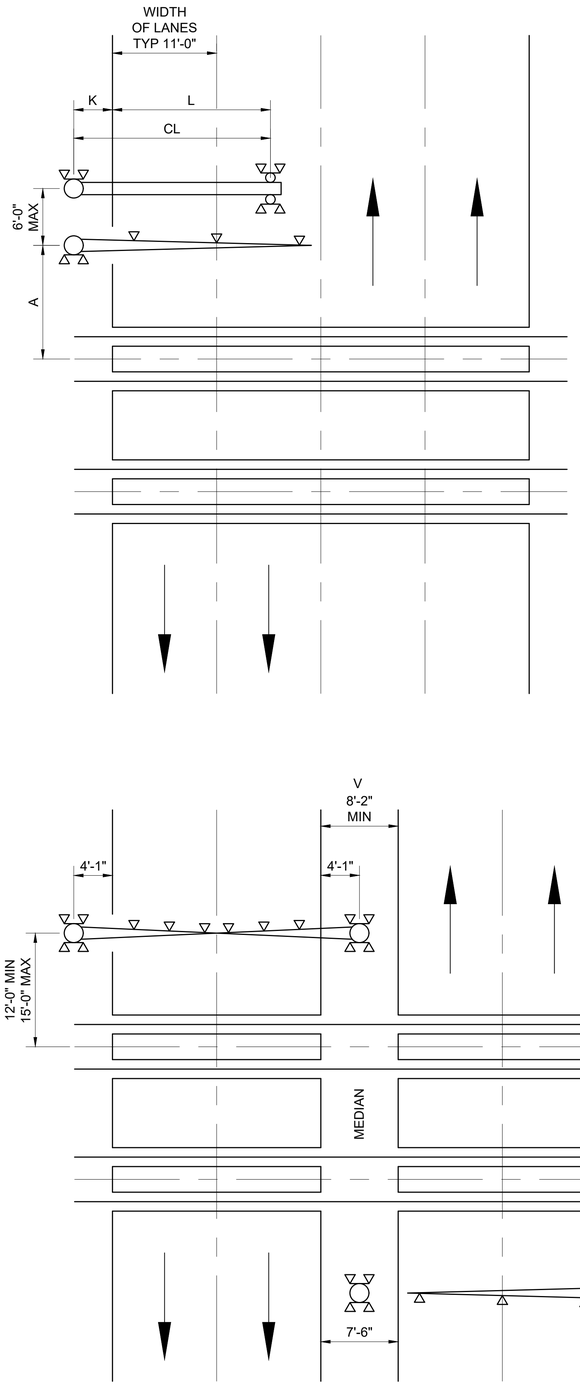
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSS100
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL AUTOMATIC HIGHWAY CROSSING
WARNING SYSTEMS DESIGN CRITERIA

DRAWING No.: **STD-JSS100**
FACILITY ID:
SHEET No.: REV: 1



IV. CRITERIA FOR DETERMINING LENGTH OF CANTILEVER SIGNAL ARM (CL) - MULTIPLE LANE ROADWAY

CL = K + L WHERE K = DISTANCE FROM CENTERLINE OF SIGNAL TO EDGE OF PAVEMENT OR INSIDE FACE OF CURB: MIN 4 FT 1 INCH
L = DISTANCE FROM EDGE OF PAVEMENT TO CENTERLINE OF INSIDE LANE

EXAMPLE: K = 4FT 1 INCH
L = 16 FT 6 INCH (11 + 5.5)
CL = 20 FT 7 INCH (*)

(*) CANTILEVER ARMS ARE MEASURED TO THE CENTERLINE OF THE END LIGHTS.

V. CRITERIA FOR DETERMINING ALTERNATE AHCW SYSTEM SIGNAL REQUIREMENTS - MULTIPLE LANE ROADWAY WITH MEDIAN

WHEN A MULTIPLE LANE ROADWAY HAS A MEDIAN OF SUFFICIENT WIDTH (7'-6" MIN), IT IS MORE COST EFFECTIVE TO INSTALL FLASHING LIGHT SIGNAL IN MEDIAN AS OPPOSED TO CANTILEVER SIGNAL AT SIDE OF ROAD. IF SECOND GATE IS TO BE USED, THE MEDIAN WIDTH SHALL BE 8'-2" MIN.

TO "PROTECT" THE FLASHING LIGHT SIGNALS FROM POSSIBLE COLLISION, IT IS RECOMMENDED THAT MEDIAN BE RAISED, AT LEAST IN APPROACH TO THE RAIL CROSSING. THIS PROVIDES AN ADDITIONAL BENEFIT OF DISCOURAGING "DRIVE-AROUNDS".

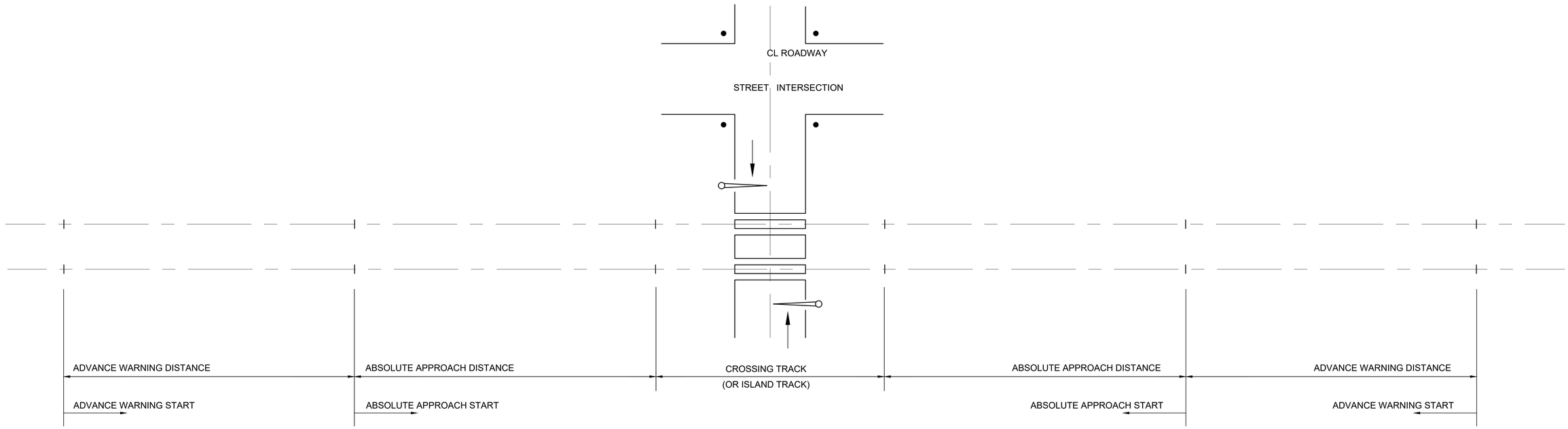
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JSS101
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL AUTOMATIC HIGHWAY CROSSING
WARNING SYSTEMS DESIGN CRITERIA

DRAWING No.: **STD-JSS101**
FACILITY ID:
SHEET No.: REV: 1



VIII: CRITERIA FOR DETERMINING THE APPROACH DISTANCE FOR AHCW SYSTEM TO INTERFACE WITH TRAFFIC PRE-EMPTION

A. DEFINITIONS

1. ABSOLUTE APPROACH START = POINT AT WHICH AHCW SYSTEM IS ACTIVATED BY AN APPROACHING TRAIN.

2. ABSOLUTE APPROACH = MINIMUM DISTANCE TO CROSSING TO PROVIDE MINIMUM WARNING TIME.

3. ADVANCE WARNING START = POINT AT WHICH THE TRAFFIC CONTROLLER AT THE STREET INTERSECTION IS INFORMED OF AN APPROACHING TRAIN, TO START THE CYCLE TO CLEAR AUTO TRAFFIC FROM RAIL CROSSING. MAY INCLUDE A SEPARATE PRE-EMPT TIME. TO BE COORDINATED WITH AUTHORITY HAVING JURISDICTION.

4. ADVANCE WARNING = THE DISTANCE TO THE ABSOLUTE APPROACH TO AFFORD THE TRAFFIC CONTROLLERS SUFFICIENT TIME TO COMPLETE ITS CLEARING CYCLE.

B. CALCULATIONS

1. ABSOLUTE APPROACH = WARNING TIME (WT) (IN SEC) x TRAIN SPEED (TS) (IN FEET PER SEC)

EXAMPLE: TS = 30 MPH OR 44 FT/SEC
WT = 21 SECS
ABSOLUTE APPROACH = 44 x 21 OR 924 FEET

2. ADVANCE WARNING = TRAFFIC WT (SECS) x TRAIN SPEED (TS) (IN FEET PER SEC)

EXAMPLE: TS = 30 MPH OR 44 FT/SEC
PRE-EMPT TIME REQUIRED = 32 SECS
ADVANCE WARNING = 32 x 44 OR 1408 FT

3. TOTAL PRE-EMPTION TIME = ADVANCE WARNING WT + ABSOLUTE APPROACH WT

C. NOTES

1. CONTRACTOR MUST INCORPORATE PUMP PREVENTION AND ANOTHER TRAIN COMING SIGNAGE FOR TWO TRAIN SCENARIO.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

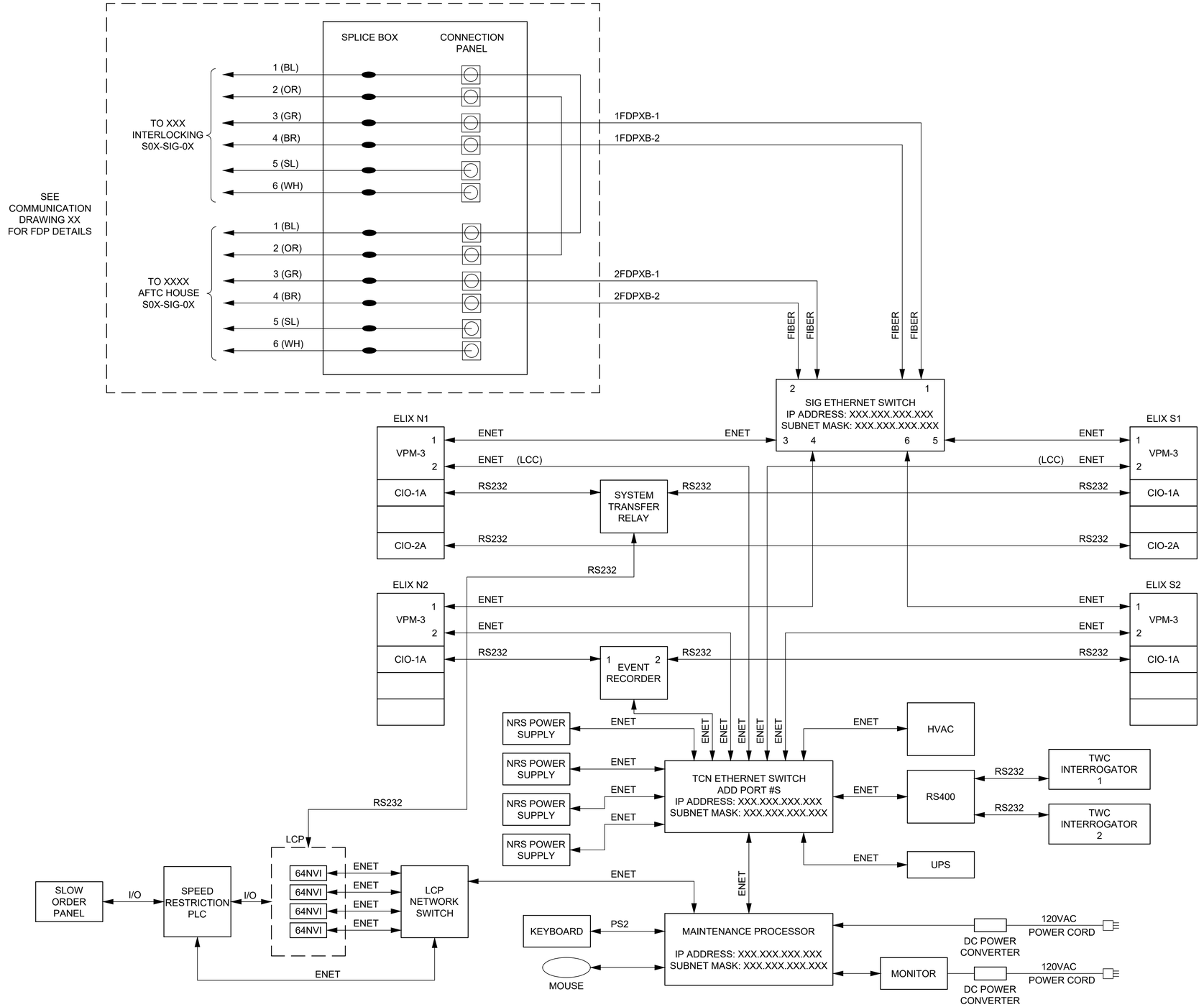
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSS102
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
TYPICAL AUTOMATIC HIGHWAY CROSSING WARNING SYSTEMS DESIGN CRITERIA

DRAWING No.: **STD-JSS102**
FACILITY ID:
SHEET No.: 1 REV:

03/21/24 | 12:53 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSS102.DWG



KEY NOTES:

(1) OFFICE COMMUNICATION:

1.1. THE ELECTROLOGIXS COMMUNICATES TO THE LINK CONTROL CENTER (LCC) VIA ETHERNET PORT 2 (N1/S1) AND THE TCN ETHERNET SWITCH.

1.2. ETHERNET PORT 1 (N1/S1) IS RESERVED AS THE VITAL SIGNAL PORT TO COMMUNICATE TO ADJACENT LOCATIONS.

(2) THE SYNCHRONIZATION FOR THE ELECTROLOGIXS:

2.1. N1/S1 WILL BE SET AS MASTER AND RECEIVE A TIME/DATE UPDATE FROM THE LINK CONTROL CENTER (LCC).

2.2. N2/S2 ARE SET TO RECEIVE UPDATES FROM "VITAL REMOTES" AND WILL BE UPDATED FROM THE MASTER.

(3) THE LCP SOFTWARE RESIDES ON THE NV6400 MODULE ACTING AS THE SERVER IN THE LCP/DIAL DOWN SYSTEM. IT IS ACCESSED VIA THE MAINTENANCE PROCESSOR.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

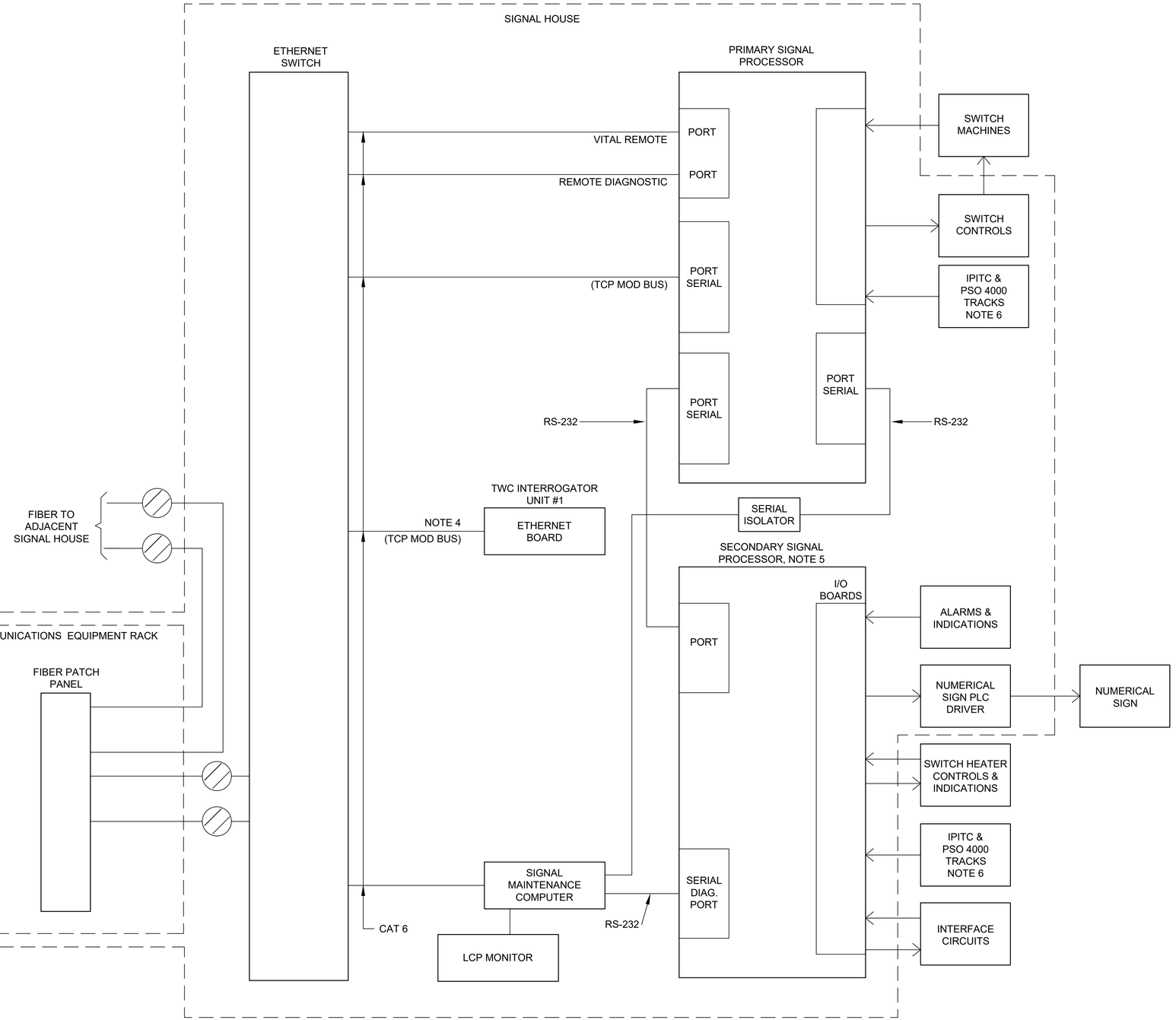
SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JSS103
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
STAR INTERLOCKING
COMMUNICATIONS BLOCK DIAGRAM

DRAWING No.: **STD-JSS103**
FACILITY ID:
SHEET No.: REV: 0



NOTES:

1. VITAL INTERFACES TO ADJACENT LOCATIONS AS NECESSARY. IF ADJACENT PROCESSOR CANNOT MATCH VITAL PROTOCOL, THEN USE VITAL RELAY LINE CIRCUITS.
2. LCC HAS NO CONTROL OF YARD SIGNAL INTERLOCKING. LCC SHALL HAVE INDICATIONS OF ALARMS AND BOUNDARY TRACK CIRCUITS AND SIGNALS.
3. QUANTITY OF INTERROGATORS AS NECESSARY, ADJACENT.
4. DIAGRAM IS BASED THAT INTERROGATOR SOFTWARE PARSES DESTINATIONS INTO USABLE PROCESSOR REQUESTS.
5. ADD PROCESSOR AS NECESSARY TO MEET I/O NEEDS.
6. OR OTHER TRACK CIRCUIT TECHNOLOGY.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

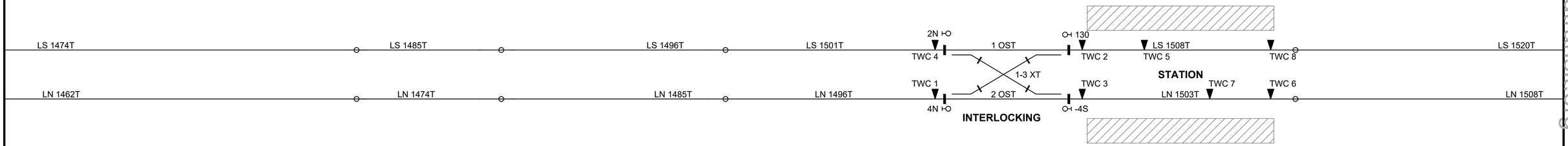
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSS104
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
SIGNAL HOUSE
BLOCK DIAGRAM

DRAWING No.: **STD-JSS104**
FACILITY ID:
SHEET No.: REV: 0



ROUTE AND ASPECT CHART

ENTRANCE SIGNAL	EXIT SIGNAL	SIGNAL ASPECT	AUTOMATIC OPERATION TRACK OCCUPANCY	TWC LOOP OPERATION	TWC CALL	SIGNAL SLOTTING TRACK	TRACK CIRCUITS IN ROUTE					SWITCHES LOCKED	TRAFFIC	PREVENTS CLEARING OF SIGNALS	APPROACH LOCKING TRACK CIRCUITS				NOTES

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSS105
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
ROUTE AND ASPECT CHART

DRAWING No.: **STD-JSS105**
FACILITY ID:
SHEET No.: REV: 0

03/21/24 | 12:53 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSS105.DWG

SOUTH HEMISPHERE - STORAGE TRACKS S1 TO S6

ENTRANCE LOOP	DESTINATION	SIGN ID	SWITCHES LOCKED NORMAL	SWITCHES LOCKED REVERSE	SWITCHES NOT IN ROUTE, LOCKED	OPPOSING / CONFLICTING SIGNS
S1-S	00	D10	S41S, S43S	S37S, S33S, S27S, S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S1-S	20	D10	S41S	S37S, S33S, S27S, S21S, S15S, S13S, S43S, S45S	S39S	D6, D8, D20, D32
S1-S	21	D10, D34	S41S, S43S	S37S, S33S, S27S, S21S, S15S, S13S, S47S, S49S, S53S, S57S, S59S	S39S, S45S	D6, D8, D16, D32, D40
S1-S	22	D10, D34	S41S, S43S, S59S	S37S, S33S, S27S, S21S, S15S, S13S, S47S, S49S, S53S, S57S	S39S, S45S	D6, D8, D16, D32, D40
S1-S	23	D10, D34	S41S, S43S, S57S	S37S, S33S, S27S, S21S, S15S, S13S, S47S, S49S, S53S	S39S, S45S	D6, D8, D16, D32, D40
S1-S	24	D10, D34	S41S, S43S, S53S	S37S, S33S, S27S, S21S, S15S, S13S, S47S, S49S, S55S	S39S, S45S	D6, D8, D16, D32, D40
S1-S	25	D10, D34	S41S, S43S, S53S, S55S	S37S, S33S, S27S, S21S, S15S, S13S, S47S, S49S	S39S, S45S	D6, D8, D16, D32, D40
S1-S	26	D10, D34	S41S, S43S, S49S	S37S, S33S, S27S, S21S, S15S, S13S, S47S, S51S	S39S, S45S	D6, D8, D16, D32, D40
S1-S	27	D10, D34	S41S, S43S, S49S, S51S	S37S, S33S, S27S, S21S, S15S, S13S, S47S	S39S, S45S	D6, D8, D16, D32, D40
S1-S	29	D10, D34	S41S, S43S, S47S	S37S, S33S, S27S, S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S1-S	41	D10	S13S, S9S	S37S, S33S, S27S, S21S, S15S, S11S		D2, D6, D8, D20, D32
S2-S	00	D10	S37S, S41S, S43S	S33S, S27S, S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S2-S	20	D10	S37S, S41S	S33S, S27S, S21S, S15S, S13S, S43S, S45S	S39S	D6, D8, D20, D32
S2-S	21	D10, D34	S37S, S41S, S43S	S33S, S27S, S21S, S15S, S13S, S47S, S49S, S53S, S57S, S59S	S39S, S45S	D6, D8, D16, D32, D40
S2-S	22	D10, D34	S37S, S41S, S43S, S59S	S33S, S27S, S21S, S15S, S13S, S47S, S49S, S53S, S57S	S39S, S45S	D6, D8, D16, D32, D40
S2-S	23	D10, D34	S37S, S41S, S43S, S57S	S33S, S27S, S21S, S15S, S13S, S47S, S49S, S53S	S39S, S45S	D6, D8, D16, D32, D40
S2-S	24	D10, D34	S37S, S41S, S43S, S53S	S33S, S27S, S21S, S15S, S13S, S47S, S49S, S55S	S39S, S45S	D6, D8, D16, D32, D40
S2-S	25	D10, D34	S37S, S41S, S43S, S53S, S55S	S33S, S27S, S21S, S15S, S13S, S47S, S49S	S39S, S45S	D6, D8, D16, D32, D40
S2-S	26	D10, D34	S37S, S41S, S43S, S49S	S33S, S27S, S21S, S15S, S13S, S47S, S51S	S39S, S45S	D6, D8, D16, D32, D40
S2-S	27	D10, D34	S37S, S41S, S43S, S49S, S51S	S33S, S27S, S21S, S15S, S13S, S47S	S39S, S45S	D6, D8, D16, D32, D40
S2-S	29	D10, D34	S37S, S41S, S43S, S47S	S33S, S27S, S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S2-S	41	D10	S37S, S13S, S9S	S33S, S27S, S21S, S15S, S11S		D2, D6, D8, D20, D32
S3-S	00	D10	S33S, S41S, S43S	S35S, S27S, S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S3-S	20	D10	S33S, S41S	S35S, S27S, S21S, S15S, S13S, S43S, S45S	S39S	D6, D8, D20, D32
S3-S	21	D10, D34	S33S, S41S, S43S	S35S, S27S, S21S, S15S, S13S, S47S, S49S, S53S, S57S, S59S	S39S, S45S	D6, D8, D16, D32, D40
S3-S	22	D10, D34	S33S, S41S, S43S, S59S	S35S, S27S, S21S, S15S, S13S, S47S, S49S, S53S, S57S	S39S, S45S	D6, D8, D16, D32, D40
S3-S	23	D10, D34	S33S, S41S, S43S, S57S	S35S, S27S, S21S, S15S, S13S, S47S, S49S, S53S	S39S, S45S	D6, D8, D16, D32, D40
S3-S	24	D10, D34	S33S, S41S, S43S, S53S	S35S, S27S, S21S, S15S, S13S, S47S, S49S, S55S	S39S, S45S	D6, D8, D16, D32, D40
S3-S	25	D10, D34	S33S, S41S, S43S, S53S, S55S	S35S, S27S, S21S, S15S, S13S, S47S, S49S	S39S, S45S	D6, D8, D16, D32, D40
S3-S	26	D10, D34	S33S, S41S, S43S, S49S	S35S, S27S, S21S, S15S, S13S, S47S, S51S	S39S, S45S	D6, D8, D16, D32, D40
S3-S	27	D10, D34	S33S, S41S, S43S, S49S, S51S	S35S, S27S, S21S, S15S, S13S, S47S	S39S, S45S	D6, D8, D16, D32, D40
S3-S	29	D10, D34	S33S, S41S, S43S, S47S	S35S, S27S, S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S3-S	41	D10	S33S, S13S, S9S	S35S, S27S, S21S, S15S, S11S		D2, D6, D8, D20, D32
S4-S	00	D10	S35S, S33S, S41S, S43S	S27S, S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S4-S	20	D10	S35S, S33S, S41S	S27S, S21S, S15S, S13S, S43S, S45S	S39S	D6, D8, D20, D32
S4-S	21	D10, D34	S35S, S33S, S41S, S43S	S27S, S21S, S15S, S13S, S47S, S49S, S53S, S57S, S59S	S39S, S45S	D6, D8, D16, D32, D40
S4-S	22	D10, D34	S35S, S33S, S41S, S43S, S59S	S27S, S21S, S15S, S13S, S47S, S49S, S53S, S57S	S39S, S45S	D6, D8, D16, D32, D40
S4-S	23	D10, D34	S35S, S33S, S41S, S43S, S57S	S27S, S21S, S15S, S13S, S47S, S49S, S53S	S39S, S45S	D6, D8, D16, D32, D40
S4-S	24	D10, D34	S35S, S33S, S41S, S43S, S53S	S27S, S21S, S15S, S13S, S47S, S49S, S55S	S39S, S45S	D6, D8, D16, D32, D40
S4-S	25	D10, D34	S35S, S33S, S41S, S43S, S53S, S55S	S27S, S21S, S15S, S13S, S47S, S49S	S39S, S45S	D6, D8, D16, D32, D40
S4-S	26	D10, D34	S35S, S33S, S41S, S43S, S49S	S27S, S21S, S15S, S13S, S47S, S51S	S39S, S45S	D6, D8, D16, D32, D40
S4-S	27	D10, D34	S35S, S33S, S41S, S43S, S49S, S51S	S27S, S21S, S15S, S13S, S47S	S39S, S45S	D6, D8, D16, D32, D40
S4-S	29	D10, D34	S35S, S33S, S41S, S43S, S47S	S27S, S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S4-S	41	D10	S35S, S33S, S13S, S9S	S27S, S21S, S15S, S11S		D2,D6, D8, D20, D32
S5-S	00	D10	S31S, S27S, S41S, S43S	S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S5-S	20	D10	S31S, S27S, S41S	S21S, S15S, S13S, S43S, S45S	S39S	D6, D8, D20, D32
S5-S	21	D10, D34	S31S, S27S, S41S, S43S	S21S, S15S, S13S, S47S, S49S, S53S, S57S, S59S	S39S, S45S	D6, D8, D16, D32, D40
S5-S	22	D10, D34	S31S, S27S, S41S, S43S, S59S	S21S, S15S, S13S, S47S, S49S, S53S, S57S	S39S, S45S	D6, D8, D16, D32, D40
S5-S	23	D10, D34	S31S, S27S, S41S, S43S, S57S	S21S, S15S, S13S, S47S, S49S, S53S	S39S, S45S	D6, D8, D16, D32, D40
S5-S	24	D10, D34	S31S, S27S, S41S, S43S, S53S	S21S, S15S, S13S, S47S, S49S, S55S	S39S, S45S	D6, D8, D16, D32, D40
S5-S	25	D10, D34	S31S, S27S, S41S, S43S, S53S, S55S	S21S, S15S, S13S, S47S, S49S	S39S, S45S	D6, D8, D16, D32, D40
S5-S	26	D10, D34	S31S, S27S, S41S, S43S, S49S	S21S, S15S, S13S, S47S, S51S	S39S, S45S	D6, D8, D16, D32, D40
S5-S	27	D10, D34	S31S, S27S, S41S, S43S, S49S, S51S	S21S, S15S, S13S, S47S	S39S, S45S	D6, D8, D16, D32, D40
S5-S	29	D10, D34	S31S, S27S, S41S, S43S, S47S	S21S, S15S, S13S	S39S, S45S	D6, D8, D16, D32, D40
S5-S	41	D10	S31S, S27S, S13S, S9S	S21S, S15S, S11S		D2, D6, D8, D20, D32
S6-S	00	D8	S27S, S41S, S43S	S31S, S21S, S15S, S13S	S39S, S45S	D6, D10, D16, D32, D40
S6-S	20	D8	S27S, S41S	S31S, S21S, S15S, S13S, S43S, S45S	S39S	D6, D10, D20, D32
S6-S	21	D10, D34	S27S, S41S, S43S	S31S, S21S, S15S, S13S, S47S, S49S, S53S, S57S, S59S	S39S, S45S	D6, D10, D16, D32, D40
S6-S	22	D10, D34	S27S, S41S, S43S, S59S	S31S, S21S, S15S, S13S, S47S, S49S, S53S, S57S	S39S, S45S	D6, D10, D16, D32, D40
S6-S	23	D10, D34	S27S, S41S, S43S, S57S	S31S, S21S, S15S, S13S, S47S, S49S, S53S	S39S, S45S	D6, D10, D16, D32, D40
S6-S	24	D10, D34	S27S, S41S, S43S, S53S	S31S, S21S, S15S, S13S, S47S, S49S, S55S	S39S, S45S	D6, D10, D16, D32, D40
S6-S	25	D10, D34	S27S, S41S, S43S, S53S, S55S	S31S, S21S, S15S, S13S, S47S, S49S	S39S, S45S	D6, D10, D16, D32, D40
S6-S	26	D10, D34	S27S, S41S, S43S, S49S	S31S, S21S, S15S, S13S, S47S, S51S	S39S, S45S	D6, D10, D16, D32, D40
S6-S	27	D10, D34	S27S, S41S, S43S, S49S, S51S	S31S, S21S, S15S, S13S, S47S	S39S, S45S	D6, D10, D16, D32, D40
S6-S	29	D10, D34	S27S, S41S, S43S, S47S	S31S, S21S, S15S, S13S	S39S, S45S	D6, D10, D16, D32, D40
S6-S	41	D8	S27S, S13S, S9S	S31S, S21S, S15S, S11S		D2, D6, D10, D20, D32

NOTES:

1. INTERMEDIATE SIGNS RETAIN THEIR NUMBER UNTIL THEY ARE PASSED.

2. EACH DESTINATION SIGN HAS FIVE (5) POSSIBLE STATES:

   2.A. HORIZONTAL BAR DISPLAYED - THIS IS THE NORMAL CONDITION AND MEANS STOP. IN THIS CONDITION, THE SIGNAL CONTROL LOGIC FOR THAT HEMISPHERE IS AVAILABLE FOR ALIGNMENT REQUESTS FROM THE TWC LOOPS ASSOCIATED WITH THAT HEMISPHERE.

   2.B. FLASHING HORIZONTAL BAR DISPLAYED - THIS MEANS STOP AND THAT SIGNAL LOGIC FOR THAT "HEMISPHERE" WILL NOT PROCESS OR REMEMBER ANY ADDITIONAL TWC DESTINATION REQUESTS. THIS WOULD BE DISPLAYED AT ALL NUMERICAL SIGNS OF THAT HEMISPHERE EXCEPT THE ONE FACING THE TWC LOOP THAT HAS INPUT A VALID REQUEST. ALL NUMERICAL SIGNS OF THAT HEMISPHERE WILL ALSO DISPLAY A FLASHING AMBER BAR WHENEVER THE LOCKOUT CONDITION IS DUE TO TRACK CIRCUIT(S) DESIGNATED ON THE ROUTE BEING OCCUPIED. THE EXCEPTION IS THAT A NUMERICAL SIGN FACING TWC LOOPS THAT HAVE A POSSIBLE NON-CONFLICTING ROUTE WILL DISPLAY THE NON-FLASHING HORIZONTAL BAR. IF ONE OF THESE LOOPS ATTEMPTS TO CALL A CONFLICTING ROUTE, THEN THE HORIZONTAL BAR WILL BEGIN TO FLASH.

   2.C. FLASHING NUMERICAL SYMBOL - THIS IS DISPLAYED WHEN A VALID TWC REQUEST IS BEING PROCESSED BY THE SIGNAL LOGIC. IT IS ONLY DISPLAYED ON THE NUMERICAL SIGN FACING THE REQUESTING TWC LOOP. IT WILL CONTINUE UNTIL THE SWITCHES ARE ALIGNED PER THE REQUEST OR UNTIL THE SOFTWARE TIMER HAS EXPIRED.

   2.D. SOLID ILLUMINATING NUMERICAL SYMBOL - THIS IS DISPLAYED WHEN A VALID TWC REQUEST HAS BEEN MADE AND THE SWITCHES ARE ALIGNED TO THE CORRECT POSITION. IT IS ONLY DISPLAYED ON THE NUMERICAL SIGN FACING THE REQUESTING TWC LOOP OR AN INTERMEDIATE SIGN. IT WILL STAY ILLUMINATED UNTIL EITHER THE FIRST TRACK CIRCUIT ON THE ROUTE BECOMES OCCUPIED OR THE SOFTWARE TIMER HAS EXPIRED. AFTER NUMERICAL SYMBOL EXTINGUISHES DUE TO EXPIRED S/W TIMER OR CANCELED ROUTE, TIME LOCKING MAINTAINS ROUTE LOCKS FOR 10 SECONDS.

   2.E. IF A TWC LOOP ATTEMPTS TO CALL A DESTINATION PHYSICALLY NOT AVAILABLE FROM THE LOOP, THEN THE FACING NUMERICAL SIGN WILL DISPLAY A "NA" FOR 3 SECONDS.

3. IF THERE IS A HAND THROW SWITCH. THE LOCKED POSITION FOR THIS SWITCH REPRESENTS THE POSITION THAT NEEDS TO BE DETECTED FOR THE ROUTE TO BE AVAILABLE.

4. IN ADDITION TO CHECKING SWITCH POSITIONS, TRACK CIRCUITS AND OPPOSING ROUTES AS SHOWN IN THE R&A CHARTS, FOR THE ROUTES EXITING THE YARD INTO THE MAIN LINE, THE SOFTWARE WILL CHECK THE OPPOSING ROUTE STICKS FROM THE INTERFACING INTERLOCKING. THESE ROUTE STICKS WILL BE NORMALLY ENERGIZED AND WILL PREVENT THE YARD ROUTE INDICATORS FROM CLEARING IF A TRAIN HAS BEEN CLEARED INTO THE YARD FROM THE MAIN LINE ALREADY.

5. FOR ROUTES WITHIN THE YARD THAT THE SOFTWARE WILL BE DESIGNED TO PASS ROUTE STICKS BETWEEN THE TWO HEMISPHERES VIA THE VITAL REMOTE LINK TO ENSURE TRAIN MOVEMENT IS ONLY ALLOWED IN ONE DIRECTION AT A TIME WHEN TRAVELING BETWEEN THE HEMISPHERES. THESE CHECKS WILL BE MADE IN ADDITION TO THE SWITCH POSITIONS, TRACK CIRCUITS AND OPPOSING ROUTES WITHIN EACH HEMISPHERE AS SHOWN IN THE R&A CHARTS.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSS106
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
YARD ROUTE LOCKING TABLE
TYPICAL

DRAWING No.: **STD-JSS106**
FACILITY ID:
SHEET No.: REV: 0

03/21/24 | 12:54 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSS106.DWG

LCP COMM

LINK OK

TX RK

VITAL LINKS

SOUTH AUX

POWER ALARM GROUND FAULT

YARD NORTH

SNOW MELTER STATUS

ON AUTO

AMBIENT TEMP

MOISTURE

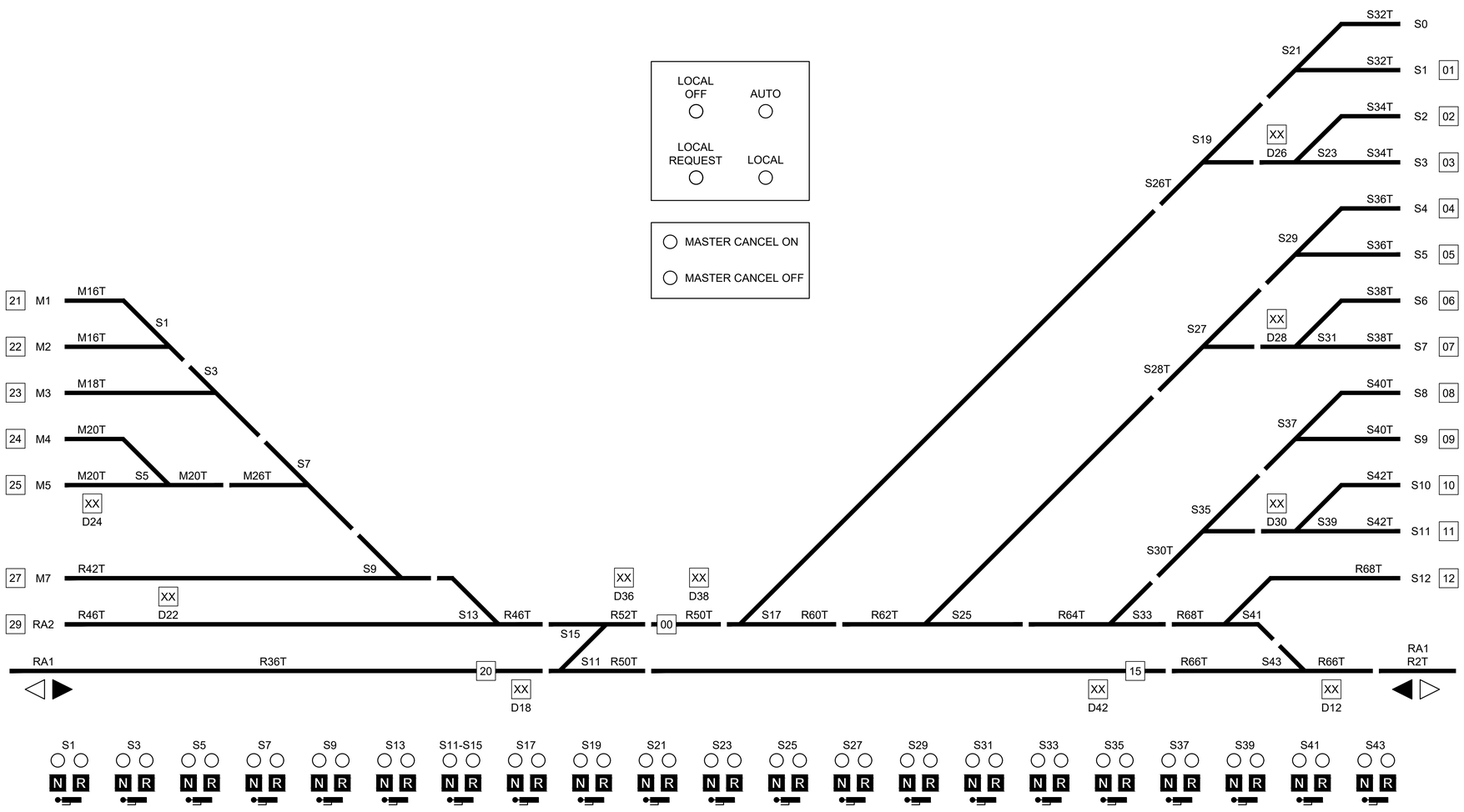
SNOW MELTER ON

LOCAL OFF AUTO

LOCAL REQUEST LOCAL

MASTER CANCEL ON

MASTER CANCEL OFF



YARD LCP PANEL NOTES:

1. PANEL BACKGROUND IS BLACK WITH WHITE TRACK PLAN AND PRINT. SPECIFIC INDICATOR COLORS AS FOLLOWS:
2. NUMERICAL SIGN SYMBOL SHALL DISPLAY THE ACTUAL FIELD SIGN CONDITION. AMBER BARS SOLID OR FLASHING OR 2 DIGIT ALPHANUMERIC SOLID OR FLASHING.
3. AMBIENT MOISTURE AND TEMP: GREEN = NORMAL; AMBER = SNOW MELTER HEATER TRIGGER LEVEL.
4. TRAFFIC DIRECTION SYMBOLS: RED = DIRECTION LOCKED; GREEN = TRAFFIC DIRECTION AVAILABLE.
5. SWITCH N & R = DULL GREEN & RED = NOT TRUE; BRIGHT GREEN & RED = TRUE.
6. SWITCH "LOCK" SYSMBOL: WHITE = UNLOCKED; RED = LOCK
7. COMMUNICATION LINKS AND ALARM INDICATIONS: GREEN = OK; RED = ALARM
8. MASTER CANCEL: GREY = OFF; RED = ON.
9. TRACK SWITCH SEGMENT: CONTINUOUS LINE= ALIGNED; OPEN LINE = UNALIGNED
10. TRACK CIRCUIT: WHITE = UNOCCUPIED; ORANGE= OCCUPIED
11. OTHER INDICATION CONDITIONS SUCH AS LOCAL CAN BE WHITE.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

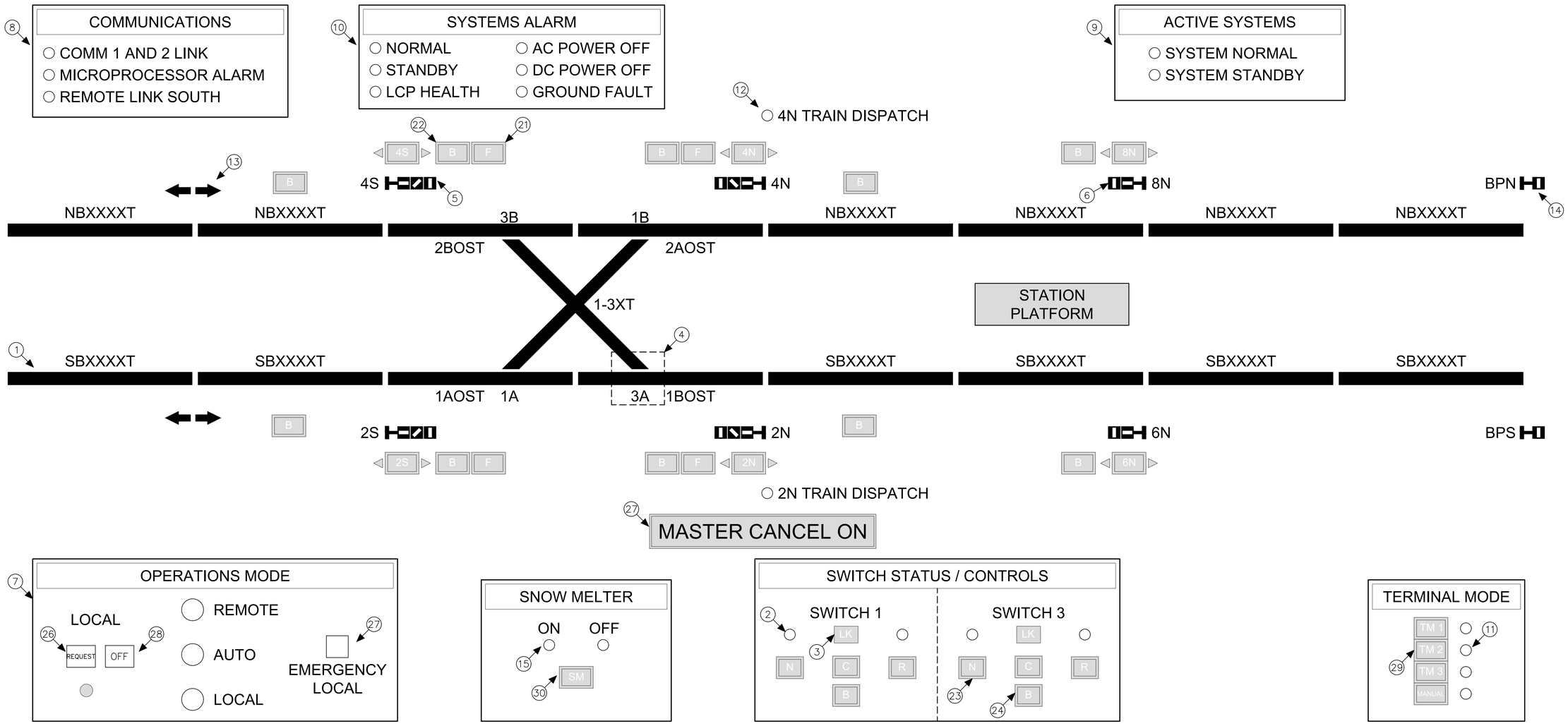
SCALE: AS NOTED
FILENAME: STD-JSS107
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL LOCAL CONTROL PANEL
FOR YARD

DRAWING No.: **STD-JSS107**
FACILITY ID:
SHEET No.: REV: 0

TYPICAL LOCAL CONTROL PANEL



INDICATIONS

1. TRACK CIRCUIT
2. SWITCH REQUEST
3. SWITCH LOCK
4. SWITCH POSITION
5. INTERLOCKING SIGNAL
6. NON-INTERLOCKING SIGNAL
7. OPERATIONS MODE
8. COMMUNICATIONS LINK
9. SIGNAL PROCESSOR ACTIVE
10. ALARMS
11. TERMINAL MODE
12. TRAIN DISPATCH
13. TRAFFIC ARROWS
14. BUMPING POST SIGNAL
15. SNOW MELTER

CONTROLS

20. MASTER CANCEL
21. SIGNAL FLEETING
22. SIGNAL BLOCKED
23. SWITCH REQUEST
24. SWITCH BLOCK
25. TRACK BLOCK
26. LOCAL REQUEST
27. EMERGENCY LOCAL
28. LOCAL OFF
29. TERMINAL MODE
30. SNOW MELTER

NOTES:

1. SOUND TRANSIT LOCAL CONTROL PANEL SHOWN TO DEMONSTRATE TYPICAL CONFIGURATION OF ICONS. DEVELOP LAYOUT APPLICABLE FOR SPECIFIC LOCATION. SEE SPECIFICATION FOR INDICATION COLOR.

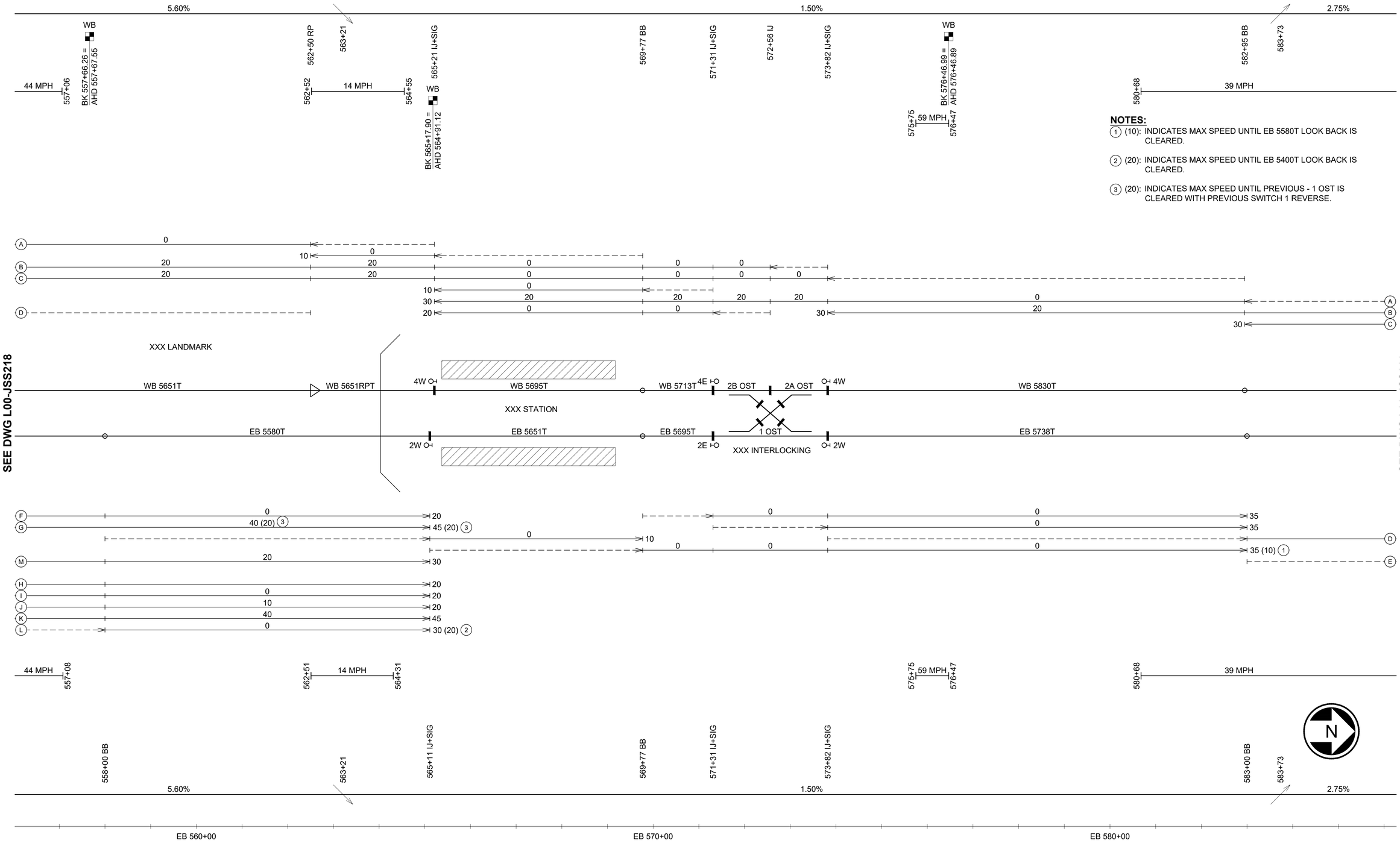
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JSS108
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
TYPICAL LOCAL CONTROL PANEL
FOR MAINLINE

DRAWING No.: **STD-JSS108**
FACILITY ID:
SHEET No.: REV: 0

03/21/24 | 12:54 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSS108.DWG



No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSS109
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
CONTROL LINE DIAGRAM
NORMAL DIRECTION

DRAWING No.: **STD-JSS109**
FACILITY ID:
SHEET No.: REV: 0

CODE FUNCTION ASSIGNMENT								
	CONTROLS FROM OCC OFFICE TO VHLC							UNIT ADDRESS
BIT	1	2	3	4	5	6	7	8
WORD 1	2N PBZ	2S PBZ	4N PBZ	4S PBZ				
WORD 2	2N CANZ	2S CANZ	4N CANZ	4S CANZ				
WORD 3	2N FLZ	2S FLZ	4N FLZ	4S FLZ				
WORD 4	2N FLCZ	2S FLCZ	4N FLCZ	4S FLCZ				
WORD 5	1 NWZ	1 RWZ	1 CWZ	3 NWZ	3 RWZ	3 CWZ		
WORD 6	2N GBLKZ	2S GBLKZ	4N GBLKZ	4S GBLKZ	2N GBLKCZ	2S GBLKCZ	4N GBLKCZ	4S GBLKCZ
WORD 7	1 WBLKZ	3 WBLKZ			1 WBLKCZ	3 WBLKCZ		
WORD 8	NBN TBLKZ	SBN TBLKZ	NBS TBLKZ	SBS TBLKZ	NBN TBLKCZ	SBN TBLKCZ	NBS TBLKCZ	SBS TBLKCZ
WORD 9	LOCZ	OCCZ	AMZ					
WORD 10	TM1Z	TM2Z	TM3Z	MMZ	2NTDZ	4NTDZ		

CODE FUNCTION ASSIGNMENT								
	INDICATIONS FROM VHLC TO OCC OFFICE						UNIT ADDRESS	
BIT	1	2	3	4	5	6	7	8
WORD 1	2N GK	2S GK	4N GK	4S GK				
WORD 2	2N GBLK	2S GBLK	4N GBLK	4S GBLK				
WORD 3	2N FLK	2S FLK	4N FLK	4S FLK	2N ORK	2S ORK	4N ORK	4S ORK
WORD 4	2N EXK	2S EXK	4N EXK	4S EXK				
WORD 5	1 NWCK	1 RWCK	3 NWCK	3 RWCK				
WORD 6	1 LK	3 LK			1 WBLK	3 WBLK		
WORD 7	1OS NRLK	1OS SRLK	2OS NRLK	2OS SRLK	1X NRLK	1X SRLK	3X NRLK	3X SRLK
WORD 8	NB NNFK	NB NRFK	SB NNFK	SB NRFK	NB NNFLK	NB NRFLK	SB NNFLK	SB NRFLK
WORD 9	NB830 TK	NB843 TK	NB854 TK	NB860 TK	NB873 TK	NB876 TK	NB881 TK	2OSTK TK
WORD 10	NB888 TK	NB893 TK						
WORD 11	SB830 TK	SB843 TK	SB854 TK	SB867 TK	SB876 TK	1OS TK	1-3X TK	SB883 TK
WORD 12	SB889 TK							
WORD 13	NBN TBLK	SBN TBLK	NBS TBLK	SBS TBLK				
WORD 14	LQK	LCK	AMK	CCK	ELCK			
WORD 15	MPAK	ACPOK	DCPOK	DCGIK				
WORD 16	TM1K	TM2K	TM3K	MMK	2NTDK	4NTDK		

CONTROL NOMENCLATURE LEGEND:

(N) NPBZ	NORTHBOUND SIGNAL PUSHBUTTON (REQUEST) CONTROL
(N) SPBZ	SOUTHBOUND SIGNAL PUSHBUTTON (REQUEST) CONTROL
(N) NCANZ	NORTHBOUND SIGNAL CANCEL CONTROL
(N) SCANZ	SOUTHBOUND SIGNAL CANCEL CONTROL
(N) NFLZ	NORTHBOUND FLEETING CONTROL
(N) SFLZ	SOUTHBOUND FLEETING CONTROL
(N) NFLCZ	NORTHBOUND FLEETING CANCEL CONTROL
(N) SFLCZ	SOUTHBOUND FLEETING CANCEL CONTROL
(N) NWZ	NORMAL SWITCH CONTROL
(N) RWZ	REVERSE SWITCH CONTROL
(N) CWZ	CENTER (LEVER SWITCH) SWITCH CONTROL
(N) NGBLKZ	NORTHBOUND SIGNAL BLOCK CONTROL
(N) SGBLKZ	SOUTHBOUND SIGNAL BLOCK CONTROL
(N) NGBLKCZ	NORTHBOUND SIGNAL BLOCK CANCEL CONTROL
(N) SGBLKCZ	SOUTHBOUND SIGNAL BLOCK CANCEL CONTROL
(N) WBLKZ	SWITCH BLOCK CONTROL
(N) WBLKCZ	SWITCH BLOCK CANCEL CONTROL
NBNTBLKZ	NORTHBOUND (TRACK) NORTH (OF INTERLOCKING) TRACK BLOCK CONTROL
SBNTBLKZ	SOUTHBOUND (TRACK) NORTH (OF INTERLOCKING) TRACK BLOCK CONTROL
NBSTBLKZ	NORTHBOUND (TRACK) SOUTH (OF INTERLOCKING) TRACK BLOCK CONTROL
SBSTBLKZ	SOUTHBOUND (TRACK) SOUTH (OF INTERLOCKING) TRACK BLOCK CONTROL
NBNTBLKCZ	NORTHBOUND (TRACK) NORTH (OF INTERLOCKING) TRACK BLOCK CANCEL CONTROL
SBNTBLKCZ	SOUTHBOUND (TRACK) NORTH (OF INTERLOCKING) TRACK BLOCK CANCEL CONTROL
NBSTBLKCZ	NORTHBOUND (TRACK) SOUTH (OF INTERLOCKING) TRACK BLOCK CANCEL CONTROL
SBNTBLKCZ	
LOCZ	LOCAL MODE CONTROL
OCCZ	OFFICE MODE CONTROL
AMZ	AUTOMATIC MODE CONTROL
TMXK	TERMINAL MODE INDICATION
MMK	MANUAL MODE INDICATION

INDICATION NOMENCLATURE LEGEND:

(N) NGK	NORTHBOUND SIGNAL INDICATION
(N) SGK	SOUTHBOUND SIGNAL INDICATION
(N) NGBLK	NORTHBOUND SIGNAL BLOCK INDICATION
(N) SGBLK	SOUTHBOUND SIGNAL BLOCK INDICATION
(N) NFLK	NORTHBOUND FLEETING INDICATION
(N) SFLK	SOUTHBOUND FLEETING INDICATION
(N) EXK	ENTRANCE/EXIT INDICATION
(N) NWCK	NORMAL SWITCH CORRESPONDENCE INDICATION
(N) RWCK	REVERSE SWITCH CORRESPONDENCE INDICATION
(N) LK	SWITCH LOCK INDICATION
(N) WBLK	SWITCH BLOCK INDICATION
(N) NRLK	NORTH ROUTE LOCK INDICATION
(N) SRLK	SOUTH ROUTE LOCK INDICATION
NBNNFK	NORTHBOUND (TRACK) NORTH (OF INTERLOCKING) NORMAL TRAFFIC INDICATION
NBNRFK	NORTHBOUND (TRACK) NORTH (OF INTERLOCKING) REVERSE TRAFFIC INDICATION
SBNNFK	SOUTHBOUND (TRACK) NORTH (OF INTERLOCKING) NORMAL TRAFFIC INDICATION
SBNRFK	SOUTHBOUND (TRACK) NORTH (OF INTERLOCKING) REVERSE TRAFFIC INDICATION
NBSNFK	NORTHBOUND (TRACK) SOUTH (OF INTERLOCKING) NORMAL TRAFFIC INDICATION
NBSRFK	NORTHBOUND (TRACK) SOUTH (OF INTERLOCKING) REVERSE TRAFFIC INDICATION
SBSNFK	SOUTHBOUND (TRACK) SOUTH (OF INTERLOCKING) NORMAL TRAFFIC INDICATION
SBSRFK	SOUTHBOUND (TRACK) SOUTH (OF INTERLOCKING) REVERSE TRAFFIC INDICATION
NBNNFLK	NORTHBOUND (TRACK) NORTH (OF INTERLOCKING) NORMAL TRAFFIC LOCK INDICATION
NBNRFLK	NORTHBOUND (TRACK) NORTH (OF INTERLOCKING) REVERSE TRAFFIC LOCK INDICATION
SBNNFLK	SOUTHBOUND (TRACK) NORTH (OF INTERLOCKING) NORMAL TRAFFIC LOCK INDICATION
SBNRFLK	SOUTHBOUND (TRACK) NORTH (OF INTERLOCKING) REVERSE TRAFFIC LOCK INDICATION
NBSNFLK	NORTHBOUND (TRACK) SOUTH (OF INTERLOCKING) NORMAL TRAFFIC LOCK INDICATION
NBSRFLK	NORTHBOUND (TRACK) SOUTH (OF INTERLOCKING) REVERSE TRAFFIC LOCK INDICATION
SBSNFLK	SOUTHBOUND (TRACK) SOUTH (OF INTERLOCKING) NORMAL TRAFFIC LOCK INDICATION
SBSRFLK	SOUTHBOUND (TRACK) SOUTH (OF INTERLOCKING) REVERSE TRAFFIC LOCK INDICATION
(N) ORK	RED SIGNAL OVERRUN INDICATION
NB (N) TK	NORTHBOUND TRACK INDICATION

NOTES:

1. TYPICAL CONTROL AND INDICATION CHART BASED ON AIRPORT LOCATION. CONTRACTOR RESPONSIBLE TO PROVIDE LOCATION SPECIFIC CODE FUNCTION ASSIGNMENTS.

NBNTBLK	NORTHBOUND (TRACK) NORTH (OF INTERLOCKING) TRACK BLOCK INDICATION
SBNTBLK	SOUTHBOUND (TRACK) NORTH (OF INTERLOCKING) TRACK BLOCK INDICATION
NBSTBLK	NORTHBOUND (TRACK) SOUTH (OF INTERLOCKING) TRACK BLOCK INDICATION
SBSTBLK	SOUTHBOUND (TRACK) SOUTH (OF INTERLOCKING) TRACK BLOCK INDICATION
LQK	LOCAL CONTROL REQUEST INDICATION
LCK	LOCAL CONTROL INDICATION
AMK	AUTOMATIC MODE INDICATION
CCK	OCC CONTROL MODE INDICATION
ELCK	EMERGENCY LOCAL CONTROL INDICATION
MPAK	MICROPROCESSOR FAILURE ALARM INDICATION
ACPOK	AC POWER OFF INDICATION
DCPOK	DC POWER OFF INDICATION
DCGIK	DC GROUND INDICATION

TCS REMOTE I/O

IAK	INTRUSION ALARM INDICATION
IDDK	INTRUSION DETECTOR DISARM INDICATION
FAK	FIRE ALARM INDICATION
UPSAK	UPS ALARM INDICATION
UPSBPK	UPS BYPASS ALARM INDICATION
BATONK	BATTERY ON INDICATION
HVACAK	HVAC ALARM INDICATION
HRTAK	HIGH ROOM TEMPERATURE ALARM INDICATION
RAK	RADIO ALARM INDICATION

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

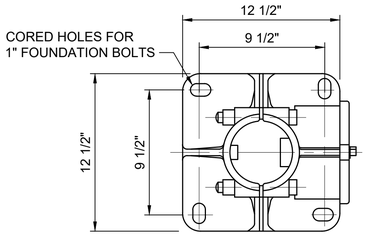
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSS110
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
CONTROL AND INDICATION CHART

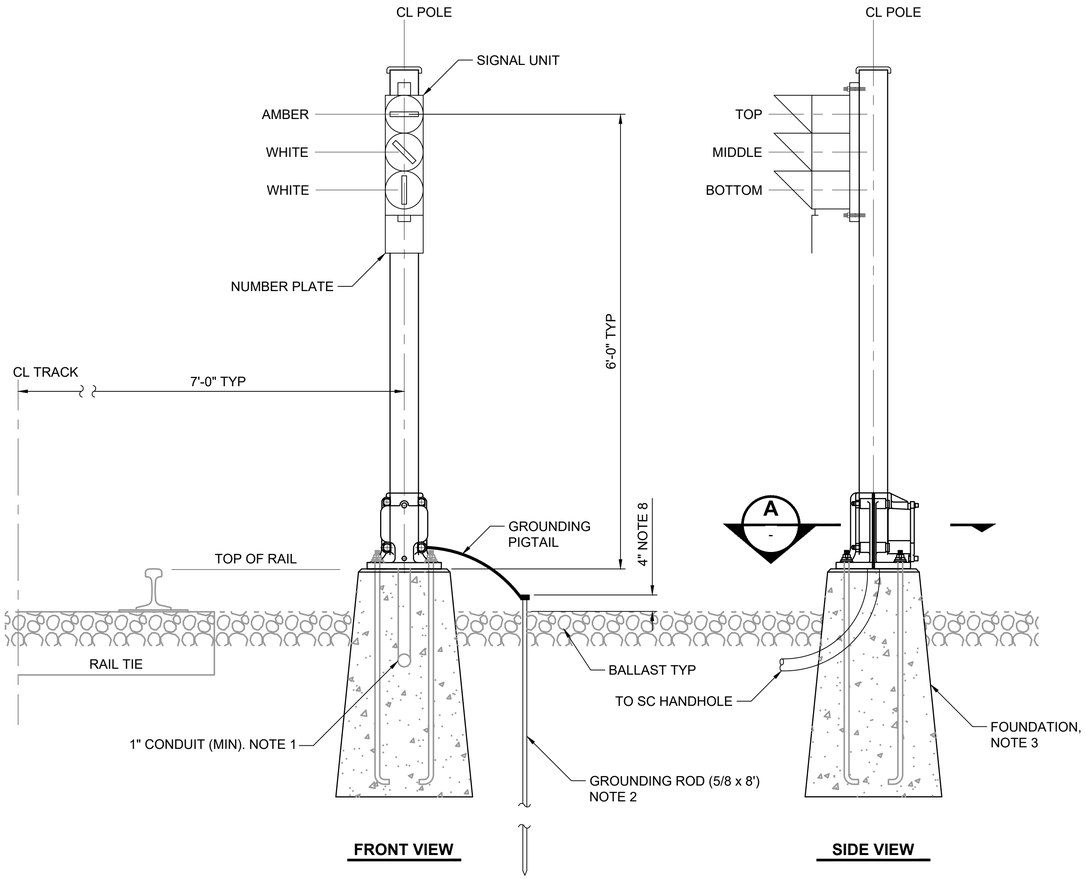
DRAWING No.: STD-JSS110
FACILITY ID:
SHEET No.: REV: 0

03/21/24 | 12:54 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSS110.DWG



SECTION PLAN OF BASE A
NTS

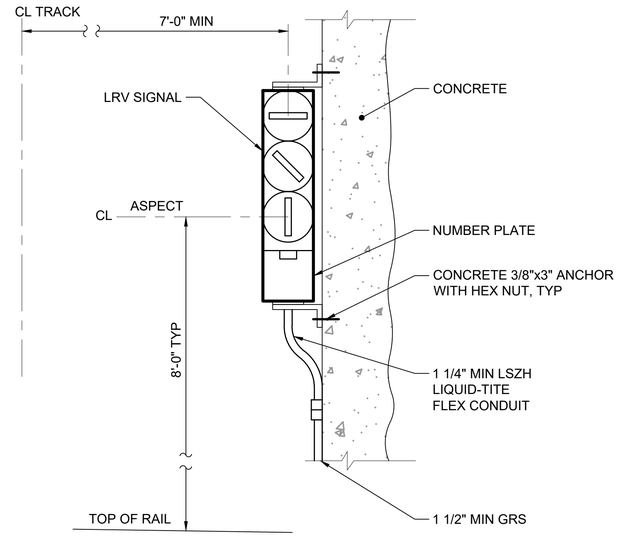
DIRECTION OF TRAFFIC



TYPICAL SIGNAL WITH PRECAST FOUNDATION 1
NTS

GENERAL NOTES:

1. PROVIDE CONDUIT TO NEAREST HANDHOLE.
2. PROVIDE GROUND ROD, #6 COPPER EQUIPMENT GROUNDING CONNECTION, AND FOUNDATION.
3. PROVIDE PRECAST FOUNDATION FOR MOUNTING SIGNAL.
4. INSTALLATION PROCEDURE SHALL KEEP BALLAST CLEAN; KEEP ALL DISPLACED SUB-BALLAST AND OTHER SOILS SEPARATE FROM BALLAST.
5. EXTEND CONDUIT TO SIGNAL FROM HANDHOLE OR STUB UP.
6. TYPICAL SIGNAL OFFSET FROM IJ LOCATION IS 15'.
7. FOR THE TUNNEL OR AERIAL GROUNDING PIGTAILS, COORDINATE TERMINATIONS.
8. GREEN INSULATED WIRE FOR GROUND.



TYPICAL SIGNAL LAYOUT - WALL MOUNTED 2
NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

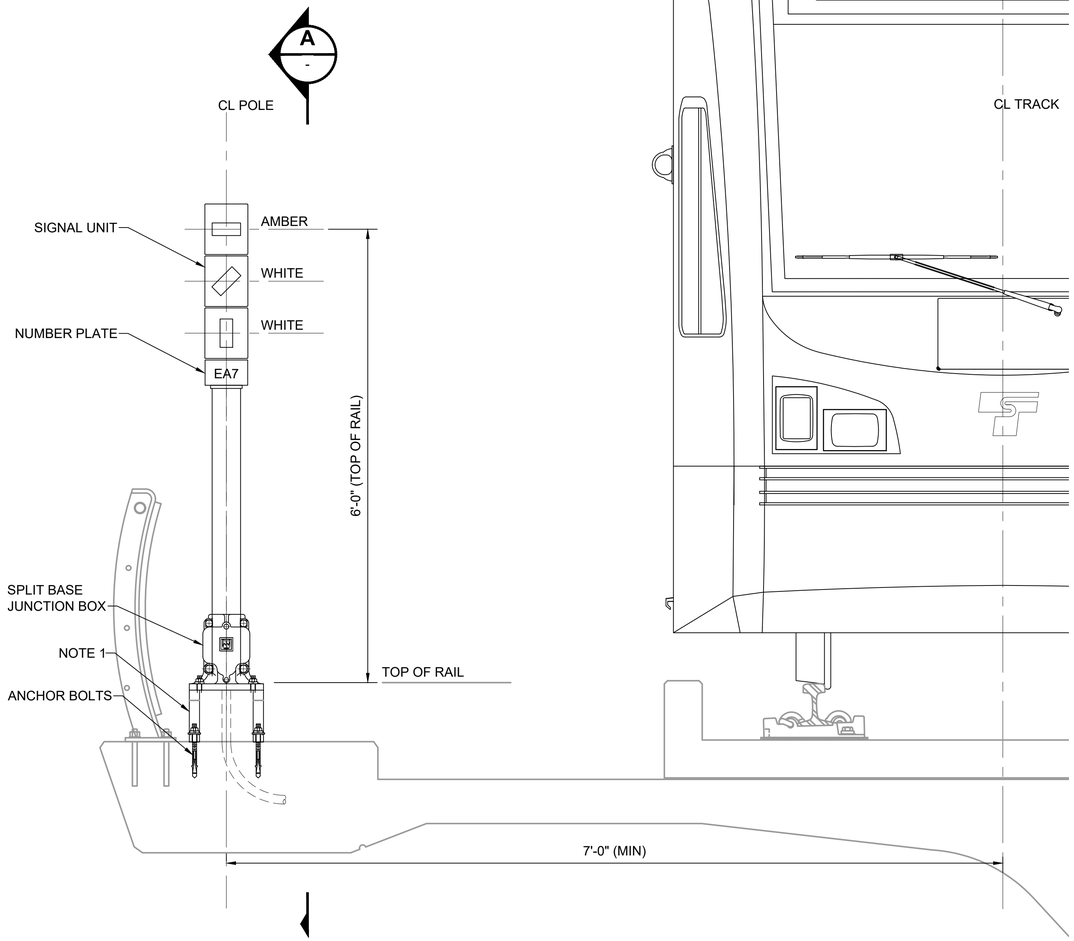
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

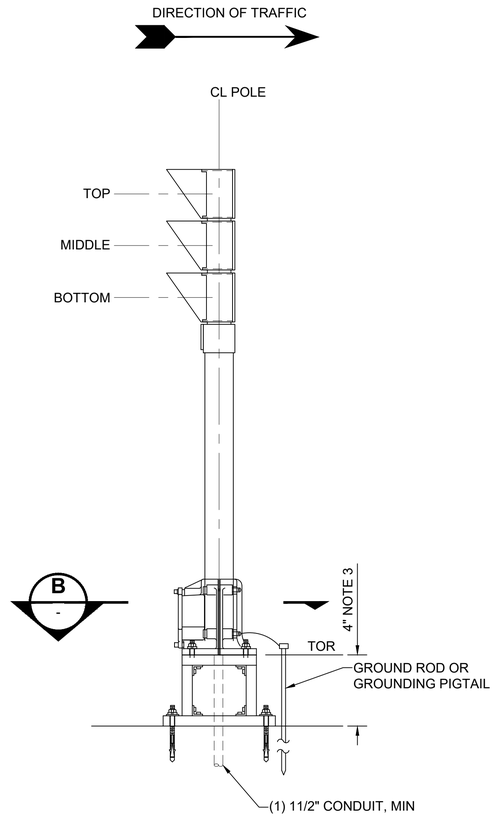
SCALE: NTS
FILENAME: STD-JSD100
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
TYPICAL SIGNAL LAYOUT WALL AND BALLASTED TRACK

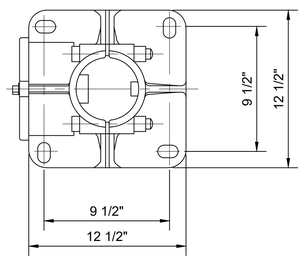
DRAWING No.: **STD-JSD100**
FACILITY ID:
SHEET No.: 2
REV:



SIGNAL MOUNTING
AERIAL DIRECT FIXATION TRACK 1 -
SCALE: 1"=1'-0"



SECTION A -
SCALE: 1"=1'-0"



SECTION PLAN VIEW
OF SPLIT BASE B -
SCALE: 2"=1'-0"

GENERAL NOTES:

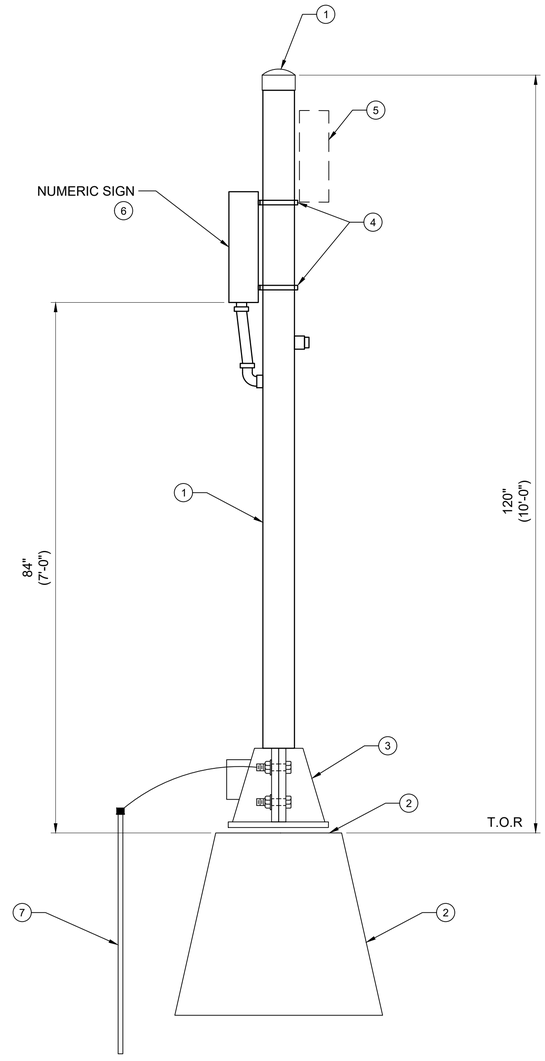
1. MOUNTING FRAME CONSTRUCTED FROM "U" CHANNEL, SUCH THAT THE SIGNAL IS LEVEL, PLUMB AND AT THE SPECIFIED ELEVATION.
2. SECTION B CAN ALSO BE USED FOR SIGNAL MOUNTED BETWEEN TRACKS.
3. 1/0 AWG GREEN INSULATED COPPER WIRE FOR GROUND.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SCALE: NTS
FILENAME: STD-JSD101
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
TYPICAL SIGNAL LAYOUT AERIAL TRACKWAY

DRAWING No.: **STD-JSD101**
FACILITY ID:
SHEET No.: 2
REV:



KEY NOTES:

1. 5 INCH ALUMINUM MAST WITH CAP.
2. MAST MOUNTED ON PRECAST FOUNDATION ON ELASTOMERIC OR NEOPRENE PAD. PROVIDE GROUND ROD.
3. PROVIDE SPLIT BASE JB EQUIPPED WITH ELECTRONIC LIGHTNING PROTECTION FOR NUMERIC SIGN.
4. MOUNTING SHALL PERMIT FLEXIBILITY FOR SIGN VISIBILITY TO REQUESTING TWC LOOPS
5. IF YARD OPERATIONAL LAYOUT REQUIRES, A SECOND SIGN CAN BE MOUNTED ON DIFFERENT SIDE OF POLE.
6. SIGN WITH AMBER DOUBLE SYMBOLS THAT SHALL BE 12 INCH HIGH MIN.
7. GROUND SIGNAL WITH #6 AWG GREEN INSULATED COPPER WIRE CONNECTION TO GROUND ROD, 4" ABOVE GRADE. MATERIAL TO BE PROVIDED BY CONTRACTOR.

03/21/24 | 12:45 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD102.DWG

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

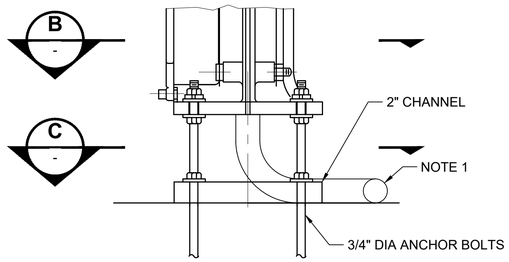
SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JSD102
CONTRACT No.: RTA/LR
DATE: 2/2024

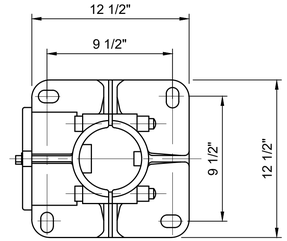
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL NUMERIC SIGN AND MAST LAYOUT

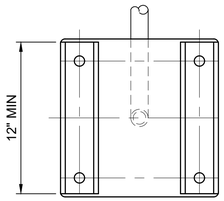
DRAWING No.: **STD-JSD102**
FACILITY ID:
SHEET No.: REV: 0



SIDE VIEW OF BASE MOUNTING (A - -)
SCALE: NTS



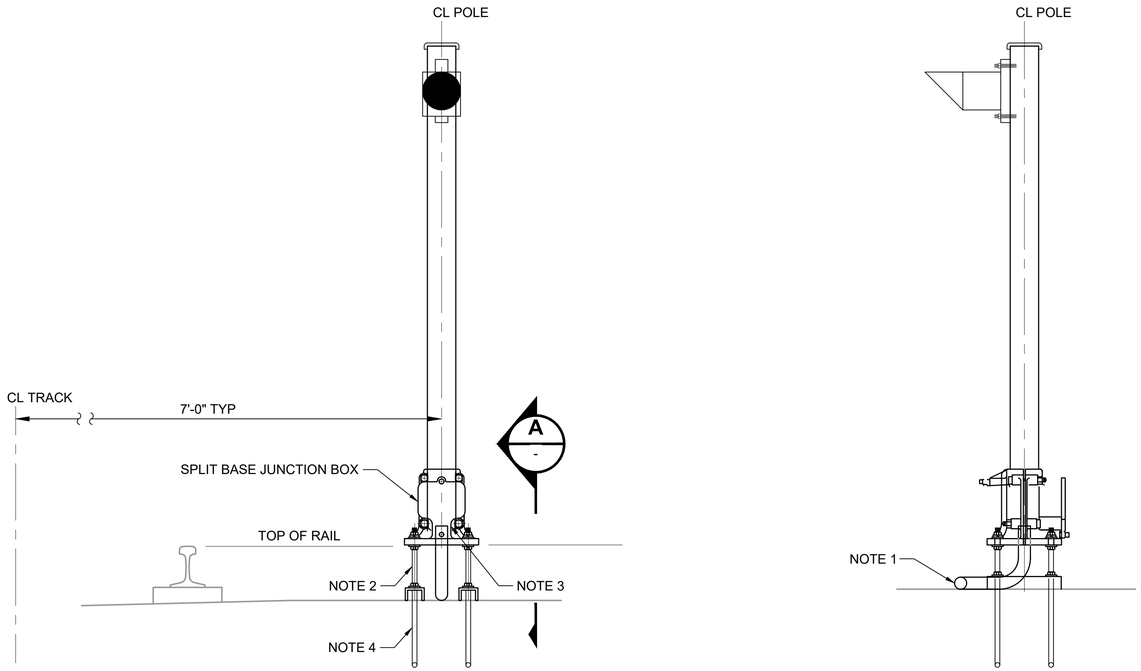
SECTION PLAN VIEW OF SPLIT BASE (B - -)
SCALE: NTS



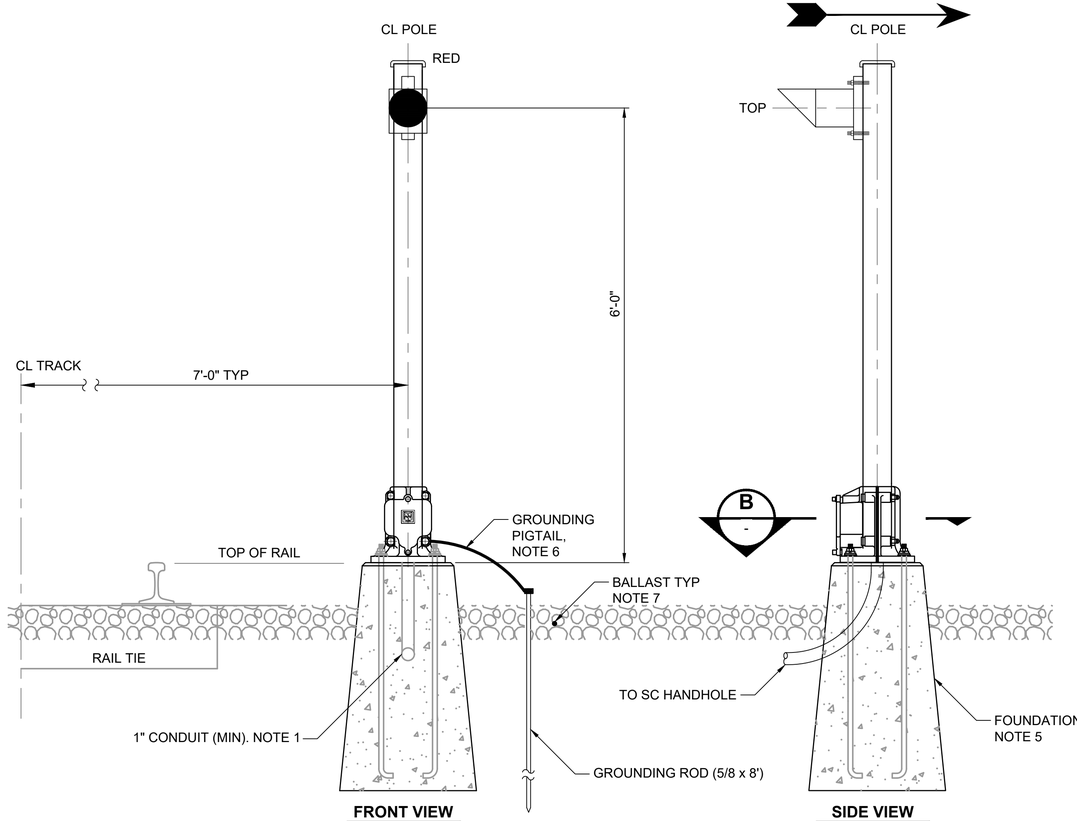
TOP VIEW OF BASE MOUNTING (C - -)
SCALE: NTS

NOTES:

1. PROVIDE CONDUIT TO NEAREST HANDHOLE PROVIDED BY CIVIL.
2. MOUNTING FRAME CONSTRUCTED FROM "U" CHANNEL SUCH THAT SIGNAL IS LEVEL, PLUMB AND AT ELEVATION SHOWN.
3. GROUND SIGNAL WITH #6 AWG GREEN INSULATED COPPER WIRE TO EQUIPMENT GROUND PROVIDED BY OTHERS IN DUCTBANK HANDHOLE.
4. PROVIDE ALL-THREAD TYPE EPOXY ANCHORS DRILLED INTO CONCRETE FOR SECURING MOUNTING FRAME. PRIOR TO DRILLING, PERFORM SCAN TO LOCATE AND AVOID REBAR.
5. PROVIDE PRECAST FOUNDATION FOR MOUNTING SIGNAL.
6. GROUND SIGNAL WITH #6 AWG GREEN INSULATED COPPER WIRE CONNECTION TO GROUND ROD. MATERIAL TO BE PROVIDED BY CONTRACTOR.
7. INSTALLATION PROCEDURE SHALL KEEP BALLAST CLEAN. KEEP ALL DISPLACED SUB-BALLAST AND OTHER SOILS SEPARATE FROM BALLAST.



BUMPING POST SIGNAL - DIRECT FIXATION (1 - -)
SCALE: NTS



BUMPING POST SIGNAL WITH PRECAST FOUNDATION (2 - -)
SCALE: NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

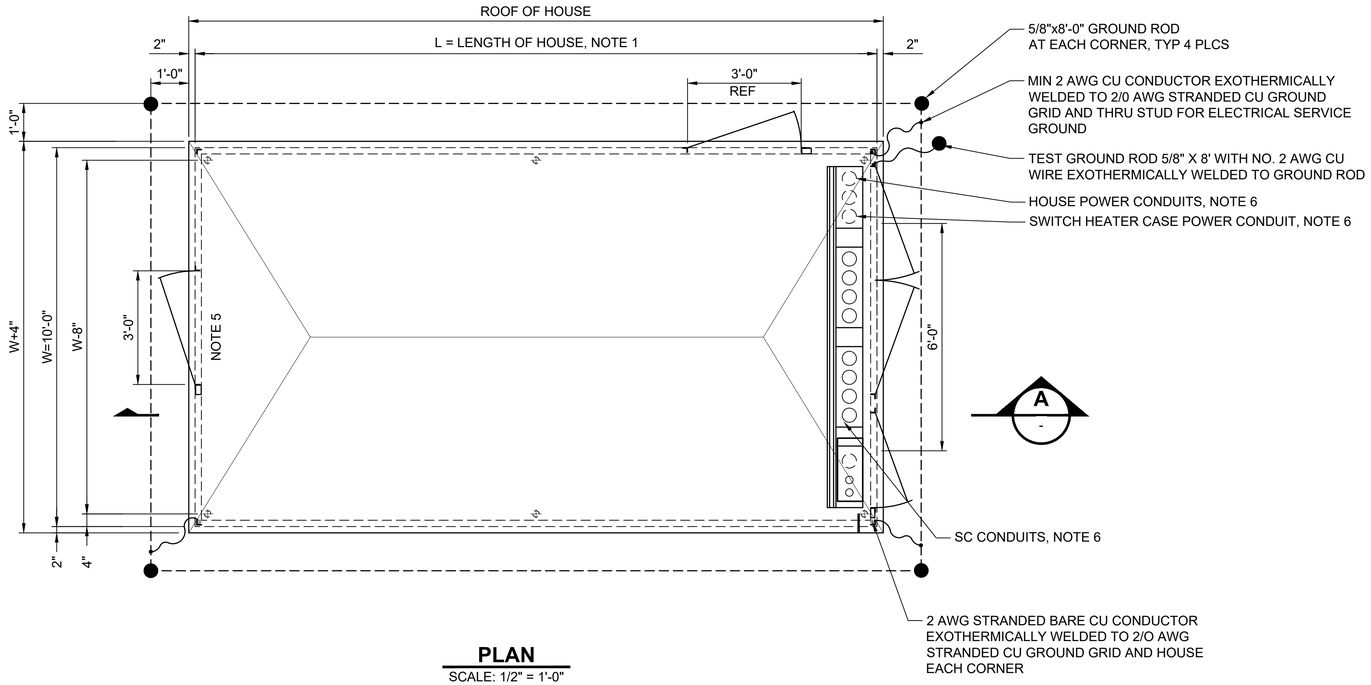
SCALE: NTS
FILENAME: STD-JSD103
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL SIGNAL LAYOUT
DIRECT FIXATION TRACK

DRAWING No.: **STD-JSD103**
FACILITY ID:
SHEET No.:
REV: 0

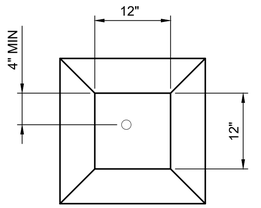
03/21/24 | 12:45 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD103.DWG



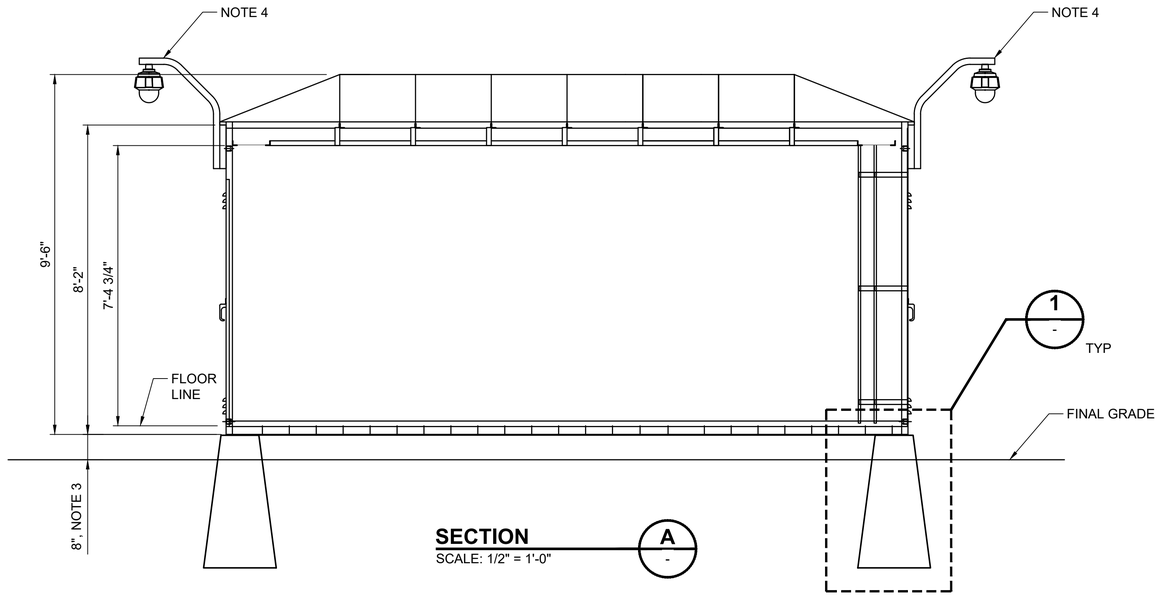
PLAN
SCALE: 1/2" = 1'-0"

GENERAL NOTES:

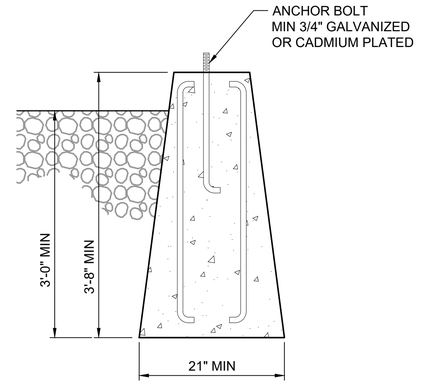
1. SIGNAL HOUSE LENGTH VARIES IN SIZE FROM 20'-0" UP TO 32'-0", BY INCREMENTS OF FOUR FEET. THE ACTUAL SIZE OF THE HOUSE IS DETERMINED BY THE CONTRACTOR. MAXIMUM ALLOWABLE SIZE SHOWN ON EQUIPMENT LAYOUTS.
2. CONTRACTOR SHALL FURNISH AND INSTALL PREFAB CONCRETE PIER FOUNDATIONS. QUANTITY AND SIZE SHALL BE CALCULATED BY THE CONTRACTOR TO MEET THE SEISMIC REQUIREMENTS FOR THE FINAL HOUSE SIZE.
3. BOTTOM OF HOUSE SHALL BE 8" ABOVE FINAL GRADE.
4. PROVIDE CLOSED CIRCUIT CAMERA COVERAGE AT ENTRANCE DOORS. COORDINATE WITH COMMUNICATIONS CONTRACTOR FOR LOCATIONS.
5. CENTER DOOR ON OPPOSITE WALL FROM ENTRANCE RACK.
6. SEE TYPICAL CONCRETE PAD HOUSE INSTALLATION FOR CONDUIT ENTRANCE PLACEMENT. IF SWITCH HEATER POWER GOES DIRECTLY TO SWITCH HEATER, THIS IS ACCEPTABLE.
7. PROVIDE GENERATOR CONNECTION PLUG ON SAME SIDE OF HOUSE AS SIDE DOOR. AT LOCATION SHOWN ON THE EQUIPMENT LAYOUT DRAWINGS.
8. CONTRACTOR SHALL INSTALL A 1/4" NEOPRENE PAD TO PREVENT DIRECT CONTACT OF THE HOUSE STRUCTURE WITH THE CONCRETE PIERS.
9. SITE LAYOUT TO BE APPROVED BY SOUND TRANSIT INCLUDING ACCESS, MAINTENANCE, PARKING AND PORTABLE GENERATOR SPACE RESERVATION.



PLAN



SECTION A -
SCALE: 1/2" = 1'-0"



ELEVATION

PREFAB CONCRETE PIER FOUNDATION 1 -
NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

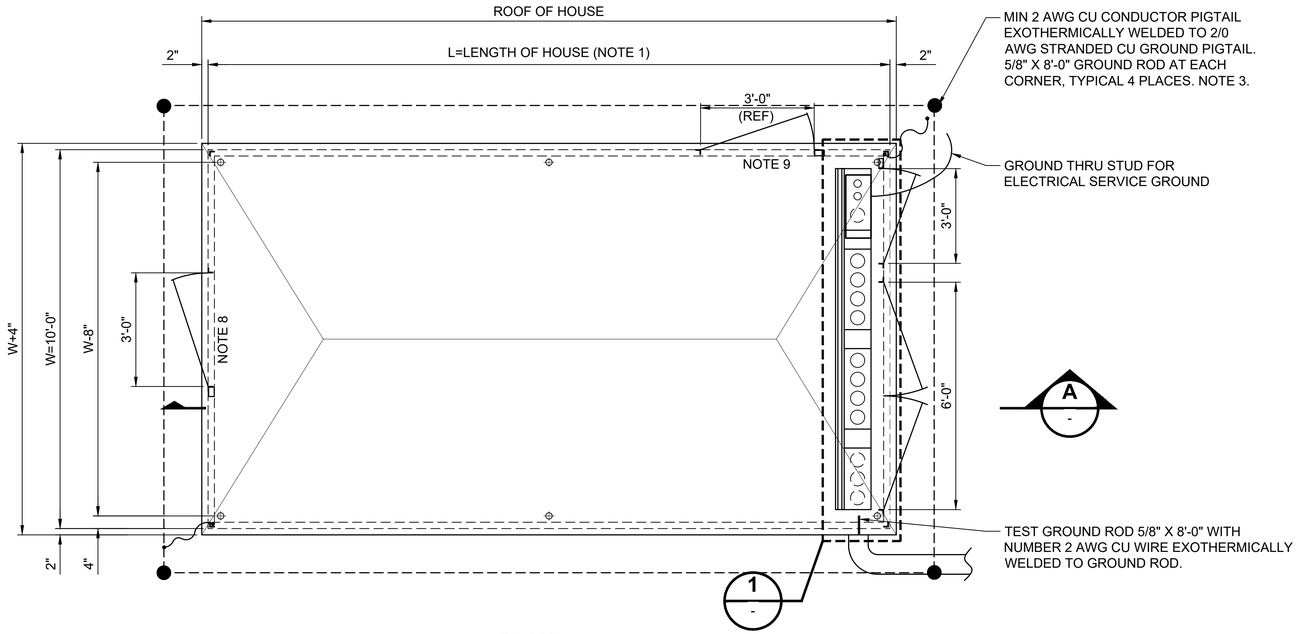
SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JSD200
CONTRACT No.: RTA/LR
DATE: 2/2024

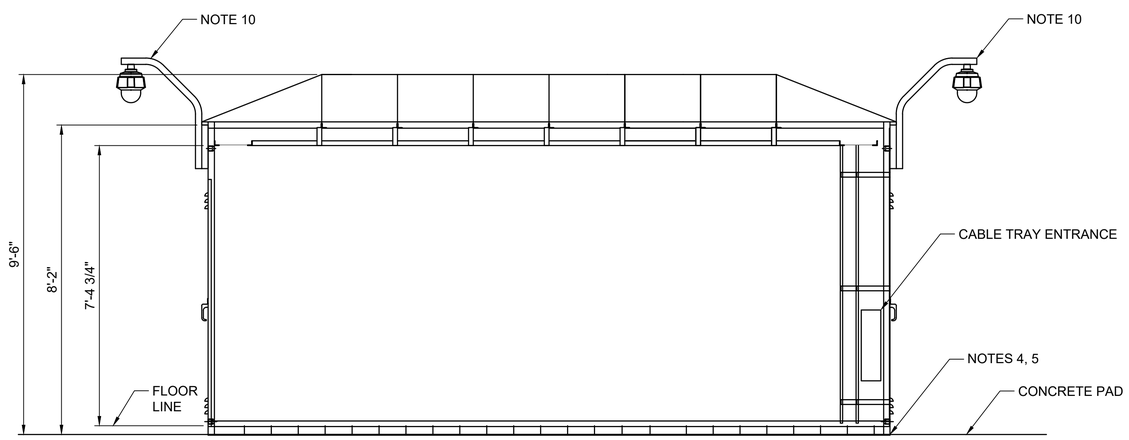
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL SIGNAL HOUSE CONCRETE PIER
INSTALLATION PLAN AND DETAILS

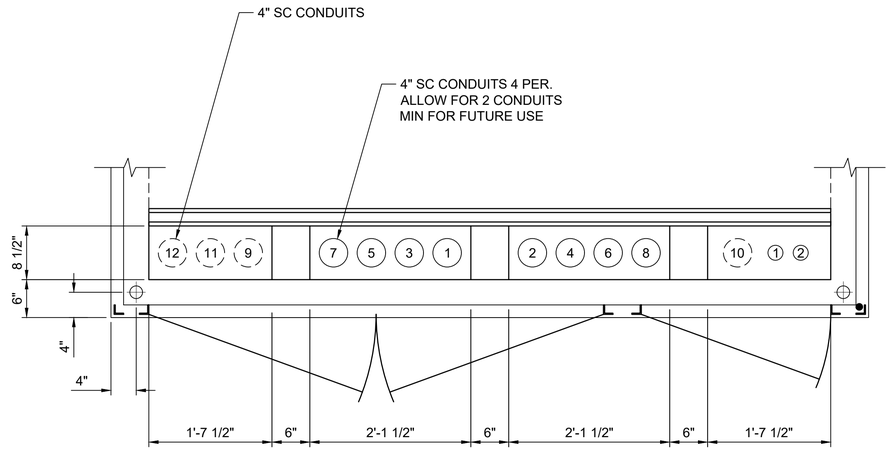
DRAWING No.: **STD-JSD200**
FACILITY ID:
SHEET No.: 2 REV:



PLAN
SCALE: 1/2" = 1'-0"



SECTION A -
SCALE: 1/2" = 1'-0"



DETAIL 1 -
SCALE: 1" = 1'-0"

GENERAL NOTES:

1. SIGNAL HOUSE LENGTH VARIES IN SIZE FROM 20'-0" UP TO 32'-0", BY INCREMENTS OF FOUR FEET. THE ACTUAL SIZE OF THE HOUSE IS DETERMINED BY THE CONTRACTOR.
2. CONTRACTOR SHALL DESIGN, FURNISH AND INSTALL AN ANCHORING SYSTEM TO MOUNT THE SIGNAL HOUSE TO THE CONCRETE PAD TO MEET THE SEISMIC AND WIND LOAD OF THE FINAL HOUSE SIZE.
3. PROVIDE 5' LONG, 2/0 AWG STRANDED CU GROUND PIGTAILS.
4. CONTRACTOR SHALL INSTALL A 1/4" NEOPRENE PAD TO PREVENT DIRECT CONTACT OF THE HOUSE STRUCTURE WITH THE CONCRETE PAD.
5. CONTRACTOR SHALL SEAL THE BASE OF THE HOUSE WITH CAULK TO PREVENT THE INTRUSION OF WATER AND RODENTS THROUGH ANY GAPS CAUSED BY FLAWS IN THE CONCRETE PAD.
6. NUMBER OF SC CONDUITS VARIES BY LOCATION, SEE LAYOUT PLANS FOR AMOUNT.
7. PROVIDE CABLE TRAY TO SURFACE MOUNTED PULL BOX IF TYPICAL CONDUIT STUB UPS ARE NOT FEASIBLE.
8. CENTER DOOR ON OPPOSITE WALL FROM ENTRANCE RACK.
9. PROVIDE GENERATOR CONNECTION PLUG ON SAME SIDE OF HOUSE AS SIDE DOOR.
10. PROVIDE CLOSED CIRCUIT CAMERA COVERAGE AT ENTRANCE DOORS.
11. SITE LAYOUT TO BE APPROVED BY SOUND TRANSIT INCLUDING ACCESS, MAINTENANCE, PARKING AND PORTABLE GENERATOR.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JSD201
CONTRACT No.: RTA/LR
DATE: 2/2024

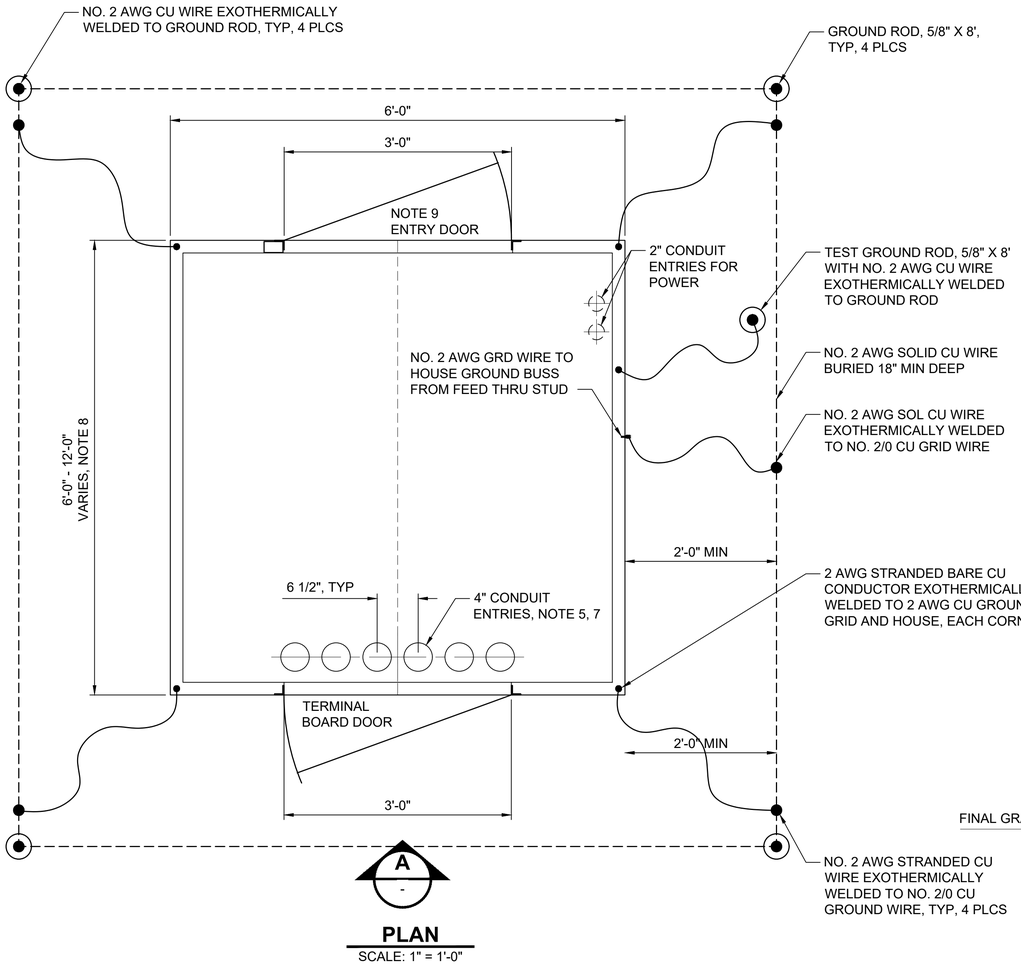
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL SIGNAL HOUSE CONCRETE SLAB INSTALLATION PLAN AND DETAILS

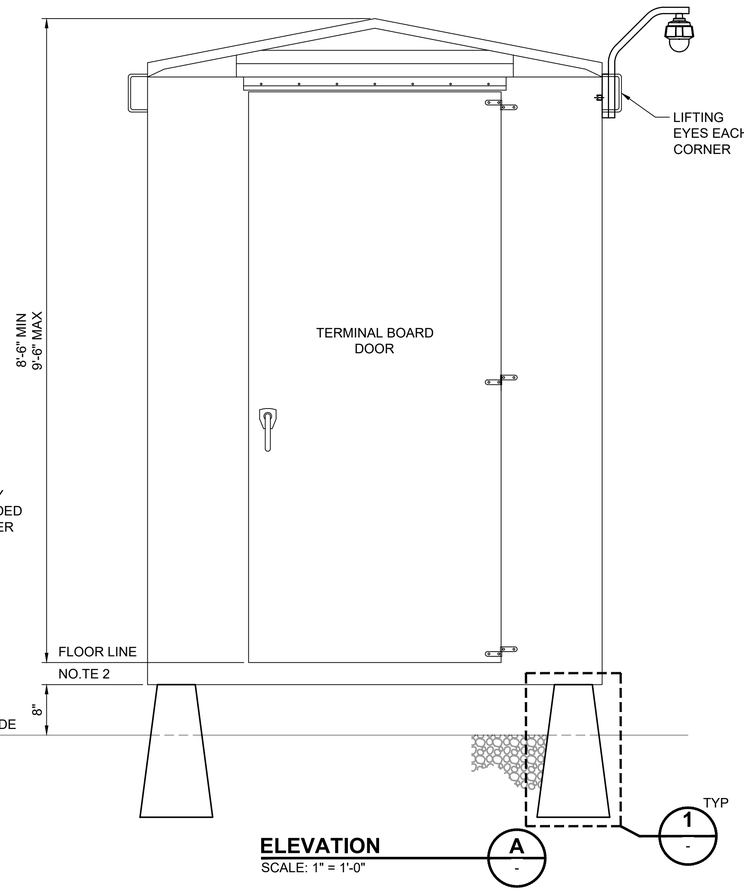
DRAWING No.: **STD-JSD201**
FACILITY ID:
SHEET No.: 3
REV:

GENERAL NOTES:

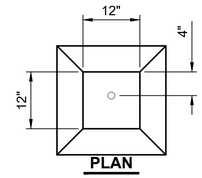
1. CONTRACTOR SHALL FURNISH AND INSTALL FOUR (4) PREFAB CONCRETE PIER FOUNDATIONS, SIZED FOR CIVIL REQUIREMENTS.
2. BOTTOM OF HOUSE SHALL BE 8" ABOVE FINAL GRADE.
3. AT LOCATIONS THAT THE CROSSING HOUSE IS INSTALLED ON AN EXISTING CONCRETE SLAB PROVIDE A HOUSE WITH AN INTEGRATED HOUSE FOUNDATION SYSTEM AND CONCRETE EPOXY ANCHORS SIZED FOR CIVIL REQUIREMENTS.
4. PROVIDE NEOPRENE PAD FOR MOUNTING ISOLATION.
5. NUMBER AND SIZE OF SC CONDUITS VARIES BY LOCATION, SEE LAYOUT PLAN FOR AMOUNT.
6. PROVIDE ANCHORS DRILLED INTO CONCRETE FOR SECURING MOUNTING FRAME. PRIOR TO DRILLING INTO CONCRETE, PERFORM SCAN TO LOCATE AND AVOID REBAR PER SPEC. SECTION 03 15 25 ANCHORAGE TO CONCRETE.
7. STUB UP AND CAP ALL CONDUITS INTO HOUSE.
8. HOUSE SIZE SHOWN IS MINIMUM.
9. CLOSED CIRCUIT CAMERA COVERAGE AT ENTRANCE DOOR OF GATED CROSSING HOUSES.



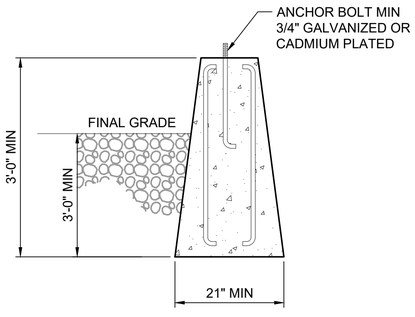
PLAN
SCALE: 1" = 1'-0"



ELEVATION
SCALE: 1" = 1'-0"

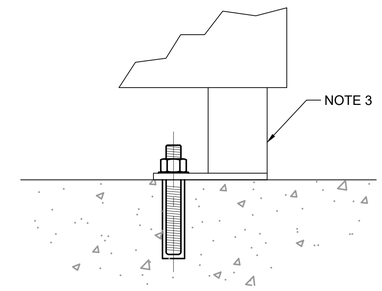


PLAN



ELEVATION

PREFAB CONCRETE PIER FOUNDATION 1A
NTS



INTEGRATED HOUSE FOUNDATION 1B
NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JSD202
CONTRACT No.: RTA/LR
DATE: 2/2024

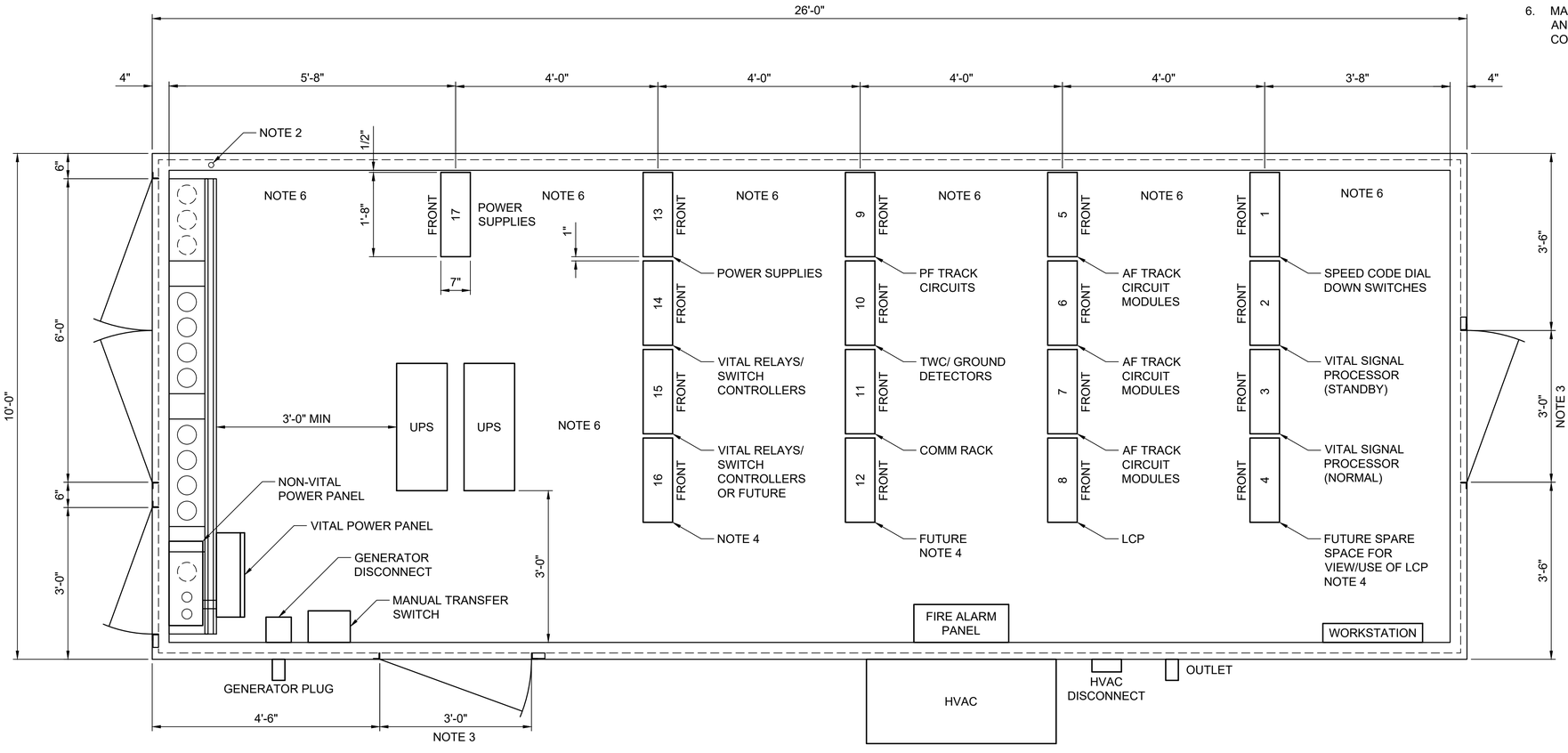
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL GRADE CROSSING HOUSE
PLAN AND DETAILS

DRAWING No.: STD-JSD202
FACILITY ID:
SHEET No.: 1
REV:

GENERAL NOTES:

1. SEE TYPICAL SIGNAL HOUSE, SIGNAL POWER DISTRIBUTION PLAN, FOR SIGNAL LINE DIAGRAM OF HOUSE POWER.
2. RADIO ANTENNA, PROVIDE PROVISIONS FOR A MAST, 10'-0" ABOVE ROOF LINE OF SIGNAL HOUSE, AND ANTENNA COAX CABLE ENTRANCE. BOND ANTENNA MAST TO HOUSE GROUNDING STUD.
3. PROVIDE PROVISIONS FOR CLOSED CIRCUIT CAMERA COVERAGE AT ENTRANCE DOORS, COORDINATE WITH COMMUNICATIONS CONTRACTOR FOR LOCATIONS.
4. PROVIDE SPACE FOR A MINIMUM OF 2 ADDITIONAL RACKS. AT END OF LINE PROVIDE ADDITIONAL SPACE.
5. RACK ASSIGNMENTS AND DIMENSIONS SHOWN MAY ADJUST TO FIT ACTUAL EQUIPMENT PROVIDED PROPOSED LAYOUT FURNISHES EQUIPMENT MAINTAINER ACCESS AND ELECTRICAL CLEARANCE.
6. MAINTAIN 30" MINIMUM WORKING CLEARANCE BETWEEN RACKS AND/OR EQUIPMENT ONCE ALL INSTALLED EQUIPMENT AND CONNECTIONS ARE IN PLACE.



10'-0" x 26'-0" SIGNAL HOUSE

SCALE: 3/4" = 1'-0"

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATES
0	8/2017	----	----	----	GUIDANCE DRAWINGS

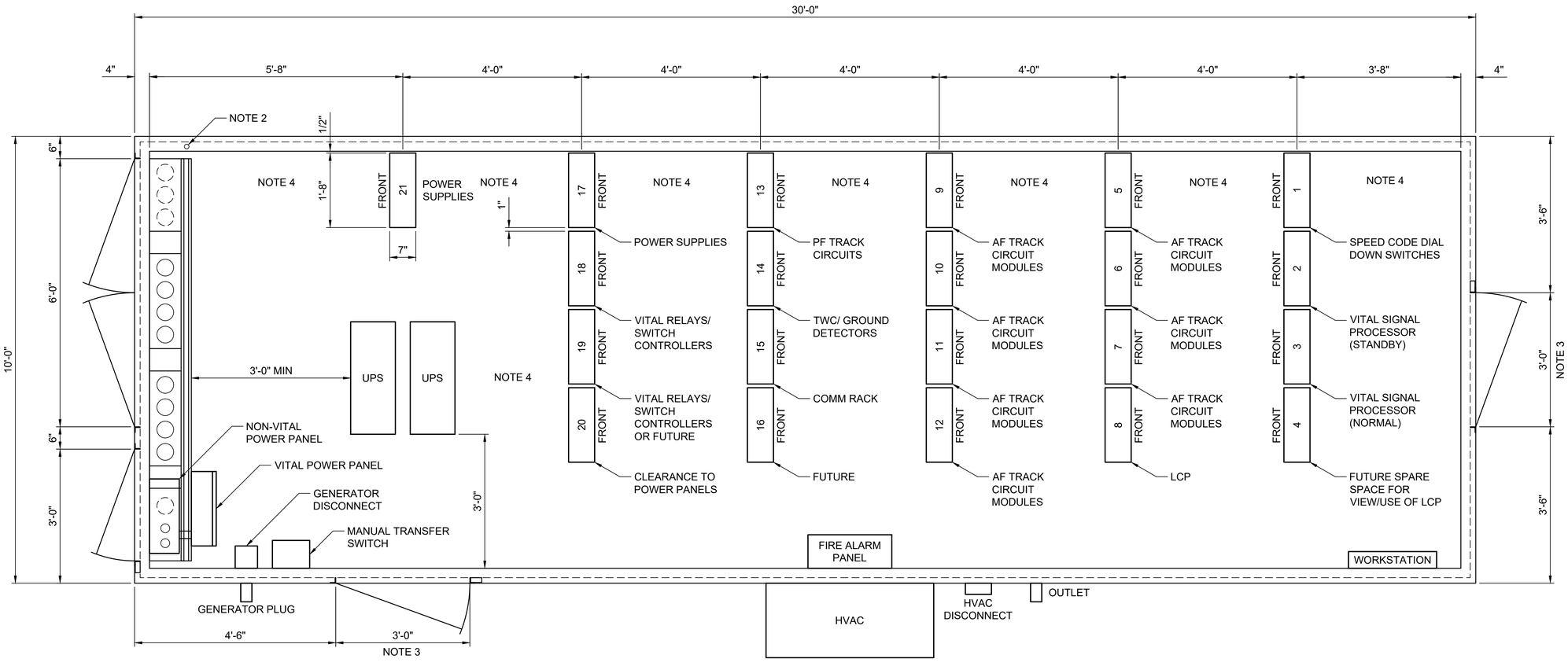
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JSD203
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
SIGNAL HOUSE EQUIPMENT LAYOUT
(10X26)

DRAWING No.: **STD-JSD203**
FACILITY ID:
SHEET No.: 3
REV:

GENERAL NOTES:

1. SEE TYPICAL SIGNAL HOUSE, SIGNAL POWER DISTRIBUTION PLAN, STD-JSD208 FOR SIGNAL LINE DIAGRAM OF HOUSE POWER AND OTHER DETAILS.
2. RADIO ANTENNA, PROVIDE PROVISIONS FOR A MAST, 10'-0" ABOVE ROOF LINE OF SIGNAL HOUSE, AND ANTENNA COAX CABLE ENTRANCE. BOND ANTENNA MAST TO HOUSE GROUNDING STUD AND BIDIRECTIONAL AMPLIFIER.
3. CLOSED CIRCUIT CAMERA COVERAGE AT ENTRANCE DOORS.
4. MAINTAIN 30" MINIMUM WORKING CLEARANCE BETWEEN RACKS AND/OR EQUIPMENT ONCE ALL INSTALLED EQUIPMENT AND CONNECTIONS ARE IN PLACE.



10'-0" x 30'-0" SIGNAL HOUSE

SCALE: 3/4" = 1'-0"

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JSD204
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
SIGNAL HOUSE EQUIPMENT LAYOUT
(10X30)

DRAWING No.: **STD-JSD204**
FACILITY ID:
SHEET No.: REV: 3

CONSTRUCTION NOTES:

(1) PANEL SIZE IS 19"W X 20"H.

H 1192 = ROTARY SWITCH

H 1193 = KNOB

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD206
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
TYPICAL SLOW ORDER PANEL FACEPLATE

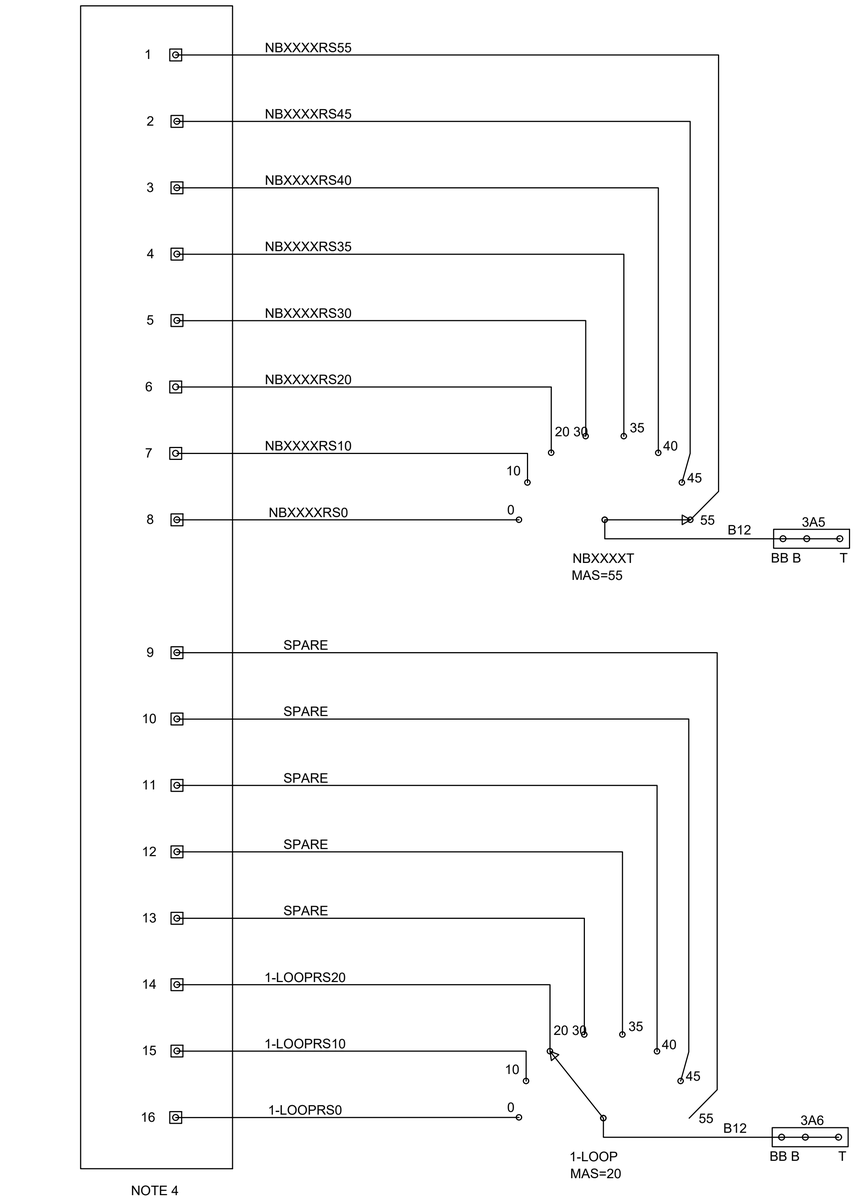
DRAWING No.: **STD-JSD206**
FACILITY ID:
SHEET No.: REV: 0

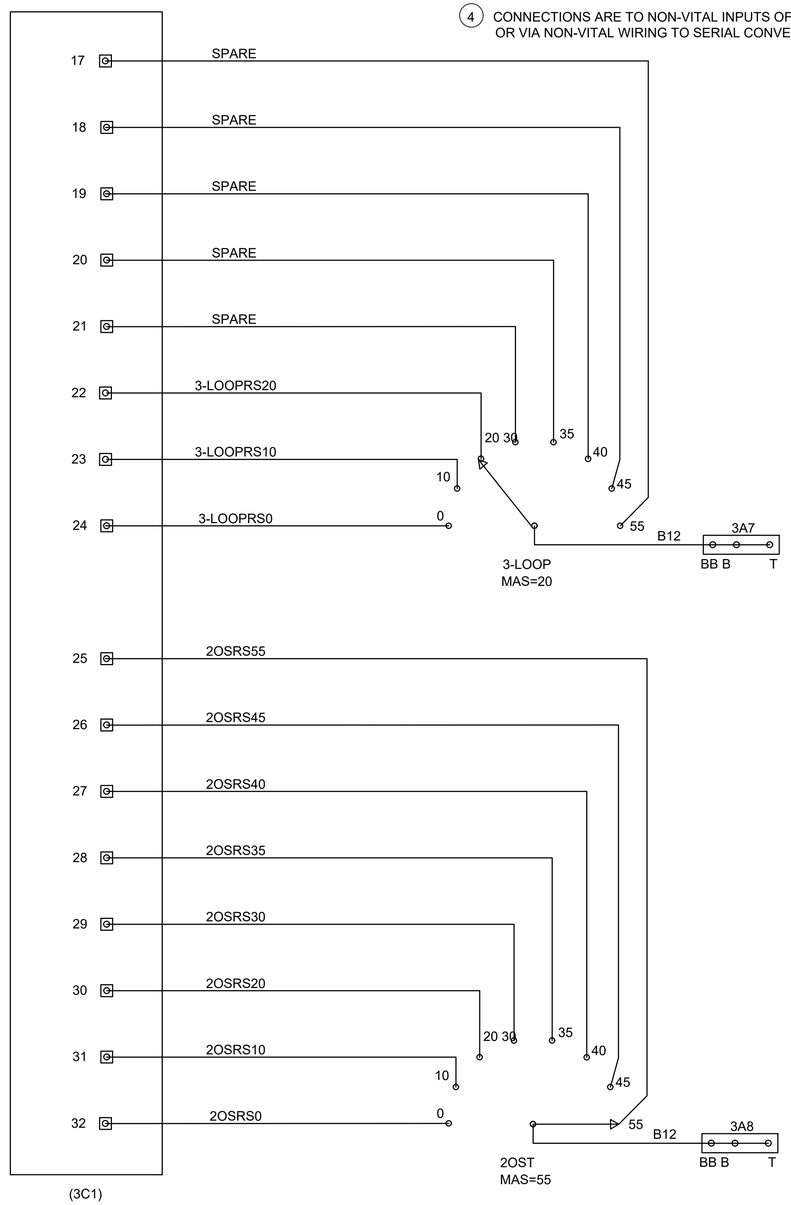
03/21/24 | 12:46 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD206.DWG

CONSTRUCTION NOTES:

1. ALL ROTARY SWITCH WIRING ON THIS SHEET TO BE #22 AWG UNLESS OTHERWISE NOTED.
2. ALL BUNGALOW WIRING ON THIS SHEET TO BE #16 AWG UNLESS OTHERWISE NOTED.
3. MECHANICAL SWITCH STOP TO BE SET AT MAS FOR EACH SLOW ORDER SWITCH.
4. CONNECTIONS ARE TO NON-VITAL INPUTS OF THE SIGNAL PROCESSOR EITHER DIRECTLY OR VIA NON-VITAL WIRING TO SERIAL CONVERSION DEVICE.

NV6400 MODULE #2 INPUTS 1-32 (TOP)





No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD207
CONTRACT No.: RTA/LR
DATE: 2/2024

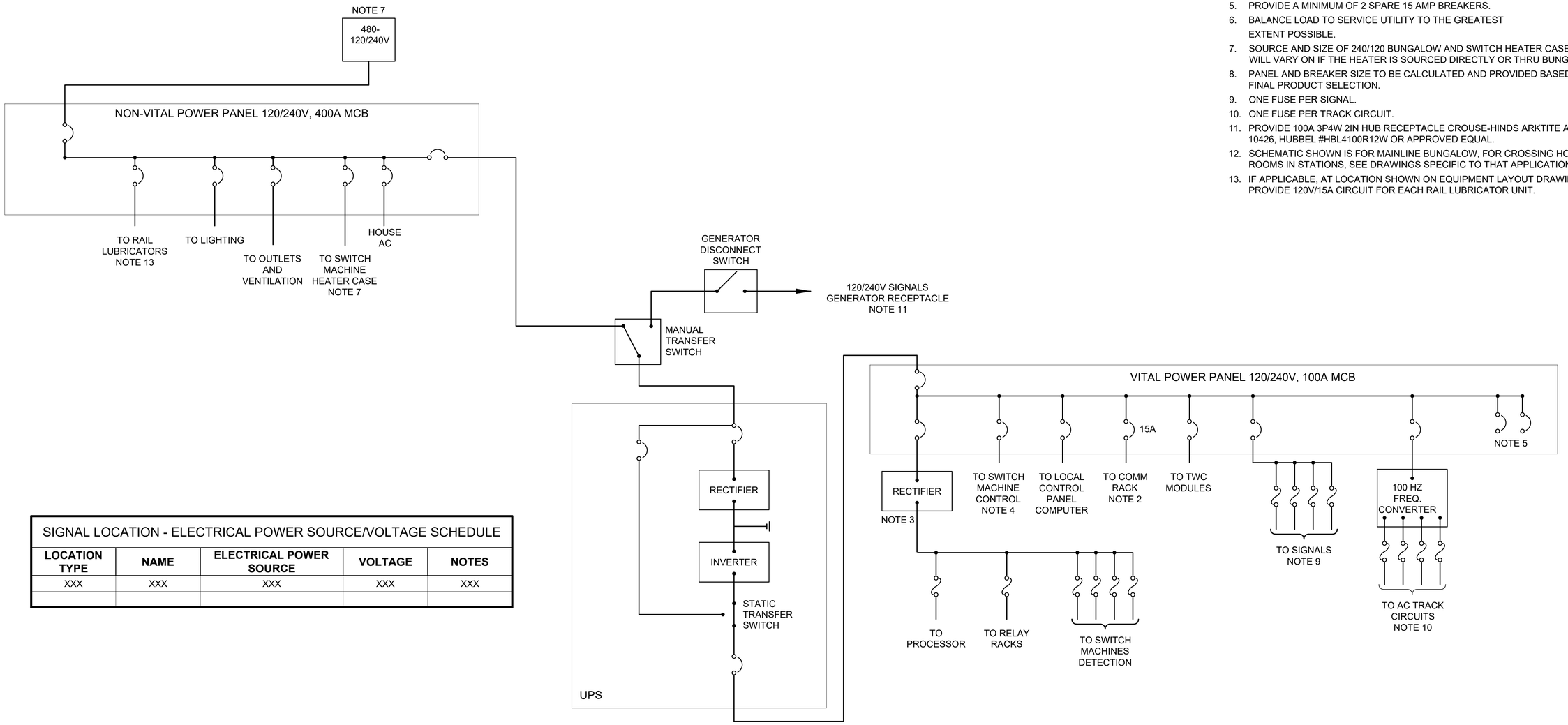
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL SLOW ORDER SWITCH CIRCUITS

DRAWING No.: **STD-JSD207**
FACILITY ID:
SHEET No.: REV: 0

GENERAL NOTES:

1. THE DESIGN SHOWN IS CONCEPTUAL ONLY. THE ACTUAL DESIGN MUST REFLECT THE TYPES AND QUANTITIES OF MATERIAL FOR AREA CONTROLLED BY THIS SIGNAL BUNGALOW.
2. PROVIDE 15 AMP BREAKER TO COMM RACK. USE 600 WATTS TO CALCULATE LOAD IN BUNGALOW.
3. PROVIDE QUANTITY AND VOLTAGE OF RECTIFIERS AS NECESSARY. PROVIDE ONE BREAKER FOR EACH RECTIFIER. MAIN RECTIFIER FOR LOGIC SHALL BE REDUNDANT.
4. ONE CIRCUIT BREAKER FOR EACH SWITCH OR SWITCH PAIR.
5. PROVIDE A MINIMUM OF 2 SPARE 15 AMP BREAKERS.
6. BALANCE LOAD TO SERVICE UTILITY TO THE GREATEST EXTENT POSSIBLE.
7. SOURCE AND SIZE OF 240/120 BUNGALOW AND SWITCH HEATER CASE POWER WILL VARY ON IF THE HEATER IS SOURCED DIRECTLY OR THRU BUNGALOW.
8. PANEL AND BREAKER SIZE TO BE CALCULATED AND PROVIDED BASED ON FINAL PRODUCT SELECTION.
9. ONE FUSE PER SIGNAL.
10. ONE FUSE PER TRACK CIRCUIT.
11. PROVIDE 100A 3P4W 2IN HUB RECEPTACLE CROUSE-HINDS ARKTITE AREA 10426, HUBBEL #HBL4100R12W OR APPROVED EQUAL.
12. SCHEMATIC SHOWN IS FOR MAINLINE BUNGALOW, FOR CROSSING HOUSE OR ROOMS IN STATIONS, SEE DRAWINGS SPECIFIC TO THAT APPLICATION.
13. IF APPLICABLE, AT LOCATION SHOWN ON EQUIPMENT LAYOUT DRAWING, PROVIDE 120V/15A CIRCUIT FOR EACH RAIL LUBRICATOR UNIT.



SIGNAL LOCATION - ELECTRICAL POWER SOURCE/VOLTAGE SCHEDULE				
LOCATION TYPE	**NAME**	**ELECTRICAL POWER SOURCE**	**VOLTAGE**	**NOTES**
XXX	XXX	XXX	XXX	XXX

SIGNAL POWER DISTRIBUTION PLAN

NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

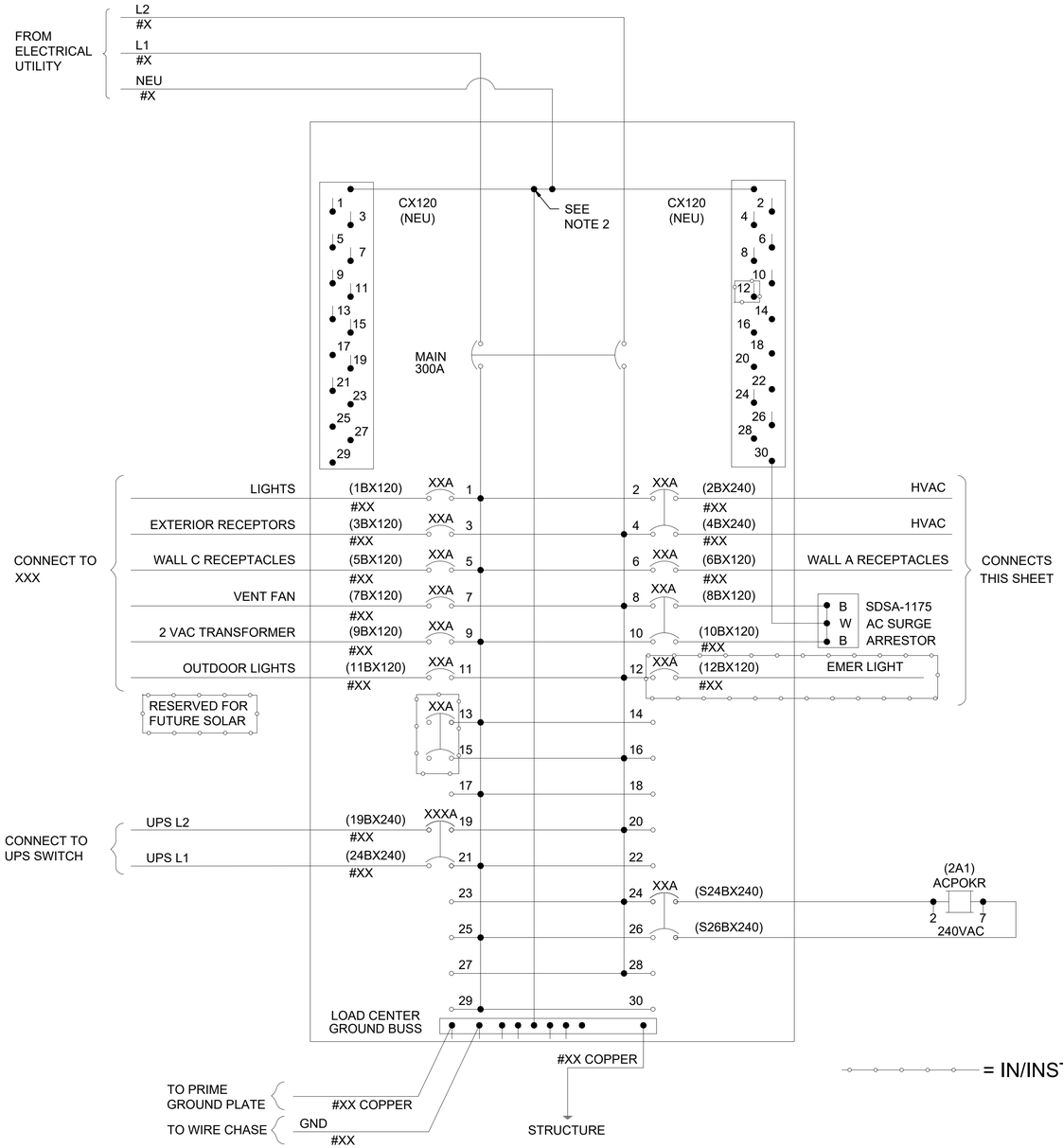
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD208
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL SIGNAL HOUSE
SIGNAL POWER DISTRIBUTION PLAN

DRAWING No.: **STD-JSD208**
FACILITY ID:
SHEET No.: 2 REV:

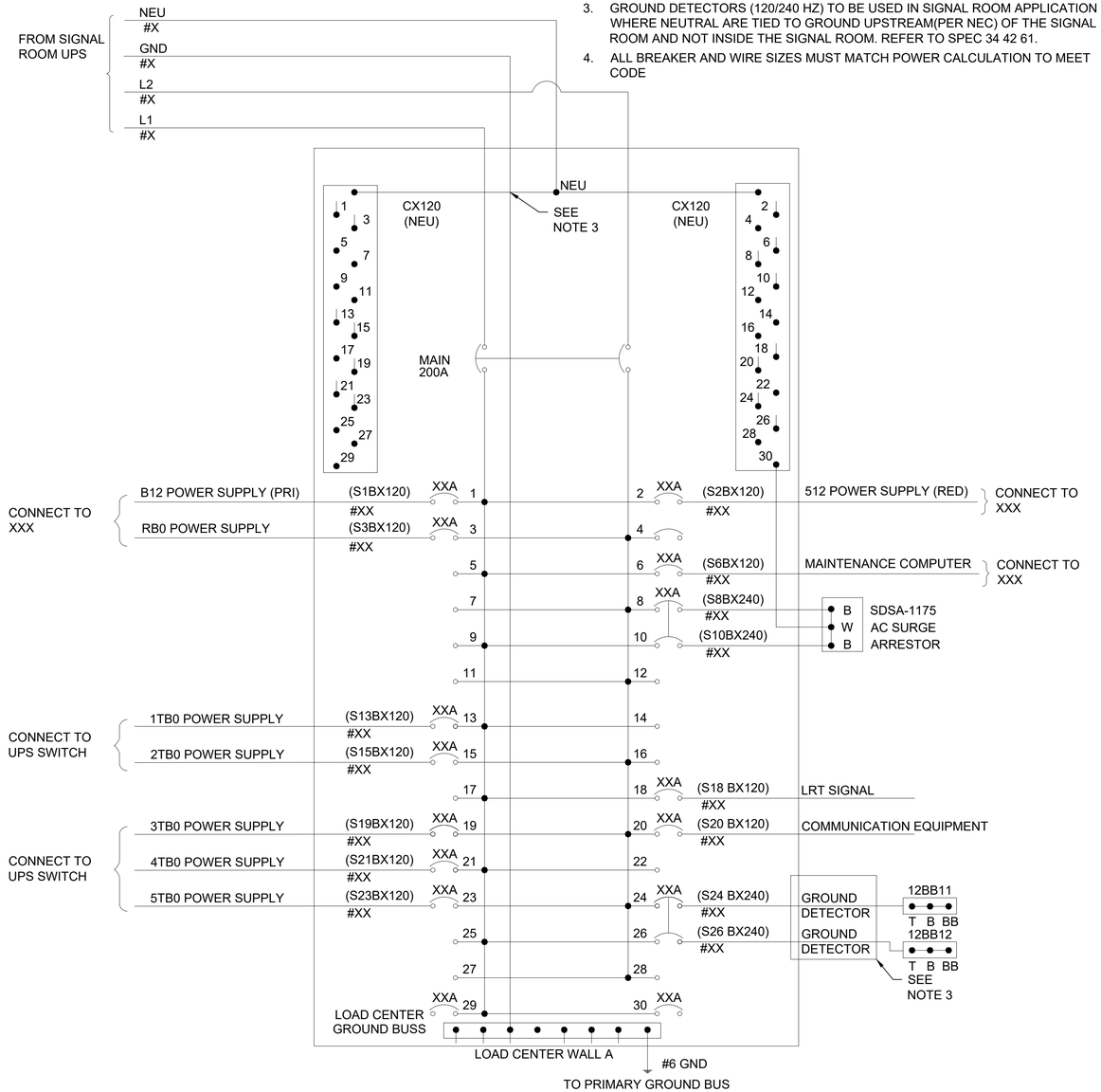


MAIN AC POWER DISTRIBUTION FOR SIGNAL BUNGALOW

NTS

CONSTRUCTION NOTES:

1. ALL BUNGALOW WIRING ON THIS SHEET TO BE #12 UNLESS OTHERWISE NOTED.
2. NEUTRAL TO BE BONDED TO LOAD CENTER GROUND BUSS WITH A SCREW ON STRAP SUPPLIED BY THE EQUIPMENT MANUFACTURER PER 2020 NCC 24 (x).
3. GROUND DETECTORS (120/240 HZ) TO BE USED IN SIGNAL ROOM APPLICATION WHERE NEUTRAL ARE TIED TO GROUND UPSTREAM(PER NEC) OF THE SIGNAL ROOM AND NOT INSIDE THE SIGNAL ROOM. REFER TO SPEC 34 42 61.
4. ALL BREAKER AND WIRE SIZES MUST MATCH POWER CALCULATION TO MEET CODE



AC POWER DISTRIBUTION FOR SIGNAL ROOM

NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD209
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

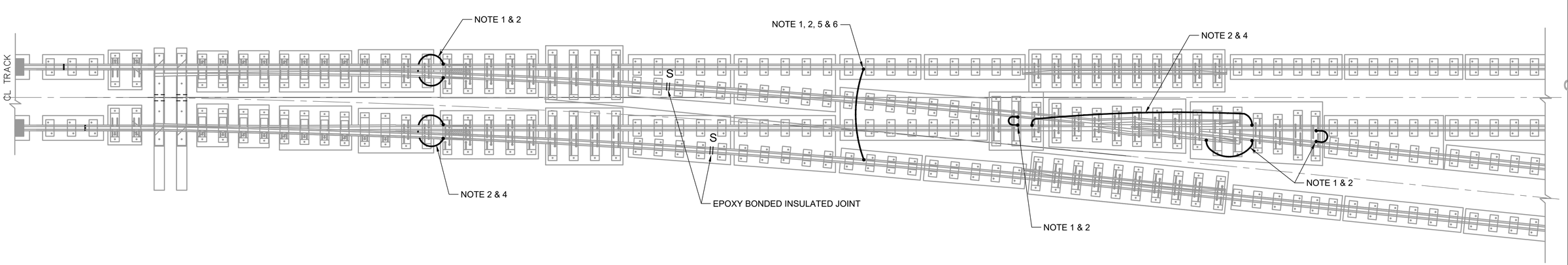
SIGNALS
TYPICAL AC POWER DISTRIBUTION

DRAWING No.: **STD-JSD209**
FACILITY ID:
SHEET No.: REV: 0

03/21/24 | 12:47 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD209.DWG

GENERAL NOTES:

1. (2) 250 KCMIL EXTRA FLEX CEMBRE TYPE BOLTED CONNECTION (OR APPROVED EQUAL) TO WEB OF RAIL AT NEUTRAL AXIS, NOT LESS THAN 4" APART.
2. DRESS CABLES CLOSE TO RAIL.
3. FOR TURNOUTS IN DIRECT FIXATION, ROUTE CABLES THROUGH PLINTH BREAKS WHEREVER POSSIBLE. FOR TURNOUTS IN BALLASTED TRACK, ROUTE CABLES ON TOP OF BALLAST AND TIES.
4. (2) 500 KCMIL EXTRA FLEX CEMBRE TYPE BOLTED CONNECTION (OR APPROVED EQUAL) TO WEB OF RAIL AT NEUTRAL AXIS AT EACH STOCK RAIL TO SWITCH RAIL BONDING OF THE NEGATIVE RETURN RAIL, NOT LESS THAN 4" APART.
5. BOND CONNECTIONS TO RAIL MUST BE PLACED 6" MINIMUM FROM RAIL WELDS.
6. BONDING NOT REQUIRED AT ALL LOCATIONS, SEE EQUIPMENT LAYOUT PLANS.
7. ALL NON-INSULATED MECHANICAL JOINTS SHALL BE BONDED.



TYPICAL TURNOUT PLAN

NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEM DIRECTIVE DRAWINGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD300
CONTRACT No.: RTA/LR
DATE: 2/2024

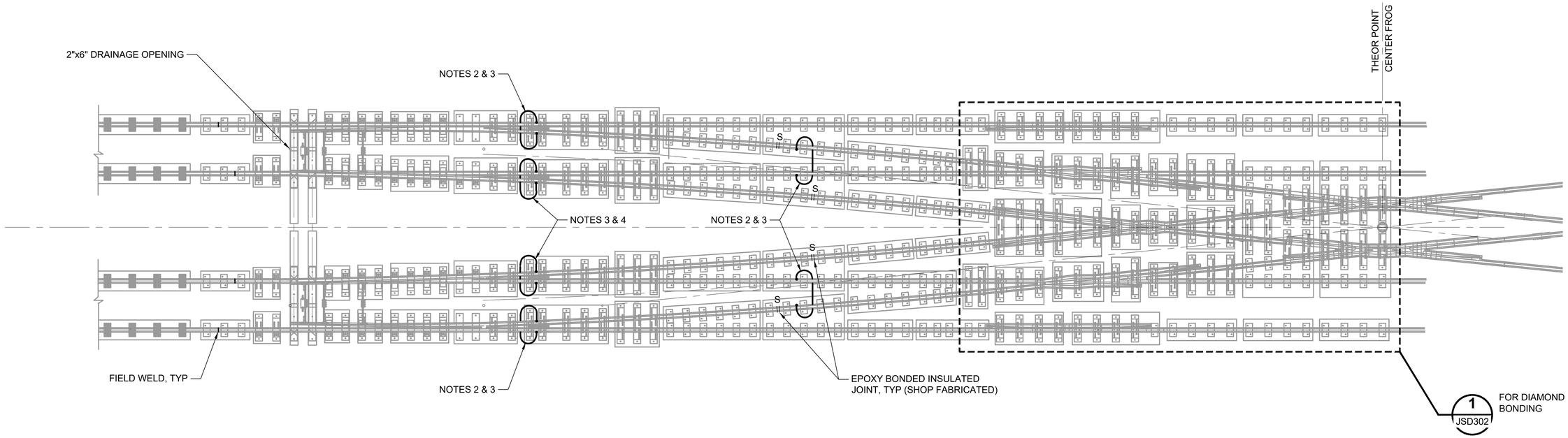
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL TURNOUT TRACTION ELECTRIFICATION
SIGNAL BONDING

DRAWING No.: **STD-JSD300**
FACILITY ID:
SHEET No.: 2
REV:

GENERAL NOTES:

1. BOND CONNECTIONS TO RAIL MUST BE PLACED 6" MINIMUM FROM RAIL WELDS.
2. (2) 250 KCMIL EXTRA FLEX CEMBRE TYPE BOLTED CONNECTION (OR APPROVED EQUAL) TO WEB OF RAIL AT NEUTRAL AXIS.
3. DRESS CABLES CLOSE TO RAIL.
4. (2) 500 KCMIL EXTRA FLEX CEMBRE TYPE BOLTED CONNECTION (APPROVED EQUAL) TO WEB OF RAIL AT NEUTRAL AXIS AT EACH STOCK RAIL TO SWITCH RAIL BONDING OF THE NEGATIVE RETURN RAIL.
5. BACKGROUND IS FOR A #10 CROSSOVER BONDING IS THE SAME FOR ALL CROSSOVER SIZES.
6. ONLY SPECIAL TRACKWORK BONDING SHOWN. LAYOUT DRAWINGS AND LOCATIONS 1 XT TRACK CIRCUIT JUMPER INSULATED JOINT LOCATIONS AND OTHER ADDITIONAL REQUIREMENTS TO BE COORDINATED AND DEVELOPED.



DOUBLE CROSSOVER PLAN

NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEM DIRECTIVE DRAWINGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

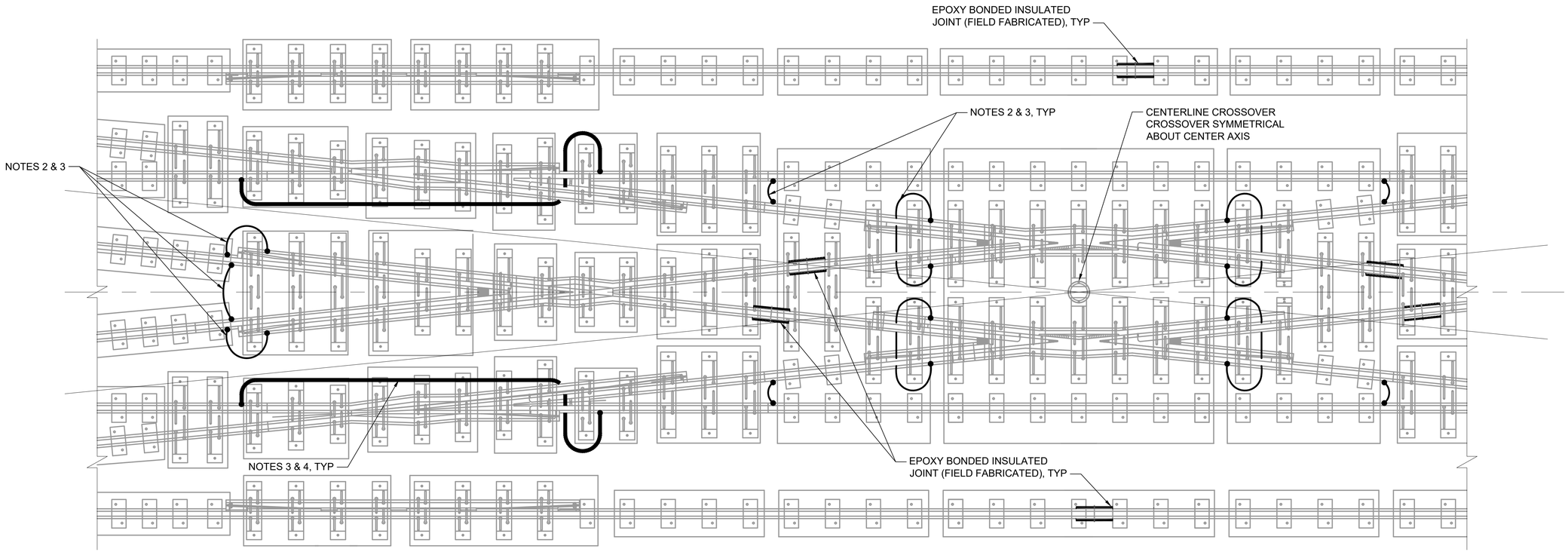
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JSD301
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
TYPICAL DOUBLE CROSSOVER BONDING

DRAWING No.: **STD-JSD301**
FACILITY ID:
SHEET No.: 2
REV:

GENERAL NOTES:

1. BOND CONNECTIONS TO RAIL MUST BE PLACED 6" MINIMUM FROM RAIL WELDS.
2. (2) 250 KCMIL EXTRA FLEX CEMBRE TYPE BOLTED CONNECTION (OR APPROVED EQUAL) TO WEB OF RAIL AT NEUTRAL AXIS.
3. DRESS CABLES CLOSE TO RAIL.
4. (2) 500 KCMIL EXTRA FLEX CEMBRE TYPE BOLTED CONNECTION (OR APPROVED EQUAL) TO WEB OF RAIL AT NEUTRAL AXIS AT EACH STOCK RAIL TO SWITCH RAIL BONDING OF THE NEGATIVE RETURN RAIL.
5. BACKGROUND IS FOR A #10 DIAMOND BONDING IS THE SAME FOR ALL SIZES.
6. ONLY SPECIAL TRACKWORK BONDING SHOWN. LAYOUT DRAWINGS AND LOCATIONS FOR 1-3XT TRACK CIRCUIT JUMPER INSULATED JOINT LOCATIONS AND OTHER ADDITIONAL REQUIREMENTS TO BE COORDINATED AND DEVELOPED.



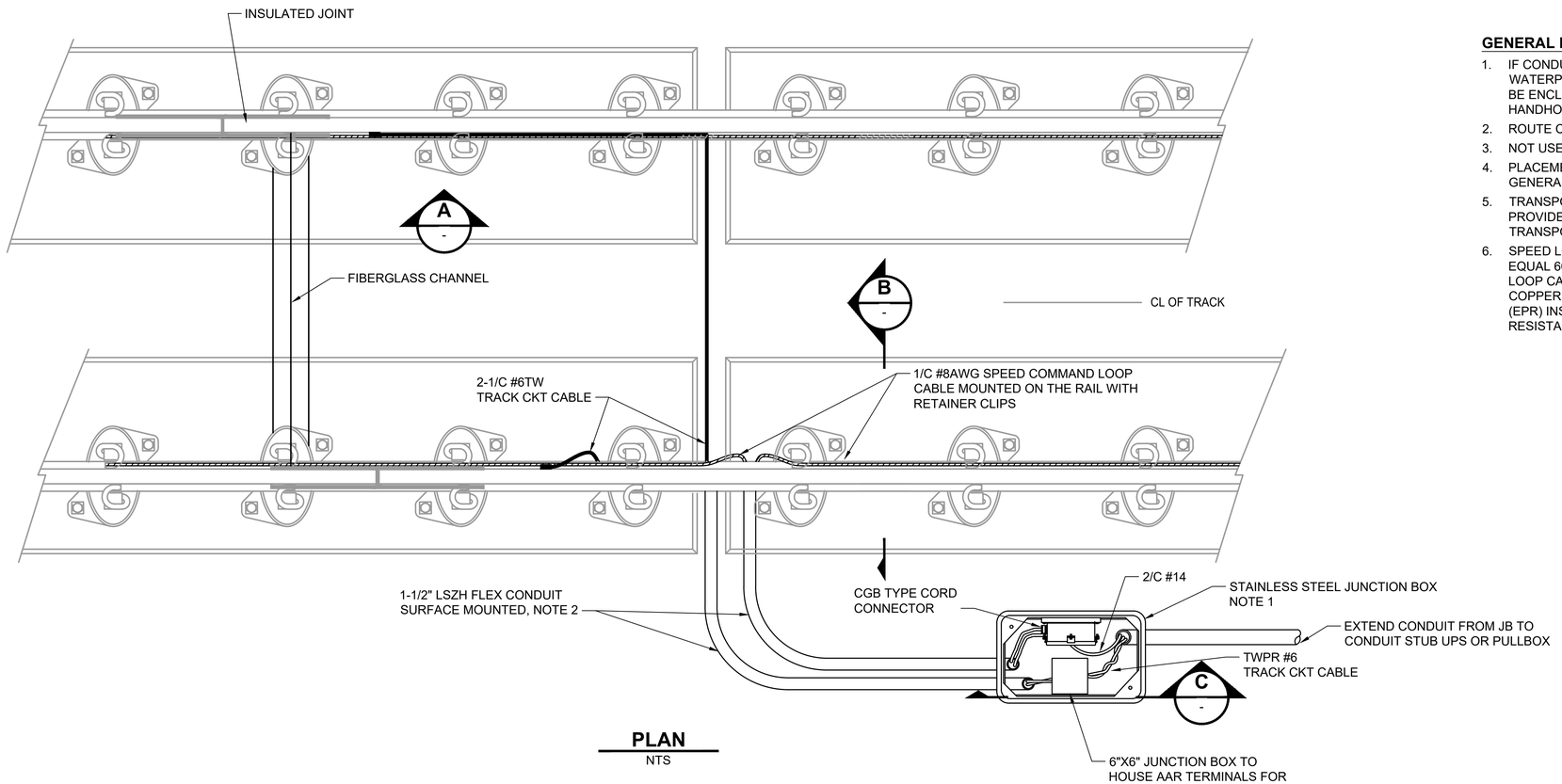
NO. 10 DIAMOND CROSSING PLAN (1 / STD-JSD301)
SCALE: 3/8" = 1'-0"

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JSD302
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
TYPICAL DIAMOND CROSSOVER

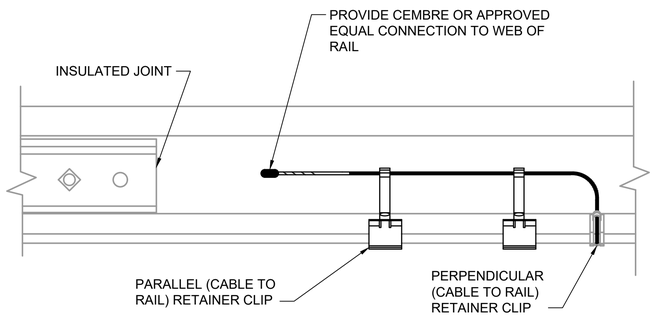
DRAWING No.: **STD-JSD302**
FACILITY ID:
SHEET No.: 1
REV:



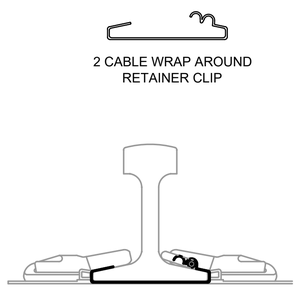
PLAN
NTS

GENERAL NOTES:

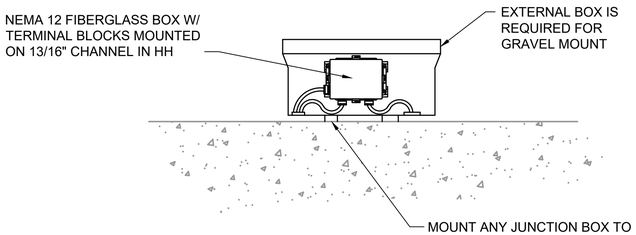
1. IF CONDUITS FROM TRACKWAY AND DUCTBANK DO NOT WATERPROOF CONNECT INTO THE JB, THEN THEY SHALL BE ENCLOSED IN A STAINLESS STEEL BOX ON INVERT OR IN HANDHOLE.
2. ROUTE CONDUITS THRU PLINTH BREAKS WHEN FEASIBLE.
3. NOT USED.
4. PLACEMENT AND QUANTITY OF LOOPS IS SHOWN FOR GENERAL INFORMATION.
5. TRANSPOSE LOOP WIRES APPROXIMATELY EVERY 50' AND PROVIDE AN ODD NUMBER OF EQUALLY SPACED TRANSPOSITIONS.
6. SPEED LOOP CABLE TO BE USED: DRAKA OR APPROVED EQUAL 600 VOLT SINGLE CONDUCTOR SPEED COMMAND LOOP CABLE; 1/C #8 AWG CLASS C (19 STRAND), TINNED COPPER (PER ASTM B 33). ETHYLENE PROPYLENE RUBBER (EPR) INSULATION, WITH AN OVERALL BLACK, UV RESISTANT, POLYURETHANE JACKET, 600 V.



ELEVATION A
NTS



SECTION B
NTS



SECTION C
NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

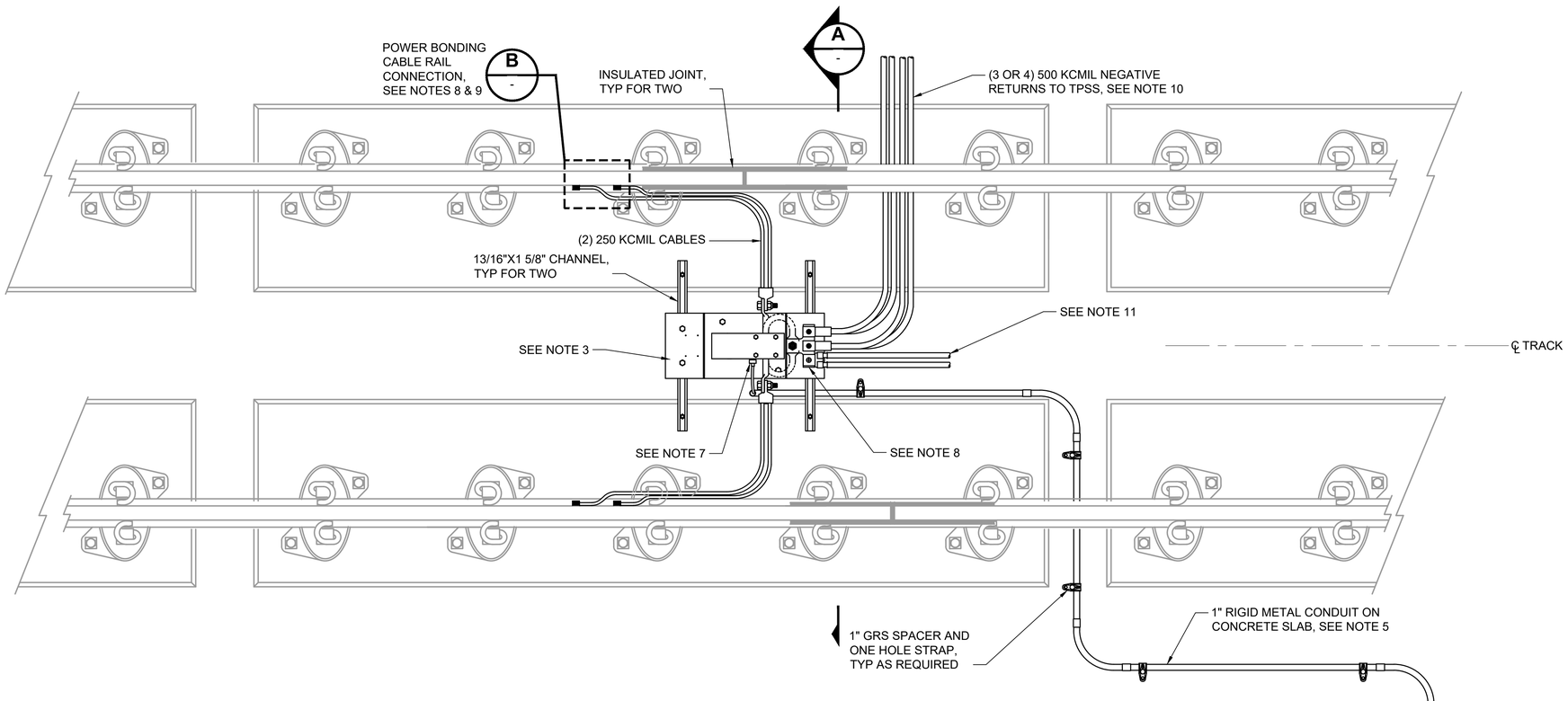
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD303
CONTRACT No.: RTA/LR
DATE: 2/2024

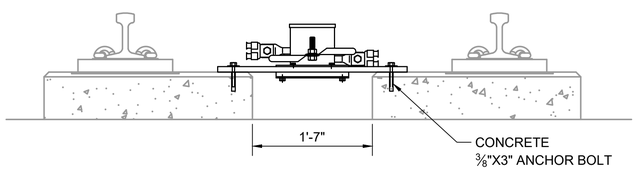
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL TRACK CIRCUIT AND SPEED COMMAND LOOP INSTALLATION LAYOUT

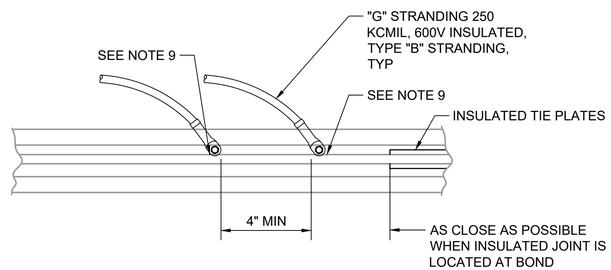
DRAWING No.: **STD-JSD303**
FACILITY ID:
SHEET No.: REV: 2



PLAN
SCALE: CUSTOM



SECTION A
SCALE: NTS



CABLE CONNECTION TO RAIL B
SCALE: NTS

GENERAL NOTES:

1. MOUNT IMPEDANCE BOND TO CONCRETE PLINTHS IN DF AREAS AND TO TIE WITH STRAPS IN BALLAST AREAS,
2. TOP OF IMPEDANCE BOND ASSEMBLY TO BE ½" MIN BELOW THE TOP OF RAILS.
3. TERMINALS & ELECTRICAL CONNECTION LUGS SHALL BE WIRE BRUSH CLEANED AND COATED WITH A CONDUCTIVE, NON-CORROSIVE, SURFACE COMPOUND IMMEDIATELY BEFORE BEING CONNECTED.
4. DO NOT INSTALL IMPEDANCE BOND CABLES WITHIN 12" OF RAIL WELDS.
5. PROVIDE CONDUIT TO EXTEND FROM HANDHOLE OR STUB UP IN BALLAST AREA TO IMPEDANCE BOND. CONNECTION FROM TRACKWAY TO HANDHOLE OR STUB UP SHALL BE IN AIR HOSE FASTENED TO THE BOTTOM CORNER OF TIE WITH STAINLESS STEEL STRAPS.
6. BEND CABLES NOT LESS THAN 8 INCH RADIUS.
7. WATER TIGHT CONNECTOR.
8. COAT CONNECTION AND UNINSULATED CABLE WITH NO-OX-ID.
9. CEMBRE OR APPROVED EQUAL TYPE RAIL CONNECTIONS SHALL BE WITHIN +/- ½" OF THE NEUTRAL AXIS OF THE RAIL.
10. NEGATIVE RETURN CABLE REQUIREMENTS TO BE DETERMINED BY DISTANCE TO TPSS.
11. CONNECT (2) 500 KCMIL CABLES BETWEEN CENTER TAPS OF IMPEDANCE BONDS ON EACH SIDE OF INSULATED JOINT PAIRS, ALSO TWO 500 KCMIL CABLES TO NEGATIVE RETURN RAIL OF SINGLE RAIL TRACK CIRCUIT.
12. LAYOUT SHOWN IS TYPICAL FOR DF TRACKWORK FOR BALLAST TRACKWORK SPACING REQUIREMENTS STILL APPLY.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWUBGS
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

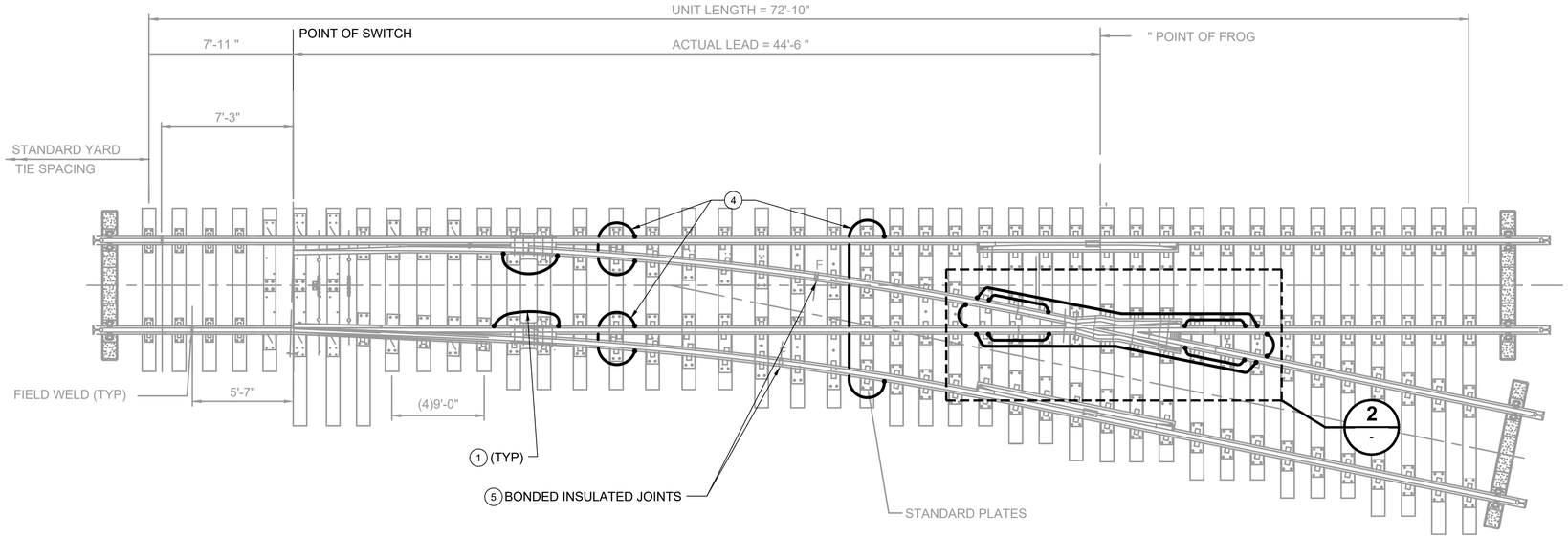
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD304
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL IMPEDANCE BOND INSTALLATION LAYOUT WITH NEGATIVE RETURN

DRAWING No.: **STD-JSD304**
FACILITY ID:
SHEET No.: REV: 2



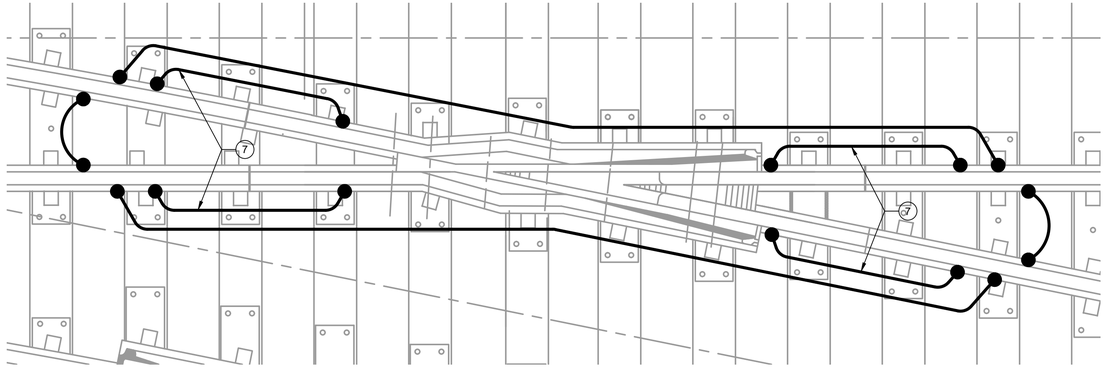
NOTES:

1. ALL RAIL JUMPER CONNECTIONS SHALL BE SINGLE HOLE LUG TO CEMBRE OR EQUIVALENT SINGLE OR DOUBLE POSTS AT RAIL WEB.
2. RAIL HEEL BLOCK JUMPERS SHALL BE DOUBLE 250 KCMIL EXTRA FLEX.
3. FROG BONDING (DETAIL 2) IS SINGLE CONDUCTOR 250 KCMIL FOR SIGNAL FOR SIGNAL RAIL AND 500 KCMIL FOR NEGATIVE RETURN .
4. FOR RAIL TO RAIL BONDING USE EXTRA FLEX DOUBLE 250 KCMIL FOR SIGNAL RAIL AND EXTRA FLEX DOUBLE 500 KCMIL FOR NEGATIVE RETURN.
5. SPECIAL AND ADDITIONAL BONDING MAY BE REQUIRED DUE TO IJ AND TRACK CIRCUIT LAYOUT.
6. DRESS CABLES CLOSE TO RAIL WITHIN GAUGE.
7. THIS BOND NOT REQUIRED IF FROG TO RAIL CONNECTION WELDED.

NO. 5 TURNOUT PLAN

SCALE: 1/4" = 1'-0"

1 / -



YARD FROG BONDING

SCALE: 3/4" = 1'-0"

2 / -

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

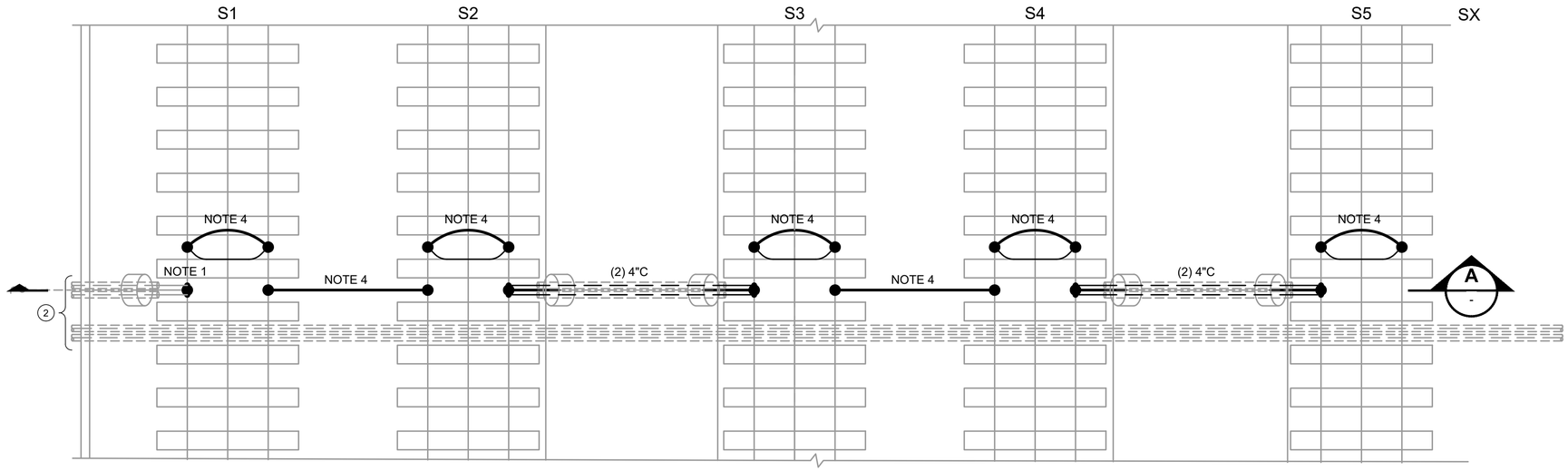
SCALE: AS NOTED
FILENAME: STD-JSD305
CONTRACT No.: RTA/LR
DATE: 2/2024

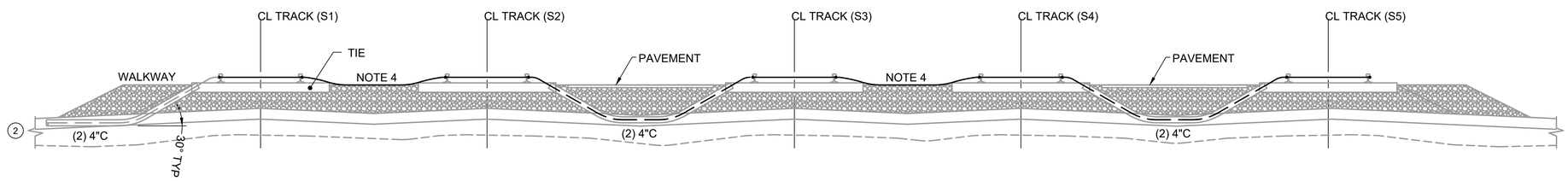
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL NEGATIVE RETURN BONDING
NO. 5 TURNOUT IN BALLASTED TRACK

DRAWING No.: **STD-JSD305**
FACILITY ID:
SHEET No.: REV: 0

03/21/24 | 12:49 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD305.DWG





SECTION A -
SCALE: NTS

NOTES:

1. PROVIDE CROSSBONDS OF 2-500 KCMIL USING SINGLE OR DOUBLE CEMBRE POSTS TO WEB OF RAIL.
2. OPTIONALLY THE CROSSBONDS MAY BE INCORPORATED INTO A TRACTION POWER SUBSTATION NEGATIVE RETURN CONNECTION.
3. STORAGE TRACKS HAVE NO TRACK CIRCUITS.
4. CROSSBONDS BETWEEN RAILS WITH NO OBSTRUCTING PAVEMENT CAN FASTEN TO TIE OR LAY ON BALLAST.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JSD306
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

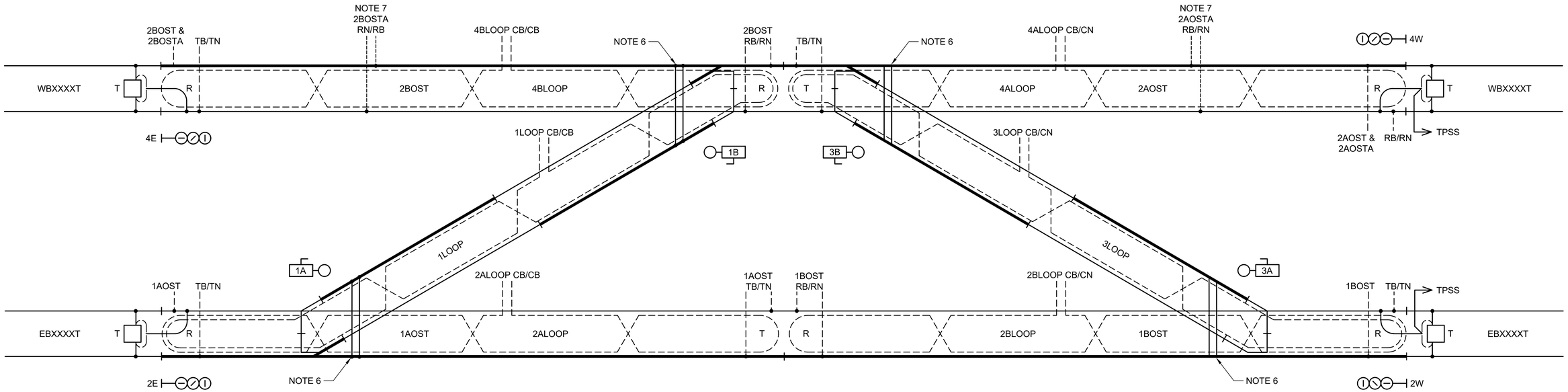
SIGNALS
TYPICAL YARD STORAGE TRACK
CROSSBONDS INSTALLATION

DRAWING No.: **STD-JSD306**
FACILITY ID:
SHEET No.:
REV: 0

03/21/24 | 12:49 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD306.DWG

NOTES:

1. PLACEMENT AND QUANTITY OF LOOPS IS SHOWN FOR GENERAL INFORMATION.
2. TRANSPOSE LOOP WIRES APPROXIMATELY EVERY 50'.
3. PROVIDE AN ODD NUMBER OF EQUALLY SPACED TRANSPOSITIONS.
4. LOOPS ARE TO EXTEND TO THE FARTHEST IJ FOR THAT TRACK CIRCUIT.
5. CAB LOOPS TO BE MOUNTED TO RAIL WITH RETAINING CLIPS OR TIED TO RAIL FASTENER CLIPS.
6. (2) 250KCML EXTRA FLEX CEMBRE BOLTED CONNECTION TO WEB OF RAIL AT NEUTRAL AXIS.
7. PROVIDE AUDIO FREQUENCY OVERLAY TRACK CIRCUIT FOR OVERUN DETECTION ONLY. IF DIRECT INJECTION TRACK CIRCUIT IS USED, PROVIDE EQUIVALENT TRACK CIRCUIT OVERRUN DETECTION METHOD.



No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

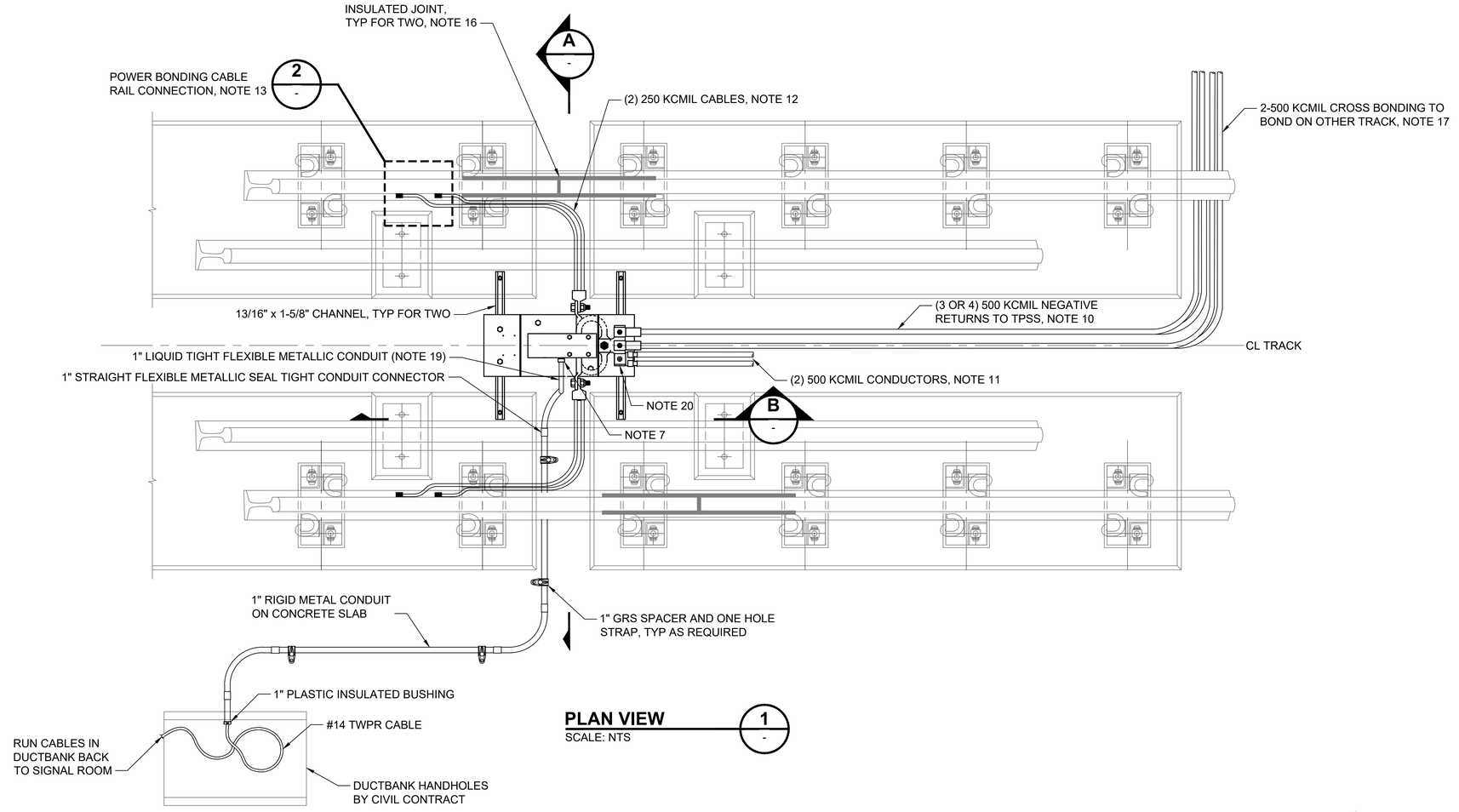
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

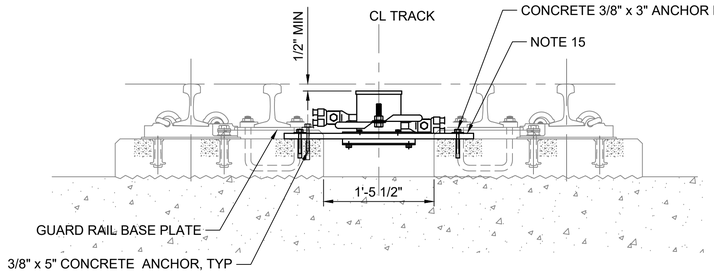
SCALE: NTS
FILENAME: STD-JSD307
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNAL SYSTEM
TYPICAL UNIVERSAL
INTERLOCKING LAYOUT

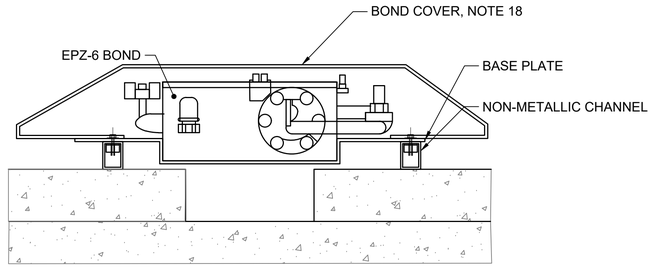
DRAWING No.: **STD-JSD307**
FACILITY ID:
SHEET No.: REV: 0



PLAN VIEW 1
SCALE: NTS



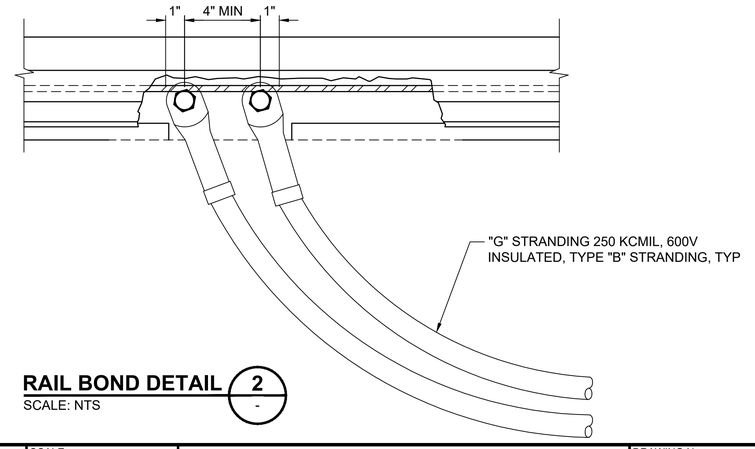
SECTION A
SCALE: NTS



SECTION B
SCALE: NTS

NOTES:

1. MOUNT IMPEDANCE BOND TO CONCRETE PLINTHS.
2. TOP OF IMPEDANCE BOND ASSEMBLY TO BE 1/2" MIN BELOW THE TOP OF RAILS.
3. TERMINALS & ELECTRICAL CONNECTION LUGS SHALL BE WIRE BRUSH CLEANED AND COATED WITH A CONDUCTIVE, NON-CORROSIVE, SURFACE COMPOUND IMMEDIATELY BEFORE BEING CONNECTED.
4. DO NOT INSTALL IMPEDANCE BOND CABLES WITHIN 12" OF RAIL WELDS.
5. PROVIDE CONDUIT TO EXTEND FROM SC PULLBOX OR HANDHOLE TO IMPEDANCE BOND.
6. BEND CABLES NOT LESS THAN 8 INCH RADIUS.
7. WATER TIGHT CONNECTOR.
8. COAT BOLT AND UNINSULATED CABLE WITH NO-OX-ID.
9. RAIL CONNECTIONS SHALL BE CEMBRE BOLTED AND CENTERED WITHIN +/- 1/2" OF THE NEUTRAL AXIS OF THE RAIL.
10. SEE EQUIPMENT LOCATION DRAWINGS FOR QUANTITY OF NEGATIVE RETURN CABLES.
11. CONNECT (2) 500 KCMIL CABLES BETWEEN CENTER TAPS OF IMPEDANCE BONDS ON EACH SIDE OF INSULATED JOINT PAIRS OR TO NEGATIVE RETURN RAIL.
12. SIDE LEAD CABLES SHALL BE OF EQUAL LENGTH.
13. BOLT TO RAIL AS CLOSE AS POSSIBLE TO INSULATED JOINT WITHOUT DAMAGING THE CABLE OR LUG BOLTED TO THE CEMBRE SLEEVE WHEN BOND IS LOCATED AT AN INSULATED JOINT.
14. AT LOCATIONS WITH BOTH GUARD RAIL AND RESTRAINING RAIL, ROUTE THE SIDE LEADS TO CONNECTIONS ON THE FIELD SIDE OF THE RUNNING RAIL. MINIMIZE REMOVAL OF RESTRAINING RAIL NECESSARY TO INSTALL CEMBRE POST.
15. PROVIDE ANCHORS DRILLED INTO CONCRETE FOR SECURING MOUNTING FRAME. PRIOR TO DRILLING INTO CONCRETE, PERFORM SCAN TO LOCATE AND AVOID REBAR.
16. SEE TRACK CHARTS FOR INSULATED JOINT LOCATIONS.
17. ROUTE CROSS BONDING FROM CENTER TAP OF IMPEDANCE BOND ON ONE TRACK TO IMPEDANCE BOND ON OTHER TRACK AT LOCATIONS SHOWN ON THE SIGNAL - SYSTEM, TRACK AND CABLE PLAN DRAWINGS.
18. PROVIDE A RAMP COVER AS REQUIRED (NOT SHOWN ON PLAN VIEW FOR CLARITY).
19. LAST 2-4' OF CONDUIT RUN IS TO BE 1" LIQUID TIGHT FLEXIBLE METALLIC CONDUIT.
20. AT TRACTION POWER RETURN AND CROSS BONDING LOCATIONS PROVIDE A COPPER BUSS BAR "T" PLATE THAT TO MOUNT THE CABLES TO THE IMPEDANCE BOND CENTER TAP THAT ALLOW THEM TO BE REMOVED ONE AT A TIME.



RAIL BOND DETAIL 2
SCALE: NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

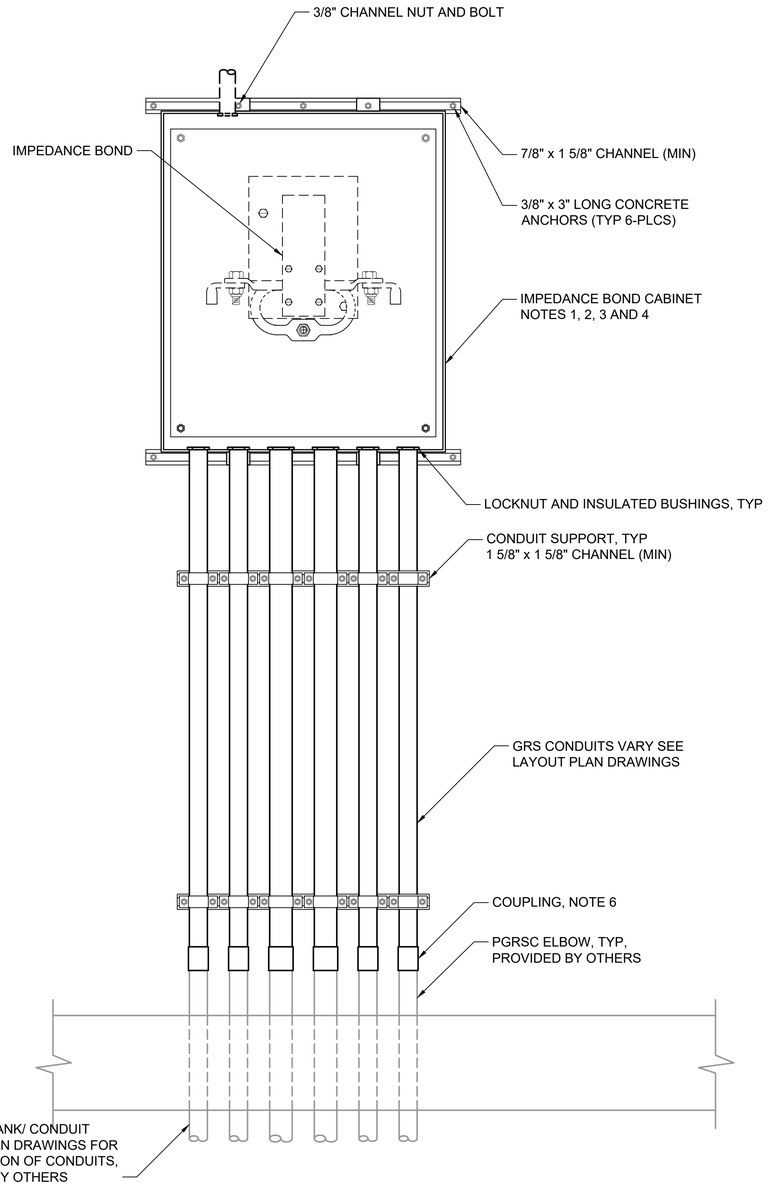
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD311
CONTRACT No.: RTA/LR
DATE: 2/2024

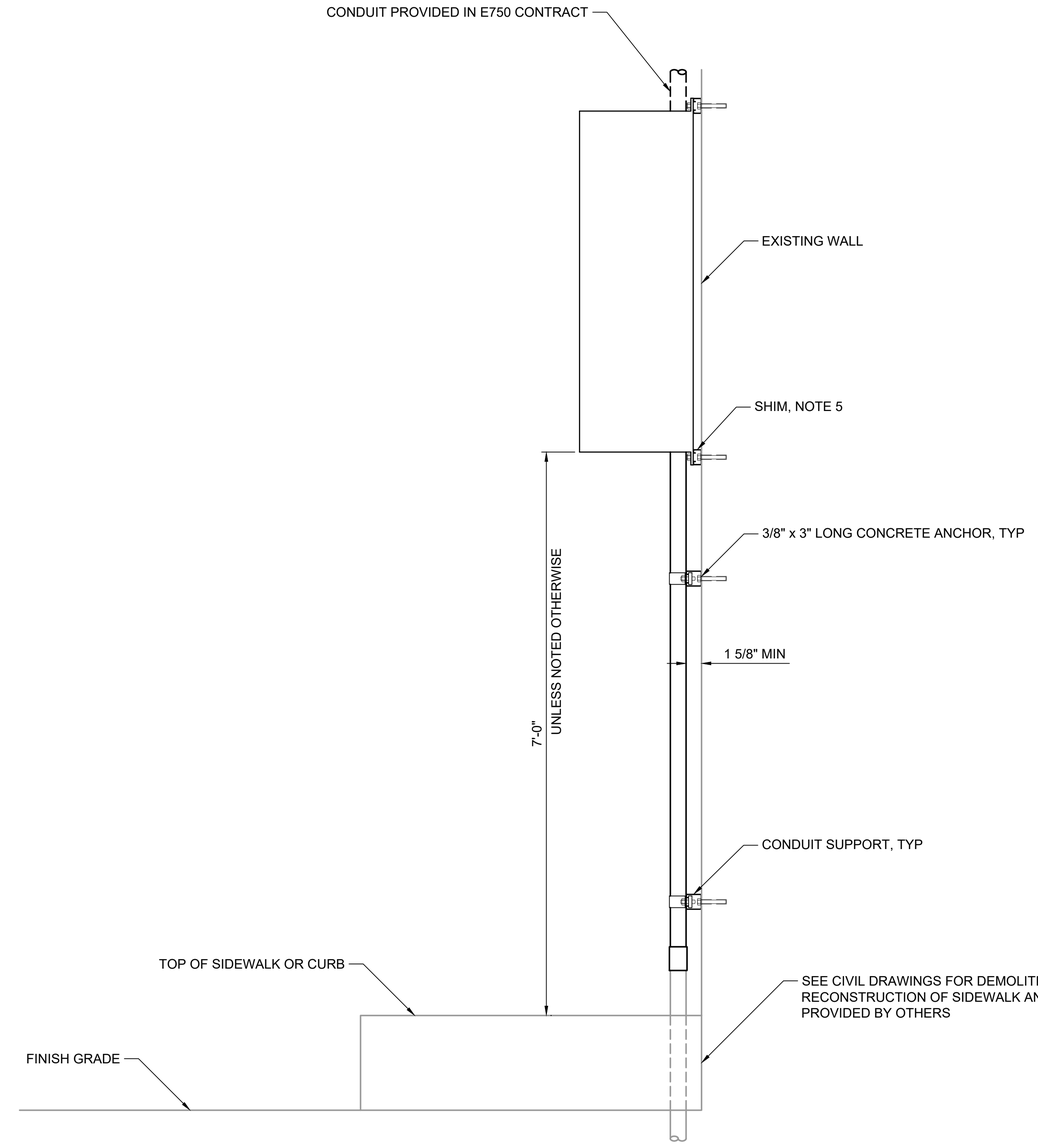
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL IMPEDANCE BOND
INSTALLATION LAYOUT WITH GUARDRAIL

DRAWING No.: **STD-JSD311**
FACILITY ID:
SHEET No.: REV: 0



WALL MOUNTED IMPEDANCE BOND CABINET 1
SCALE: NTS



TYPICAL FENCE POST GROUNDING DETAIL 2
SCALE: NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

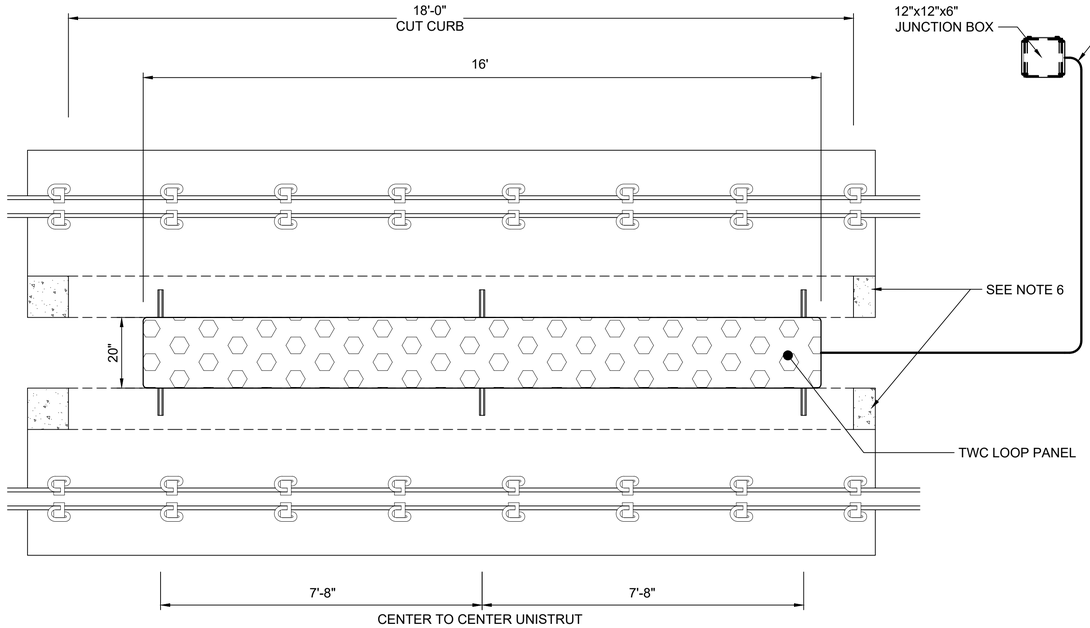
SCALE: NTS
FILENAME: STD-JSD312
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

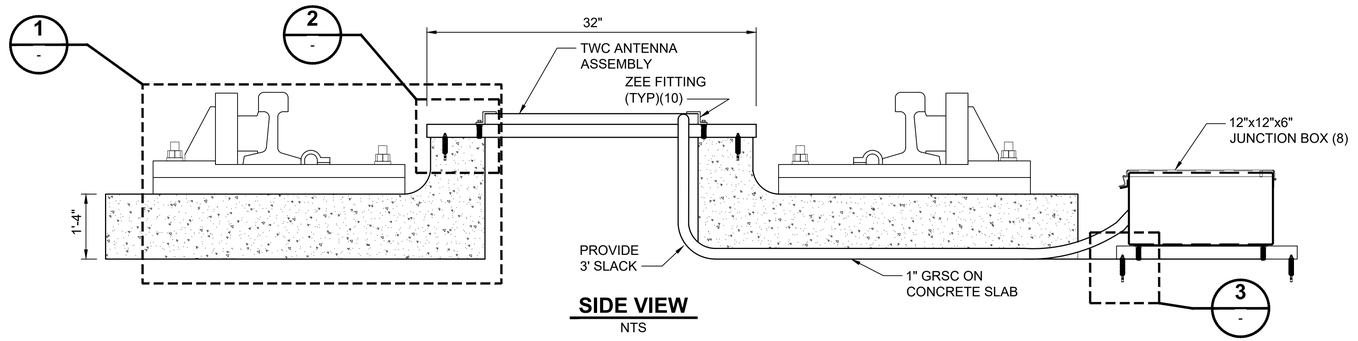
SIGNALS
IMPEDANCE BOND CABINET - TYPE 1
WALL MOUNTED DETAILS

DRAWING No.: **STD-JSD312**
FACILITY ID:
SHEET No.: REV: 0

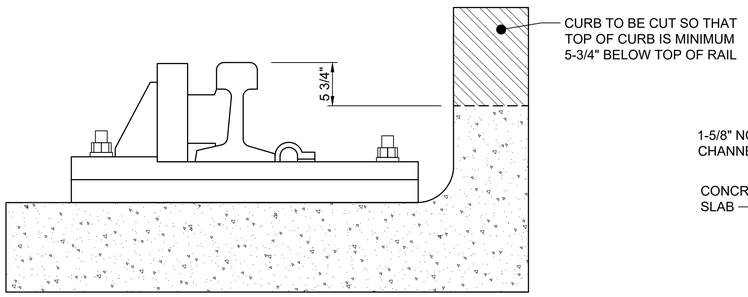
03/21/24 | 12:50 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD312.DWG



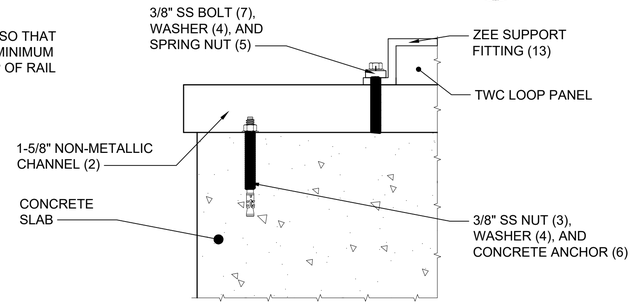
PLAN
NTS



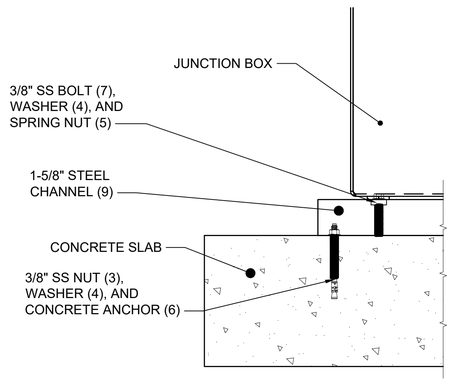
SIDE VIEW
NTS



DETAIL 1 -
NTS



DETAIL 2 -
NTS



DETAIL 3 -
NTS

GENERAL NOTES:

1. TERMINATE WIRES AND INSTALL LOOP CONVERTER INSIDE OF TWC JUNCTION BOX.
2. RUN 1" GRSC FROM BELOW LOOP ALONG PLINTH TO JUNCTION BOX.
3. TWC ANTENNA WILL BE MOUNTED TO THE UNISTRUT USING A S.S. 12-GAUGE Z- CLIP.
4. UNISTRUT MUST BE FASTENED DOWN USING CONCRETE ANCHORS.
5. JUNCTION BOX IS SECURED TO THE DECK WITH UNISTRUT AND CONCRETE ANCHORS.
6. CURB TO BE CUT OUT AT THE TWC LOOP LOCATION TO ALLOW LOOP TO BE INSTALLED

ITEM NO.	QTY.	DESCRIPTION
2	3	1-5/8" NON-METALLIC CHANNEL 32" LONG
3	10	3/8" SS NUT
4	20	3/8" SS WASHER
5	10	3/8" SS SPRING NUT
6	10	3/8" CONCRETE ANCHOR 3" LONG
7	10	3/8" SS BOLT
8	1	12" x 12" x 6" SS JUNCTION BOX
9	2	1-5/8" STEEL CHANNEL 14" LONG TO MOUNT JB TO CONCRETE SLAB
10	6	ZEE FITTING

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

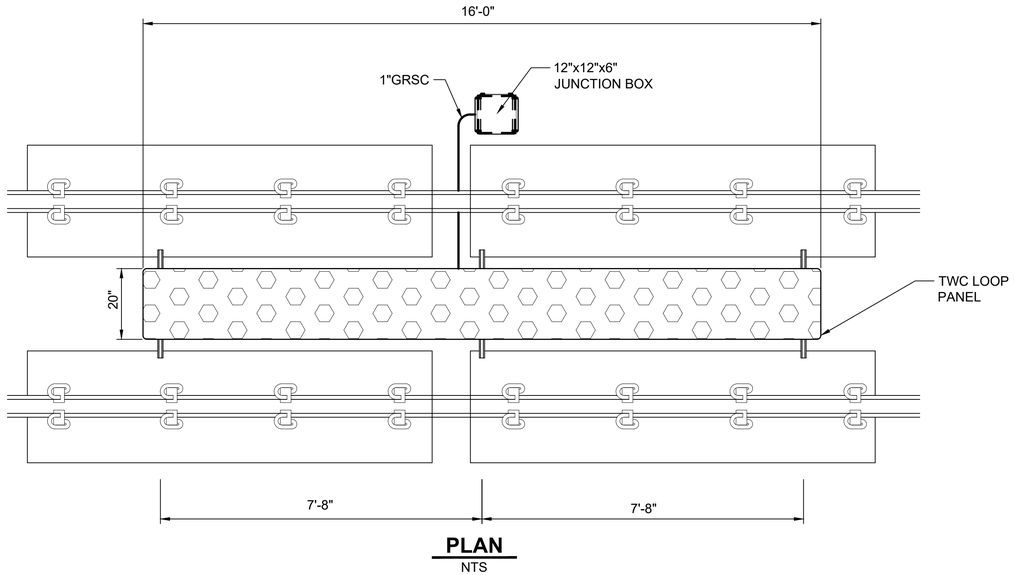
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD400
CONTRACT No.: RTA/LR
DATE: 2/2024

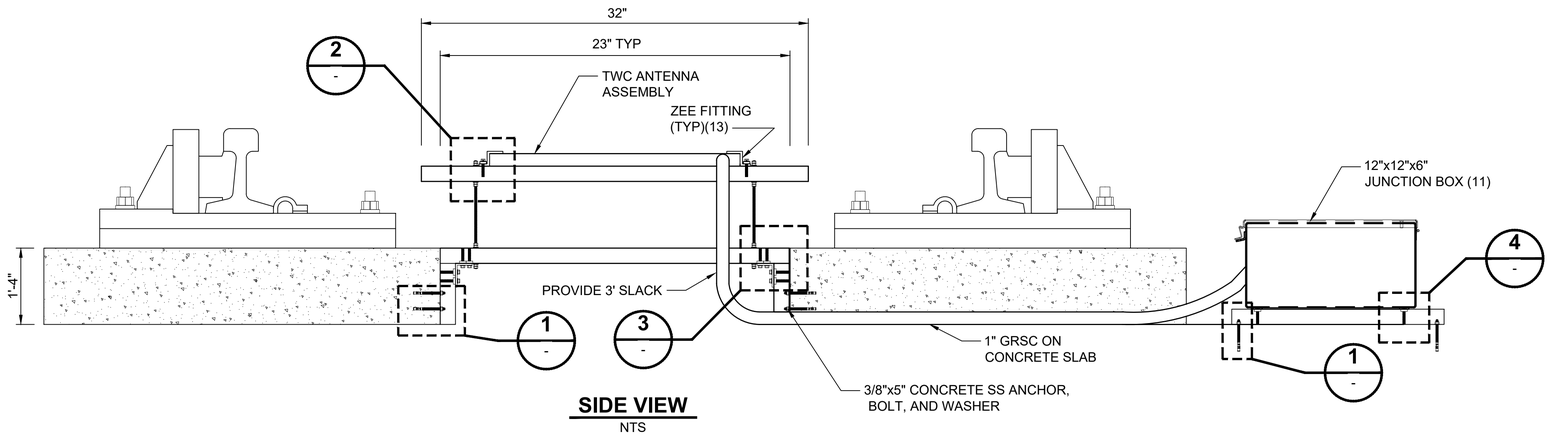
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TWC LOOP INSTALLATION LAYOUT - CURB MOUNT

DRAWING No.: **STD-JSD400**
FACILITY ID:
SHEET No.: 1 REV:



PLAN
NTS

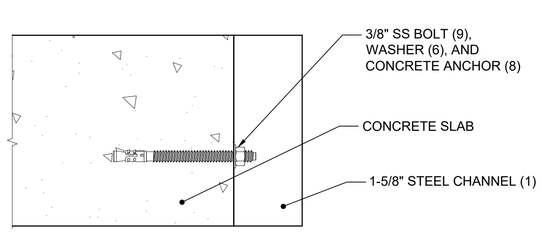


SIDE VIEW
NTS

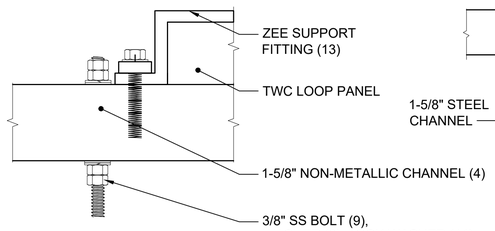
GENERAL NOTES:

1. TERMINATE WIRES AND INSTALL LOOP CONVERTER INSIDE OF TWC JUNCTION BOX.
2. RUN 1" GRSC FROM LOOP ALONG PLINTH TO JUNCTION BOX.
3. TWC ANTENNA WILL BE MOUNTED TO THE UNISTRUT USING A S.S. 12-GAUGE Z- CLIP.
4. UNISTRUT MUST BE FASTENED DOWN USING CONCRETE ANCHORS.
5. JUNCTION BOX IS SECURED TO THE DECK WITH UNISTRUT AND CONCRETE ANCHORS.

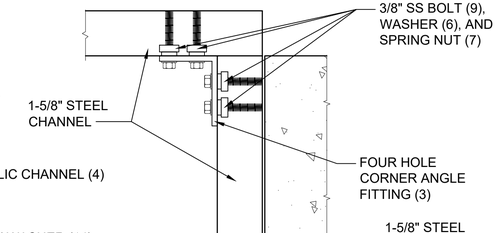
ITEM NO.	QTY.	DESCRIPTION
1	6	1-5/8" NON-METALLIC CHANNEL 12" LONG
2	3	1-5/8" NON-METALLIC CHANNEL 23" LONG
3	6	4-1/8" x 3-1/2" 90° L-SHAPE 4-CORNER ANGLE FITTING
4	3	1-5/8" STEEL CHANNEL 32" LONG
5	60	3/8" SS NUT
6	36	3/8" SS WASHER
7	28	3/8" SS SPRING NUT
8	28	3/8" CONCRETE ANCHOR 3" LONG
9	24	3/8" SS BOLT
10	6	3/8" THREADED BOLT 12" LONG
11	1	12" x 12" x 6" SS JUNCTION BOX
12	2	1-5/8" STEEL CHANNEL 14" LONG TO MOUNT JB TO CONCRETE SLAB
13	6	ZEE FITTING
14	4	3/8" SS LOCK WASHER



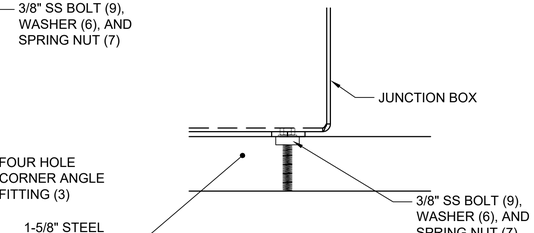
DETAIL 1 (-)
NTS



DETAIL 2 (-)
NTS



DETAIL 3 (-)
NTS



DETAIL 4 (-)
NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SCALE: NTS
FILENAME: STD-JSD401
CONTRACT No.: RTA/LR
DATE: 2/2024

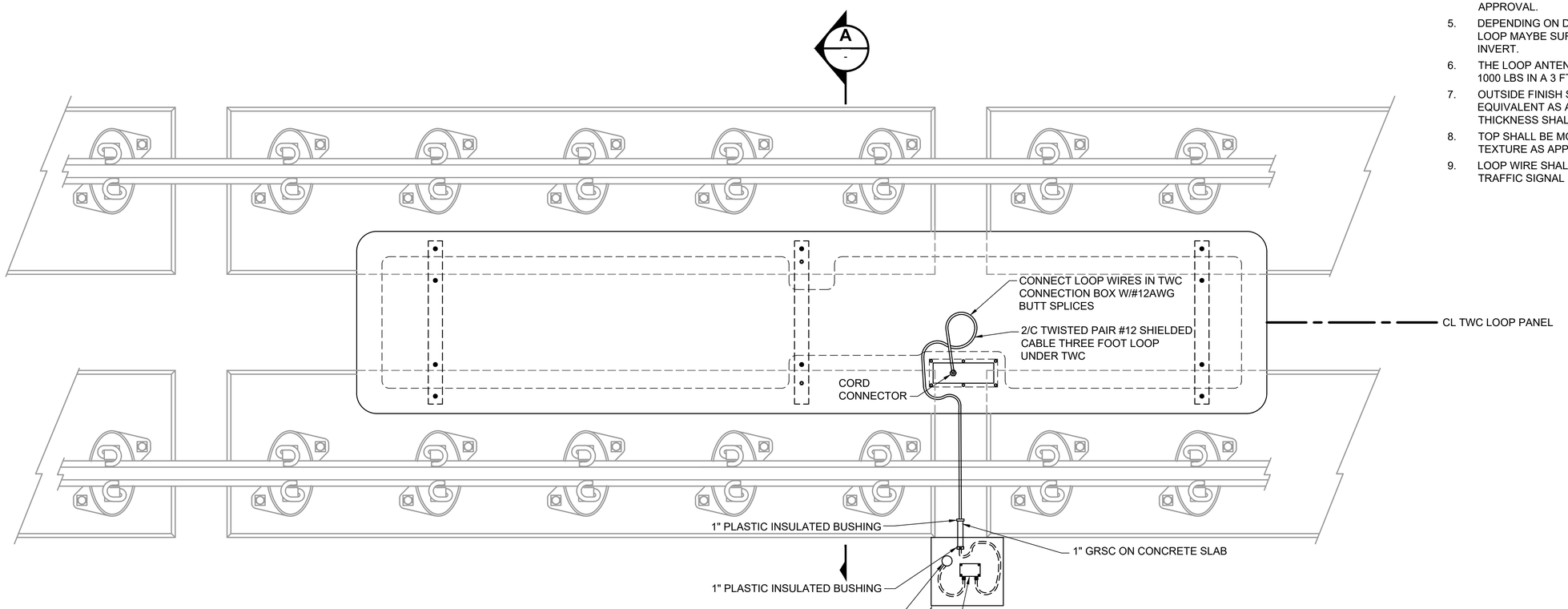
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TWC LOOP INSTALLATION LAYOUT
JUNCTION BOX MOUNT

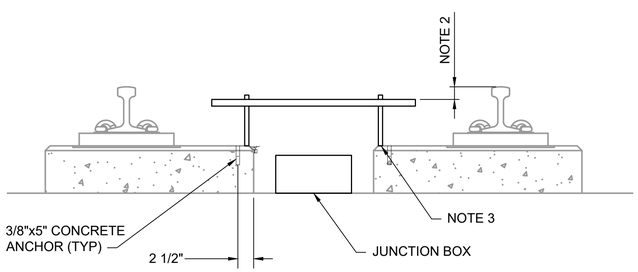
DRAWING No.: **STD-JSD401**
FACILITY ID:
SHEET No.: REV: 1

GENERAL NOTES:

1. TERMINATE FILTER OR LOOP IN ACCORDANCE WITH APPROVED CONTRACTOR INSTALLATION AND TUNING PROCEDURES.
2. RAISE TWC LOOP OFF TIE OR CONCRETE PLINTH AS TO APPROXIMATELY 2 INCHES BELOW TOP OF RAIL.
3. SUPPORT LOOP AT MIDDLE AND BOTH ENDS USING A FIBERGLASS STRUT.
4. TWC EMBEDDED LOOP. DESIGN INSTALLATION AND SUBMIT INSTALLATION DRAWINGS TO RESIDENT ENGINEER FOR APPROVAL.
5. DEPENDING ON DUCTBANK DESIGN CONDUIT PATH TO TWC LOOP MAYBE SURFACE MOUNT GRS, OR STUB UP IN BALLAST OR INVERT.
6. THE LOOP ANTENNA ASSEMBLY SHALL BE ABLE TO SUPPORT 1000 LBS IN A 3 FT OUTSIDE SUPPORT SPAN.
7. OUTSIDE FINISH SHALL BE SKY CAP GREY GELCOAT OR EQUIVALENT AS APPROVED BY SOUND TRANSIT. FINISH THICKNESS SHALL BE 20 THOUSANDS OF ONE INCH, MINIMUM.
8. TOP SHALL BE MOLDED WITH AN AGGRESSIVE NON-SKID TEXTURE AS APPROVED BY SOUND TRANSIT.
9. LOOP WIRE SHALL BE AWG #12 XHHW POLYETHYLENE JACKETED TRAFFIC SIGNAL LOOP WIRE.



PLAN
NTS



SECTION A -
NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

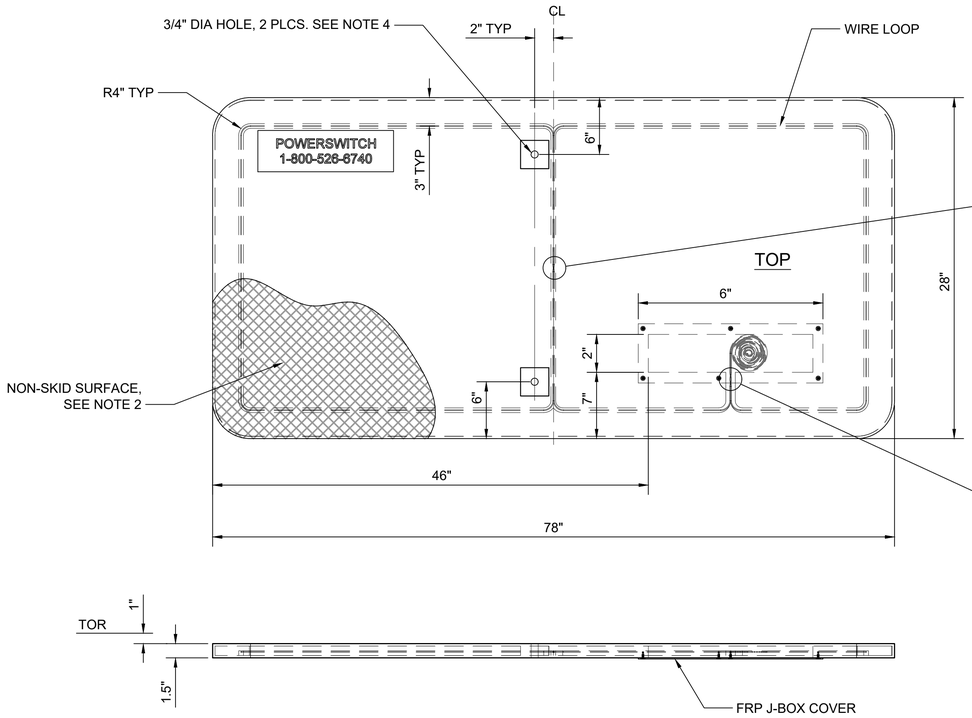
SCALE: NTS
FILENAME: STD-JSD402
CONTRACT No.: RTA/LR
DATE: 2/2024

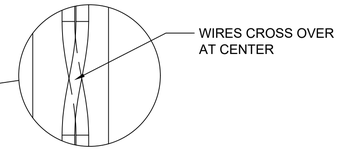
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL TWC LOOP INSTALLATION LAYOUT

DRAWING No.: **STD-JSD402**
FACILITY ID:
SHEET No.: REV: 1

03/21/24 | 12:50 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD402.DWG





CENTER OF LOOP DETAIL

LOOP CLOSING TO JUNCTION BOX DETAIL

NOTES:

1. MATERIAL IS RESIN IMPREGNATED OPEN CELL FIBERBOARD ENCASED IN 1/4" THK FIBERGLASS REINFORCED POLYESTER (FRP) LAMINATE CONSISTING OF GLASS FIBER, ALTERNATE LAYERS OF WOVEN ROVING, AND 60% RESIN. RESIN SYSTEM USED SHALL MEET UL 94VE-1 FLAMMABILITY RATING. EXTERIOR SURFACES HAVE 20 MIL THK ANSI 61 LIGHT GREY GEL COAT. JUNCTION BOX COVER TO BE MADE FROM SAME FRP MATERIAL. HARDWARE TO BE STAINLESS STEEL.
2. TOP SHALL BE MOLDED WITH AN AGGRESSIVE NON-SKID TEXTURE. NON-SKID SURFACE NOT SHOWN FOR CLARITY. TOP SIDE ONLY.
3. LOOP WIRE SHALL BE #12 XHHW WIRE. THE WIRE SHALL CROSS AT THE CENTER OF PANEL AND TERMINATE AT JUNCTION BOX CAVITY WITH 120" OF EXTRA LEAD. LEADS TO BE TWISTED FROM LOOP CLOSING TO JUNCTION BOX.
4. MOUNTING HOLES TO BE PRE-DRILLED IN TWO PLACES 2" FROM THE CENTER OF THE LOOP AND 6" FROM EDGE.
5. PANEL SHALL SUPPORT 1000 LBS IN A 3' OUTSIDE SUPPORTED SPAN.
6. TOP TO INCLUDE A 1/4" CROWN ALONG THE LONG AXIS OF THE LOOP.
7. MOUNT TOP OF LOOP 1" BELOW TOP OF RAIL.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

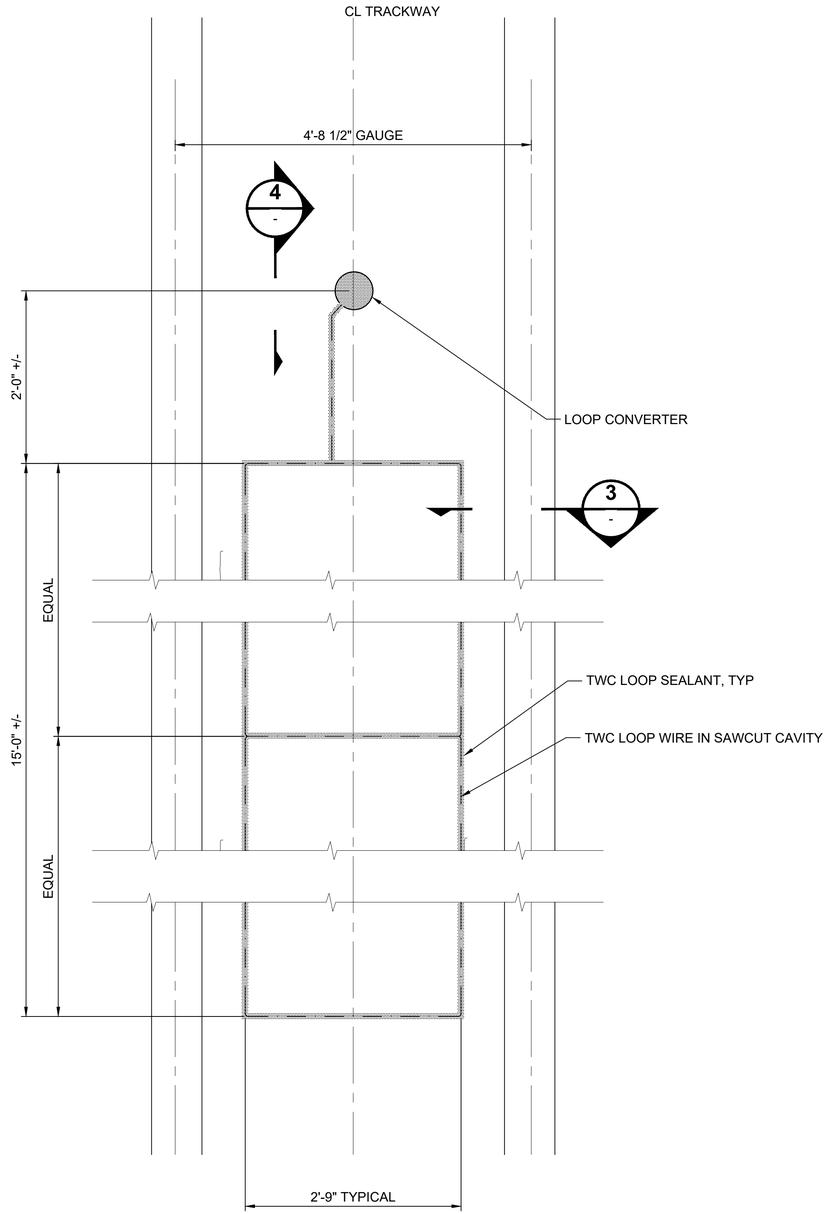
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JSD403
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
YARD TWC LOOP

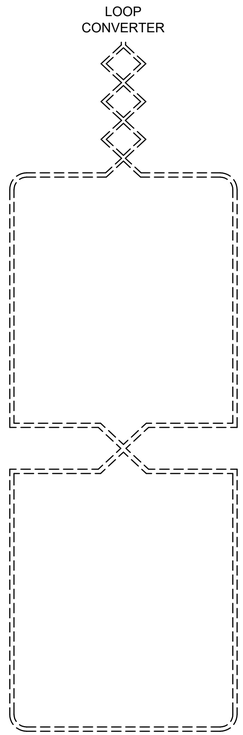
DRAWING No.: **STD-JSD403**
FACILITY ID:
SHEET No.:
REV: 0



SAWCUT TWC LOOP PAVED TRACK DETAIL

SCALE: 1" = 1'-0"

1
-



PLAN

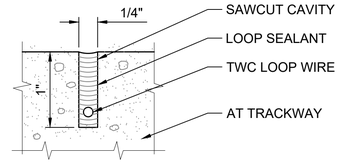
LOOP WIRE CONFIGURATION

SCALE: NTS

2
-

NOTES:

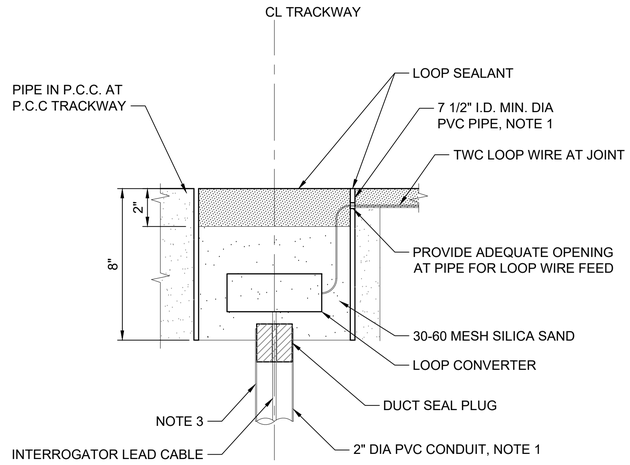
1. PVC PIPE AND CONDUIT WILL BE INSTALLED BY THE CIVIL CONTRACTOR
2. SAW CUTTING, TWC LOOP WIRE, LOOP SEALANT, LOOP CONVERTER, SILICA SAND AND INTERROGATOR LEAD CABLE INSTALLED BY SYSTEMS CONTRACTOR.
3. LOOP CONVERTER CONDUIT MAY EXTEND FROM SIDE INSTEAD OF BOTTOM AT LOCATIONS WHERE NECESSARY.



TWC LOOP AT TRACKWAY

SCALE: FULL SCALE

3
-



SECTION AT LOOP CONVERTER

SCALE: 3" = 1'-0"

4
-

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JSD404
CONTRACT No.: RTA/LR
DATE: 2/2024

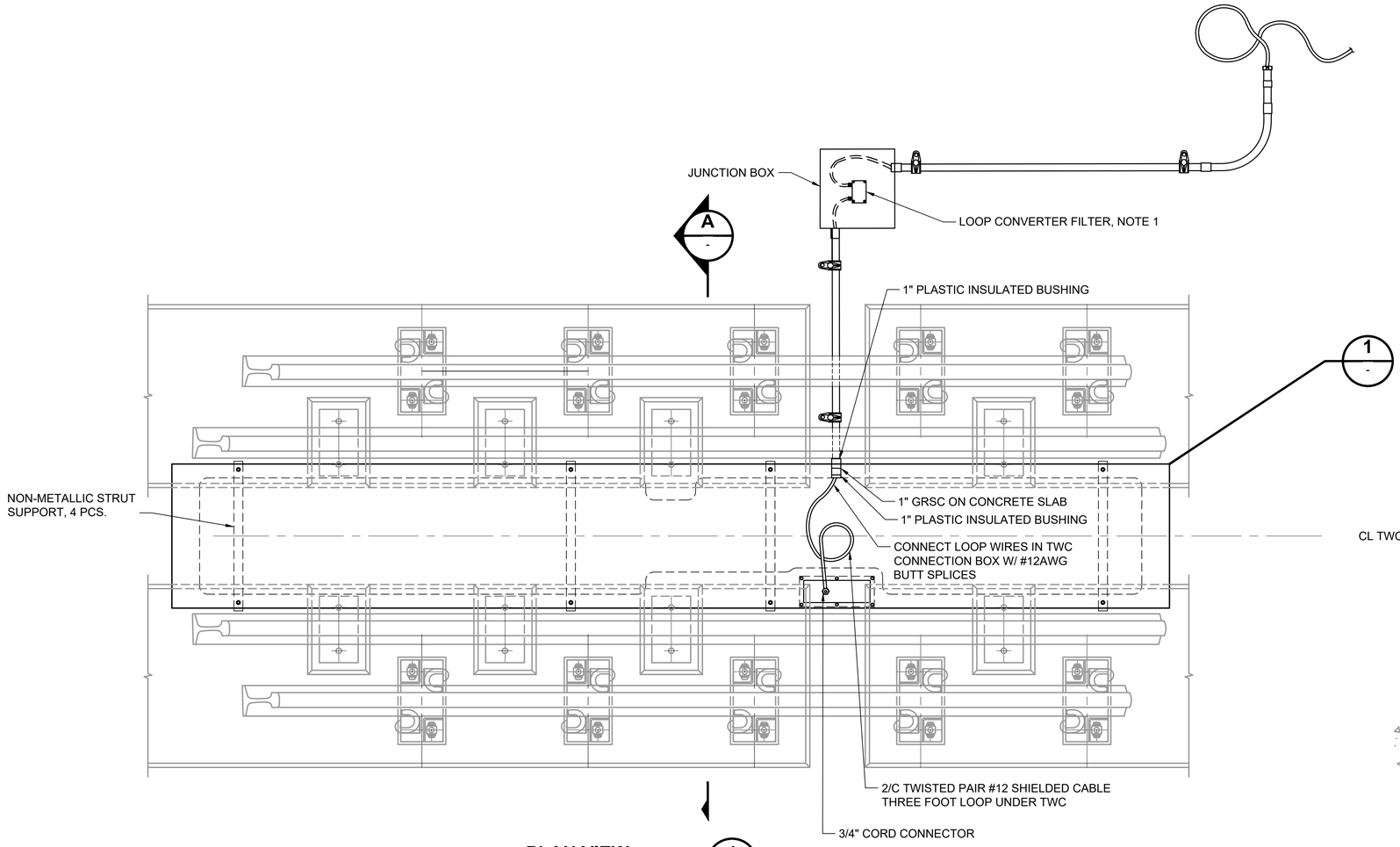
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL TWC LOOP
EMBEDDED TRACK

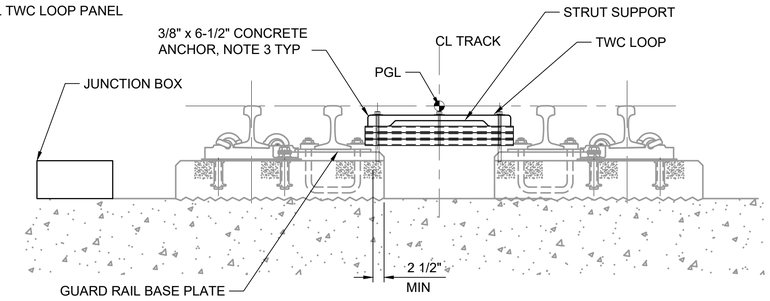
DRAWING No.: **STD-JSD404**
FACILITY ID:
SHEET No.:
REV: 0

NOTES:

1. TERMINATE LOOP CONVERTER IN ACCORDANCE WITH APPROVED CONTRACTOR INSTALLATION AND TUNING PROCEDURES.
2. RAISE TWC LOOP OFF CONCRETE PLINTH WHERE TWC SURFBOARD IS 1" BELOW TOP OF RAIL TO ENSURE PROPER RECEPTION BY LRV.
3. PROVIDE ANCHORS DRILLED INTO CONCRETE FOR SECURING MOUNTING FRAME. PRIOR TO DRILLING INTO CONCRETE, PERFORM SCAN TO LOCATE AND AVOID REBAR PER SPEC. SECTION 03 15 25 ANCHORAGE TO CONCRETE.



PLAN VIEW 1 -
SCALE: NTS



SECTION A -
SCALE: NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWING

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

LINE IS 1" AT FULL SCALE

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD405
CONTRACT No.: RTA/LR
DATE: 2/2024

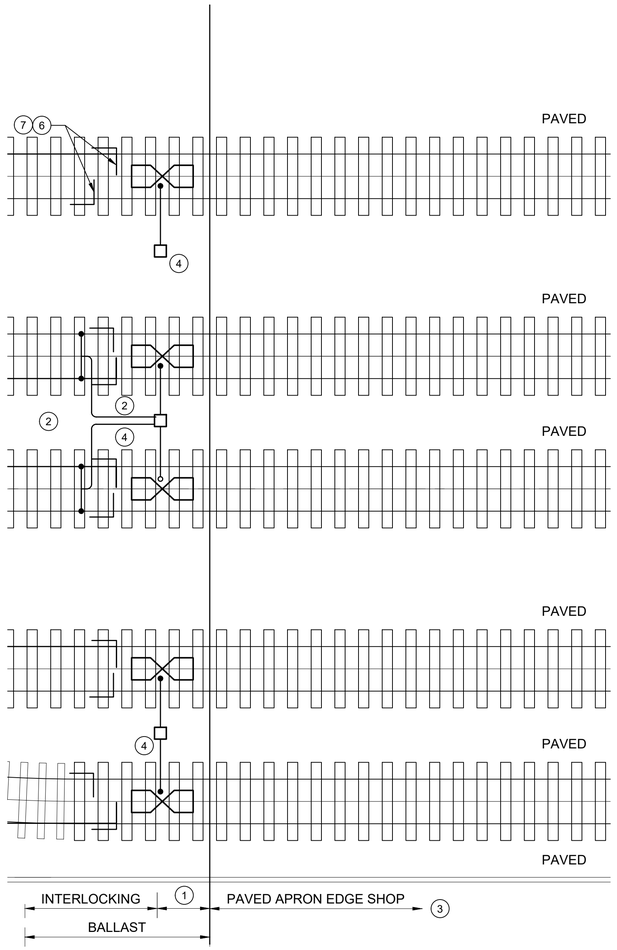
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL TWC LOOP INSTALLATION
DIRECT FIXATION WITH GUARD RAIL

DRAWING No.: **STD-JSD405**
FACILITY ID:
SHEET No.: REV: 0

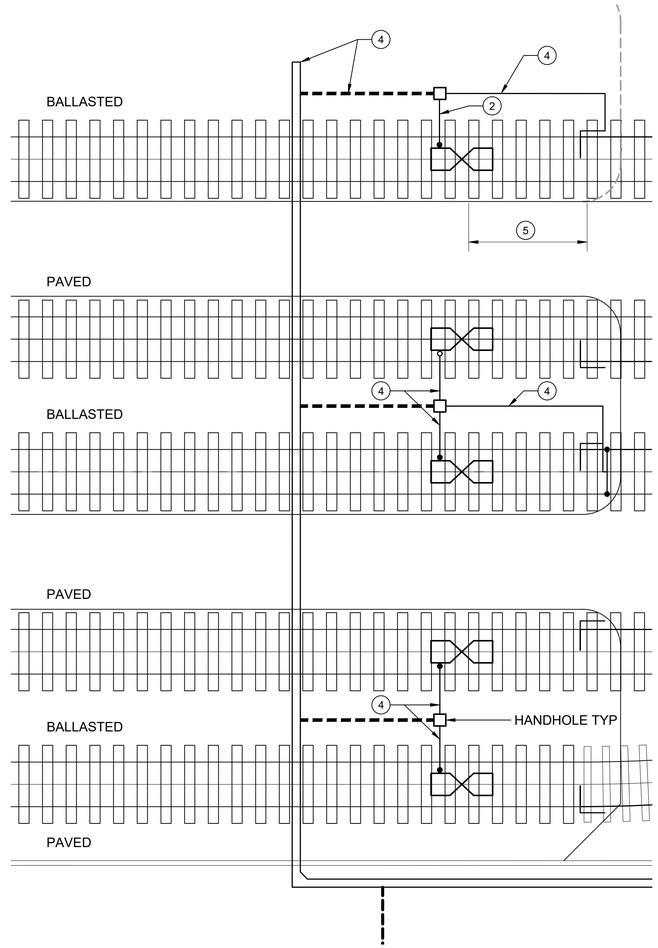
KEY NOTES:

1. PLACE IJ IN BALLAST SUFFICIENT DISTANCE FROM PAVEMENT TO INSTALL 6'-6" TWC PREFABRICATED LOOP.
2. PROVIDE PROTECTIVE HOSE FOR CABLE CONNECTIONS FROM JB TO TWC LOOP OR TRACK CIRCUIT CONNECTION, TYP.
3. SHOP APRON PAVEMENT TO ALLOW ONE LRV LENGTH MIN. OUTSIDE OF BUILDING WITHOUT ENTERING INTERLOCKING.
4. PROVIDE CONDUIT SYSTEM SIZED FOR TRACK CIRCUIT AND TWC CABLES PER MANUFACTURER'S MANUAL.
5. COORDINATE TWC & IJ LOCATION WITH YARD ROADS TO ASSURE NO EMBEDDED IJ OR TWC AND THAT 4 CAR TRAINS ON THE TWC LOOP WILL NOT BLOCK ROADS.
6. DOUBLE IJ NEEDED TO ISOLATE YARD TRACTION POWER FROM SHOP TRACTION POWER AND AT YARD/MAINLINE BOUNDARY.
7. NEG ISOLATION DOUBLE IJ SHALL COORDINATE TO BE WITHIN 28FT OF POSITIVE OCS BREAK.



SHOP APRON SIGNAL LAYOUT

SCALE: NTS



STORAGE TRACK TO INTERLOCKING INTERFACE

SCALE: NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JSD406
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

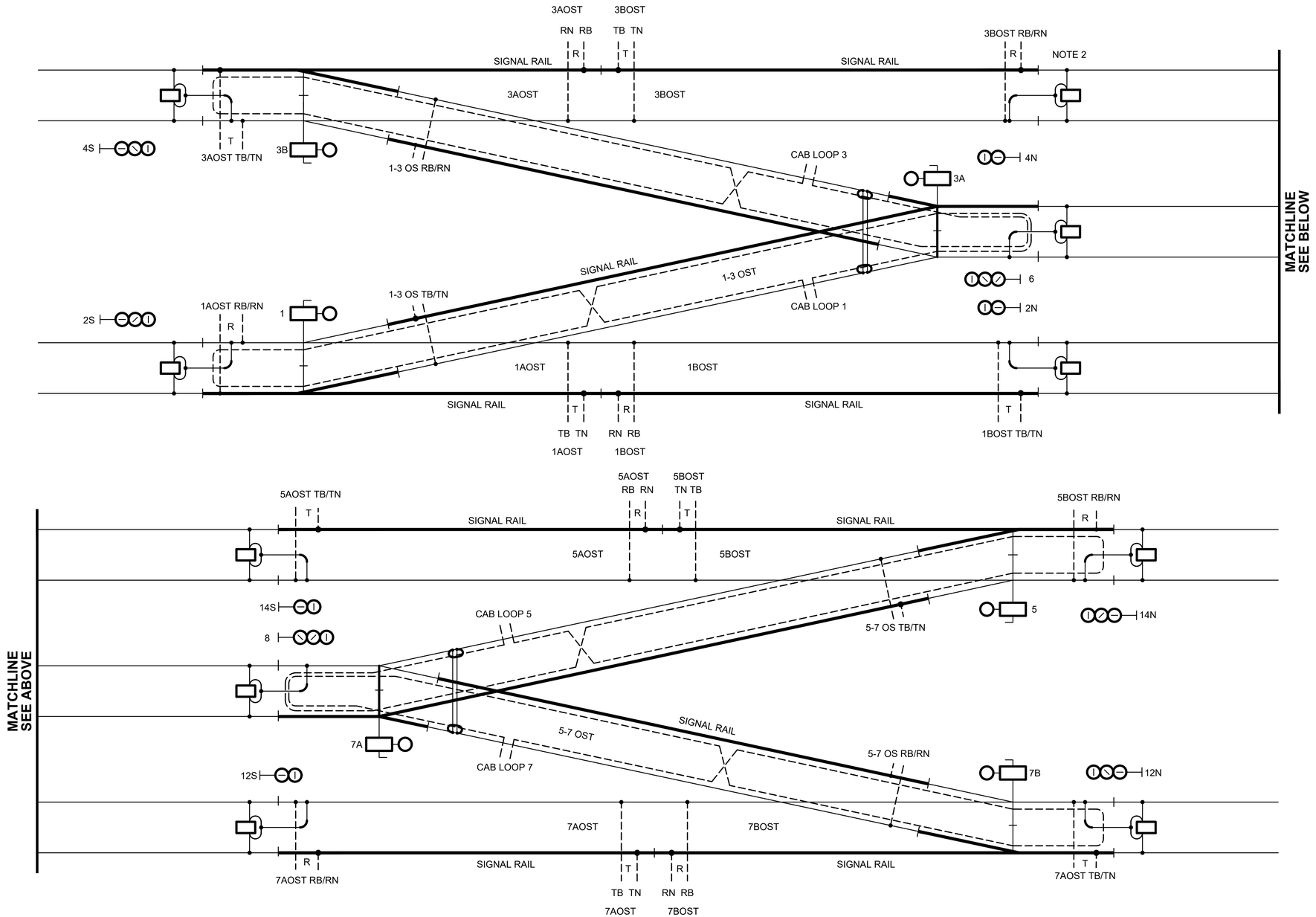
SIGNALS
SIGNAL SYSTEM EQUIPMENT LAYOUT
STORAGE TRACKS AND YARD LAYOUT

DRAWING No.: **STD-JSD406**
FACILITY ID:
SHEET No.: REV: 0

03/21/24 | 12:51 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD406.DWG

GENERAL NOTES:

1. BONDING NOT SHOWN.
2. SIGNAL LOCATIONS TO BE DETERMINED BASED ON CLEARANCE WALK WAYS, OR OTHER INTERFACES.



No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD410
CONTRACT No.: RTA/LR
DATE: 2/2024

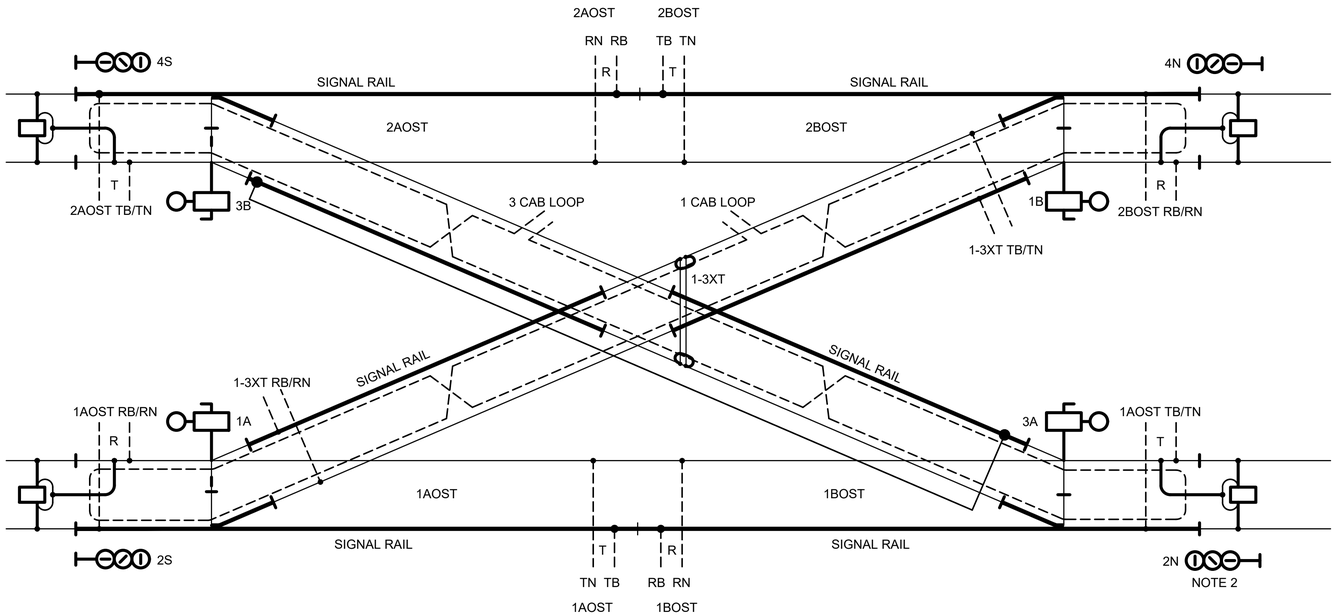
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL POCKET TRACK
INTERLOCKING EQUIPMENT LAYOUT

DRAWING No.: **STD-JSD410**
FACILITY ID:
SHEET No.: 1
REV:

GENERAL NOTES:

1. BONDING NOT SHOWN.
2. SIGNAL LOCATIONS TO BE DETERMINED BASED ON CLEARANCE WALK WAYS, OR OTHER INTERFACES.



SIGNAL RAIL

NEGATIVE RETURN RAIL

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

DATE:

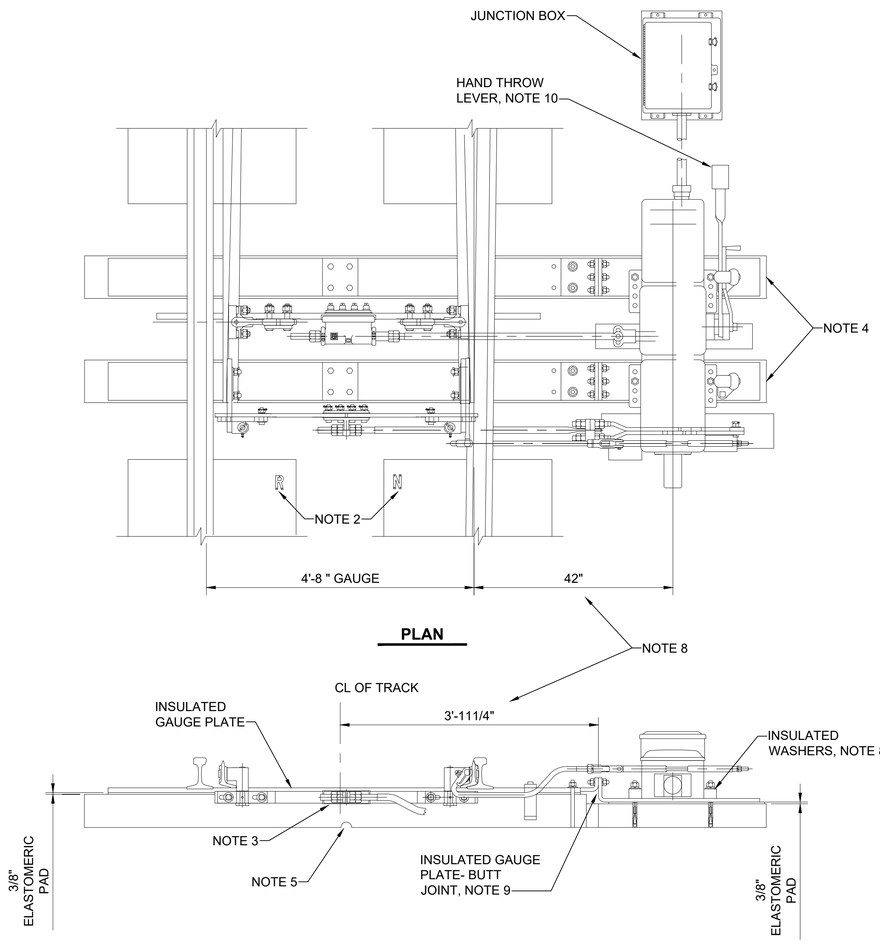
SCALE: NTS
FILENAME: STD-JSD411
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL DIAMOND EQUIPMENT LAYOUT

DRAWING No.: **STD-JSD411**
FACILITY ID:
SHEET No.: REV: 1

03/21/24 | 12:51 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD411.DWG



PLAN

ELEVATION

(RIGHT HAND LAYOUT, RIGHT HAND POINT
CLOSED, WITH HAND THROW LEVER)

TYPICAL SWITCH MACHINE LAYOUT
DIRECT FIXATION TRACK

NTS

(ALL OTHER SWITCH DIRECT FIXATION TRACK
MACHINE LAYOUTS SIMILAR TO ABOVE)

GENERAL NOTES:

1. LAYOUT SHOWS SWITCH MACHINE ON PREFERRED CLOSED POINT SIDE OF SWITCH LAYOUT. PHYSICAL RESTRICTIONS MAY REQUIRE SWITCH MACHINES TO BE INSTALLED ON OPEN POINT SIDE.
2. PROVIDE N AND R LETTERS.
3. PROVIDE HORIZONTAL SWITCH BASKET AND FRONT ROD WITH DETECTOR LUG.
4. PROVIDE SWITCH PLINTH AS REQUIRED BY SWITCH MACHINE.
5. PROVIDE 2"X6" DRAIN OPENING THROUGH BOTH CONCRETE SWITCH PLINTHS
6. CONTRACTOR RESPONSIBLE FOR FINAL DESIGN FOR THE SWITCH LAYOUT KITS.
7. FOR INTERLOCKINGS THAT PROVIDE INSUFFICIENT SPACE TO STAND AND THROW SWITCHES, PROVIDE LOW PROFILE HAND CRANK TYPE SWITCH MACHINES AND ADJUST SPACING FROM GAUGE.
8. INSTALLATION SHALL MAINTAIN 1K OHM MINIMUM RESISTANCE BETWEEN MACHINE AND RAIL AND MACHINE AND GROUND.
9. AFTER ASSEMBLY, FILL SPACE UNDER SPACER WITH RTV SILICONE OR APPROVED EQUAL.
10. IF SELECTED AND APPROVED SWITCH MACHINE DOES NOT COME WITH A HAND THROW LEVER, CONTRACTOR MUST SUPPLY ONE HAND CRANK PER PAIR OF SWITCHES.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

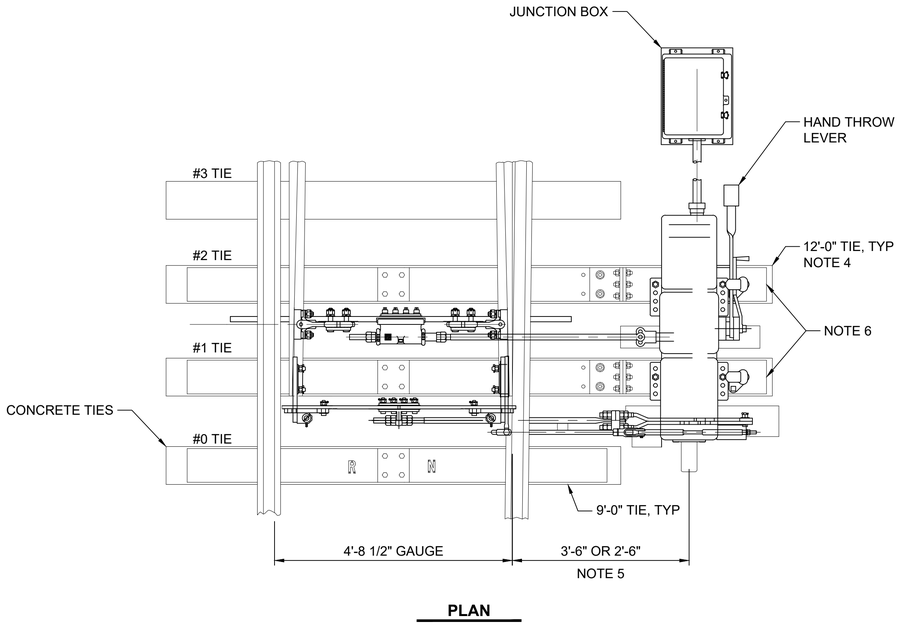
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD415
CONTRACT No.: RTA/LR
DATE: 2/2024

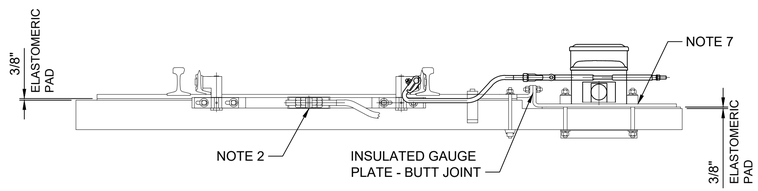
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL SWITCH MACHINE LAYOUT
IN DIRECT FIXATION TRACK

DRAWING No.: **STD-JSD415**
FACILITY ID:
SHEET No.: REV: 1



PLAN



ELEVATION

(RIGHT HAND LAYOUT, RIGHT HAND POINT CLOSED, WITH HAND THROW LEVER)

TYPICAL SWITCH MACHINE LAYOUT BALLASTED TRACK

1
-

SCALE: NTS
(ALL OTHER BALLASTED TRACK SWITCH MACHINE LAYOUTS SIMILAR TO ABOVE)

NOTES:

1. LAYOUT SHOWS SWITCH MACHINE ON CLOSED POINT SIDE OF SWITCH LAYOUT. PHYSICAL RESTRICTIONS MAY REQUIRE SWITCH MACHINES TO BE INSTALLED ON OPEN POINT SIDE.
2. PROVIDE HORIZONTAL SWITCH BASKET AND FRONT ROD WITH DETECTOR LUG AND DROP LUGS FOR STRAIGHT LOCK RODS.
3. NOTCHED TIES WILL BE PROVIDED BY CONTRACTOR AS COORDINATED FOR THE REQUIREMENTS OF THE CONTRACTORS' SUBMITTED SWITCH MACHINE. IF NECESSARY, REPLACE TIES OR USE AN APPROVED METHOD TO MODIFY SWITCH TIES FOR PROVIDED SWITCH MACHINES.
4. MAINTAIN ELECTRICAL ISOLATION BETWEEN SWITCH MACHINE AND RAIL AND BETWEEN SWITCH MACHINE AND GROUND.
5. IN REDUCED CLEARANCE LOCATIONS, INSTALL SWITCH MACHINE WITH MINIMUM DISTANCE OF 30" FROM GAUGE TO CENTERLINE OF SWITCH MACHINE AND PROVIDE LOW PROFILE MACHINE WITH HAND CRANK MECHANISM.
6. PROVIDE GAUGE PLATE EXTENSION UNDER SWITCH MACHINE.
7. PROVIDE ANCHORS DRILLED INTO CONCRETE FOR SECURING MOUNTING FRAME. PRIOR TO DRILLING INTO CONCRETE, PERFORM SCAN TO LOCATE AND AVOID REBAR PER SPEC. SECTION 03 15 25 ANCHORAGE TO CONCRETE.

No.	DATE	DSN	CHK	APP	REVISION
0	2/2024				2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

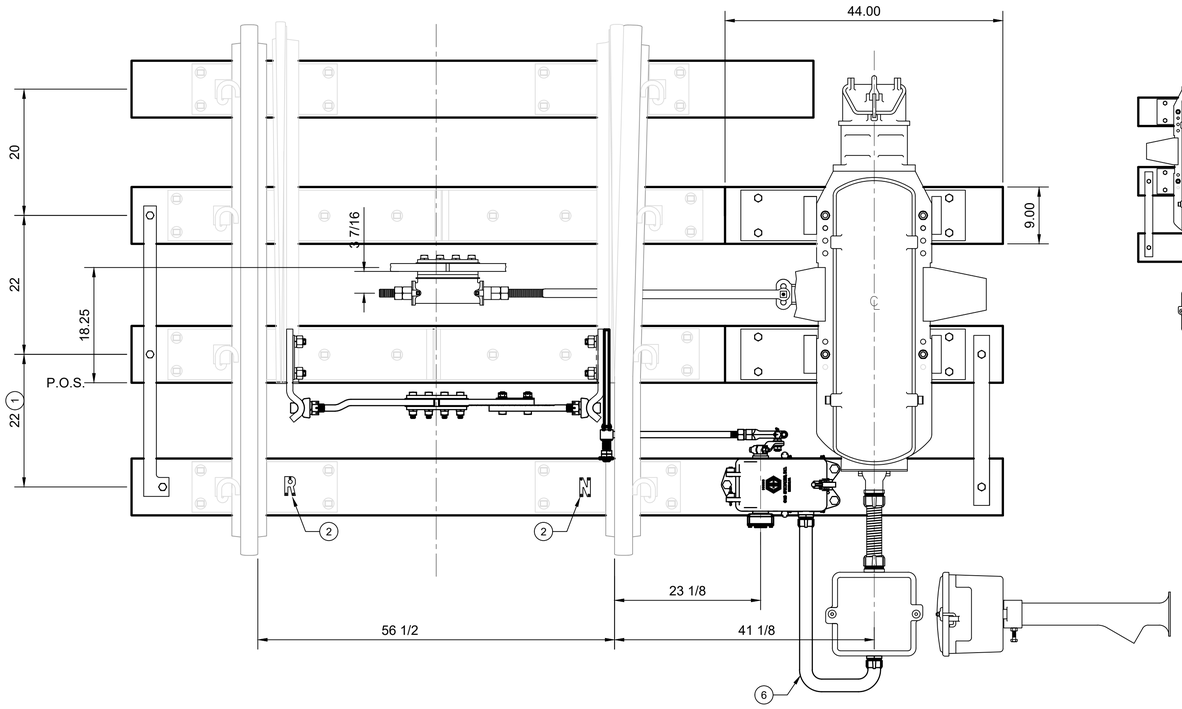
SOUNDTRANSIT

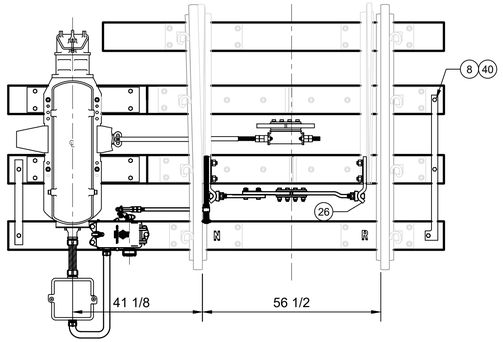
SCALE: NTS
FILENAME: STD-JSD416
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

SIGNALS
TYPICAL SWITCH MACHINE LAYOUT
BALLASTED TRACK

DRAWING No.: **STD-JSD416**
FACILITY ID:
SHEET No.:
REV: 0

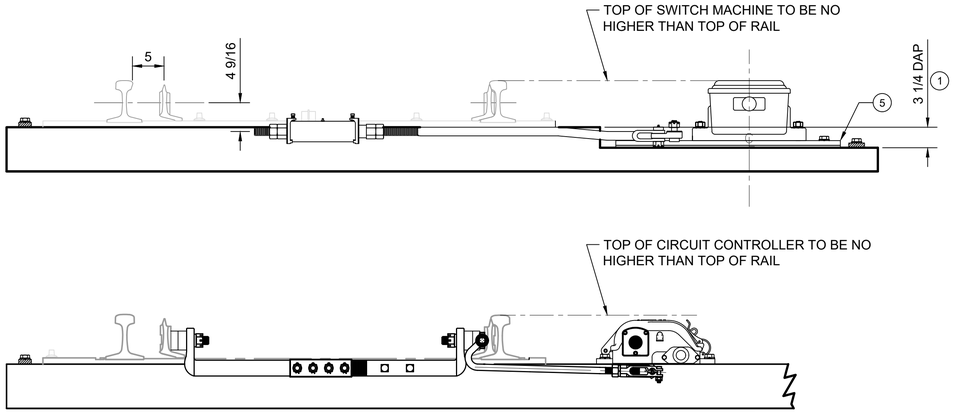


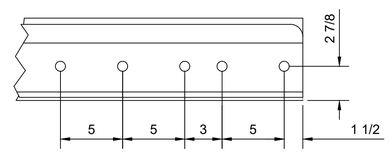


LEFT HAND LAYOUT
SCALE: NTS

NOTES:

1. LAYOUT APPLIED TO CONCRETE TIES. HARDWARE MOUNTS TO THREADED SLEEVES DIRECTLY CAST IN TO THE CONCRETE. DETAILS SHALL BE COORDINATED BETWEEN SIGNAL AND TRACK SUPPLIERS.
2. DRILL AND TAP HOLES, USING LETTERS AS TEMPLATES.
3. APPLY ANTI-SEIZE TO ALL SCREWS FASTENING TO THE TIE BEFORE ASSEMBLING.
4. POINT OF SWITCH (P.O.S) TO BE FLUSH WITH FACE OF TIE.
5. FURNISH ELASTOMERIC PAD UNDER STEEL MOUNTING PLATES.
6. JB CONNECTION SHALL BE HOSE WHICH CAN BE CUT TO FIT FIELD REQUIREMENTS.
7. SWITCH TIES SHALL BE PERPENDICULAR TO RAIL.
8. WHEN TRACK SPACING REQUIRES USE A FARSIDE POINT SWITCH LAYOUT
9. LAYOUT SHOWN USING ALSTOM MODEL 6 MACHINE AND 7K CONTROLLER. MODIFY AS REQUIRED IF USING OTHER PRODUCTS.
10. COORDINATE RAIL MOUNTING HARDWARE, BALLAST, AND ROD INSTALLATION TO FACILITATE CAL-ROD AND CRIB HEATER INSTALLATION.





POINT DRILLING DETAIL PER AREMA DETAIL 122
SCALE: NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

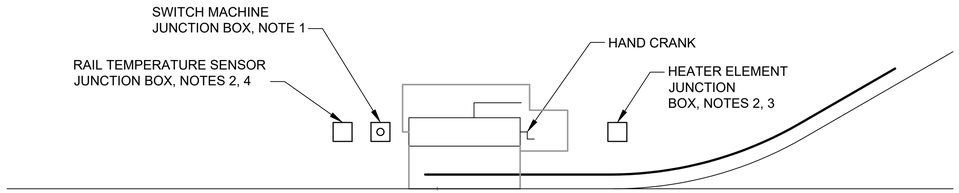
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JSD418
CONTRACT No.: RTA/LR
DATE: 2/2024

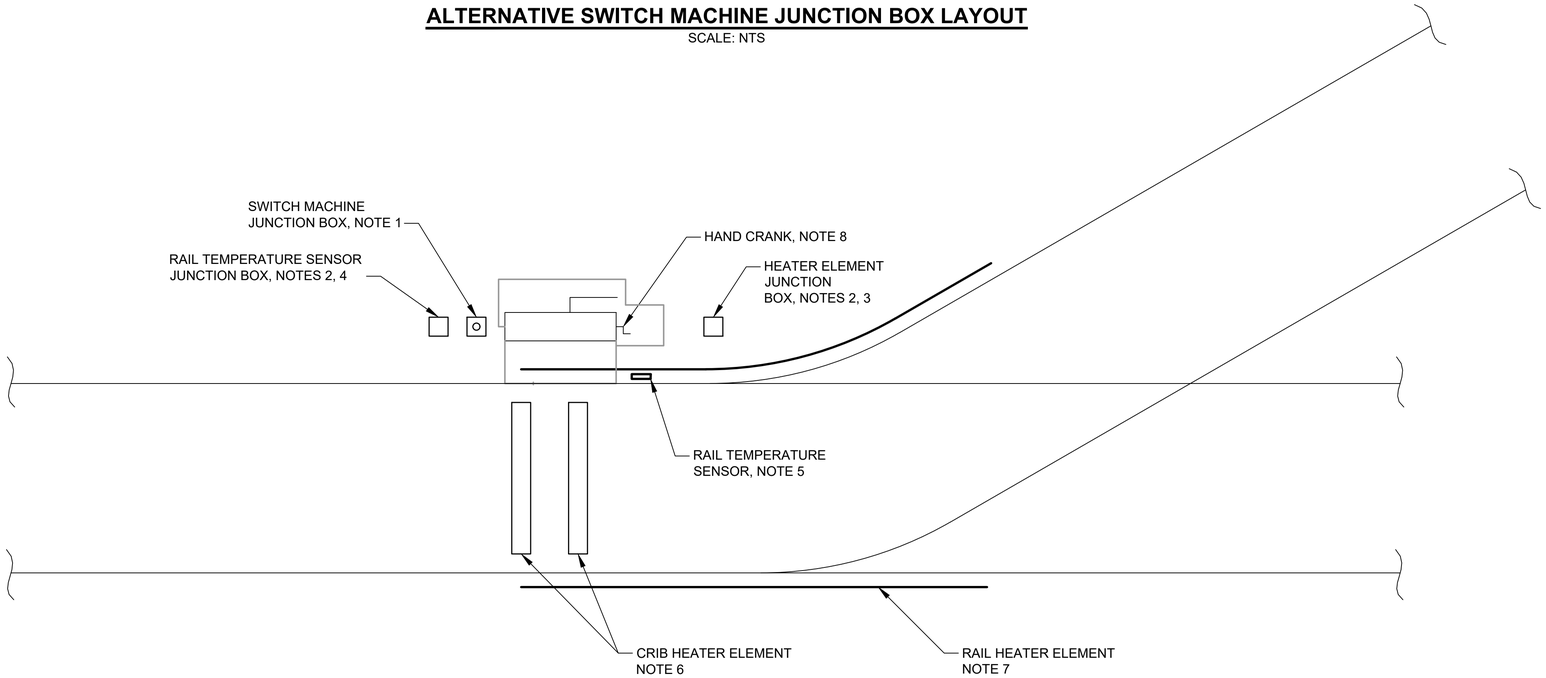
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
TYPICAL SWITCH MACHINE LAYOUT
FOR NO. 5 SWITCH IN YARDS

DRAWING No.: **STD-JSD418**
FACILITY ID:
SHEET No.: REV: 0



ALTERNATIVE SWITCH MACHINE JUNCTION BOX LAYOUT

SCALE: NTS



RAIL HEATER INSTALLATION

SCALE: NTS

NOTES:

1. FOR SWITCH MACHINE JUNCTION BOX AND LAYOUT SEE DWG STD-JSD415 OR STD-JSD417.
2. REQUIRED FOR ALL INSTALLATIONS, LOCATIONS THAT HEATING ELEMENTS ARE INSTALLED AND LOCATIONS THAT ARE "SWITCH HEATER READY."
3. FURNISH AND INSTALL A NEMA TYPE 4 OR 12 JUNCTION BOX FOR THE DISTRIBUTION OF ELECTRICAL POWER TO THE RAIL AND CRIB HEATING ELEMENTS. FURNISH AND INSTALL A 2" CONDUIT PATH FROM THE JUNCTION BOX TO THE SWITCH HEATER CONTROL CASE. INSTALL THE JUNCTION BOX ON THE OPPOSITE END OF THE SWITCH MACHINE FROM THE SWITCH MACHINE JUNCTION BOX OR OTHER SUITABLE LOCATION AS SPACE ALLOWS THAT DOES NOT INTERFERE WITH OTHER EQUIPMENT AND THE EMERGENCY EGRESS WALKWAY.
4. FURNISH AND INSTALL A NEMA TYPE 4 OR 12 JUNCTION BOX FOR THE CONNECTION TO RAIL TEMPERATURE SENSOR. FURNISH AND INSTALL A 1-1/4" CONDUIT PATH FROM THE JUNCTION BOX TO THE SWITCH HEATER CONTROL CASE.
5. FURNISH AND INSTALL A RAIL TEMPERATURE SENSOR CLIPPED TO THE RAIL WITHIN THE LENGTH OF THE HEATING ELEMENT.
6. FURNISH AND INSTALL CRIB HEATING ELEMENTS UNDER THE DETECTION, LOCK, AND THROW RODS TO PREVENT THE BUILDUP OF SNOW OR ICE FROM INTERFERING WITH THE OPERATION OF THE RODS. FOR DIRECT FIXATION TRACK, SECURE CRIB HEATING ELEMENT TO THE DECK ON STRUT OR OTHER APPROVED METHOD.
7. FURNISH AND INSTALL ROD TYPE HEATING ELEMENTS AT A MINIMUM FROM THE POINT OF THE SWITCH TO THE HEEL OF THE SWITCH TO PREVENT THE BUILDUP OF SNOW OR ICE FROM INTERFERING WITH THE MOVEMENT OF THE SWITCH POINTS.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

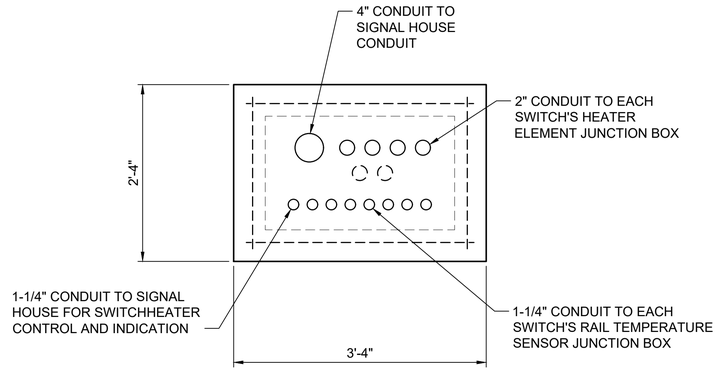
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD500
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

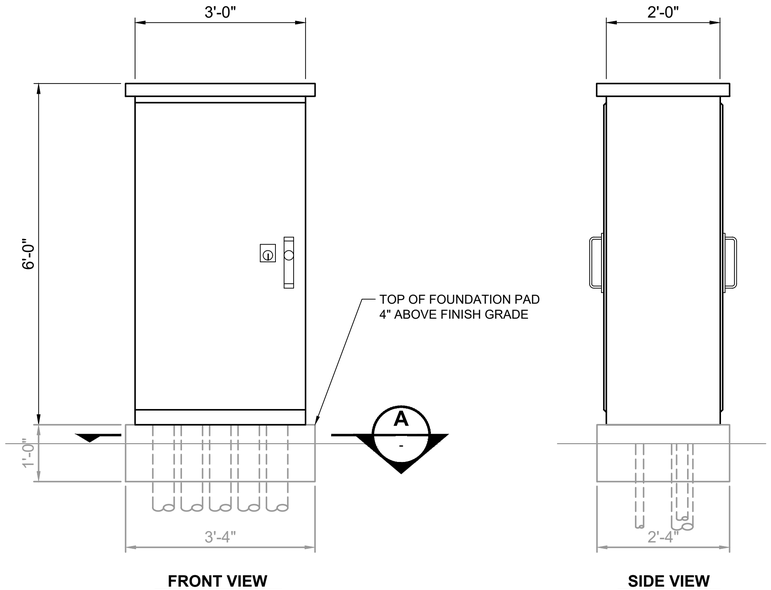
SIGNALS
TYPICAL SWITCH RAIL HEATER
INSTALLATION FOR MAINLINE

DRAWING No.: **STD-JSD500**
FACILITY ID:
SHEET No.: REV: 0



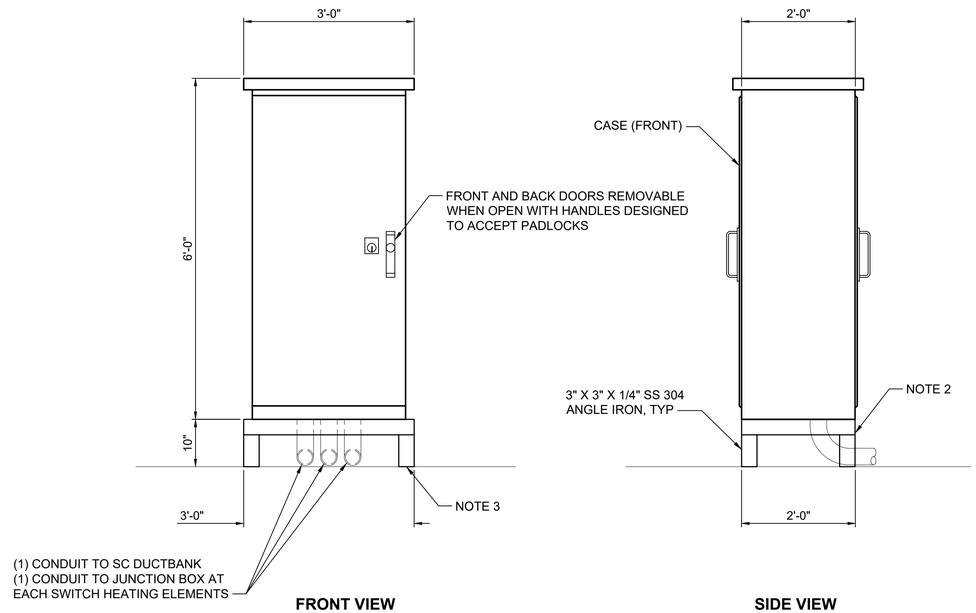
FOUNDATION PLAN VIEW A
SCALE: NTS

NOTES:
1. COAT ALL CUTS OF METAL STRUT WITH A CORROSION PROTECTION COMPOUND.
2. PROVIDE A SPRING NUT, HEX BOLT, FLAT WASHER, AND LOCK WASHER FOR ALL BOLTED CONNECTIONS.
3. PROVIDE AN ANCHOR, FLAT WASHER, AND LOCK WASHER FOR ALL ANCHOR CONNECTIONS.
4. PROVIDE LIQUID TIGHT HUBS FOR ALL CONDUIT ENTRANCES.



FRONT VIEW SIDE VIEW

TYPICAL SWITCH HEATER CASE - BALLAST TRACK 1
SCALE: NTS



FRONT VIEW SIDE VIEW

TYPICAL SWITCH HEATER CASE - DIRECT FIXATION 2
SCALE: NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JSD502
CONTRACT No.: RTA/LR
DATE: 2/2024

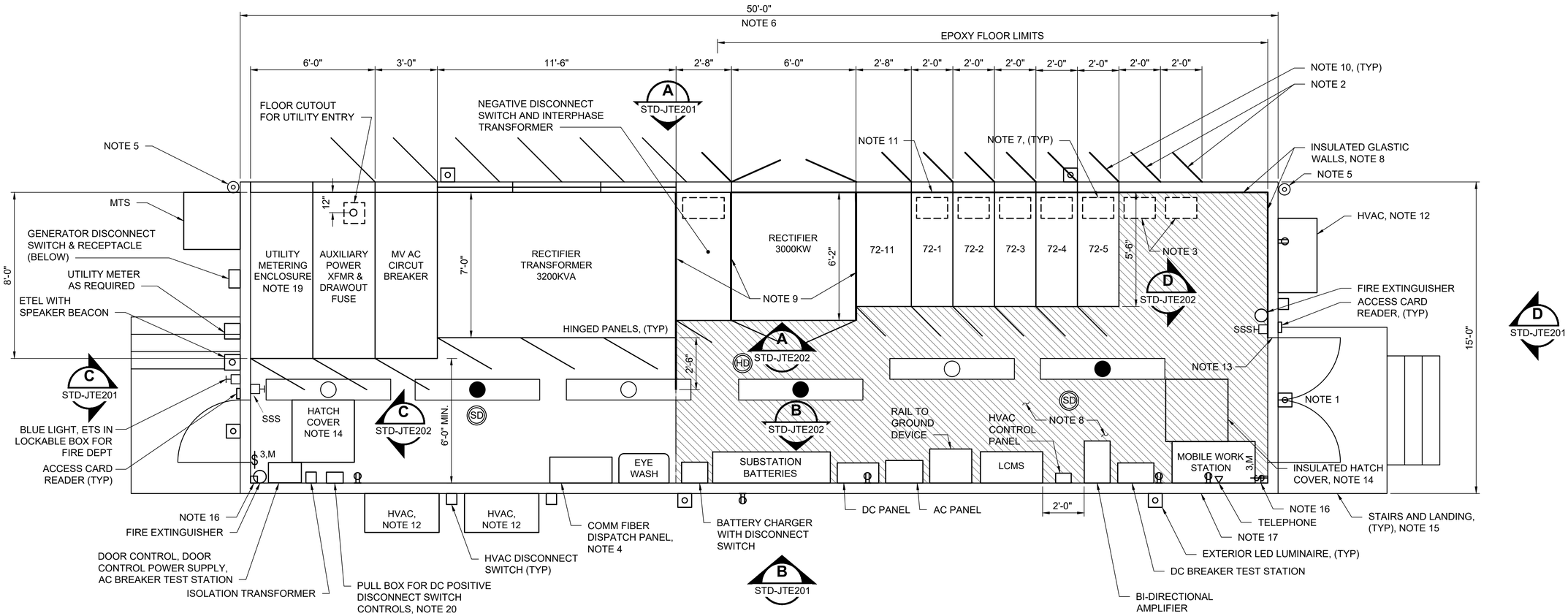
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
SIGNALS
TYPICAL SWITCH HEATER CONTROL PANEL INSTALLATION LAYOUT

DRAWING No.: **STD-JSD502**
FACILITY ID:
SHEET No.: REV: 0

03/21/24 | 12:52 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JSD502.DWG

GENERAL NOTES:

1. PROVIDE REMOVABLE TRANSOM AND WALL PANEL ABOVE DOOR.
2. PROVIDE TWO ADDITIONAL REAR ENTRY DOORS FOR ACCESS TO FUTURE DC FEEDER BREAKERS.
3. PROVIDE OPENING IN FLOOR FOR FUTURE FEEDER BREAKERS. COVER WITH 1/4" GLASTIC AND FASTEN TO FLOOR.
4. COMM TO DETERMINE FINAL LOCATION AND SIZE.
5. MOUNT CAMERAS AND CASES TO TPSS FOR WATER TEST AND REMOVE FOR SHIPMENT. REINSTALL AT SITE.
6. COORDINATE BUILDING DIMENSIONS WITH STRUCTURAL ENGINEER.
7. SIZE AND LOCATION OF DC CABLE ENTRANCES TO BE DETERMINED BY CONTRACTOR.
8. PROVIDE ELECTRICAL INSULATION ON ALL WALLS AND FLOOR IN AREAS SHOWN. IF 6' MINIMUM CANNOT BE ACHIEVED, LINE DOORS, FRAMES AND HARDWARE WITH INSULATION. FLOOR INSULATION TO EXTEND TO ALL 3 WALLS.
9. PROVIDE GLASTIC BARRIER BETWEEN RECTIFIER TRANSFORMER AND NEGATIVE DISCONNECT SWITCH. EXTEND GLASTIC 2'-6" BEYOND RECTIFIER TRANSFORMER, AS SHOWN. PROVIDE AN INSULATED SEALED FINISHED EDGE ON EXPOSED GLASTIC EDGE.
10. PROVIDE GLASTIC BARRIER INSIDE REAR DOOR TO COMPLETE WALL INSULATION WHEN DOOR IS CLOSED.
11. SPACE DC SWITCHGEAR AND RECTIFIER 2 INCHES OFF REAR WALL.
12. HVAC UNIT LAYOUT DESIGN IS FOR REFERENCE ONLY.
13. DOOR FRAMES AND DOORS TO BE INSULATED HERE REQUIRED TO MEET 6 FOOT MINIMUM FROM DC SWITCHGEAR TO GROUNDED OBJECT.
14. HATCH COVER SHALL BE RATED TO HANDLE MAXIMUM EQUIPMENT WEIGHT PER WAC 296-876 WITH PROTECTION OF THE FLOOR OPENING USING A GUARD MEETING WAC 296-880-40015
15. PROVIDE STAIRS, LANDINGS AND HANDRAIL.
16. PROVIDE CONTINUOUS GROUND BUS AROUND ENTIRE TPSS.
17. SEE DWG STD-JTD104 FOR TPSS BASEMENT.
18. NOT REQUIRED IF UTILITY USES EXTERNAL METERING CABINET.
19. NUMBER OF LIGHTS MUST BE SUFFICIENT TO MEET LIGHTING REQUIREMENTS.
20. LOCATE AND SIZE PULL BOX TO SUIT SITE CONDITIONS.



TPSS EQUIPMENT LAYOUT PLAN

SCALE: 3/8" = 1'-0"

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 3/8"=1'-0"
FILENAME: STD-JTP200
CONTRACT No.: RTA/LR
DATE: 2/2024

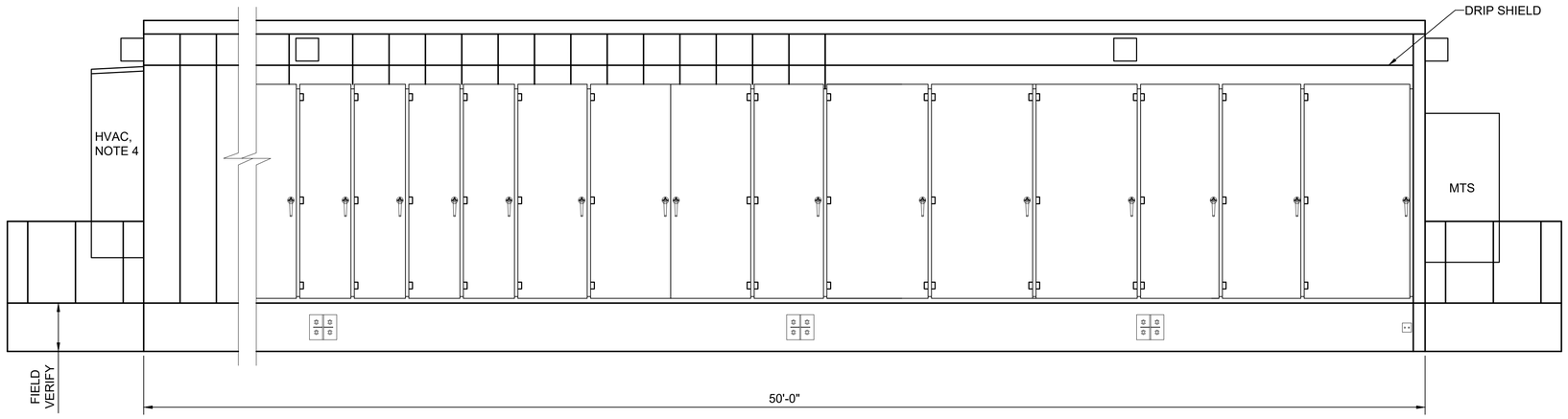
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

TRACTION POWER
TPSS EQUIPMENT LAYOUT PLAN

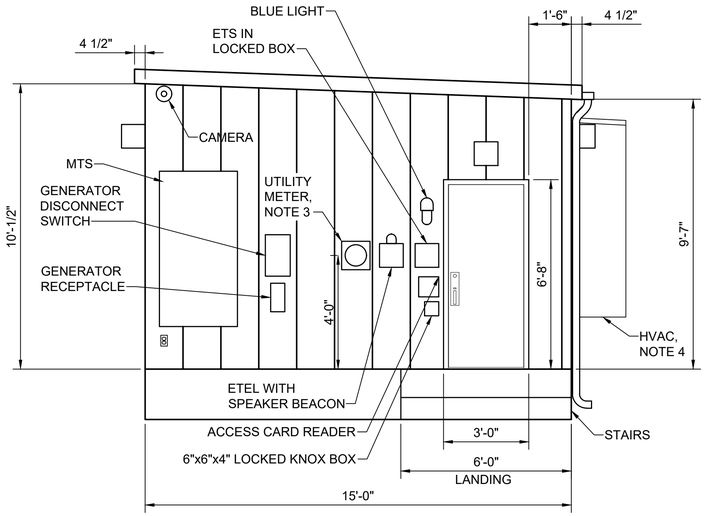
DRAWING No.: **STD-JTP200**
FACILITY ID:
SHEET No.: 1 REV:

GENERAL NOTES:

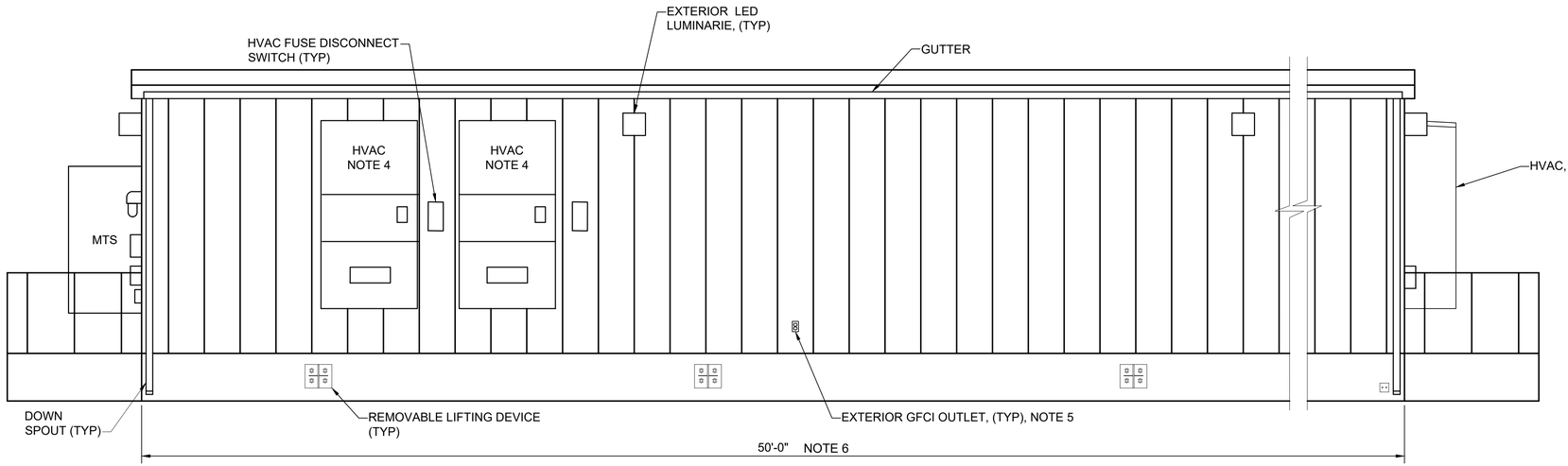
1. DIMENSIONS ARE APPROXIMATE. SUBMIT FINAL DIMENSIONS FOR APPROVAL.
2. PROVIDE 1'-8" REMOVABLE TRANSOM AND WALL PANEL ABOVE DOUBLE DOORS TO ALLOW FOR TOTAL OPENING OF 8'-4".
3. METERING EQUIPMENT AND SOCKET DETAILS SUBJECT TO REQUIREMENTS AND APPROVAL OF UTILITY.
4. HVAC UNIT DESIGN IS FOR REFERENCE ONLY.
5. PROVIDE SEPARATE CIRCUIT FOR EXTERIOR GFCI OUTLETS.
6. ADJUST TPSS LENGTH FOR TPSS WITH ADDITIONAL DC FEEDER CIRCUIT BREAKERS.



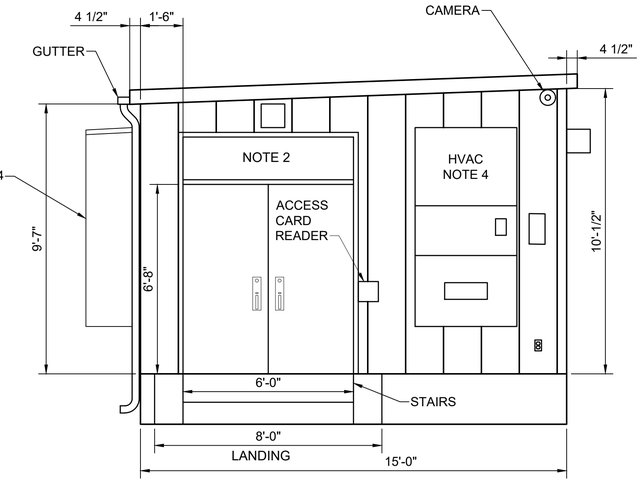
SECTION A
SCALE: 3/8" = 1'-0" STD-JTP200



SECTION C
SCALE: 3/8" = 1'-0" STD-JTP200



SECTION B
SCALE: 3/8" = 1'-0" STD-JTP200



SECTION D
SCALE: 3/8" = 1'-0" STD-JTP200

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: 3/8"=1'-0"
FILENAME: STD-JTE201
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

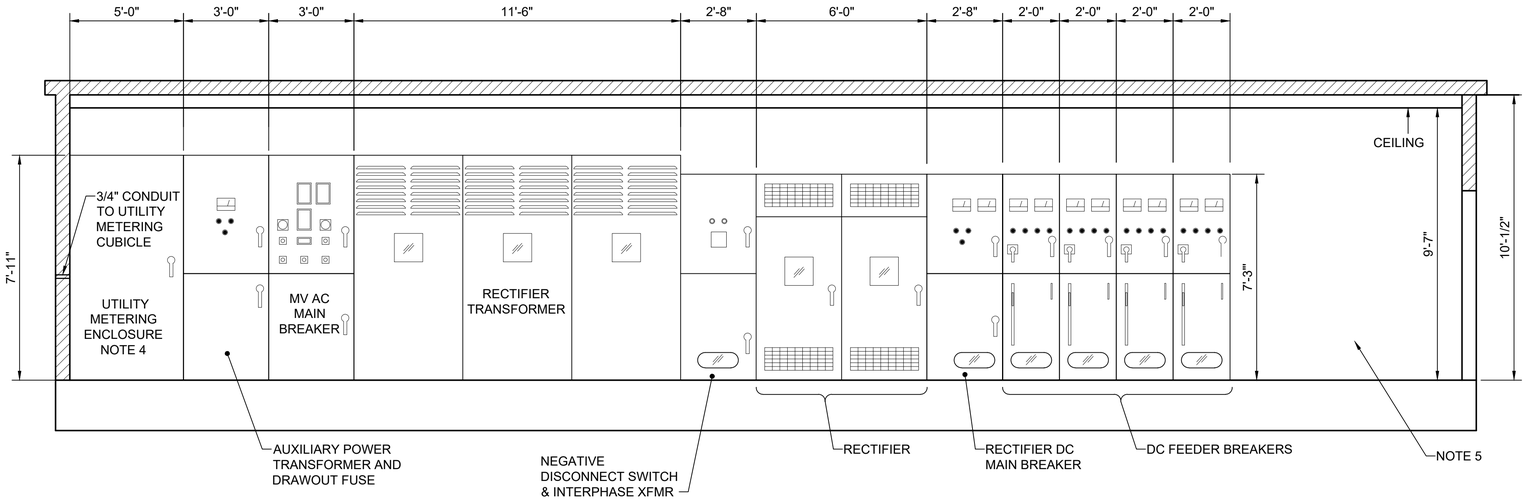
TRACTION POWER
TYPICAL PREFABRICATED TPSS EXTERIOR EQUIPMENT ELEVATION

DRAWING No.: **STD-JTE201**
FACILITY ID:
SHEET No.: REV: 1

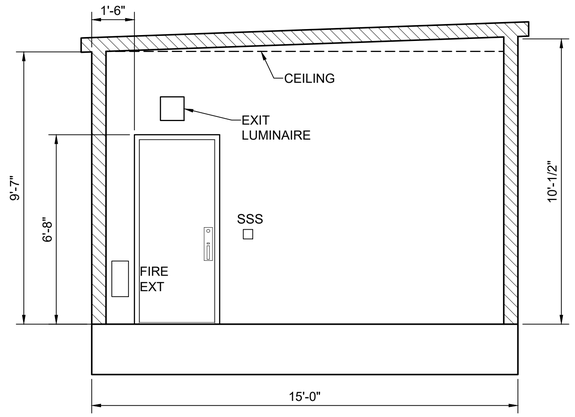
01/29/25 | 2:49 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JTE201.DWG

GENERAL NOTES:

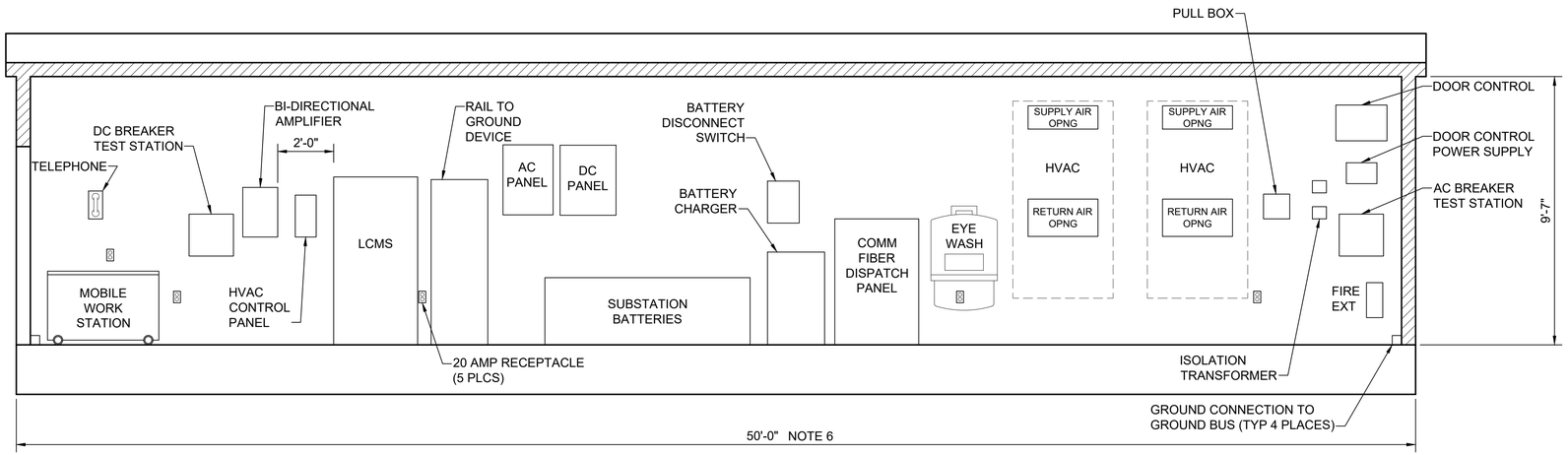
1. ALL DIMENSIONS ARE APPROXIMATE. SUBMIT FINAL DIMENSIONS FOR APPROVAL.
2. PROVIDE 1'-8" REMOVABLE TRANSOM ABOVE DOUBLE DOORS TO ALLOW FOR TOTAL OPENING OF 8'-4".
3. INSTALL 2" x 1/4" CONTINUOUS COPPER GROUND BUS AROUND ENTIRE TPSS.
4. UTILITY METERING ENCLOSURE SPACE SERVES AS EQUIPMENT STORAGE FOR PSE OR SNOHOMISH PUD FED TPSS.
5. EXTERIOR DOORS NOT SHOWN.
6. ADJUST TPSS LENGTH FOR TPSS WITH ADDITIONAL DC FEEDER CIRCUIT BREAKERS.
7. RACEWAY SYSTEMS NOT SHOWN.



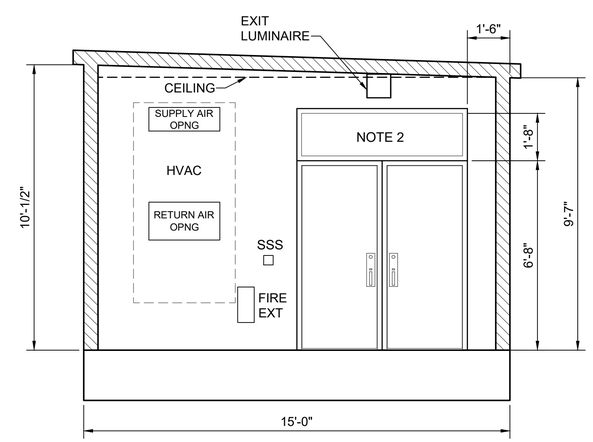
SECTION A
SCALE: 3/8" = 1'-0" STD-JTP200



SECTION C
SCALE: 3/8" = 1'-0" STD-JTP200



SECTION B
SCALE: 3/8" = 1'-0" STD-JTP200



SECTION D
SCALE: 3/8" = 1'-0" STD-JTP200

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

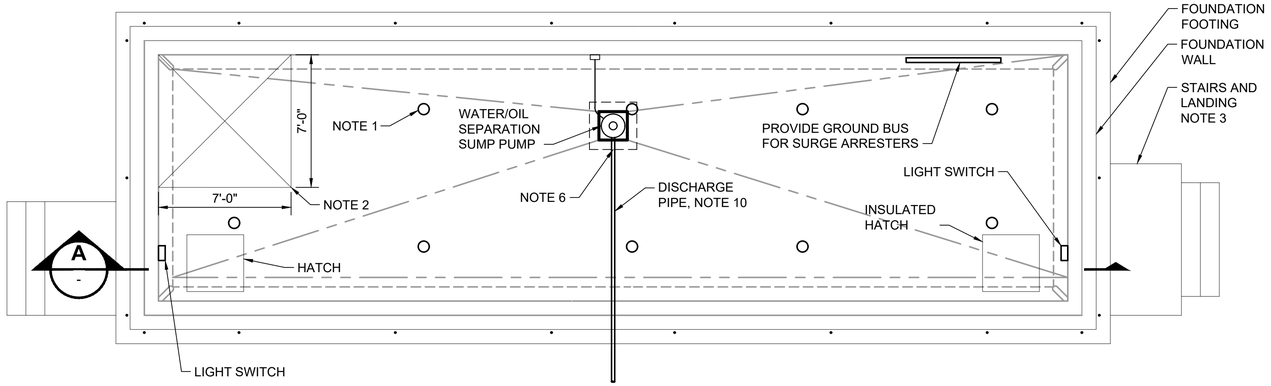
SCALE: 3/8" 1'=0"
FILENAME: STD-JTE202
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

TRACTION POWER
TYPICAL PREFABRICATED TPSS BUILDING
INTERIOR ELEVATIONS

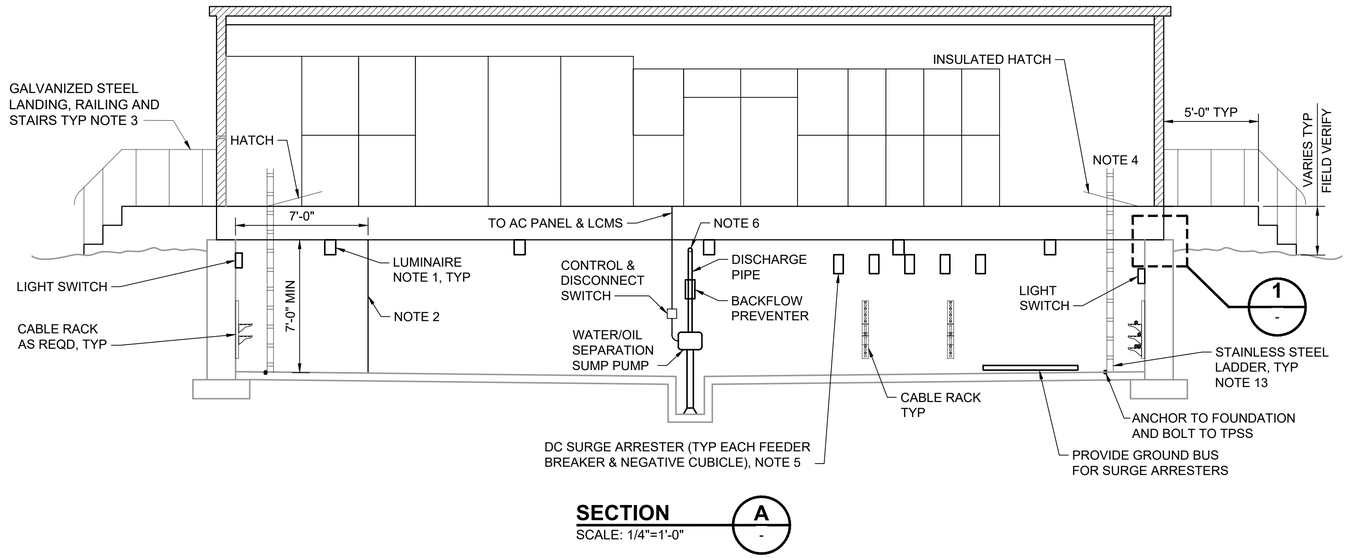
DRAWING No.: **STD-JTE202**
FACILITY ID:
SHEET No.: REV: 1

01/29/25 | 2:52 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JTE202.DWG



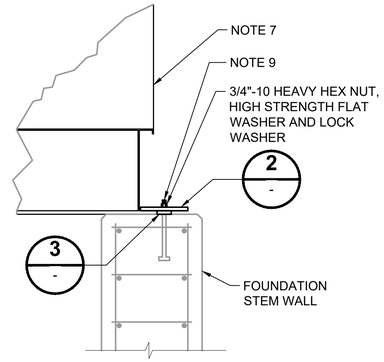
TPSS - BASEMENT EQUIPMENT LAYOUT PLAN

SCALE: 1/4" = 1'-0"



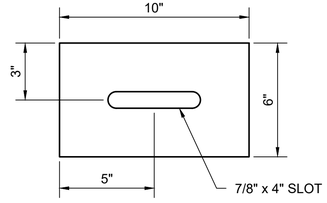
SECTION A

SCALE: 1/4"=1'-0"



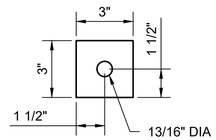
TYPICAL SUGGESTED ANCHOR BOLT DETAIL 1

SCALE: 3/4"=1'-0"



3/4" x 6" x 10" PLATE DETAIL 2

SCALE: 3"=1'-0"



3/4" x 3" x 3" PLATE DETAIL 3

SCALE: 3"=1'-0"

GENERAL NOTES:

1. PROVIDE LED VAPOR TIGHT LUMINAIRES ON UNDERSIDE OF PREFABRICATED TPSS.
2. IF REQUIRED BY UTILITY, PROVIDE 7' x 7' GALVANIZED PULLBOX FASTENED TO FOUNDATION FOR UTILITY FEED. AVOID CONDUITS AND CONDUCTORS IN PULLBOX AREA.
3. GROUND STAIRS & RAILINGS TO TPSS GROUND.
4. TWO ADDITIONAL RUNGS REQUIRED ON SLIDE UP SECTION.
5. REFER TO SPECIFICATIONS FOR SURGE ARRESTER REQUIREMENTS.
6. PUMP CONFIGURATION IS SCHEMATIC ONLY. DESIGN TEAM TO COORDINATE WITH UTILITY AND CIVIL DESIGN FOR APPLICATION OF PUMP. IF A PUMP IS NECESSARY, DESIGN TEAM TO DEVELOP CONSTRUCTION DETAILS, ACCOUNTING FOR INSTALLATION, OPERATION AND SAFETY.
7. BASE IS PART OF SUBSTATION.
8. PLATES, NUTS, WASHERS TO BE HOT DIP GALVANIZED OR EQUIVALENT & PROVIDED BY MANUFACTURER.
9. ANCHOR BOLT AND ANCHORAGE PLATE DETAIL SHOWN ARE TYPICAL. SUBMIT BUILDING ANCHORAGE PLANS AND CALCULATIONS SEALED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF WASHINGTON THAT SHOWS THE ANCHOR BOLT DETAILS AND THE NUMBER OF ANCHOR BOLTS TO BE USED. DESIGN THE BUILDING BASE SO THAT IT CAN BE SECURED TO THE FOUNDATION SHOWN IN THE CONTRACT DOCUMENTS.
10. CONNECT TO SITE DISCHARGE PIPE. OFFSET PIPE RUNS AS NECESSARY TO AVOID CONFLICT WITH CABLES AND RACEWAYS IN BASEMENT AND TO MAINTAIN 6'-0" MIN HEADROOM UNDER PIPES.
11. APPLY MASTIC SEALANT AROUND THE BUILDING BASE PERIMETER TO SEAL THE SUBSTATION TO THE FOUNDATION.
12. SIZE ANCHORAGE PLATE SUCH THAT PLATE 1 AND PLATE 2 VERTICAL EDGES ARE FLUSH.
13. COMPLIANT WITH WAC 296-876 AND ANSI 14.3.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: AS NOTED
FILENAME: STD-JTD104
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
TRACTION POWER
TRACTION POWER SUBSTATION ANCHORAGE DETAILS

DRAWING No.: STD-JTD104
FACILITY ID:
SHEET No.: 1
REV:

03/26/24 | 7:42 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JTD104.DWG

INCOMING FEEDER
FROM UTILITY NOTE 2

NOTE 3

TO AC DISTRIBUTION PANEL

AUXILIARY POWER TRANSFORMER
-120/240V
3Ø, 60HZ

NOTE 1

PROTECTION CT NOTE 6

POWER METER

NOTE 9

Xnn-MVB-401
1200A

METERING CT, NOTES 3, 6

TRANSFORMER RECTIFIER
UNIT, UTILITY ##KV AC-1500 VDC
12 PULSE, 3.0MW, IEEE 1653.2, CIRCUIT 31

Xnn-RT1, RT2

NOTE 8

FCC / FCR

NOTE 4

TPSS

SCALE
0-2000V

Xnn-H-711
6000A

Xnn-N-901
89N
6000A

NOTE 1

SSS INTERNAL

SCALE
0 TO 6000A

6000A, 1500 VDC, POSITIVE DC BUS

RECTIFIER ENCLOSURE

DC FEEDER ENCLOSURE

NEG ENCLOSURE

NEGATIVE DC BUS, 6000A

GND BUS

100A

NOTE 7

FUTURE UTILITY CONNECTION

NOTE 5

(8) 500 KCMIL

TO NEGATIVE RETURN RAILS

	TRANSFER TRIP TO/FROM ADJACENT TPSS	TRANSFER TRIP TO/FROM TPSS	TRANSFER TRIP TO/FROM TPSS	TRANSFER TRIP TO/FROM TPSS
	Xnn--H-703	BKR Xnn-H-704	BKR Xnn-H-701	BKR Xnn-H-702
	72-1	72-2	72-3	72-4
	Xnn-H-701	Xnn-H-702	Xnn-H-703	Xnn-H-704
	4000A	4000A	4000A	4000A
SCALE	-4000 TO 4000A	-4000 TO 4000A	-4000 TO 4000A	-4000 TO 4000A
	4000A 50mV	4000A 50mV	4000A 50mV	4000A 50mV
SCALE	0 TO 2000V	0 TO 2000V	0 TO 2000V	0 TO 2000V
	NOTE 5	NOTE 5	NOTE 5	NOTE 5
	(3) 500KCMIL	(3) 500KCMIL	(3) 500KCMIL	(3) 500KCMIL
	TO TPSS DISCONNECT SWITCHES	TO TPSS DISCONNECT SWITCHES	TO TPSS DISCONNECT SWITCHES	TO TPSS DISCONNECT SWITCHES

GENERAL NOTES:

1. COORDINATE INTERLOCKING REQUIREMENTS WITH ST.
2. PROVIDE REVENUE METERING FACILITY IN ACCORDANCE WITH UTILITY REQUIREMENTS.
3. POWER METERING CT'S AND PT'S TO BE REVENUE ACCURACY.
4. ETS SHALL BE MOUNTED ON EXTERIOR OF TPSS BUILDING.
5. MOUNT SURGE ARRESTER ON WALL OF CABLE VAULT UNDER TPSS. PROTECT AGAINST LIVE PARTS.
6. SUBMIT TYPE AND SIZING CALCULATION OF CT'S FOR APPROVAL.
7. DRAINAGE CONTRACTOR SHALL BE CONTROLLED BY 72-11. CONTRACTOR SHALL BE OPENED WHEN 72-11 IS OPEN AND CLOSED WHEN 72-11 IS CLOSED.
8. COORDINATE FCC/FCR ETS DESIGN WITH ST.
9. REFER TO SPECIFICATIONS FOR POWER METER REQUIREMENTS.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY: -
DRAWN BY: -
CHECKED BY: -
APPROVED BY: -

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JTS100
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

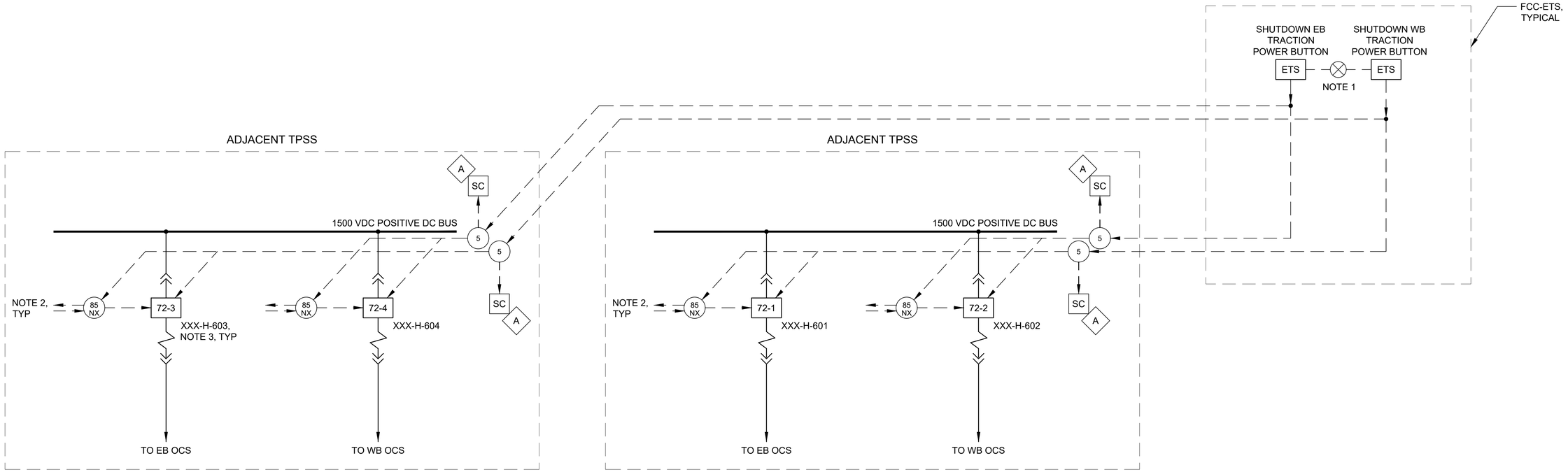
TRACTION POWER
SYSTEMS TYPICAL PREFABRICATED TPSS
LINE DIAGRAM FOR 12.5KV & 26 KV TPSS

DRAWING No.: STD-JTS100
FACILITY ID: -
SHEET No.: - REV: 2

03/21/24 | 12:55 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JTS100.DWG

GENERAL NOTES:

1. CONTROL VOLTAGE SUPERVISION LAMP.
2. WHEN TPSS IS IN BYPASS, TRANSFER TRIP TO BREAKER FEEDING THE SAME OCS SECTION FROM THE NEXT TPSS.



SCHEMATIC DIAGRAM

NTS

SEE NOTE 2

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JTS101
CONTRACT No.: RTA/LR
DATE: 2/2024

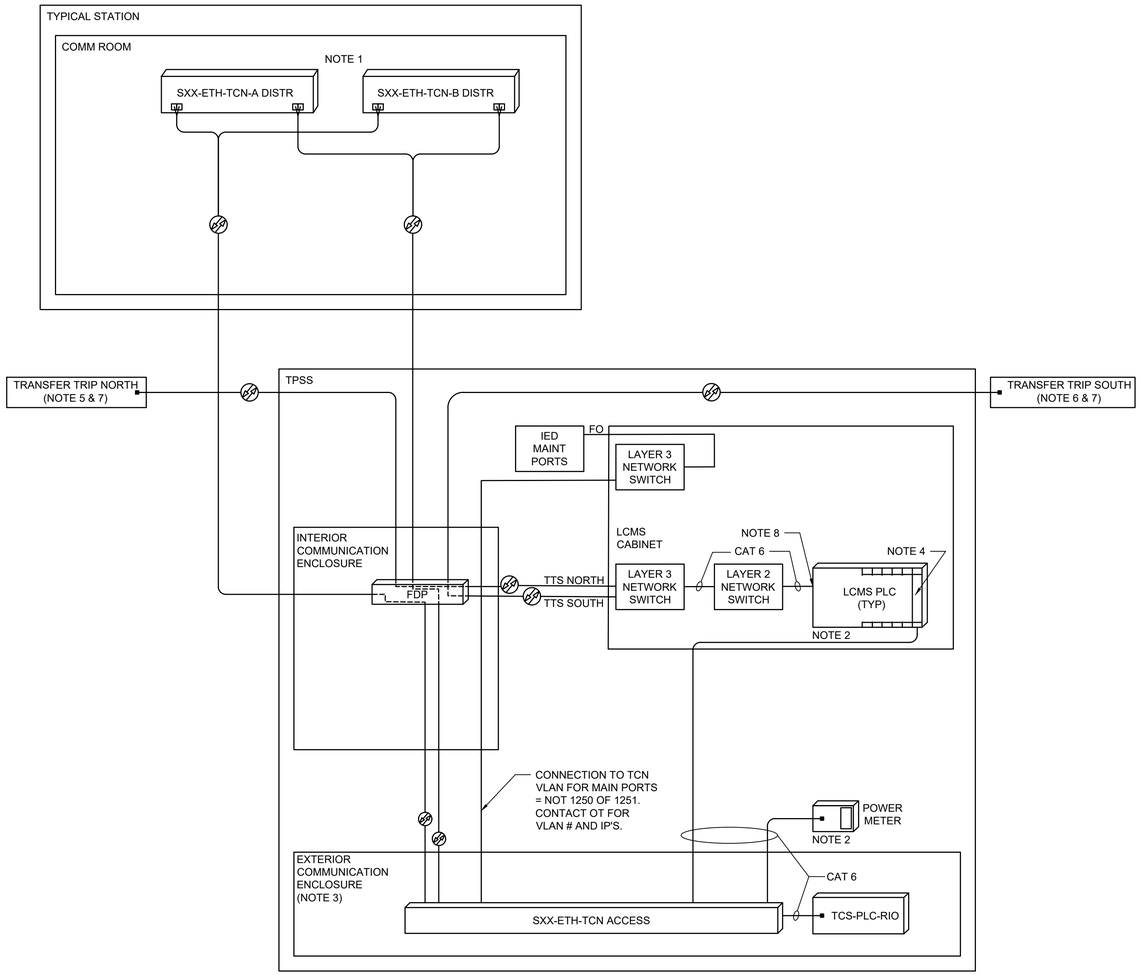
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

TRACTION POWER
SYSTEMS TYPICAL PREFABRICATED TPSS
ONE LINE DIAGRAM FOR 12.5KV & 26 KV TPSS

DRAWING No.: **STD-JTS101**
FACILITY ID:
SHEET No.: 2
REV:

GENERAL NOTES:

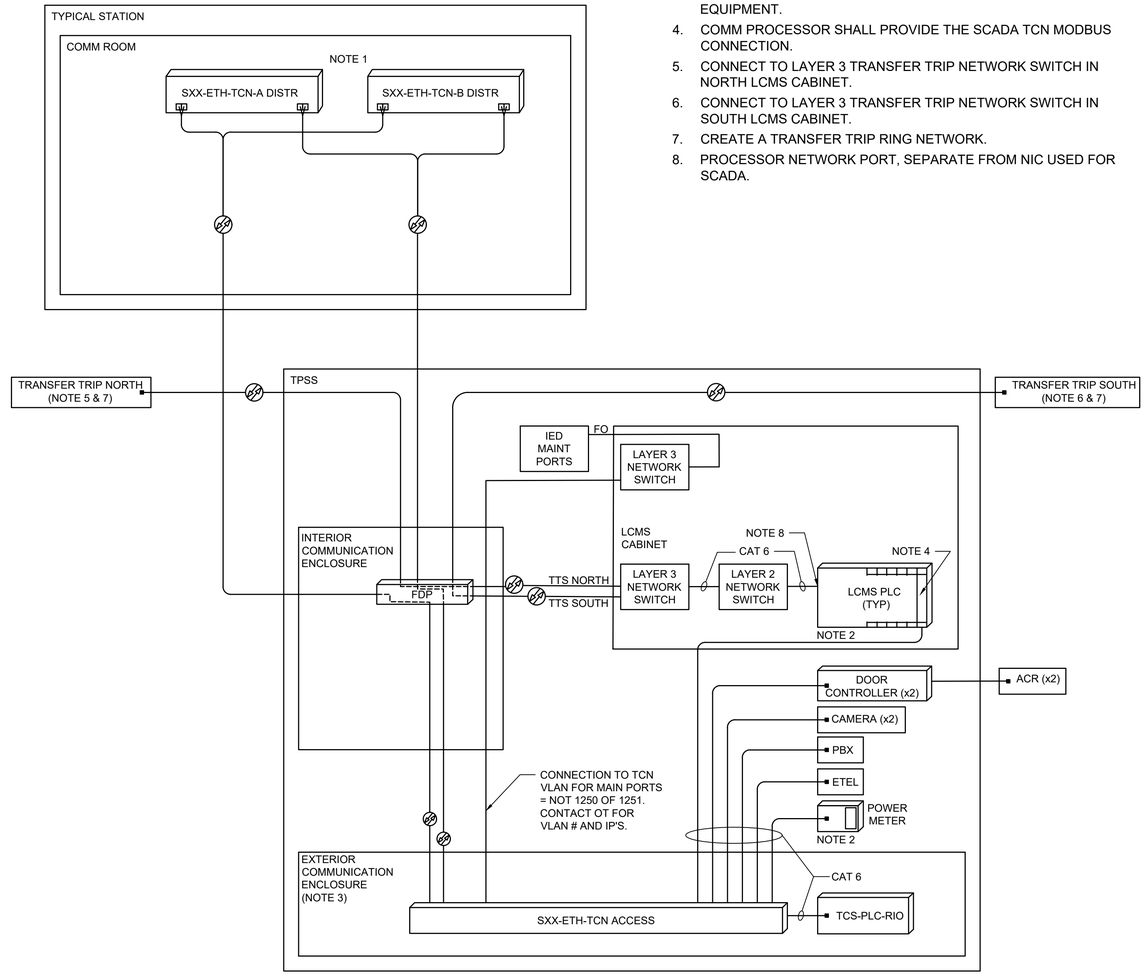
1. CONNECT TCN EXPANSION TO EXISTING TCN BACKBONE.
2. SEE SPEC SECTION 34 21 16.23 FOR LCMS REQUIREMENTS AND SECTION 29 09 16 FOR POWER METER REQUIREMENTS. POWER METER SHALL BE COMPATIBLE AND INTEGRATED WITH THE EXISTING SOUND TRANSIT POWER MONITORING SYSTEM.
3. CABINET ON SIDE OF TPSS HOUSES COMMUNICATIONS EQUIPMENT.
4. COMM PROCESSOR SHALL PROVIDE THE SCADA TCN MODBUS CONNECTION.
5. CONNECT TO LAYER 3 TRANSFER TRIP NETWORK SWITCH IN NORTH LCMS CABINET.
6. CONNECT TO LAYER 3 TRANSFER TRIP NETWORK SWITCH IN SOUTH LCMS CABINET.
7. CREATE A TRANSFER TRIP RING NETWORK.
8. PROCESSOR NETWORK PORT, SEPARATE FROM NIC USED FOR SCADA.



TYPICAL TPSS ROOM BLOCK DIAGRAM

NTS

1
-



TYPICAL TPSS BUILDING BLOCK DIAGRAM

NTS

2
-

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
3	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
2	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
1	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATES
0	8/2017	----	----	----	GUIDANCE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JTS307
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

COMMUNICATIONS
TPSS INTERFACE
BLOCK DIAGRAM

DRAWING No.: **STD-JTS307**
FACILITY ID:
SHEET No.: 3
REV:

TABLE 1 - OVERHEAD CONDUCTOR PARTICULARS

CONDUCTOR PARTICULARS	UNITS	OPEN ROUTE - MAIN LINE AUTO-TENSIONED SIMPLE CATENARY	
		CONTACT WIRE	MESSENGER WIRE
CONDUCTOR TYPE	-	350 KCMIL SOLID GROOVED	500 KCMIL 19 STRAND
MATERIAL	-	HARD DRAWN COPPER	HARD DRAWN COPPER
DIAMETER	IN	0.620	0.811
CROSS SECTIONAL AREA	SQ IN	0.2758	0.3928
CONDUCTOR BREAKING STRENGTH	LB	11810	21590
MODULUS OF ELASTICITY	PSI	17000000	17000000
COEFFICIENT OF THERMAL EXPANSION	/°F	0.0000094	0.0000094
WEIGHT OF CONDUCTOR	LB/FT	1.063	1.544
WEIGHT OF HANGERS (ASSUMED)	LB/FT	0.032	
WEIGHT OF SYSTEM	LB/FT	2.639	
OPERATING (O) ICE THICKNESS	IN	0.25	0.5
ICE WEIGHT	LB/FT	0.270	0.815
WEIGHT OF SYSTEM WITH ICE (O)	LB/FT	3.724	
NON-OPERATING (NO) ICE THICKNESS	IN	0.5	0.5
ICE WEIGHT	LB/FT	0.696	0.815
WEIGHT OF SYSTEM WITH ICE (NO)	LB/FT	4.150	
EQUIVALENT SPAN LENGTH FOR TENSION CALCULATIONS	FT	145	145
CONDUCTOR TENSIONS AT:			
5° F, NO WIND, NO ICE	LB	3300	5000
60° F, NO WIND	LB	3300	5000
130° F, NO WIND	LB	3300	5000
0° F, NO ICE, 55 MPH WIND	LB	3431	5199
0° F, WITH ICE (O), 40 MPH WIND	LB	3680	5576
0° F, WITH ICE (NO), 70 MPH WIND	LB	3910	5924
FACTOR OF SAFETY (MINIMUM)		3.02	3.64
SPAN LENGTH (MAXIMUM)	FT	220	
CONDUCTOR SAG:			
5° F, NO WIND	FT	0	3.193
60° F, NO WIND	FT	0	3.193
130° F, NO WIND	FT	0	3.193
32° F, WITH ICE (NO), NO WIND (UNLOCKED)	FT	1.829	5.022
NORMAL SYSTEM HEIGHT	FT	4.0	
NORMAL CONTACT WIRE HEIGHT	FT	20.5	-
NORMAL CONTACT WIRE HEIGHT: AERIAL STRUCTURE	FT	16.0	-

CONDUCTOR PARTICULARS	UNITS	OPEN ROUTE - MAIN LINES (SCAT)	
		CONTACT WIRE	MESSENGER WIRE
WORN CONDUCTOR:			
WORN (CONTACT CONDITION) PERMISSIBLE WEAR	% OF AREA	30	N/A
WEIGHT OF WORN CONDUCTOR	LB/FT	0.744	1.544
WEIGHT OF WORN SYSTEM	LB/FT	2.320	
WORN ICE WEIGHT (O)	LB/FT	0.21	0.815
WEIGHT OF WORN SYSTEM WITH ICE (O)	LB/FT	3.348	
WORN ICE WEIGHT (NO)	LB/FT	0.61	0.815
WEIGHT OF WORN SYSTEM WITH ICE (NO)	LB/FT	3.749	
CONDUCTOR TENTIONS AT:			
0° F, WITH ICE (NO), 70 MPH WIND	LB	3910	5924
CONDUCTOR BREAKING STRENGTH	LB	8267	21590
FACTOR OF SAFETY	LB	2.11	3.64

GENERAL NOTES:

1. ICE CONDITIONS:
   (O) 1/4" ON CONTACT WIRE, 1/2" ON MESSENGER WIRE
   (NO) 1/2" ON CONTACT WIRE, 1/2" ON MESSENGER WIRE
2. MAXIMUM WIND SPEED FOR STRUCTURAL DESIGN = 70 MPH (NO)
3. MAXIMUM WIND SPEED FOR LRV OPERATIONS = 55 MPH (O)
4. DROOP IS THE SAG OF THE CONTACT WIRE FROM NORMAL CONTACT WIRE HEIGHT AT 60°F. FOR SIMPLE CATENARY, CONTACT WIRE SAG VALUE INCLUDES MESSENGER SAG CHANGES.
5. WIND CONDITIONS:
   (O) 55 MPH WITHOUT ICE
   (O) 40 MPH WITH ICE
   (NO) 70 MPH WITH ICE

LEGEND:

(O) IS OPERATING CONDITION
(NO) IS NON-OPERATING CONDITION

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD100
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS CONDUCTOR CHARACTERISTICS
SCAT

DRAWING No.: **STD-JOD100**
FACILITY ID:
SHEET No.: 1
REV:

TABLE 1 - OVERHEAD CONDUCTOR PARTICULARS			
CONDUCTOR PARTICULARS	**UNITS**	**MAIN LINE FIXED TERMINATED SIMPLE CATENARY**	
		CONTACT WIRE	**MESSENGER WIRE**
CONDUCTOR TYPE	-	350 KCMIL SOLID GROOVED	500 KCMIL 19 STRAND
MATERIAL	-	HARD DRAWN COPPER	HARD DRAWN COPPER
DIAMETER	IN	0.620	0.811
CROSS SECTIONAL AREA	SQ IN	0.2758	0.3928
CONDUCTOR BREAKING STRENGTH	LB	11810	21590
MODULUS OF ELASTICITY	PSI	17000000	17000000
COEFFICIENT OF THERMAL EXPANSION	/°F	0.0000094	0.0000094
WEIGHT OF CONDUCTOR	LB/FT	1.063	1.544
WEIGHT OF HANGERS (ASSUMED)	LB/FT	0.032	
WEIGHT OF SYSTEM	LB/FT	2.639	
EQUIVALENT SPAN LENGTH FOR TENSION CALCULATIONS	FT	22	66
CONDUCTOR TENSIONS AT:			
60° F, NO WIND	LB	3300	5000
40° F, 55 MPH WIND	LB	4160	6150
120° F, 55 MPH WIND	LB	863	2410
MINIMUM FACTOR OF SAFETY		2.84	3.51
SPAN LENGTH (MAXIMUM)	FT	80	
CONDUCTOR SAG:			
60° F, NO WIND	FT	0	0.422
40° F, 55 MPH WIND	FT	-0.079	0.343
120° F, 55 MPH WIND	FT	0.454	0.876
NORMAL SYSTEM HEIGHT	FT	1.3	
NORMAL CONTACT WIRE HEIGHT	FT	13'-10"	-

CONDUCTOR PARTICULARS	UNITS	MAIN LINES (SCFT)	
		CONTACT WIRE	**MESSENGER WIRE**
WORN CONDUCTOR:			
WORN (CONTACT CONDITION) PERMISSIBLE WEAR	% OF AREA	30	N/A
WEIGHT OF WORN CONDUCTOR	LB/FT	0.744	1.544
WEIGHT OF WORN SYSTEM	LB/FT	2.320	
CONDUCTOR TENTIONS AT:			
40° F, 55 MPH WIND	LB	4160	6150
CONDUCTOR BREAKING STRENGTH	LB	8267	21590
MINIMUM FACTOR OF SAFETY	LB	1.99	3.51

GENERAL NOTES:

1. MAXIMUM WIND SPEED FOR LRV OPERATIONS = 55 MPH.
2. DROOP IS THE SAG OF THE CONTACT WIRE FROM NORMAL CONTACT WIRE HEIGHT AT 60°F. FOR SIMPLE CATENARY, CONTACT WIRE SAG VALUE INCLUDES MESSENGER SAG CHANGES.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD101
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS CONDUCTOR CHARACTERISTICS
SCFT

DRAWING No.: **STD-JOD101**
FACILITY ID:
SHEET No.: 1 REV:

20' - 6" CONTACT WIRE HEIGHT, BALLAST TRACK				
SPAN (FT)	MINIMUM TRACK RADIUS (FT)	VERSINE (FT)	CONTACT WIRE BLOW OFF (IN)	PERMISSIBLE MID SPAN OFFSET (IN)
20	27	1.85	0.07	8.17
30	61	1.84	0.16	8.08
40	109	1.83	0.29	7.95
50	172	1.82	0.45	7.79
60	250	1.80	0.65	7.59
70	344	1.78	0.89	7.35
80	455	1.76	1.16	7.08
90	585	1.73	1.47	6.77
100	734	1.70	1.82	6.42
110	906	1.67	2.20	6.04
120	1101	1.64	2.62	5.62
130	1322	1.60	3.07	5.17
140	1574	1.56	3.56	4.68
150	1859	1.51	4.09	4.15
160	2183	1.47	4.65	3.59
170	2552	1.42	5.25	2.99
180	2972	1.36	5.89	2.35
190	3454	1.31	6.56	1.68
200	4008	1.25	7.27	0.97
210	4651	1.19	8.02	0.22
215	5011	1.15	8.40	NOT PERMISSIBLE
220	5401	1.12	8.80	NOT PERMISSIBLE

16' - 0" CONTACT WIRE HEIGHT, BALLAST TRACK				
SPAN (FT)	MINIMUM TRACK RADIUS (FT)	VERSINE (FT)	CONTACT WIRE BLOW OFF (IN)	PERMISSIBLE MID SPAN OFFSET (IN)
20	23	2.13	0.07	10.54
30	53	2.12	0.16	10.45
40	95	2.11	0.29	10.32
50	149	2.10	0.45	10.16
60	216	2.08	0.65	9.96
70	297	2.06	0.89	9.72
80	393	2.04	1.16	9.45
90	503	2.01	1.47	9.14
100	630	1.98	1.82	8.79
110	775	1.95	2.20	8.41
120	939	1.92	2.62	7.99
130	1125	1.88	3.07	7.54
140	1334	1.84	3.56	7.05
150	1568	1.79	4.09	6.52
160	1832	1.75	4.65	5.96
170	2130	1.70	5.25	5.36
180	2465	1.64	5.89	4.72
190	2843	1.59	6.56	4.05
200	3272	1.53	7.27	3.34
210	3760	1.47	8.02	2.59
215	4030	1.43	8.40	2.21
220	4319	1.40	8.80	1.81

13' - 10" CONTACT WIRE HEIGHT, BALLAST TRACK				
SPAN (FT)	MINIMUM TRACK RADIUS (FT)	VERSINE (FT)	CONTACT WIRE BLOW OFF (IN)	PERMISSIBLE MID SPAN OFFSET (IN)
20	22	2.22	0.07	11.68
30	51	2.22	0.16	11.59
40	91	2.21	0.29	11.46
50	143	2.19	0.45	11.30
60	207	2.17	0.65	11.10
70	284	2.16	0.89	10.86
80	375	2.13	1.16	10.59
90	481	2.11	1.47	10.28
100	602	2.08	1.82	9.93
110	739	2.05	2.20	9.55
120	895	2.01	2.62	9.13
130	1071	1.97	3.07	8.68
140	1268	1.93	3.56	8.19
150	1489	1.89	4.09	7.66
160	1738	1.84	4.65	7.10
170	2017	1.79	5.25	6.50
180	2330	1.74	5.89	5.86
190	2682	1.68	6.56	5.19
200	3080	1.62	7.27	4.48
210	3531	1.56	8.02	3.73
215	3779	1.53	8.40	3.35
220	4044	1.50	8.80	2.95

13' - 0" CONTACT WIRE HEIGHT, BALLAST TRACK				
SPAN (FT)	MINIMUM TRACK RADIUS (FT)	VERSINE (FT)	CONTACT WIRE BLOW OFF (IN)	PERMISSIBLE MID SPAN OFFSET (IN)
20	22	2.26	0.07	12.12
30	50	2.25	0.16	12.03
40	89	2.24	0.29	11.90
50	140	2.23	0.45	11.74
60	204	2.21	0.65	11.54
70	279	2.19	0.89	11.30
80	369	2.17	1.16	11.03
90	472	2.14	1.47	10.72
100	591	2.11	1.82	10.37
110	726	2.08	2.20	9.99
120	879	2.05	2.62	9.57
130	1051	2.01	3.07	9.12
140	1244	1.97	3.56	8.63
150	1461	1.92	4.09	8.10
160	1704	1.88	4.65	7.54
170	1976	1.83	5.25	6.94
180	2282	1.77	5.89	6.30
190	2625	1.72	6.56	5.63
200	3012	1.66	7.27	4.92
210	3450	1.60	8.02	4.17
215	3691	1.57	8.40	3.79
220	3948	1.53	8.80	3.39

GENERAL NOTES:

1. THESE TABLES HAVE BEEN DETERMINED FOR WIND SPEEDS OF 55 MPH.
2. FOR DESIGN CONSIDERATIONS THE MAXIMUM SPAN IS REDUCED BY 5 FEET TO CATER FOR SITE ADJUSTMENTS IF OBSTRUCTIONS ARE ENCOUNTERED.
3. THE PERMISSIBLE MID SPAN OFFSET IS THE DEVIATION OF THE STATIC CONTACT WIRE FROM THE SUPER ELEVATED CENTERLINE OF TRACK AT MID SPAN.
4. MAXIMUM STAGGER = 12" AT 16'-0" CONTACT WIRE HEIGHT.
5. MAXIMUM STAGGER = 11" AT 20'-6" CONTACT WIRE HEIGHT.
6. CONTACT WIRE INSTALLATION
   TOLERANCE = ± 1 INCH.
7. IN THE VICINITY OF GRADE CROSSINGS THE MAXIMUM SPAN SHOULD BE REDUCED BY 10'-0"
8. EXAMPLE SPAN DETERMINATION:
   GIVEN - RADIUS OF CURVATURE = 3100 FT ON BALLASTED TRACK AT 16'-0" CONTACT WIRE HEIGHT.
   FIND - MAXIMUM CONSTRUCTED SPAN = 196 FT
   - MAXIMUM DESIGN SPAN = 191 FT
   - PERMISSIBLE MIDSPAN OFFSET = 3.6 IN
9. USE LINEAR INTERPOLATION FOR INTERMEDIATE SPAN LENGTHS.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD102
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS BALLASTED TRACK BLOW OFF & MIDSPAN OFFSET

DRAWING No.: **STD-JOD102**
FACILITY ID:
SHEET No.: 1
REV:

20' - 6" CONTACT WIRE HEIGHT, EMBEDDED OR DIRECT FIXATION TRACK

SPAN (FT)	MINIMUM TRACK RADIUS (FT)	VERSINE (FT)	CONTACT WIRE BLOW OFF (IN)	PERMISSIBLE MID SPAN OFFSET (IN)
20	22	2.28	0.07	12.34
30	50	2.27	0.16	12.25
40	88	2.26	0.29	12.13
50	139	2.25	0.45	11.96
60	202	2.23	0.65	11.76
70	277	2.21	0.89	11.53
80	366	2.19	1.16	11.25
90	468	2.16	1.47	10.94
100	586	2.13	1.82	10.60
110	720	2.10	2.20	10.22
120	871	2.07	2.62	9.80
130	1041	2.03	3.07	9.34
140	1233	1.99	3.56	8.85
150	1447	1.94	4.09	8.33
160	1687	1.90	4.65	7.76
170	1956	1.85	5.25	7.16
180	2258	1.79	5.89	6.53
190	2597	1.74	6.56	5.85
200	2979	1.68	7.27	5.14
210	3410	1.62	8.02	4.40
215	3647	1.58	8.40	4.01
220	3900	1.55	8.80	3.62

16' - 0" CONTACT WIRE HEIGHT, EMBEDDED OR DIRECT FIXATION TRACK

SPAN (FT)	MINIMUM TRACK RADIUS (FT)	VERSINE (FT)	CONTACT WIRE BLOW OFF (IN)	PERMISSIBLE MID SPAN OFFSET (IN)
20	21	2.44	0.07	14.24
30	46	2.43	0.16	14.14
40	83	2.42	0.29	14.02
50	130	2.40	0.45	13.85
60	188	2.39	0.65	13.65
70	259	2.37	0.89	13.42
80	341	2.35	1.16	13.14
90	436	2.32	1.47	12.84
100	546	2.29	1.82	12.49
110	670	2.26	2.20	12.11
120	809	2.22	2.62	11.69
130	966	2.19	3.07	11.24
140	1142	2.15	3.56	10.74
150	1338	2.10	4.09	10.22
160	1558	2.05	4.65	9.65
170	1802	2.00	5.25	9.05
180	2075	1.95	5.89	8.42
190	2381	1.90	6.56	7.74
200	2723	1.84	7.27	7.04
210	3107	1.77	8.02	6.29
215	3317	1.74	8.40	5.90
220	3540	1.71	8.80	5.51

13' - 10" CONTACT WIRE HEIGHT, EMBEDDED OR DIRECT FIXATION TRACK

SPAN (FT)	MINIMUM TRACK RADIUS (FT)	VERSINE (FT)	CONTACT WIRE BLOW OFF (IN)	PERMISSIBLE MID SPAN OFFSET (IN)
20	20	2.51	0.07	15.15
30	45	2.50	0.16	15.06
40	80	2.49	0.29	14.93
50	126	2.48	0.45	14.77
60	183	2.46	0.65	14.57
70	251	2.44	0.89	14.33
80	330	2.42	1.16	14.06
90	423	2.40	1.47	13.75
100	528	2.37	1.82	13.40
110	648	2.34	2.20	13.02
120	783	2.30	2.62	12.60
130	934	2.26	3.07	12.15
140	1103	2.22	3.56	11.66
150	1292	2.18	4.09	11.13
160	1502	2.13	4.65	10.57
170	1736	2.08	5.25	9.97
180	1998	2.03	5.89	9.33
190	2289	1.97	6.56	8.66
200	2615	1.91	7.27	7.95
210	2979	1.85	8.02	7.20
215	3178	1.82	8.40	6.82
220	3389	1.79	8.80	6.42

13' - 0" CONTACT WIRE HEIGHT, EMBEDDED OR DIRECT FIXATION TRACK

SPAN (FT)	MINIMUM TRACK RADIUS (FT)	VERSINE (FT)	CONTACT WIRE BLOW OFF (IN)	PERMISSIBLE MID SPAN OFFSET (IN)
20	20	2.54	0.07	15.50
30	44	2.53	0.16	15.41
40	79	2.52	0.29	15.28
50	125	2.51	0.45	15.12
60	181	2.49	0.65	14.92
70	248	2.47	0.89	14.68
80	326	2.45	1.16	14.41
90	418	2.42	1.47	14.10
100	522	2.40	1.82	13.75
110	640	2.36	2.20	13.37
120	773	2.33	2.62	12.95
130	922	2.29	3.07	12.50
140	1089	2.25	3.56	12.01
150	1275	2.21	4.09	11.48
160	1482	2.16	4.65	10.92
170	1712	2.11	5.25	10.32
180	1969	2.06	5.89	9.68
190	2256	2.00	6.56	9.01
200	2575	1.94	7.27	8.30
210	2933	1.88	8.02	7.55
215	3128	1.85	8.40	7.17
220	3335	1.81	8.80	6.77

GENERAL NOTES:

1. THESE TABLES HAVE BEEN DETERMINED FOR WIND SPEEDS OF 55 MPH.
2. FOR DESIGN CONSIDERATIONS THE MAXIMUM SPAN IS REDUCED BY 5 FEET TO CATER FOR SITE ADJUSTMENTS IF OBSTRUCTIONS ARE ENCOUNTERED.
3. THE PERMISSIBLE MID SPAN OFFSET IS THE DEVIATION OF THE STATIC CONTACT WIRE FROM THE SUPER ELEVATED CENTERLINE OF TRACK AT MID SPAN.
4. MAXIMUM STAGGER = 12" AT 14'-0", 16'-0" AND 20'-6" CONTACT WIRE HEIGHTS.
5. CONTACT WIRE INSTALLATION
   TOLERANCE = ± 1 INCH.
6. IN THE VICINITY OF GRADE CROSSINGS THE MAXIMUM SPAN SHOULD BE REDUCED BY 10'-0"
7. EXAMPLE SPAN DETERMINATION:
   GIVEN - RADIUS OF CURVATURE = 2400 FT ON EMBEDDED TRACK AT 16'-0" CONTACT WIRE HEIGHT.
   FIND - MAXIMUM CONSTRUCTED SPAN = 190 FT
   - MAXIMUM DESIGN SPAN = 185 FT
   - PERMISSIBLE MIDSPAN OFFSET = 7.7 IN
8. USE LINEAR INTERPOLATION FOR INTERMEDIATE SPAN LENGTHS.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD103
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS EMBEDDED TRACK BLOW OFF & MIDSPAN OFFSET

DRAWING No.: **STD-JOD103**
FACILITY ID:
SHEET No.: 1
REV:

ERECTION TENSIONS FOR AUTO-TENSIONED CONTACT WIRE				
L = EQUIVALENT SPAN (FT)		22	25	30
tn = NEW TEMPERATURE	0	5937	5935	5931
	10	5497	5496	5492
	20	5057	5055	5052
	30	4617	4616	4613
	40	4177	4176	4174
	50	3738	3738	3737
	60	3300	3300	3300
	70	2862	2863	2865
	80	2427	2430	2434
	90	1995	2000	2008
	100	1571	1580	1597
	110	1165	1183	1213
	120	809	839	889

ERECTION TENSIONS FOR FIXED TERMINATED CONTACT WIRE							
L = EQUIVALENT SPAN (FT)		22	25	50	65	80	100
tn = NEW TEMPERATURE	0	5937	5935	5910	5886	5856	5808
	10	5497	5496	5471	5449	5422	5377
	20	5057	5055	5034	5015	4989	4951
	30	4617	4616	4598	4581	4561	4527
	40	4177	4176	4163	4150	4135	4110
	50	3738	3738	3729	3722	3713	3699
	60	3300	3300	3300	3300	3300	3300
	70	2862	2863	2875	2886	2898	2916
	80	2427	2430	2459	2484	2513	2555
	90	1995	2000	2058	2103	2153	2222
	100	1571	1580	1681	1754	1829	1929
	110	1165	1183	1349	1452	1553	1677
	120	809	839	1079	1209	1328	1472

GENERAL NOTES:

1. ERECTION TENSIONS SHOWN FOR A/T CATENARY APPLY ONLY WITH BALANCE WEIGHTS LOCKED AT 60° F POSITION.
2. FOR INTERMEDIATE EQUIVALENT SPANS BETWEEN THOSE INDICATED IN THE GRAPH, THE TENSION VALUES CAN BE INTERPOLATED ON A STRAIGHT LINE BASIS.
3. EQUIVALENT SPAN IS DETERMINED BY THE FOLLOWING FORMULA:

$$\sqrt{\frac{L_1^3 + L_2^3 + L_3^3 + \cdots L_N^3}{L_1 + L_2 + L_3 + \cdots L_N}}$$

WHERE $L_1, L_2, L^3 \cdots L^N$ ARE THE LENGTHS OF THE SPANS IN EACH FULL TENSION LENGTH (ANCHOR TO ANCHOR)

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

LINE IS 1" AT FULL SCALE

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

SCALE: NTS
FILENAME: STD-JOD104
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS CONTACT WIRE TEMPERATURE TENSION CHARTS

DRAWING No.: **STD-JOD104**
FACILITY ID:
SHEET No.: REV: 1

ERECTION TENSIONS FOR AUTO-TENSIONED MESSENGER WIRE (UNLOADED)

L = EQUIVALENT SPAN (FT)		60	75	90	100	125	145	150	175	200
tn = NEW TEMPERATURE	0	8520	8383	8217	8092	7728	7391	7301	6827	6326
	10	7897	7764	7604	7481	7130	6809	6723	6278	5819
	20	7276	7148	6992	6876	6541	6239	6159	5750	5338
	30	6658	6534	6387	6276	5963	5684	5612	5246	4890
	40	6042	5925	5787	5685	5398	5151	5087	4772	4476
	50	5430	5323	5198	5106	4856	4643	4590	4334	4102
	60	4824	4730	4623	4545	4338	4171	4130	3936	3767
	70	4227	4152	4068	4009	3856	3738	3710	3581	3472
	80	3645	3597	3544	3508	3419	3354	3338	3269	3213
	90	3088	3075	3062	3053	3032	3017	3014	2999	2987
	100	2571	2603	2635	2655	2700	2730	2736	2767	2791
	110	2115	2198	2273	2319	2420	2487	2501	2567	2622
	120	1741	1867	1978	2045	2188	2281	2303	2397	2473

ERECTION TENSIONS FOR FIXED TERMINATED MESSENGER WIRE (UNLOADED)

L = EQUIVALENT SPAN (FT)		45	50	60	65	80	90	145
tn = NEW TEMPERATURE	0	8627	8595	8520	8477	8330	8217	7391
	10	8002	7970	7897	7856	7713	7604	6809
	20	7379	7347	7276	7236	7099	6992	6239
	30	6756	6726	6658	6619	6487	6387	5684
	40	6133	6105	6042	6005	5882	5787	5151
	50	5514	5489	5430	5396	5283	5198	4643
	60	4899	4876	4824	4794	4696	4623	4171
	70	4289	4269	4227	4204	4126	4068	3738
	80	3686	3673	3645	3629	3579	3544	3354
	90	3099	3096	3088	3083	3071	3062	3017
	100	2540	2551	2571	2582	2614	2635	2730
	110	2031	2059	2115	2143	2224	2273	2487
	120	1601	1649	1741	1785	1907	1978	2281

GENERAL NOTES:

1. UNLOADED MESSENGER WIRE TENSIONS SHOWN FOR APPLICATION DURING WIRE ERECTION PRIOR TO THE ERECTION OF CONTACT WIRE.
2. ERECTION TENSIONS SHOWN FOR A/T CATENARY APPLY ONLY WITH BALANCE WEIGHTS LOCKED AT 60° F POSITION.
3. FOR INTERMEDIATE EQUIVALENT SPANS BETWEEN THOSE INDICATED IN THE GRAPH, THE TENSION VALUES CAN BE
4. EQUIVALENT SPAN IS DETERMINED BY THE FOLLOWING FORMULA:

$$\sqrt{\frac{L_1^3 + L_2^3 + L_3^3 + \cdots L_N^3}{L_1 + L_2 + L_3 + \cdots L_N}}$$

WHERE $L_1, L_2, L^3 \cdots L^N$ ARE THE LENGTHS OF THE SPANS IN EACH FULL TENSION LENGTH (ANCHOR TO ANCHOR)

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

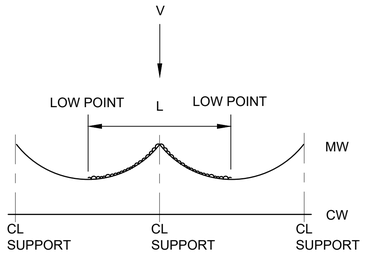
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD105
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS MESSENGER WIRE TEMPERATURE TENSION CHARTS

DRAWING No.: **STD-JOD105**
FACILITY ID:
SHEET No.: REV: 1



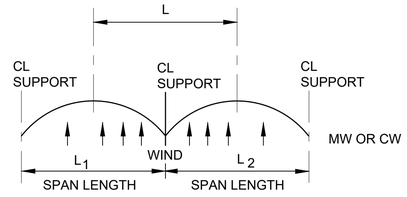
MW = MESSENGER WIRE

CW = CONTACT WIRE

L = SUM OF THE DISTANCE TO THE LOW POINT OF THE CONDUCTOR ON EACH SIDE OF THE SUPPORT

W = WEIGHT PER FOOT OF SYSTEM

V = VERTICAL LOAD = W x L



$L = \frac{L_1 + L_2}{2}$

MW = MESSENGER WIRE

CW = CONTACT WIRE

P = PRESSURE FROM WIND = .00256 V^2

V = WIND SPEED IN MPH

D = EFFECTIVE DIAMETER OF CONDUCTOR (WITH OR WITHOUT ICE)

$W = \frac{P \times D \times L}{12}$

VERTICAL LOADS (LB)

SPAN LENGTH (FT)	BARE WIRES	ICED WIRES	
		OPERATING	NON-OPERATING
30	79.17	111.72	124.50
40	105.56	148.96	166.00
50	131.95	186.20	207.50
60	158.34	223.44	249.00
70	184.73	260.68	290.50
80	211.12	297.92	332.00
90	237.51	335.16	373.50
100	263.90	372.40	415.00
110	290.29	409.64	456.50
120	316.68	446.88	498.00
130	343.07	484.12	539.50
140	369.46	521.36	581.00
150	395.85	558.60	622.50
160	422.24	595.84	664.00
170	448.63	633.08	705.50
180	475.02	670.32	747.00
190	501.41	707.56	788.50
200	527.80	744.80	830.00
210	554.19	782.04	871.50
220	580.58	819.28	913.00

WIND LOADS (LB)

SPAN LENGTH (FT)	OPERATING BARE WIRE 55 MPH WIND		NON-OPERATING ICE MW - 1/2", CW - 1/2" 70 MPH WIND		OPERATING ICE MW - 1/2", CW - 1/4" 40 MPH WIND		NON-OPERATING ICE MW - 1/2", CW - 1/2" 40 MPH WIND	
	CONTACT	MESSENGER	CONTACT	MESSENGER	CONTACT	MESSENGER	CONTACT	MESSENGER
30	12.0	15.6	50.7	56.7	11.4	18.6	16.5	18.6
40	16.0	20.8	67.6	75.6	15.2	24.8	22.0	24.8
50	20.0	26.0	84.5	94.5	19.0	31.0	27.5	31.0
60	24.0	31.2	101.4	113.4	22.8	37.2	33.0	37.2
70	28.0	36.4	118.3	132.3	26.6	43.4	38.5	43.4
80	32.0	41.6	135.2	151.2	30.4	49.6	44.0	49.6
90	36.0	46.8	152.1	170.1	34.2	55.8	49.5	55.8
100	40.0	52.0	169.0	189.0	38.0	62.0	55.0	62.0
110	44.0	57.2	185.9	207.9	41.8	68.2	60.5	68.2
120	48.0	62.4	202.8	226.8	45.6	74.4	66.0	74.4
130	52.0	67.6	219.7	245.7	49.4	80.6	71.5	80.6
140	56.0	72.8	236.6	264.6	53.2	86.8	77.0	86.8
150	60.0	78.0	253.5	283.5	57.0	93.0	82.5	93.0
160	64.0	83.2	270.4	302.4	60.8	99.2	88.0	99.2
170	68.0	88.4	287.3	321.3	64.6	105.4	93.5	105.4
180	72.0	93.6	304.2	340.2	68.4	111.6	99.0	111.6
190	76.0	98.8	321.1	359.1	72.2	117.8	104.5	117.8
200	80.0	104.0	338.0	378.0	76.0	124.0	110.0	124.0
210	84.0	109.2	354.9	396.9	79.8	130.2	115.5	130.2
220	88.0	114.4	371.8	415.8	83.6	136.4	121.0	136.4

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SUBMITTED BY:

DATE:

REVIEWED BY:

DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS

FILENAME: STD-JOD106

CONTRACT No.: RTA/LR

DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

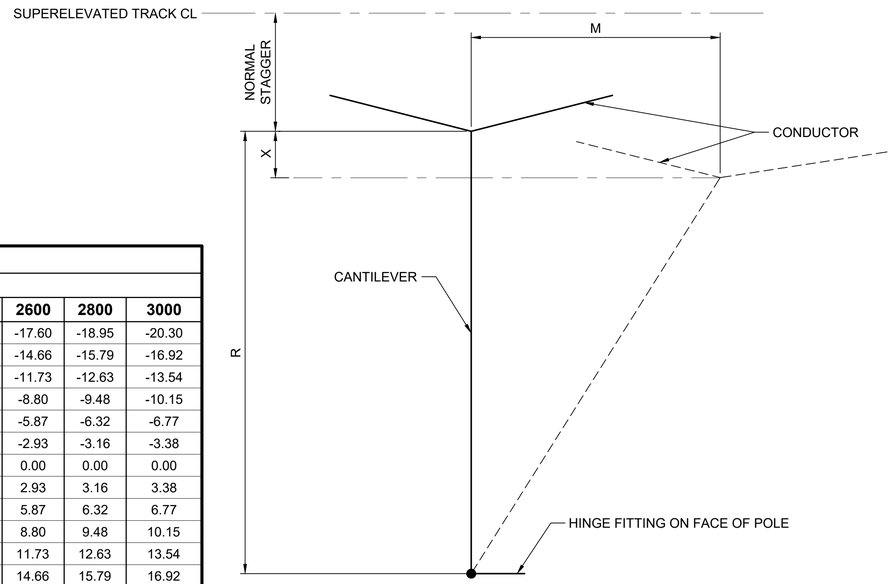
OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS VERTICAL LOADS AND WIND LOADS

DRAWING No.: **STD-JOD106**

FACILITY ID:

SHEET No.: 1 REV:

03/21/24 | 1:48 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\STD-JOD106.DWG



GENERAL NOTE:

1. ALONG TRACK MOVEMENT IS TO BE CONSIDERED IN ADJUSTMENT OF CANTILEVER ASSEMBLIES, STEADY ARMS, CROSS CONTACT BRIDGE ASSEMBLIES, JUMPERS, FEEDERS, SPAN WIRES, AND ANY OTHER ASSEMBLIES OR COMPONENTS THAT MAY BE AFFECTED BY THIS MOVEMENT.

		ALONG TRACK MOVEMENT (IN)														
		DISTANCE FROM MIDPOINT TO TERMINATION (FT)														
		200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
TEMPERATURE	0	-1.35	-2.71	-4.06	-5.41	-6.77	-8.12	-9.48	-10.83	-12.18	-13.54	-14.89	-16.24	-17.60	-18.95	-20.30
	10	-1.13	-2.26	-3.38	-4.51	-5.64	-6.77	-7.90	-9.02	-10.15	-11.28	-12.41	-13.54	-14.66	-15.79	-16.92
	20	-0.90	-1.80	-2.71	-3.61	-4.51	-5.41	-6.32	-7.22	-8.12	-9.02	-9.93	-10.83	-11.73	-12.63	-13.54
	30	-0.68	-1.35	-2.03	-2.71	-3.38	-4.06	-4.74	-5.41	-6.09	-6.77	-7.44	-8.12	-8.80	-9.48	-10.15
	40	-0.45	-0.90	-1.35	-1.80	-2.26	-2.71	-3.16	-3.61	-4.06	-4.51	-4.96	-5.41	-5.87	-6.32	-6.77
	50	-0.23	-0.45	-0.68	-0.90	-1.13	-1.35	-1.58	-1.80	-2.03	-2.26	-2.48	-2.71	-2.93	-3.16	-3.38
	60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	70	0.23	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.26	2.48	2.71	2.93	3.16	3.38
	80	0.45	0.90	1.35	1.80	2.26	2.71	3.16	3.61	4.06	4.51	4.96	5.41	5.87	6.32	6.77
	90	0.68	1.35	2.03	2.71	3.38	4.06	4.74	5.41	6.09	6.77	7.44	8.12	8.80	9.48	10.15
	100	0.90	1.80	2.71	3.61	4.51	5.41	6.32	7.22	8.12	9.02	9.93	10.83	11.73	12.63	13.54
	110	1.13	2.26	3.38	4.51	5.64	6.77	7.90	9.02	10.15	11.28	12.41	13.54	14.66	15.79	16.92
	120	1.35	2.71	4.06	5.41	6.77	8.12	9.48	10.83	12.18	13.54	14.89	16.24	17.60	18.95	20.30

NEGATIVE VALUE (-) INDICATES MOVEMENT TOWARD FIXED ANCHOR
POSITIVE VALUE INDICATES MOVEMENT AWAY FROM FIXED ANCHOR
ALONG TRACK MOVEMENT IS IN INCHES

ALONG TRACK MOVEMENT - AUTO - TENSIONED O.C.S

M = ALONG TRACK MOVEMENT

X = STAGGER CHANGE

R = DISTANCE FROM FACE OF POLE TO CONDUCTOR

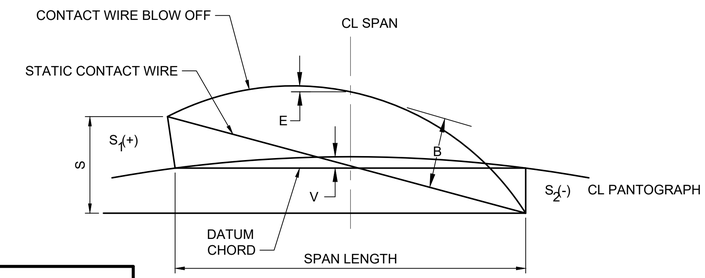
M = α (T-60)

WHERE α = COEFFICIENT OF EXPANSION OF CONDUCTOR

L = DISTANCE FROM FIXED ANCHOR

T = TEMPERATURE

$X = R - \sqrt{R^2 - M^2}$



S = STAGGER DIFFERENCE

S1 & S2 = STAGGER AT EACH SUPPORT

V = VERSINE OF CURVE BETWEEN SUPPORTS

B = CONTACT WIRE BLOW OFF

E = STAGGER EFFECT

STAGGER DIFFERENCE (S) = S1-S2

STAGGER EFFECT (E) = $\frac{(S)^2}{16(B-V)}$

ALONG TRACK MOVEMENT	CANTILEVER REACH (DIMENSION R FEET-INCHES)													
(INCHES)	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	11'-6"	12'-0"	12'-6"
2	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01
4	0.11	0.10	0.10	0.09	0.08	0.08	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05
6	0.25	0.23	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.14	0.13	0.13	0.12
8	0.45	0.41	0.38	0.36	0.33	0.31	0.30	0.28	0.27	0.25	0.24	0.23	0.22	0.21
10	0.70	0.64	0.60	0.56	0.52	0.49	0.46	0.44	0.42	0.40	0.38	0.36	0.35	0.33
12	1.01	0.93	0.86	0.80	0.75	0.71	0.67	0.63	0.60	0.57	0.55	0.52	0.50	0.48
14	1.37	1.27	1.17	1.10	1.03	0.97	0.91	0.86	0.82	0.78	0.74	0.71	0.68	0.65
16	1.80	1.66	1.54	1.43	1.34	1.26	1.19	1.13	1.07	1.02	0.97	0.93	0.89	0.86
18	2.29	2.11	1.95	1.82	1.70	1.60	1.51	1.43	1.36	1.29	1.23	1.18	1.13	1.08
20	2.83	2.61	2.42	2.25	2.11	1.98	1.87	1.77	1.68	1.60	1.52	1.46	1.40	1.34
22	3.44	3.17	2.93	2.73	2.55	2.40	2.26	2.14	2.03	1.94	1.85	1.76	1.69	1.62
24	4.12	3.78	3.50	3.26	3.05	2.86	2.70	2.55	2.42	2.31	2.20	2.10	2.01	1.93

STAGGER CHANGE - AUTO - TENSIONED O.C.S.

STAGGER CHANGE VALUES IN INCHES

B-V	STAGGER DIFFERENCE (S) INCHES											
(INCHES)	2	4	6	8	10	12	14	16	18	20	22	24
2	0.13	0.50	1.13	2.00	3.13	4.50	6.13	8.00	10.13	12.50	15.13	18.00
4	0.06	0.25	0.56	1.00	1.56	2.25	3.06	4.00	5.06	6.25	7.56	9.00
6	0.04	0.17	0.38	0.67	1.04	1.50	2.04	2.67	3.38	4.17	5.04	6.00
8	0.03	0.13	0.28	0.50	0.78	1.13	1.53	2.00	2.53	3.13	3.78	4.50
10	0.03	0.10	0.23	0.40	0.63	0.90	1.23	1.60	2.03	2.50	3.03	3.60
12	0.02	0.08	0.19	0.33	0.52	0.75	1.02	1.33	1.69	2.08	2.52	3.00
14	0.02	0.07	0.16	0.29	0.45	0.64	0.88	1.14	1.45	1.79	2.16	2.57
16	0.02	0.06	0.14	0.25	0.39	0.56	0.77	1.00	1.27	1.56	1.89	2.25
18	0.01	0.06	0.13	0.22	0.35	0.50	0.68	0.89	1.13	1.39	1.68	2.00
20	0.01	0.05	0.11	0.20	0.31	0.45	0.61	0.80	1.01	1.25	1.51	1.80

STAGGER EFFECT - ALL O.C.S. STYLES

STAGGER EFFECT VALUES IN INCHES

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

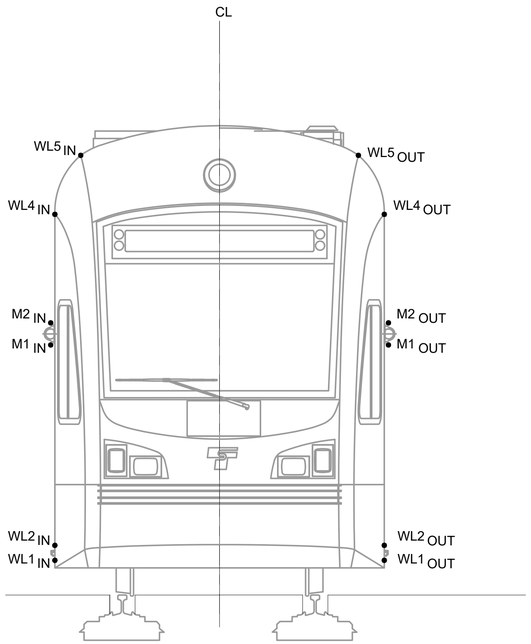
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SCALE: NTS
FILENAME: STD-JOD107
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS ALONG TRACK MOVEMENT

DRAWING No.: STD-JOD107
FACILITY ID:
SHEET No.: 1
REV:

GENERAL NOTES:

1. THE OCS STRUCTURE CLEARANCE ENVELOPE IS DEFINED AS THE SPACE OCCUPIED BY THE VEHICLE DYNAMIC ENVELOPE PLUS CONSTRUCTION AND MAINTENANCE TOLERANCES, PLUS RUNNING CLEARANCES.
2. THE PANTOGRAPH CLEARANCE ENVELOPE IS DESCRIBED ON DRAWING JOD112.
3. COORDINATES FOR THE VEHICLE DYNAMIC ENVELOPE ON CURVED AND SUPERELEVATED TRACK ARE SHOWN IN THE TABLES PROVIDED IN THE SPECIFICATIONS.
4. COORDINATES ARE BASED ON ST1 KINKISHARYO VEHICLES. COORDINATES FOR ST2 SIEMENS VEHICLES TO BE CONFIRMED WITH SOUND TRANSIT AND INCORPORATED INTO FINAL DRAWINGS.
5. TRACK MAINTENANCE TOLERANCES AT OCS POLES AND STRUCTURES SHALL BE .5 INCHES FOR DIRECT FIXATION TRACK OR 2.5 INCHES FOR BALLASTED TRACK. RUNNING CLEARANCE AT OCS POLES AND STRUCTURES SHALL BE 2.0 INCHES.
6. COORDINATES SHOWN ARE IN INCHES.
7. COORDINATES ARE REFERENCED FROM A POINT LOCATED AT CENTER OF TRACK GAUGE AND TOP OF RAIL (0.0).
8. SUPERELEVATION IS APPLIED RELATIVE TO TOP OF LOW RAIL.



VEHICLE STATIC OUTLINE
NTS

STATIC BODY POINTS						
	X	Y			X	Y
WL1OUT	52.24	8.86		WL1IN	-52.24	8.86
WL2OUT	52.24	14.00		WL2IN	-52.24	14.00
WL4OUT	52.24	126.00		WL4IN	-52.24	126.00
WL5OUT	48.31	140.35		WL5IN	-48.31	140.35
WL6OUT	38.39	148.82		WL6IN	-39.39	148.82
M1OUT	55.08	80.00		M1IN	-55.08	80.00
M2OUT	55.08	85.00		M2IN	-55.08	85.00

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD110
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS STRUCTURE
CLEARANCE ENVELOPE

DRAWING No.: **STD-JOD110**
FACILITY ID:
SHEET No.: REV: 1

	BALLAST TRACK				DIRECT FIXATION TRACK			
CONTACT WIRE HEIGHT (FT)	**20.50**	**16.00**	**13.83**	**13.00**	**20.50**	**16.00**	**13.83**	**13.00**
LATERAL OFFSET DUE TO CROSS LEVEL TOLERANCE (IN)	4.35	3.40	2.94	2.76	2.18	1.70	1.47	1.38
LATERAL ALLOWANCE FOR TRACK AND VEHICLE TOLERANCE (IN)	6.85	5.90	5.44	5.26	2.68	2.20	1.97	1.88
LATERAL VEHICLE MOVEMENT DUE TO 1.50 ROLL (IN) (NOTE 2)	6.05	4.63	3.95	3.69	6.05	4.63	3.95	3.69
TOTAL MOVEMENT AT PANTOGRAPH WITH 1.50 ROLL (IN)	18.26	15.89	14.75	14.31	14.08	12.19	11.28	10.93
MAXIMUM ALLOWABLE WIRE DISPLACEMENT AT MIDSPAN (IN)	11.24	13.61	14.75	15.19	15.42	17.31	18.22	18.57

GENERAL NOTES:

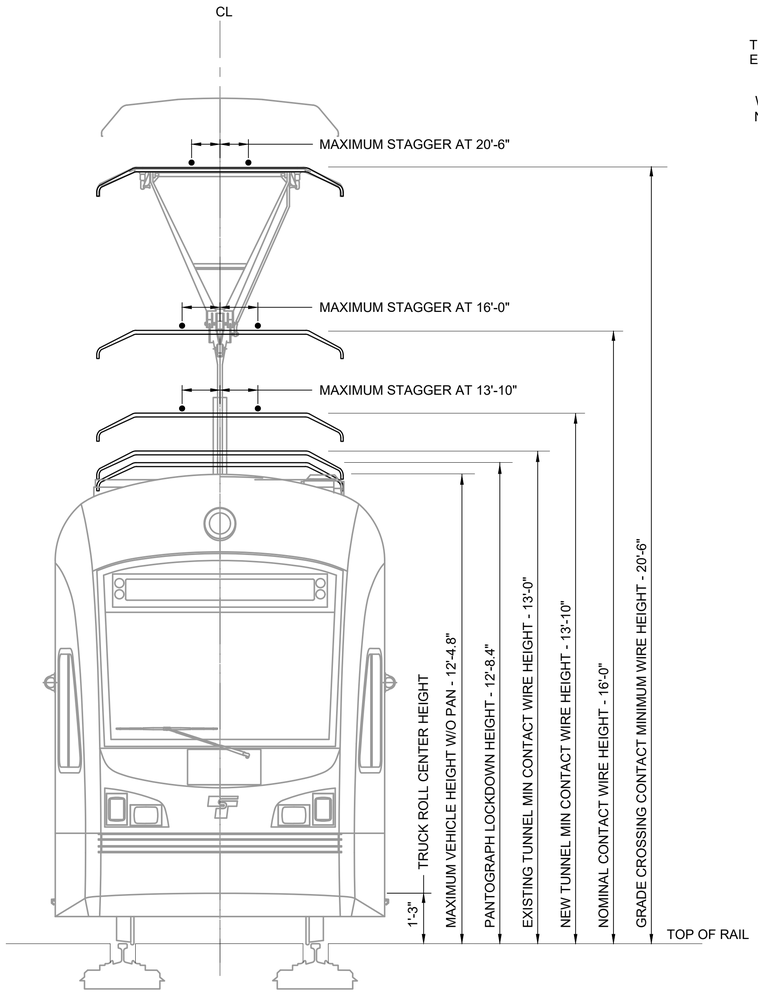
1. CONTACT WIRE DISPLACEMENT IS DUE TO WIRE STAGGER AT THE POLE PLUS WIRE BLOW-OFF AT MIDSPAN.
2. AREMA SECTION # 33:4.2.44 RECOMMENDED 50% OF MAXIMUM VEHICLE ROLL INTO WIND.
3. REDUCE STAGGERS AT REGISTRATIONS MORE THAN 2000' FROM A MPA OR FA.
4. BASED ON 6'-3" CANTILEVER REACH, 60°F TEMPERATURE CHANGE, AND 2000 FT LONG TENSION LENGTH.
5. VEHICLE AND PANTOGRAPH PARAMETERS ARE BASED ON ST1 KINKISHARYO VEHICLES. PARAMETERS FOR ST2 SIEMENS VEHICLES TO BE CONFIRMED WITH SOUND TRANSIT AND INCORPORATED INTO FINAL DRAWINGS.

PANTOGRAPH PARAMETERS		
DESCRIPTION	**IN**	**FT**
OVERALL WIDTH OVER HORNS	75.0	6.25
CARBON WIDTH	47.0	3.92
PANTOGRAPH SWAY AT ALL HEIGHTS (SIDE TO SIDE)	3.00	0.25
PANTOGRAPH UPLIFT ALLOWANCE	3.00	0.25
PANTOGRAPH SECURITY ALLOWANCE	6.00	0.50
MAXIMUM PANTOGRAPH OPERATING HEIGHT	267.60	22.30
MINIMUM PANTOGRAPH OPERATING HEIGHT	156.00	13.00
PANTOGRAPH LOCKDOWN HEIGHT	152.40	12.70

OVERHEAD CONTACT SYSTEM PARAMETERS		
DESCRIPTION	**IN**	**FT**
MAXIMUM CATENARY SPAN	-	220.00
OPERATING WIND SPEED WITHOUT ICE	55 MPH	
OPERATING WIND SPEED WITH RADIAL ICE	40 MPH	
POLE DEFLECTION AT CONTACT WIRE HEIGHT DUE TO WIND	1.00	0.08
STAGGER CHANGE DUE TO ALONG TRACK MOVEMENT (NOTES 3, 4)	1.23	0.10
OCS TOLERANCE	1.00	0.08
PANTOGRAPH SECURITY ALLOWANCE	6.00	0.50

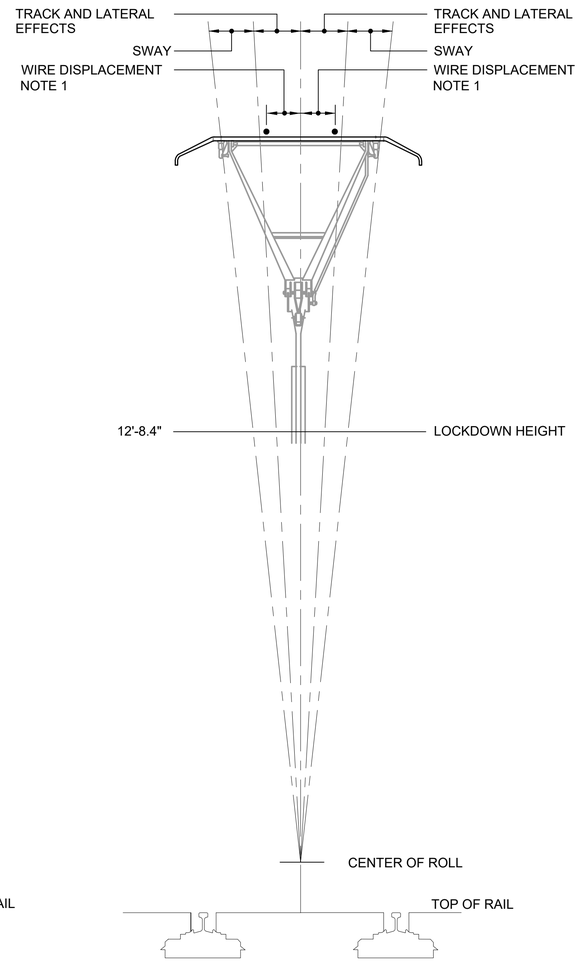
TRACK PARAMETERS		
DESCRIPTION	**IN**	**FT**
TRACK GAUGE	56.50	4.71
DIRECT FIXATION TRACK HORIZONTAL ALIGNMENT TOLERANCE	0.50	
DIRECT FIXATION TRACK CROSS LEVEL TOLERANCE	0.50	
BALLAST TRACK HORIZONTAL ALIGNMENT TOLERANCE	2.50	
BALLAST TRACK CROSS LEVEL TOLERANCE	1.00	
RAIL GAUGE TOLERANCE	0.236	
WEAR ON RAIL GAUGE (PER RAIL)	0.512	

VEHICLE PARAMETERS		
DESCRIPTION	**IN**	**FT**
TRUCK ROLL CENTER HEIGHT	15.0	1.25
LATERAL MOTION AT TRUCK ROLL CENTER	3.86	0.32
MAXIMUM VEHICLE ROLL ANGLE BY DEGREES	3 DEGREES	
MAXIMUM DISTANCE OF PANTOGRAPH SHOE TO CENTERLINE TRUCK	46.00	3.83
MAXIMUM HEIGHT OF VEHICLE EQUIPMENT (EXCEPT PANTOGRAPH)	148.80	12.40



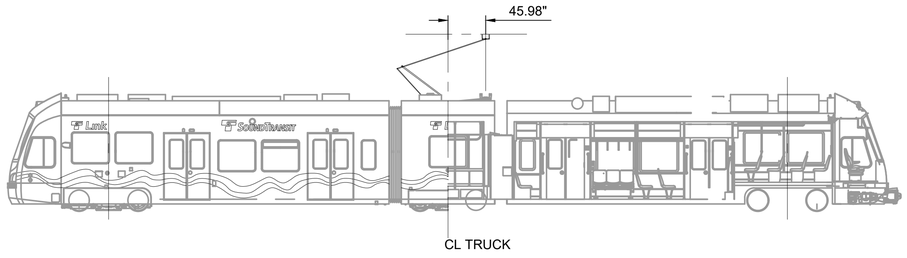
PANTOGRAPH RANGE OF MOTION-VERTICAL

NTS



PANTOGRAPH RANGE OF MOTION-HORIZONTAL

NTS



VEHICLE CRITERIA

NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

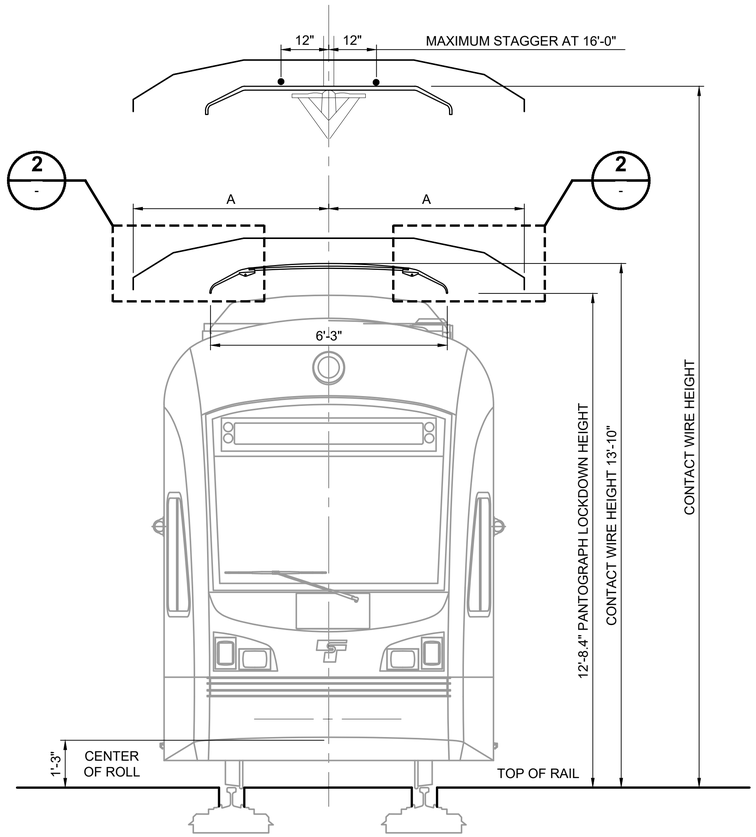
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD111
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS PANTOGRAPH INTERFACE

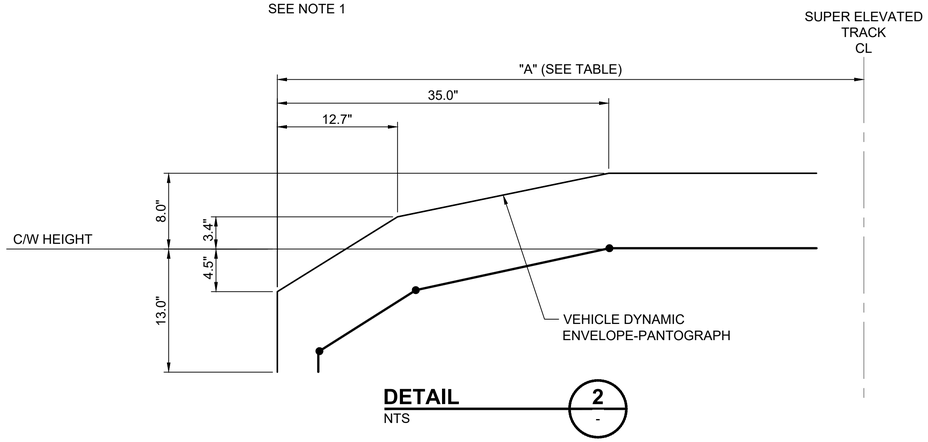
DRAWING No.: **STD-JOD111**
FACILITY ID:
SHEET No.: 1
REV:

03/21/24 | 1:48 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\TECHNICAL STANDARDS AND REQUIREMENTS PROJECTS - DRAWINGS UPDATE 2023\STANDARD DRAWINGS\SYSTEMS\STD-JOD111.DWG



PANTOGRAPH CLEARANCE ENVELOPE 1 -
NTS

SEE NOTE 1



DETAIL 2 -
NTS

GENERAL NOTES:

1. THE PANTOGRAPH CLEARANCE ENVELOPE DIMENSIONS AS SHOWN SHALL APPLY WHEN OCS, TRACK AND OCS SUPPORTS, MASONRY WALLS AND OTHER STRUCTURES ARE BUILT. THEY ARE TO BE MEASURED RELATIVE TO THE SUPERELEVATED TRACK.
2. USE LINEAR INTERPOLATION TO OBTAIN DIMENSION "A" VALUES FOR CONTACT WIRE HEIGHTS OTHER THAN LISTED.
3. VEHICLE AND PANTOGRAPH PARAMETERS ARE BASED ON ST1 KINKISHARYO VEHICLES. PARAMETERS FOR ST2 SIEMENS VEHICLES TO BE CONFIRMED WITH SOUND TRANSIT AND INCORPORATED INTO FINAL DRAWINGS.

PANTOGRAPH PARAMETERS		
DESCRIPTION	**IN**	**FT**
OVERALL WIDTH OVER HORNS	75.00	6.25
CARBON WIDTH	47.00	3.92
PANTOGRAPH UPLIFT ALLOWANCE	3.00	0.25
PANTOGRAPH SECURITY ALLOWANCE	6.00	0.50
ELECTRICAL PASSING CLEARANCE	3.00	0.25
ELECTRICAL STATIC CLEARANCE	5.00	0.42
MAXIMUM PANTOGRAPH OPERATING HEIGHT	267.60	22.30
MINIMUM PANTOGRAPH OPERATING HEIGHT	156.00	13.00
PANTOGRAPH LOCKDOWN HEIGHT	152.40	12.70

TRACK PARAMETERS		
DESCRIPTION	**IN**	**FT**
TRACK GAUGE	56.50	4.71
DIRECT FIXATION TRACK HORIZONTAL ALIGNMENT TOLERANCE	0.50	
DIRECT FIXATION TRACK CROSS LEVEL TOLERANCE	0.50	
BALLAST TRACK HORIZONTAL ALIGNMENT TOLERANCE	2.50	
BALLAST TRACK CROSS LEVEL TOLERANCE	1.00	
WEAR ON RAIL GAUGE (PER RAIL)	0.51	
RAIL GAUGE TOLERANCE	0.236	
MAXIMUM SUPERELEVATION	6.00	0.50

VEHICLE PARAMETERS		
DESCRIPTION	**IN**	**FT**
TRUCK ROLL CENTER HEIGHT	15.00	1.25
LATERAL MOTION AT TRUCK ROLL CENTER	3.86	0.32
MAXIMUM VEHICLE ROLL ANGLE BY DEGREES	3 DEGREES	
MAXIMUM DISTANCE OF PANTOGRAPH SHOE TO CENTERLINE TRUCK	46.00	3.83
MAXIMUM HEIGHT OF VEHICLE EQUIPMENT (EXCEPT PANTOGRAPH)	148.80	12.40

BALLAST TRACK ENVELOPE DIMENSION		
NOMINAL CONTACT WIRE HEIGHT (FT)	20.50	16.00
DIMENSION "A" (IN)	63.03	59.30

DIRECT FIXATION TRACK ENVELOPE DIMENSION		
NOMINAL CONTACT WIRE HEIGHT (FT)	20.50	16.00
DIMENSION "A" (IN)	60.57	57.30

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD112
CONTRACT No.: RTA/LR
DATE: 2/2024

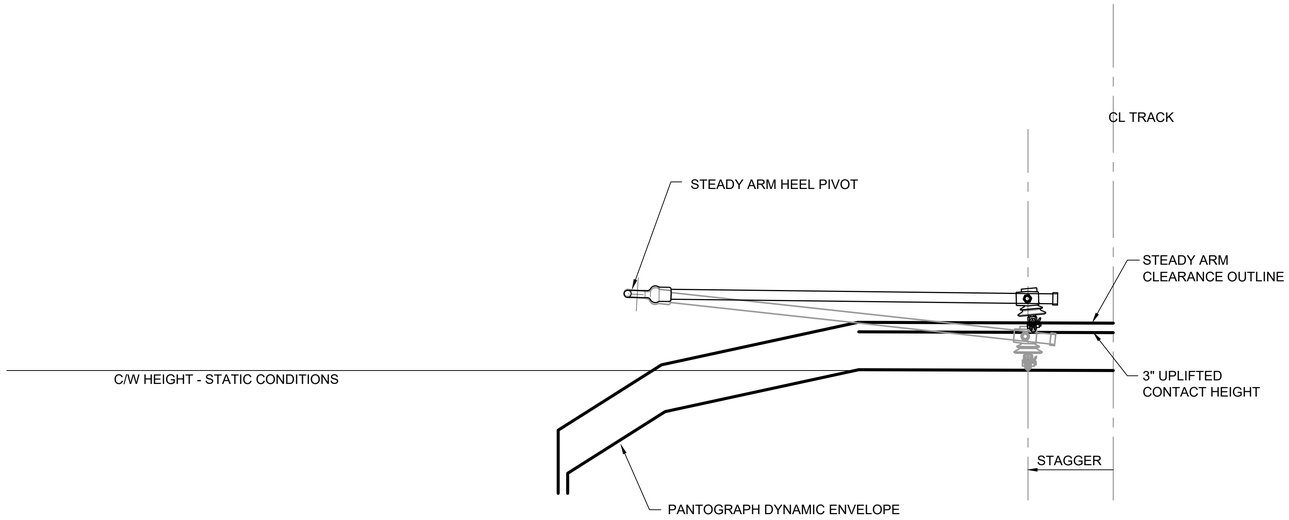
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS PANTOGRAPH
CLEARANCE ENVELOPE

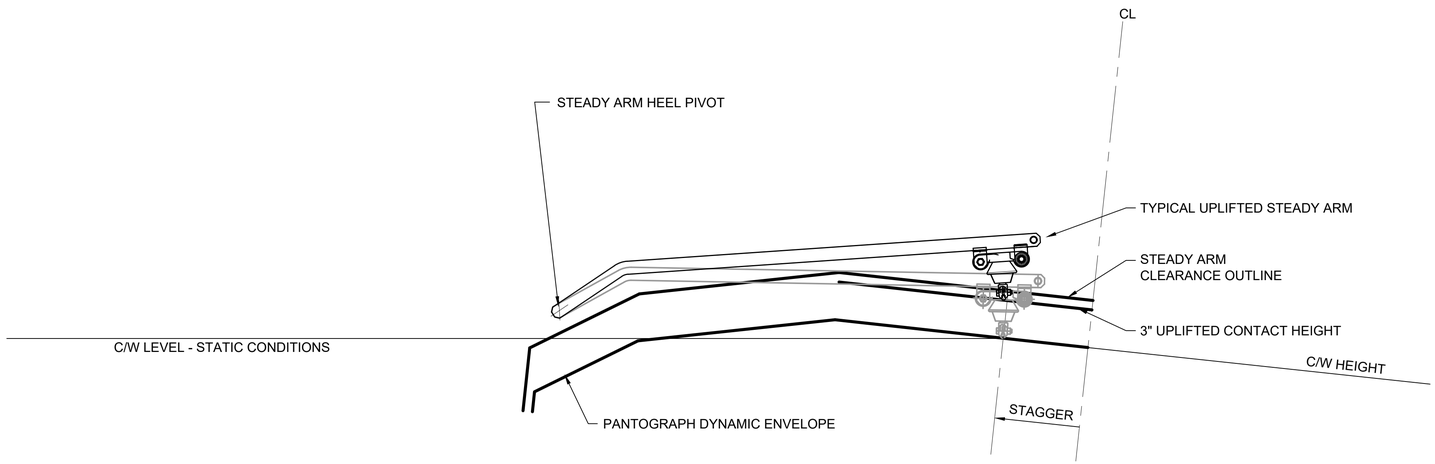
DRAWING No.: **STD-JOD112**
FACILITY ID:
SHEET No.: REV: 1

GENERAL NOTES:

1. THIS DRAWING IS TO BE USED FOR THE DESIGN AND APPLICATION OF STEADY ARMS REGISTERING IN-RUNNING CONTACT WIRES. IT DOES NOT APPLY TO UPLIFT RESTRICTING STEADY ARMS SPECIFIED FOR USE IN TUNNELS.
2. ALL STEADY ARMS SHALL BE SHAPED SO AS NOT TO ENCROACH INSIDE THE THE UPLIFTED PANTOGRAPH TO STEADY ARM CLEARANCE OUTLINE OR WITHIN 1" RUNNING CLEARANCE OF THE PANTOGRAPH DYNAMIC CLEARANCE AT ANY TIME, EXCEPTING FOR CONTACT WIRE CLAMP COMPONENTS.



SUPERELEVATION = 0 — 1 / -
NTS



TRACK WITH UP TO 6" SUPERELEVATION — 2 / -
NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD113
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

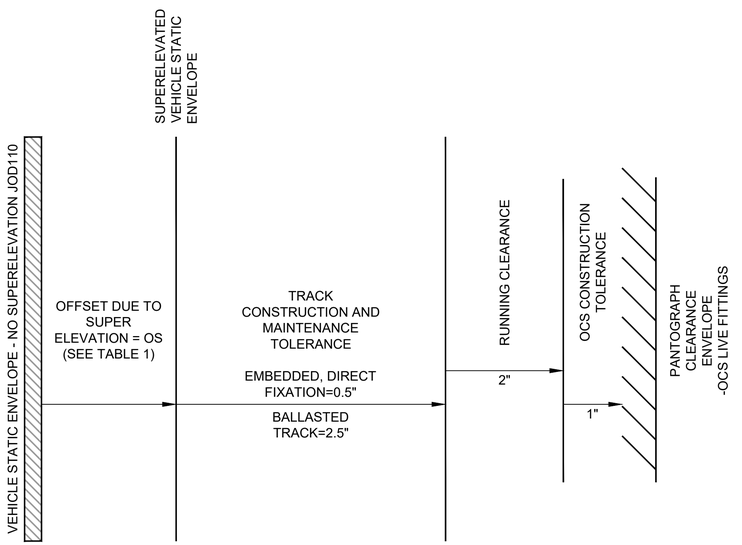
OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS STEADY ARM CLEARANCE
TO LIVE FITTINGS

DRAWING No.: **STD-JOD113**
FACILITY ID:
SHEET No.: REV: 1

HORIZONTAL OFFSET DUE TO TRACK SUPERELEVATION (OS)						
CONTACT WIRE HEIGHT (FT)	SUPERELEVATION (IN)					
	1.00	2.00	3.00	4.00	5.00	6.00
23'-0"	4.9	9.8	14.7	19.5	24.4	29.3
20'-6"	4.4	8.7	13.1	17.4	21.8	26.1
18'-6"	3.9	7.9	11.8	15.7	19.6	23.6
16'-0"	3.4	6.8	10.2	13.6	17.0	20.4
13'-10"	2.9	5.9	8.8	11.8	14.7	17.6
13'-0"	2.8	5.5	8.3	11.0	13.8	16.6

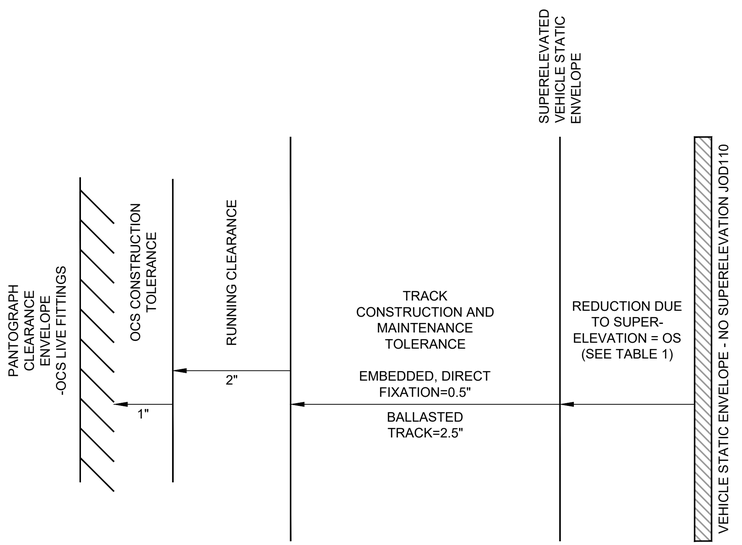
GENERAL NOTES:

1. THE DRAWING PROVIDES RELATIONSHIPS AND DIMENSIONS FOR DETERMINATION OF MINIMUM CLEARANCES BETWEEN A PANTOGRAPH AND ADJACENT LIVE OCS, FITTINGS, EXCEPT FOR IN RUNNING STEADY ARMS.
2. FOR THE PURPOSE OF DETERMINATION OF CLEARANCES TO A PANTOGRAPH, AN OCS FITTING SHALL BE CONSIDERED LIVE ONLY WHERE IT IS SEPARATED FROM GROUNDED POLES OR LIVE WIRING OF ADJACENT TRACKS, BY AT LEAST ONE LEVEL OF SYSTEM RATED INSULATION.
   - 2.1 CLEARANCES FOR OTHER LIVE OCS FITTINGS TO BE DETERMINED FROM THIS DRAWING
   - 2.1 ALL OTHER STRUCTURES, POLES OR EQUIPMENT REQUIRE CLEARANCES DETERMINED FROM DRAWING JOD110.
3. FOR OBJECTS DIAGONALLY SEPARATED, BOTH HORIZONTAL AND VERTICAL CLEARANCES ARE TO BE APPLIED. RUNNING CLEARANCES COMPONENTS MAY BE MEASURE RADIALLY.
4. MINIMUM CLEARANCES BETWEEN LIVE WIRES OR FITTINGS AND OTHER FIXED INFRASTRUCTURE SHALL BE DETERMINED FROM NATIONAL ELECTRICAL SAFETY CODE (N.E.S.C.) AND DRAWING JOD115.



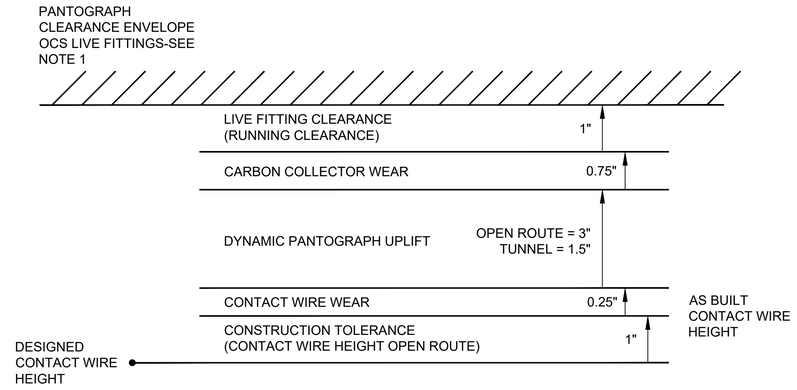
HORIZONTAL CLEARANCE TO A PANTOGRAPH FROM OBJECTS ON THE INSIDE OF CURVE

NTS



HORIZONTAL CLEARANCE TO A PANTOGRAPH FROM OBJECTS ON THE OUTSIDE OF CURVE

NTS



VERTICAL CLEARANCE TO A PANTOGRAPH

NTS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

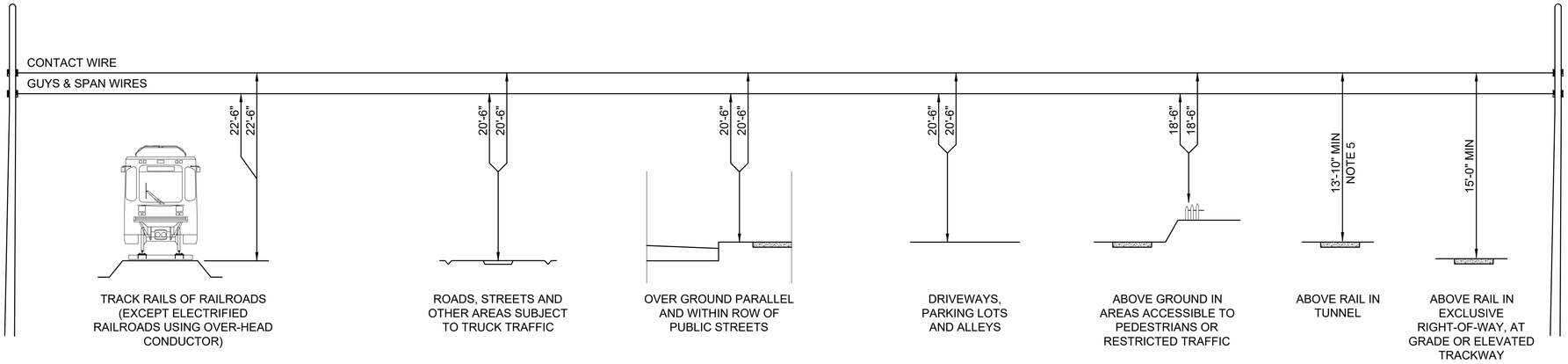
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD114
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS PANTOGRAPH CLEARANCE TO LIVE FITTINGS

DRAWING No.: **STD-JOD114**
FACILITY ID:
SHEET No.: 1
REV:



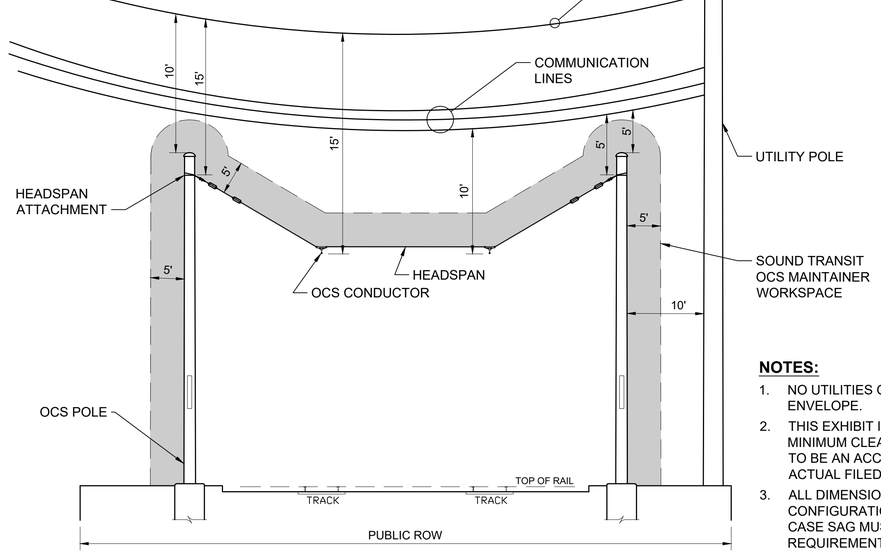
VERTICAL CLEARANCES OF CONTACT WIRE ABOVE GROUND, ROADWAY OR RAILS

NTS

SEE NOTE 1

GENERAL NOTES:

1. THE CLEARANCES APPLY UNDER THE FOLLOWING CONDITIONS:
   - 1.1. CONDUCTOR TEMPERATURE OF 60°F, NO WIND, WITH FINAL UNLOADED SAG IN THE WIRE.
   - 1.2. SPAN LENGTHS NOT GREATER THAN THE FOLLOWING:
     - SINGLE CONTACT LINE - 100 FT
     - SIMPLE CATENARY - 220 FT
2. ALL CLEARANCES ARE MINIMUM.
3. FOR VOLTAGES EXCEEDING 50KV (UP TO 470KV) THE 50KV CLEARANCE SHALL BE INCREASED BY 0.4 INCHES FOR EACH 1KV, OR FRACTION THEREOF, IN EXCESS OF 50KV.
4. THE CLEARANCES APPLY UNDER THE FOLLOWING CONDITIONS:
   - 4.1. CONDUCTOR SAG AT 120°F OR
   - 4.2. MAXIMUM CONDUCTOR TEMPERATURE IF GREATER THAN 120°F OR
   - 4.3. 32°F WITH RADIAL ICE OF 0.25 INCHES.
5. FOR NEW TUNNELS MINIMUM CONTACT WIRE HEIGHT SHALL BE 13'-10". FOR EXISTING TUNNELS MINIMUM CONTACT WIRE HEIGHT SHALL BE 13'-0".
6. CLEARANCES SHOWN ARE MINIMUM WIRE TO WIRE CLEARANCES BASED ON THE NESC. FINAL REQUIRED CLEARANCES BETWEEN OVERHEAD UTILITIES AND OCS MUST BE COORDINATED WITH AND APPROVED BY SOUND TRANSIT.



VERTICAL CLEARANCES BETWEEN CROSSING WIRES

NTS

SEE NOTE 4, 6

NOTES:

1. NO UTILITIES OR SERVICES WILL BE PERMITTED INSIDE ENVELOPE.
2. THIS EXHIBIT IS A GRAPHIC REPRESENTATION TO ILLUSTRATE MINIMUM CLEARANCE REQUIREMENTS AND IS NOT INTENDED TO BE AN ACCURATE DEPICTION OF ALL CROSS SECTIONS OR ACTUAL FILED CONDITIONS.
3. ALL DIMENSIONS SHOWN ARE MINIMUM. FINAL CONFIGURATION OF OVERHEAD UTILITY LINES AT WORST CASE SAG MUST MEET ALL INDIVIDUAL CLEARANCE REQUIREMENTS SHOWN.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD115
CONTRACT No.: RTA/LR
DATE: 2/2024

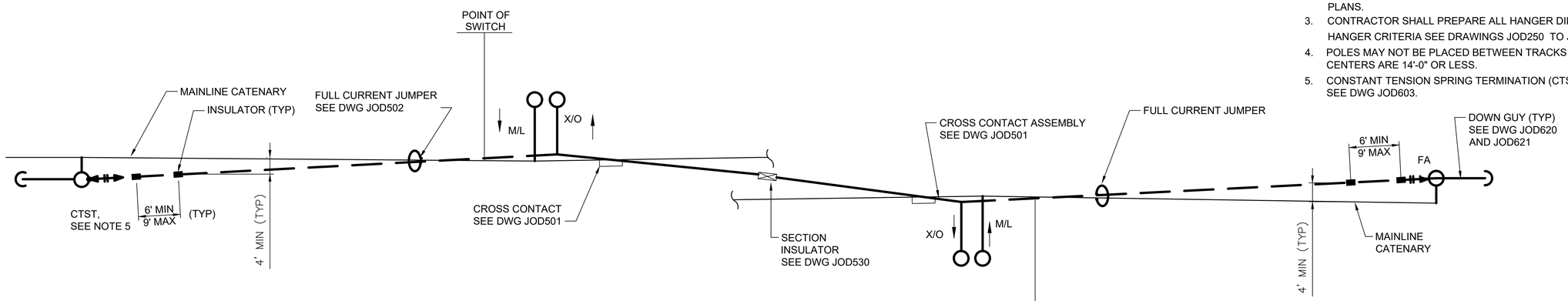
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TECHNICAL SHEETS CLEARANCE
FROM OVERHEAD CONDUCTORS

DRAWING No.: **STD-JOD115**
FACILITY ID:
SHEET No.: 2
REV:

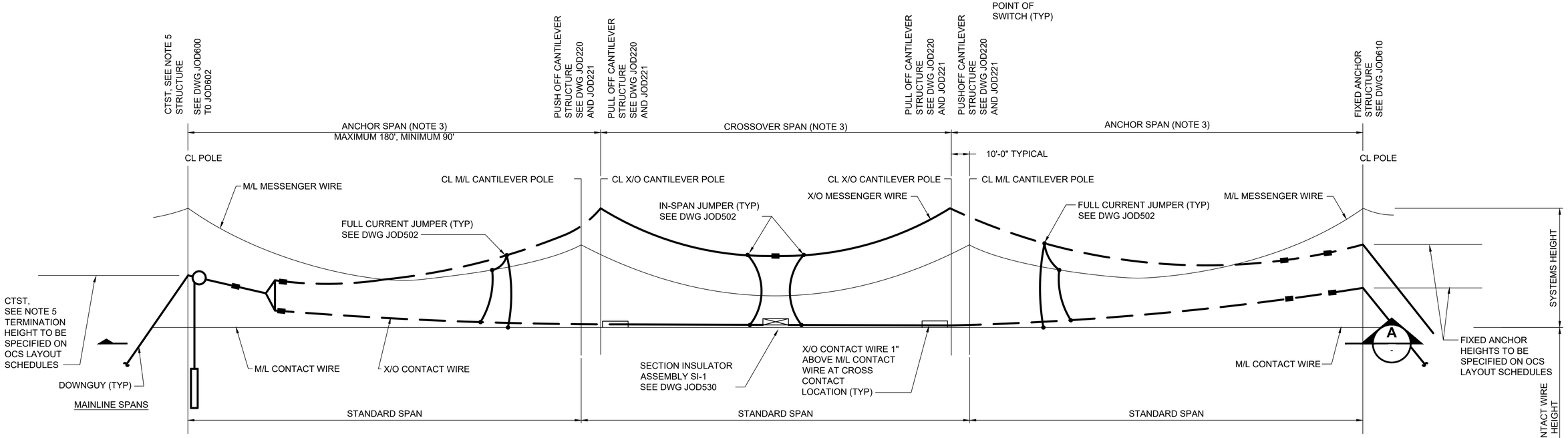
GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DWG JZN001, JZN002 AND JZN006.
2. SITE SPECIFIC REQUIREMENTS TO BE SHOWN ON OCS LAYOUT PLANS.
3. CONTRACTOR SHALL PREPARE ALL HANGER DIMENSIONS FOR HANGER CRITERIA SEE DRAWINGS JOD250 TO JOD253.
4. POLES MAY NOT BE PLACED BETWEEN TRACKS WHEN TRACK CENTERS ARE 14'-0" OR LESS.
5. CONSTANT TENSION SPRING TERMINATION (CTST) PREFERRED, SEE DWG JOD603.



TYPICAL SINGLE CROSSOVER PLAN

NTS



SECTION A - A

NTS

HANGERS OMITTED FOR CLARITY

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

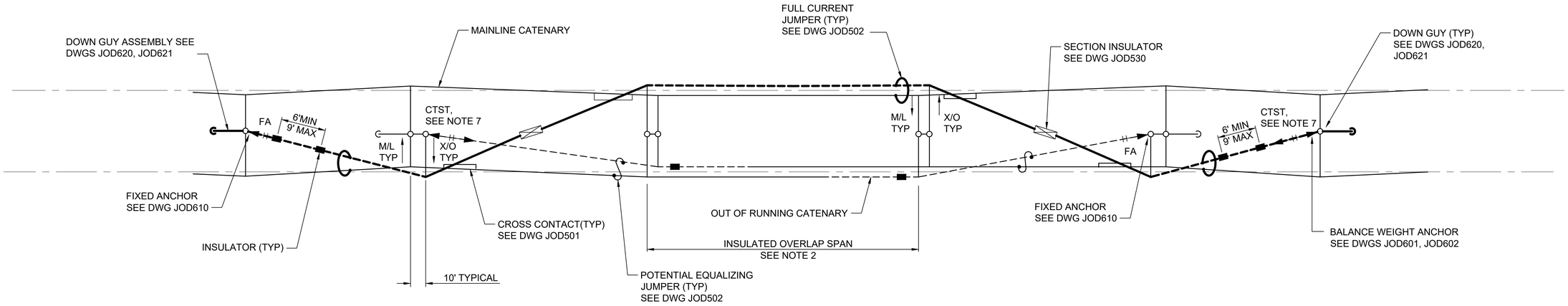
SCALE: NTS
FILENAME: STD-JOD200
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT SINGLE CROSSOVER

DRAWING No.: **STD-JOD200**
FACILITY ID:
SHEET No.: REV: 1

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DWG JZN001, JZN002 AND JZN006.
2. SITE SPECIFIC REQUIREMENTS TO BE SHOWN ON OCS LAYOUT PLANS.
3. CROSSOVER CATENARY HAS A 3'-11" SYSTEM HEIGHT AT SUPPORT (TYP).
4. MAINLINE CATENARY HAS A 5'-0" SYSTEM HEIGHT AT SUPPORT (TYP).
5. STAGGERS IN TURNOUTS ARE TO BE MEASURED FROM TURNOUT TRACK CENTERLINE.
6. CANTILEVERS SHALL BE SET NORMAL TO THE MAINLINE TRACK AT 60° F.
7. CONSTANT TENSION SPRING TERMINATION (CTST) PREFERRED, SEE DWG JOD603.



TYPICAL UNIVERSAL CROSSOVER PLAN

NTS

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

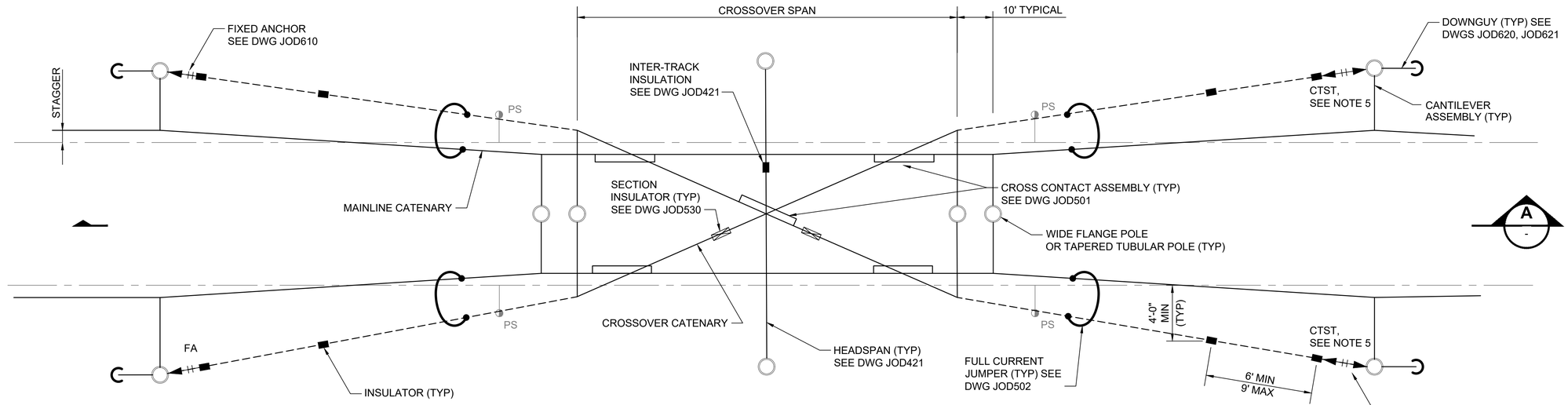
SCALE: NTS
FILENAME: STD-JOD201
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT UNIVERSAL CROSSOVER

DRAWING No.: **STD-JOD201**
FACILITY ID:
SHEET No.: 1 REV:

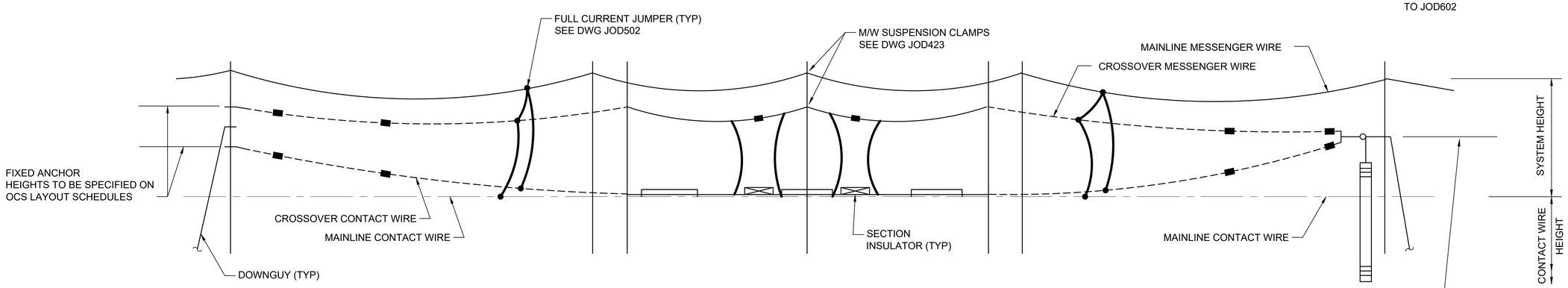
GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DWG JZN001, JZN002 AND JZN006.
2. SITE SPECIFIC REQUIREMENTS TO BE SHOWN ON OCS LAYOUT PLANS.
3. CANTILEVERS SHALL BE NORMAL TO MAINLINE TRACK AT 60° F.
4. TERMINATION MAY BE CENTER POLES.
5. CONSTANT TENSION SPRING TERMINATION (CTST) PREFERRED, SEE DWG JOD603.



TYPICAL DIAMOND CROSSOVER ARRANGEMENT SIDE POLES PLAN

NTS



SECTION A-A

NTS

HANGERS OMITTED FOR CLARITY

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SCALE: NTS
FILENAME: STD-JOD202
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

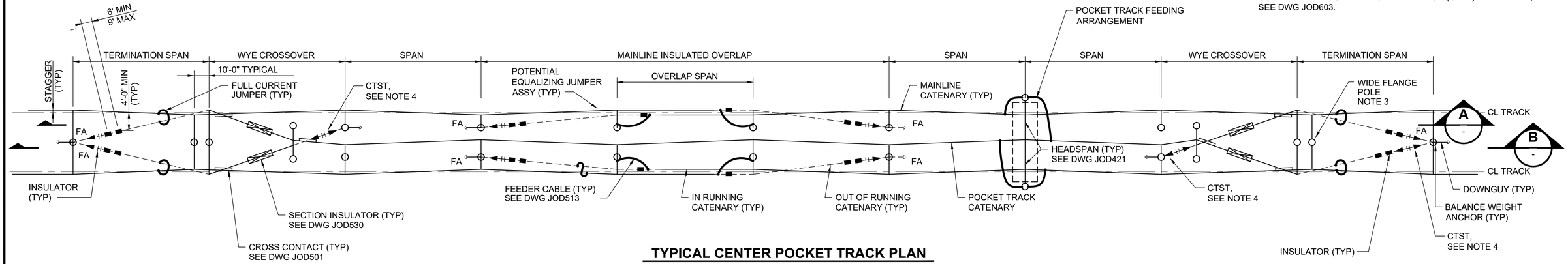
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT DIAMOND CROSSOVER

DRAWING No.: **STD-JOD202**
FACILITY ID:
SHEET No.: 1 REV:

01/30/25 | 11:06 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD202.DWG

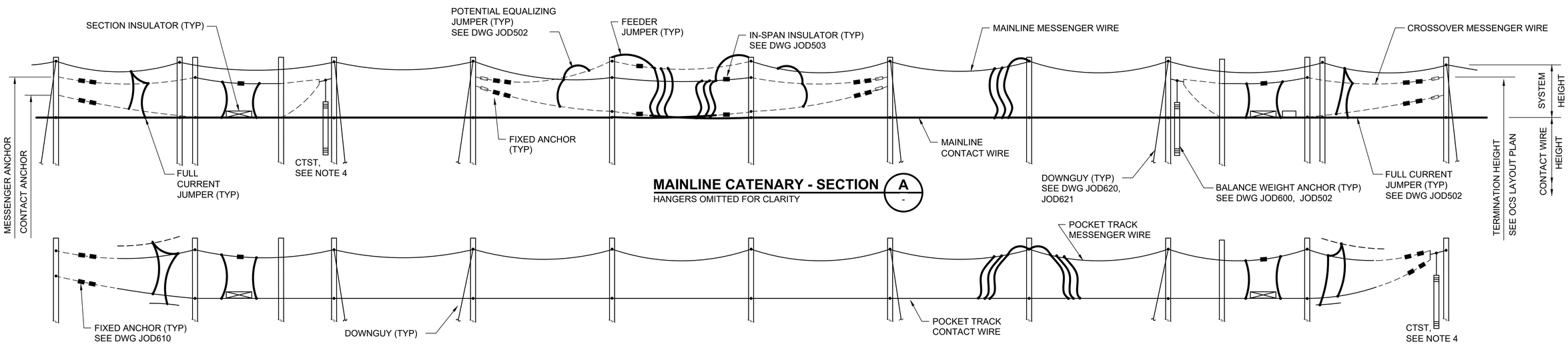
GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DWG JZN001, JZN002 AND JZN006.
2. SITE SPECIFIC REQUIREMENTS TO BE SHOWN ON OCS LAYOUT PLANS.
3. ROUND TAPERED TUBULAR POLE MAY BE SUBSTITUTED FOR WIDE FLANGE POLE. POLE TYPES TO BE SPECIFIED ON CONTRACT DRAWINGS.
4. CONSTANT TENSION SPRING TERMINATION (CTST) PREFERRED, SEE DWG JOD603.



TYPICAL CENTER POCKET TRACK PLAN

NTS



MAINLINE CATENARY - SECTION A

HANGERS OMITTED FOR CLARITY

CENTER POCKET TRACK CATENARY - SECTION B

NTS

HANGERS OMITTED FOR CLARITY

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

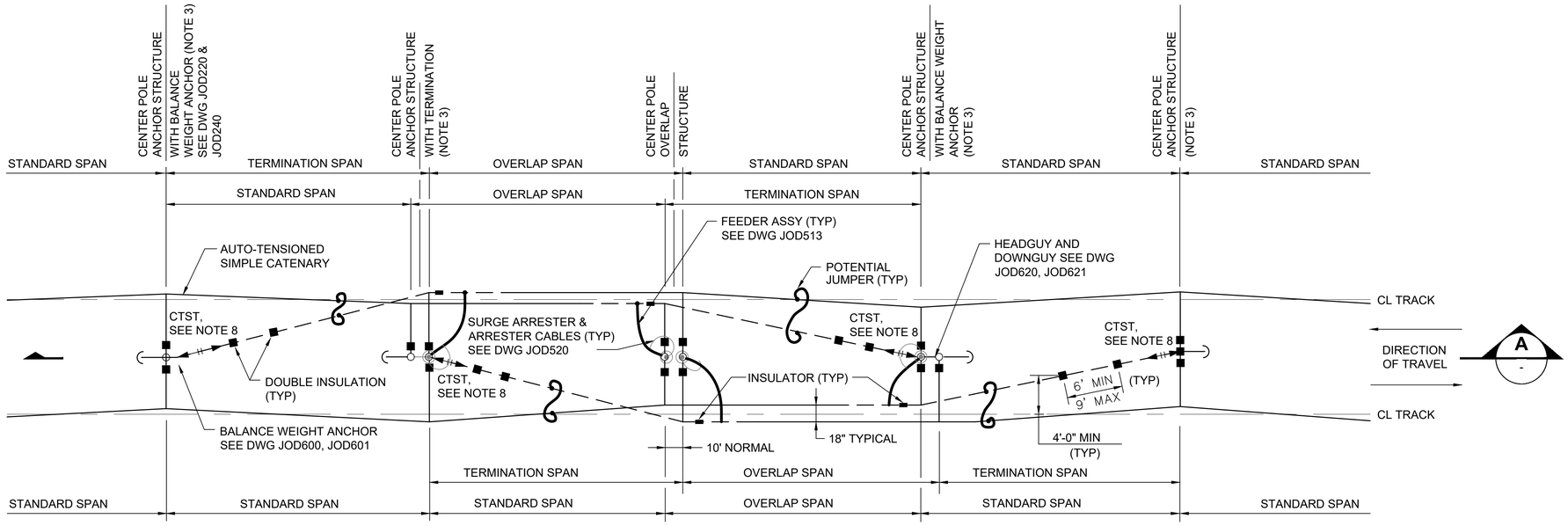
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD203
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT CENTER POCKET TRACK

DRAWING No.: **STD-JOD203**
FACILITY ID:
SHEET No.: REV: 1

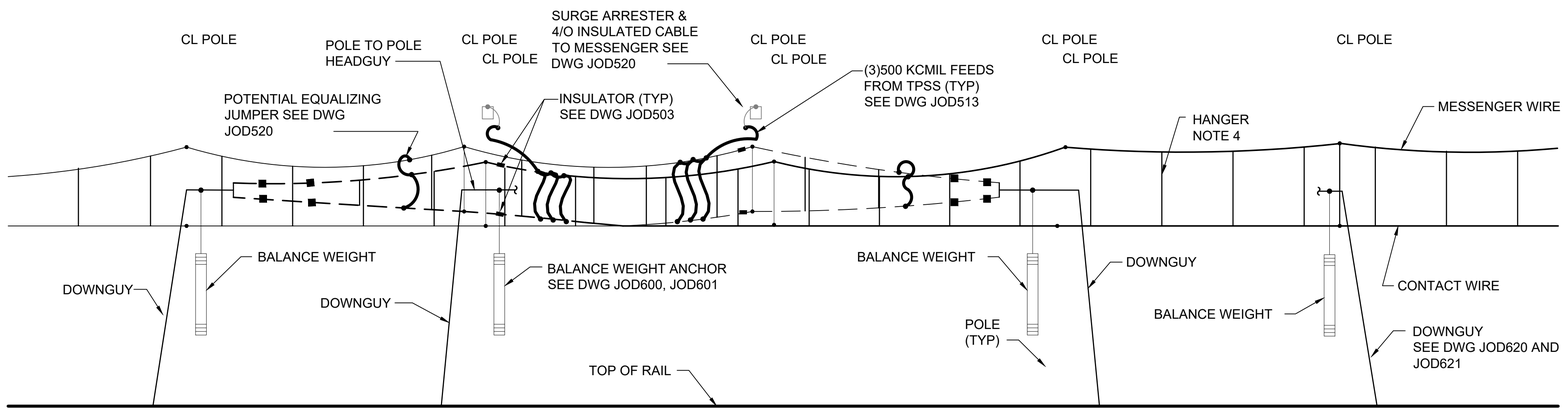


INSULATED OVERLAP PLAN - CENTER POLES

NTS

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND LEGEND SEE DWG JZN001, JZN002, AND JZN006.
2. CONDUCTOR HEIGHTS, ANCHOR HEIGHTS, SPAN LENGTHS, STAGGER VALUES AND DIRECTIONS TO BE SHOWN ON OCS LAYOUT PLANS.
3. FIXED ANCHOR TERMINATION MAY BE SUBSTITUTED FOR BALANCE WEIGHT ANCHOR. SITE SPECIFIC REQUIREMENTS TO BE SHOWN ON OCS LAYOUT PLANS.
4. FOR TYPICAL STANDARD OVERLAP AND TERMINATION SPAN DETAILS AND HANGER SETOUT, SEE DWGS JOD250, JOD251 & JOD253.
5. CANTILEVERS SHALL BE NORMAL TO MAINLINE TRACK AT 60° F.
6. POLE-MOUNTED SWITCHES MAY BE USED. SITE SPECIFIC DETAILS TO BE SHOWN ON OCS LAYOUT PLANS.
7. LOCATION AND TYPE OF SURGE ARRESTERS TO BE SHOWN ON OCS LAYOUT PLANS.
8. CONSTANT TENSION SPRING TERMINATION (CTST) PREFERRED, SEE DWG JOD603.



SECTION A

NTS

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

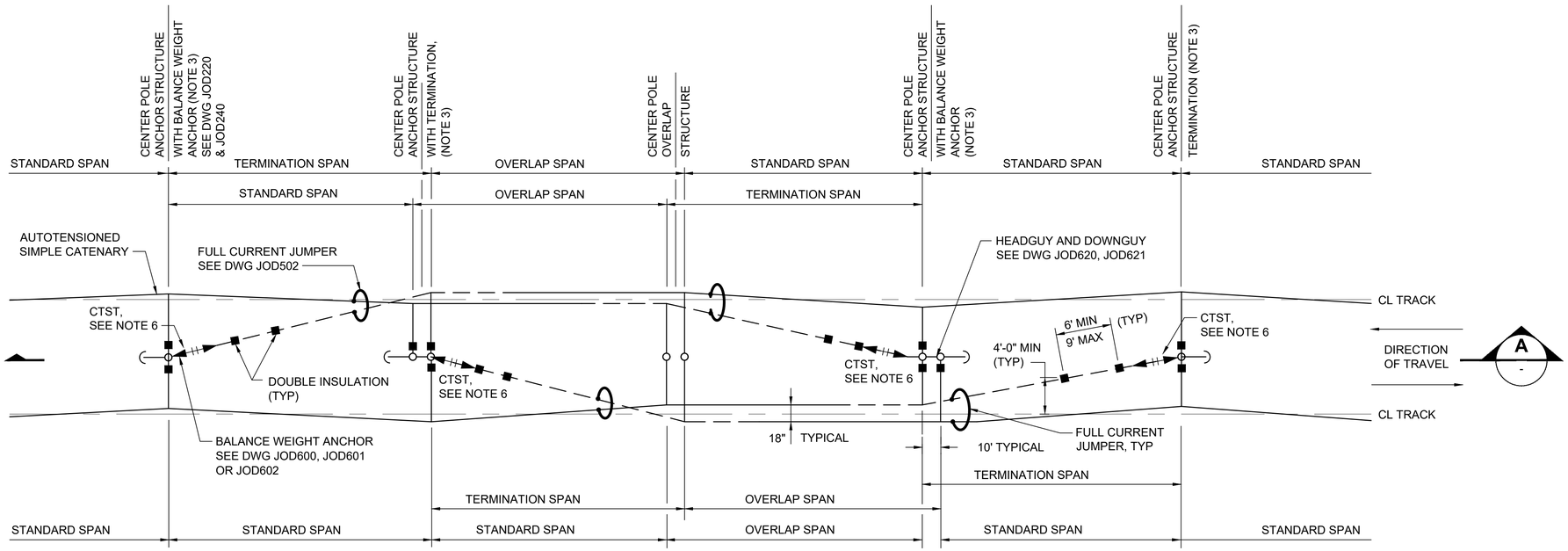
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD210
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

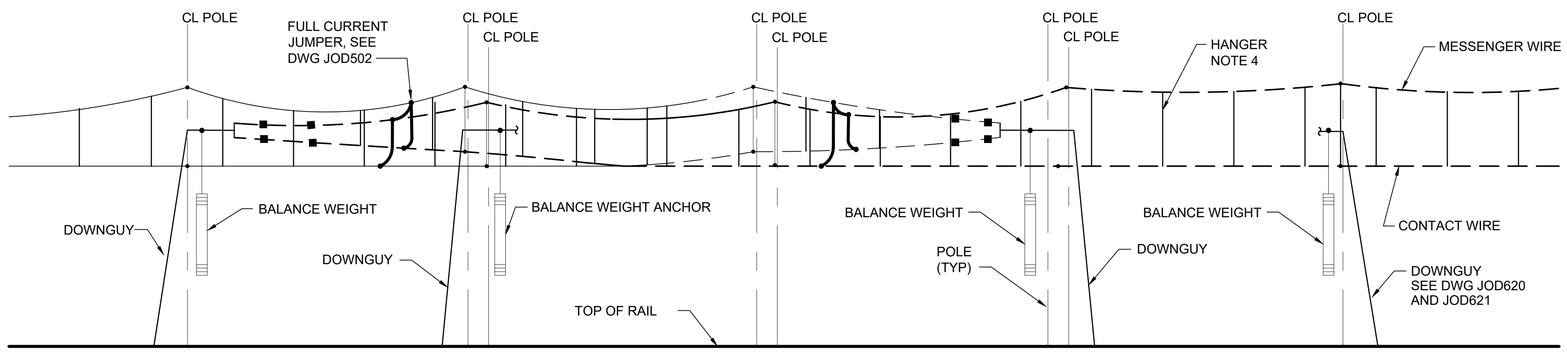
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT INSULATED OVERLAP CENTER POLES

DRAWING No.: **STD-JOD210**
FACILITY ID:
SHEET No.: 1
REV:



UNINSULATED OVERLAP PLAN - CENTER POLES

NTS



SECTION A-A

NTS

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND LEGEND SEE DWG JZN001, JZN002, AND JZN006.
2. CONDUCTOR HEIGHTS, ANCHOR HEIGHTS, SPAN LENGTHS, STAGGER VALUES AND DIRECTIONS TO BE SHOWN ON OCS LAYOUT PLANS.
3. FIXED ANCHOR TERMINATION MAY BE SUBSTITUTED FOR BALANCE WEIGHT ANCHOR. SITE SPECIFIC REQUIREMENTS TO BE SHOWN ON OCS LAYOUT PLANS.
4. FOR TYPICAL STANDARD OVERLAP AND TERMINATION SPAN DETAILS & HANGER SETOUT, SEE DWG JOD250, JOD251, & JOD253.
5. CANTILEVERS SHALL BE NORMAL TO MAINLINE TRACK AT 60° F.
6. CONSTANT TENSION SPRING TERMINATION (CTST) PREFERRED, SEE DWG JOD603.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SCALE: NTS
FILENAME: STD-JOD211
CONTRACT No.: RTA/LR
DATE: 2/2024

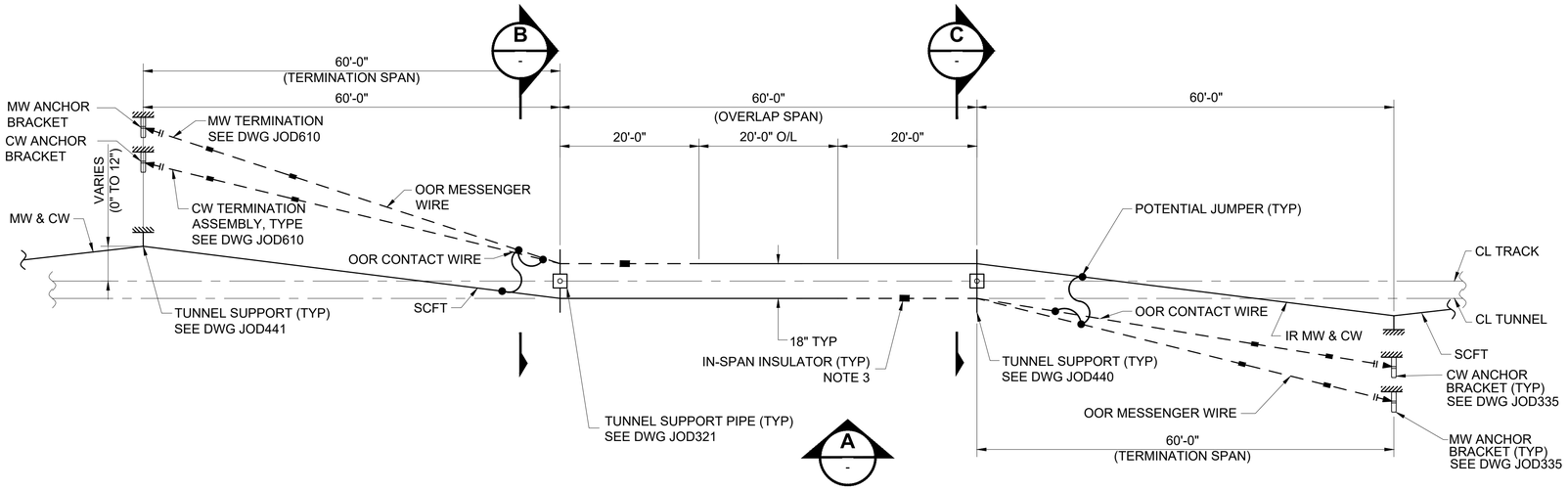
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT UNINSULATED OVERLAP CENTER POLES

DRAWING No.: **STD-JOD211**
FACILITY ID:
SHEET No.: REV: 1

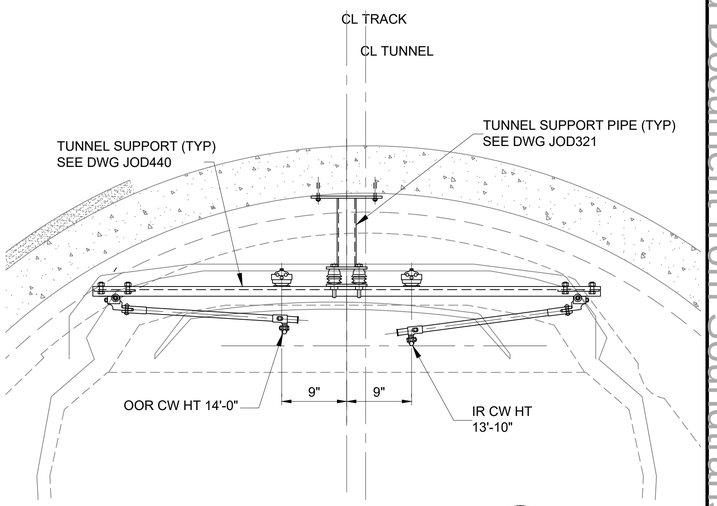
GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND, SEE DWG JZN001, JZN002 AND JZN006.
2. CLEARANCE BETWEEN DESIGNED MESSENGER WIRE HEIGHT AND THE TUNNEL SOFFIT VARIES.
3. IN-RUNNING CW INSULATORS ARE REQUIRED AT THIS LOCATION FOR AN INSULATED OVERLAP.
4. HEIGHTS, STAGGERS AND ASSEMBLY CALL-OUTS TO BE SPECIFIED ON OCS LAYOUT PLANS AND SCHEDULES.



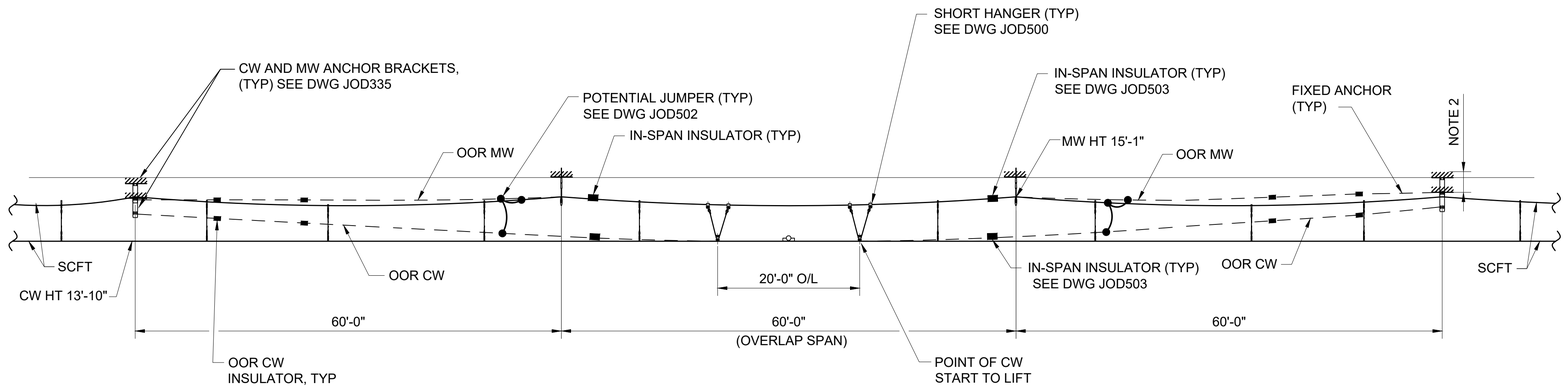
INSULTATED OVERLAP IN BORED TUNNEL PLAN

NTS



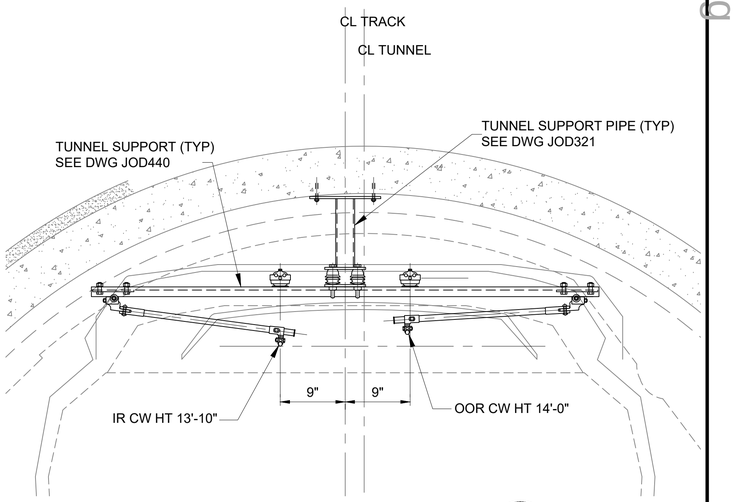
SECTION B

NTS



ELEVATION A

NTS



SECTION C

NTS

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD212
CONTRACT No.: RTA/LR
DATE: 2/2024

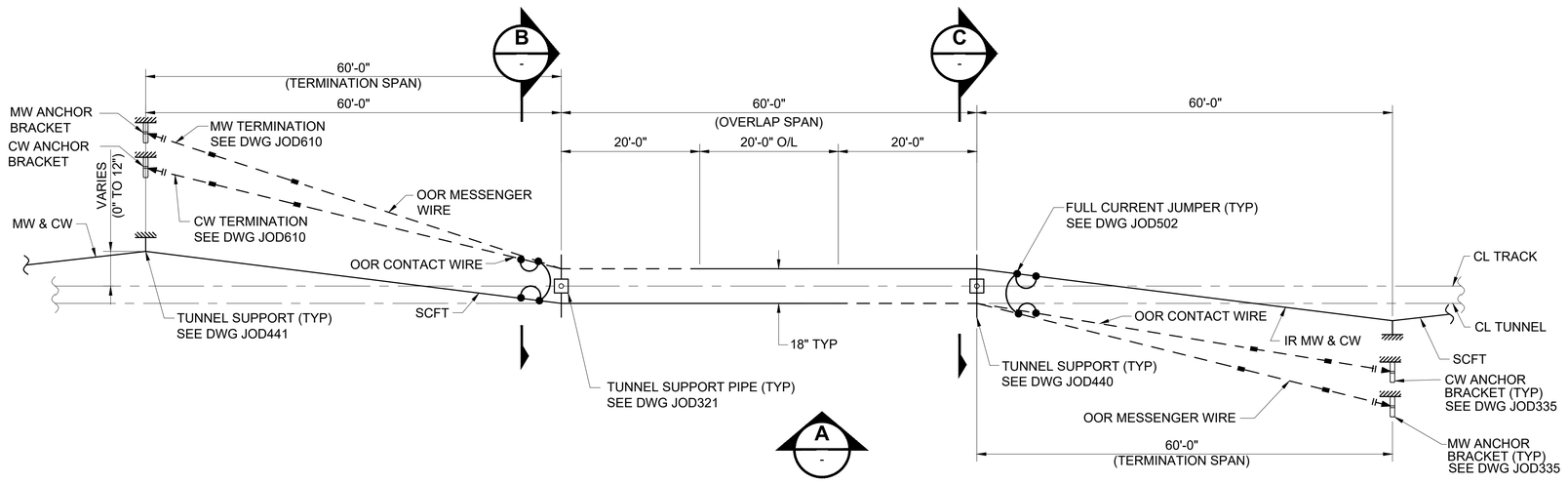
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT INSULATED OVERLAP IN TUNNEL

DRAWING No.: **STD-JOD212**
FACILITY ID:
SHEET No.: REV: 1

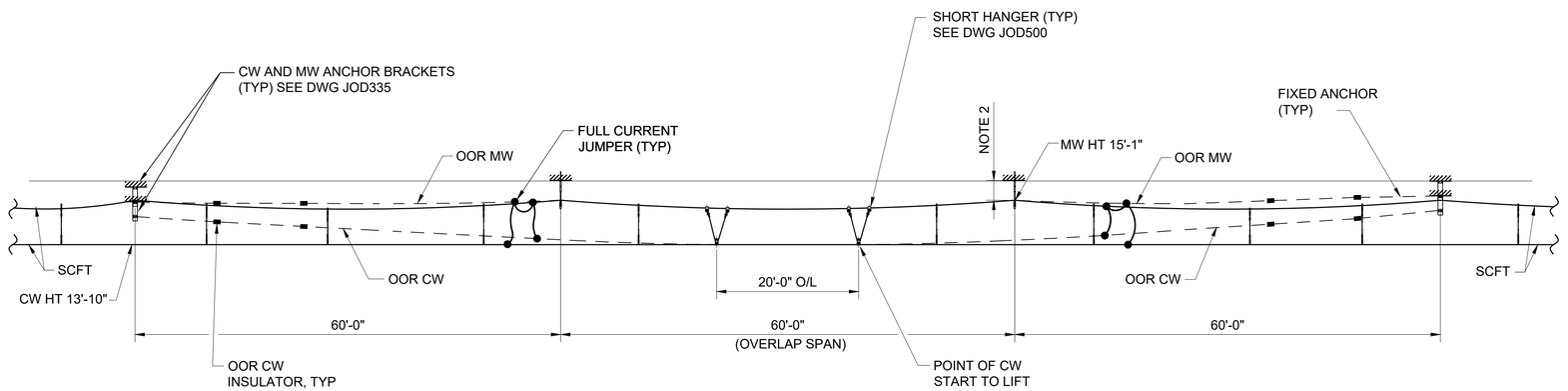
GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND, SEE DWG JZN001, JZN002 AND JZN006.
2. CLEARANCE BETWEEN DESIGNED MESSENGER WIRE HEIGHT AND TUNNEL SOFFIT VARIES.
3. HEIGHTS, STAGGERS AND ASSEMBLY CALL-OUTS TO BE SPECIFIED ON OCS LAYOUT PLANS AND SCHEDULES.



UNINSULATED OVERLAP IN BORED TUNNEL PLAN

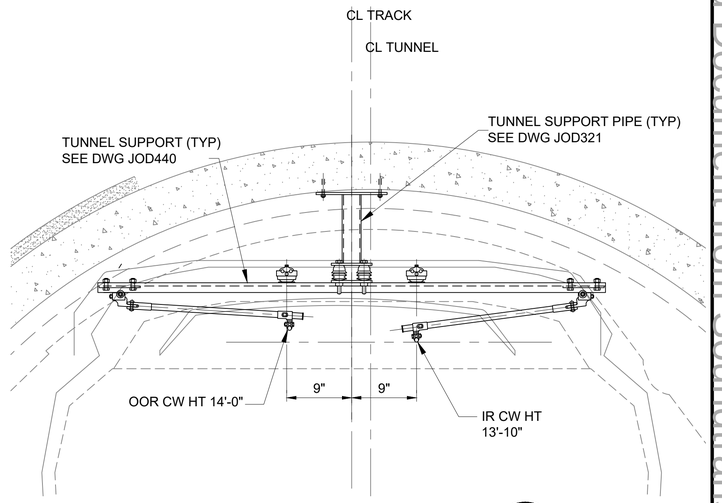
NTS



ELEVATION

NTS

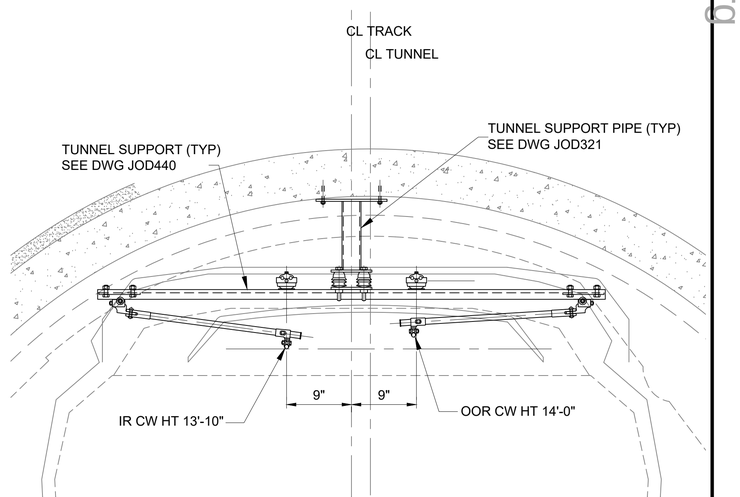
A
-



SECTION

SCALE: NTS

B
-



SECTION

SCALE: NTS

C
-

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

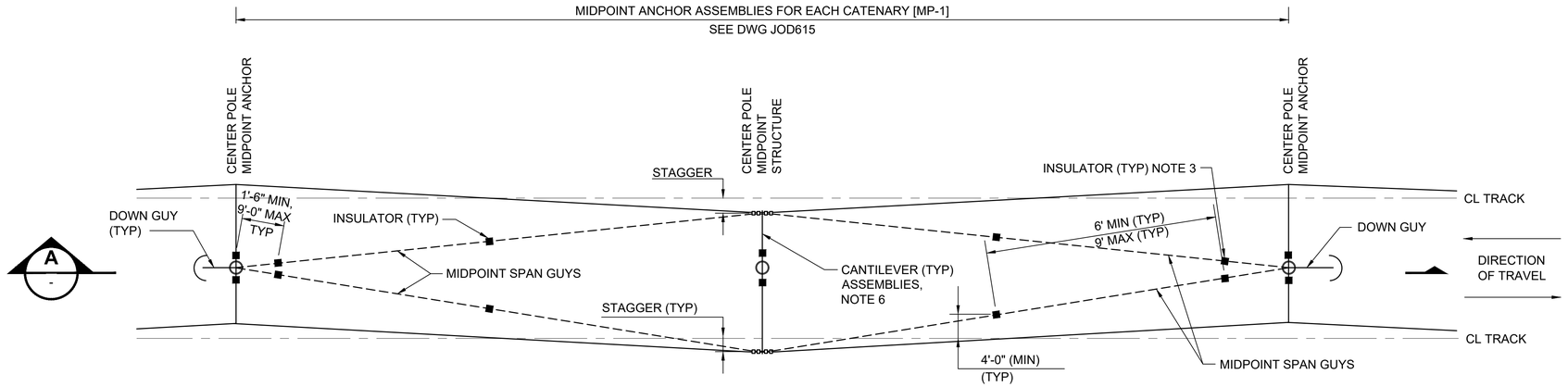
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD213
CONTRACT No.: RTA/LR
DATE: 2/2024

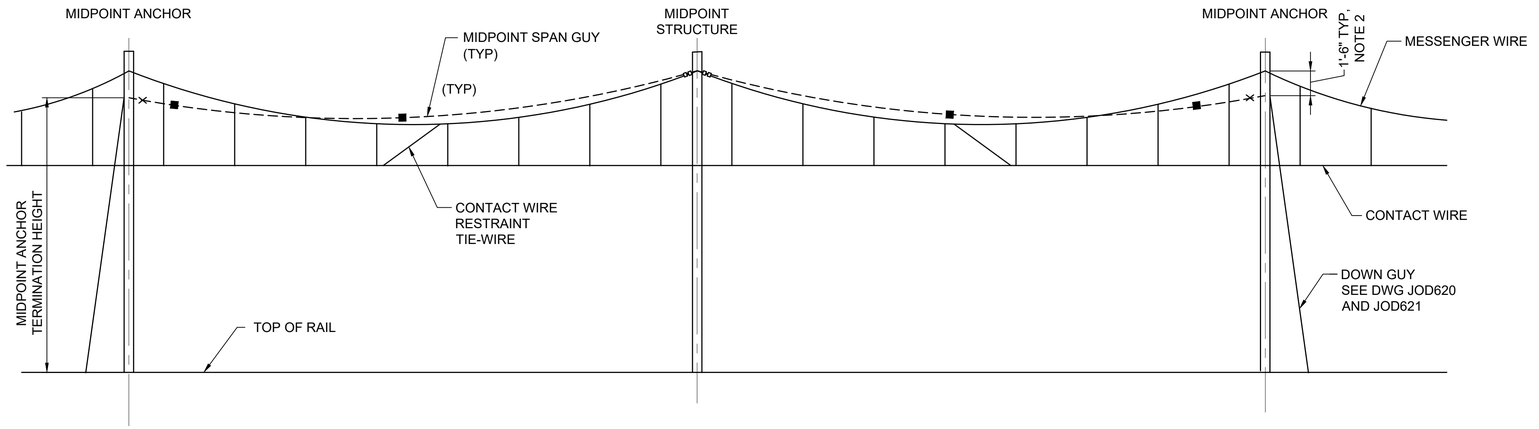
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT UNINSULATED OVERLAP IN TUNNEL

DRAWING No.: STD-JOD213
FACILITY ID:
SHEET No.: 1
REV:



MIDPOINT CENTER POLES PLAN
NTS



SECTION A
NTS

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND LEGEND SEE DWG JZN001, JZN002, AND JZN006.
2. NORMAL MIDPOINT SPAN GUY WIRE TERMINATION HEIGHT SHALL BE 1'-6" BELOW THE MESSENGER WIRE HEIGHT.
3. LOCATE TERMINATION INSULATORS SO THAT THEY PREVENT INTERFERING WITH ADJACENT INSULATORS AT ALL TIMES.
4. SITE SPECIFIC VALUES OF SPAN LENGTHS, WIRE HEIGHTS, STAGGER VALUE & DIRECTION AND TERMINATION HEIGHTS TO BE SHOWN ON OCS LAYOUT PLANS.
5. MIDPOINT SPAN GUY WIRES SHALL RESTRAIN MESSENGER WIRE AND CONTACT WIRE ON ONE SIDE UNDER BROKEN WIRE CONDITIONS.
6. CONTRACTOR TO MODIFY MIDPOINT CANTILEVER AS REQUIRED TO SUPPORT BOTH DEAD AND LIVE LOADS GENERATED BY THE MIDPOINT ANCHOR ASSEMBLY UNDER ALL CONDITIONS AND FAILURE MODES.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

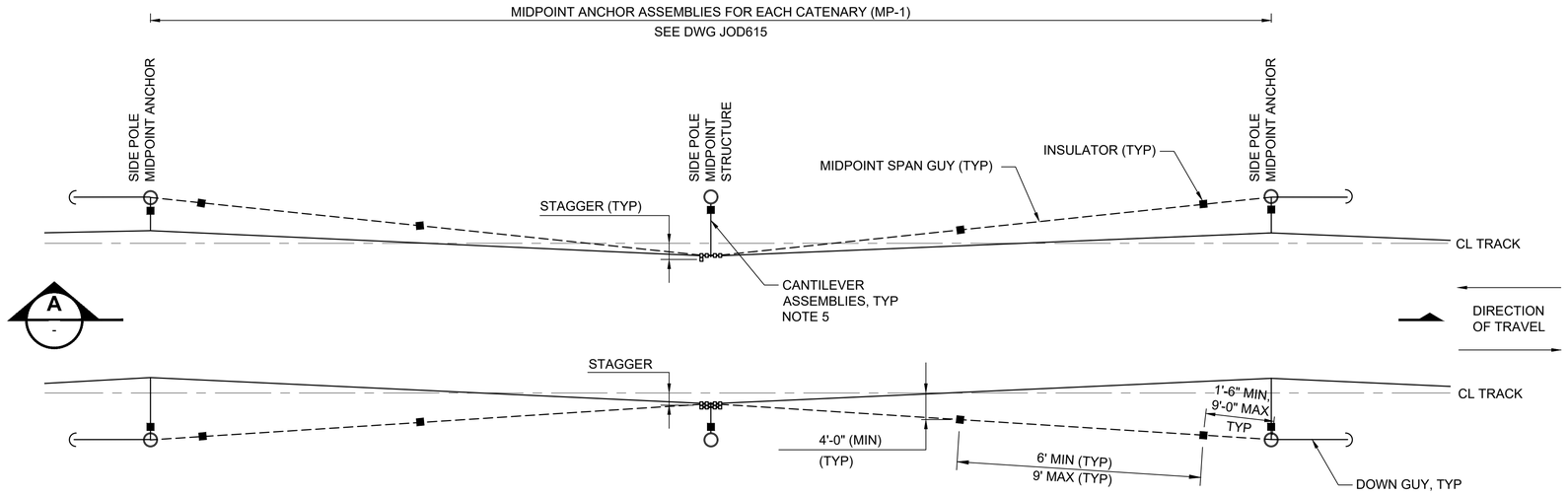
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD214
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT MIDPOINT ANCHOR ON CENTER POLES

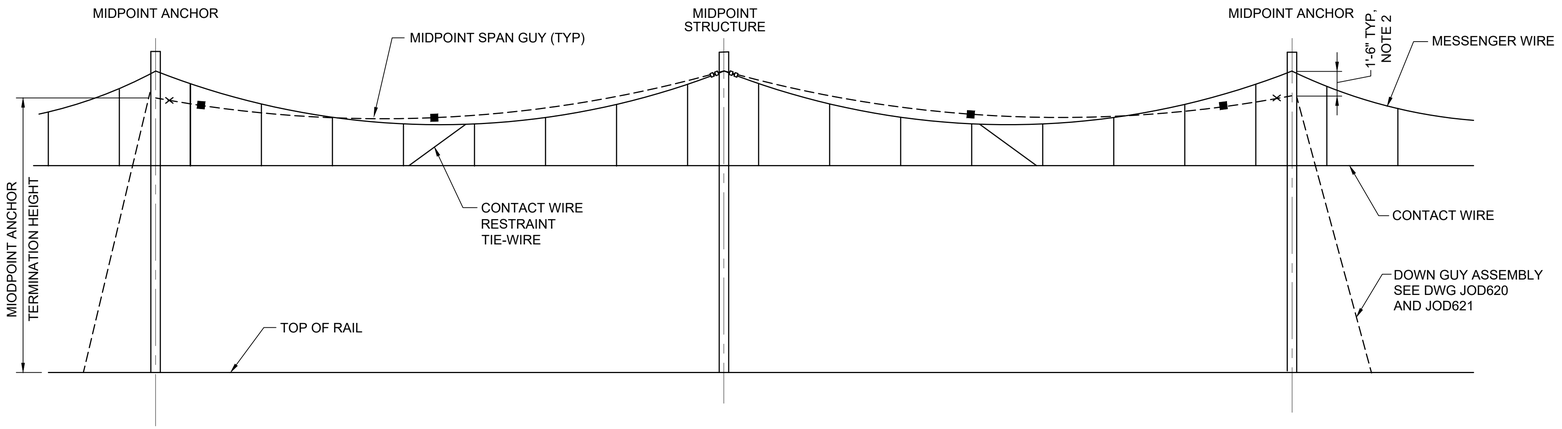
DRAWING No.: **STD-JOD214**
FACILITY ID:
SHEET No.: 1
REV:

01/30/25 | 11:07 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD214.DWG



MIDPOINT ANCHOR ON SIDE POLES PLAN

NTS



ELEVATION

NTS

A
-

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS, AND LEGEND SEE DWG JZN001, JZN002, AND JZN006.
2. NORMAL MIDPOINT SPAN GUY WIRE TERMINATION HEIGHT SHALL BE 1'-6" BELOW THE MESSENGER WIRE HEIGHT.
3. SITE SPECIFIC VALUES OF SPAN LENGTHS, WIRE HEIGHTS, STAGGER VALUE & DIRECTION AND TERMINATION HEIGHTS TO BE SHOWN ON OCS LAYOUT PLANS.
4. MIDPOINT SPAN GUY WIRES SHALL RESTRAIN MESSENGER WIRE AND CONTACT WIRE ON ONE SIDE UNDER BROKEN WIRE CONDITIONS.
5. CONTRACTOR TO MODIFY MIDPOINT CANTILEVER AS REQUIRED TO SUPPORT BOTH DEAD AND LIVE LOADS GENERATED BY THE MIDPOINT ANCHOR ASSEMBLY UNDER ALL CONDITIONS AND FAILURE MODES.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD215
CONTRACT No.: RTA/LR
DATE: 2/2024

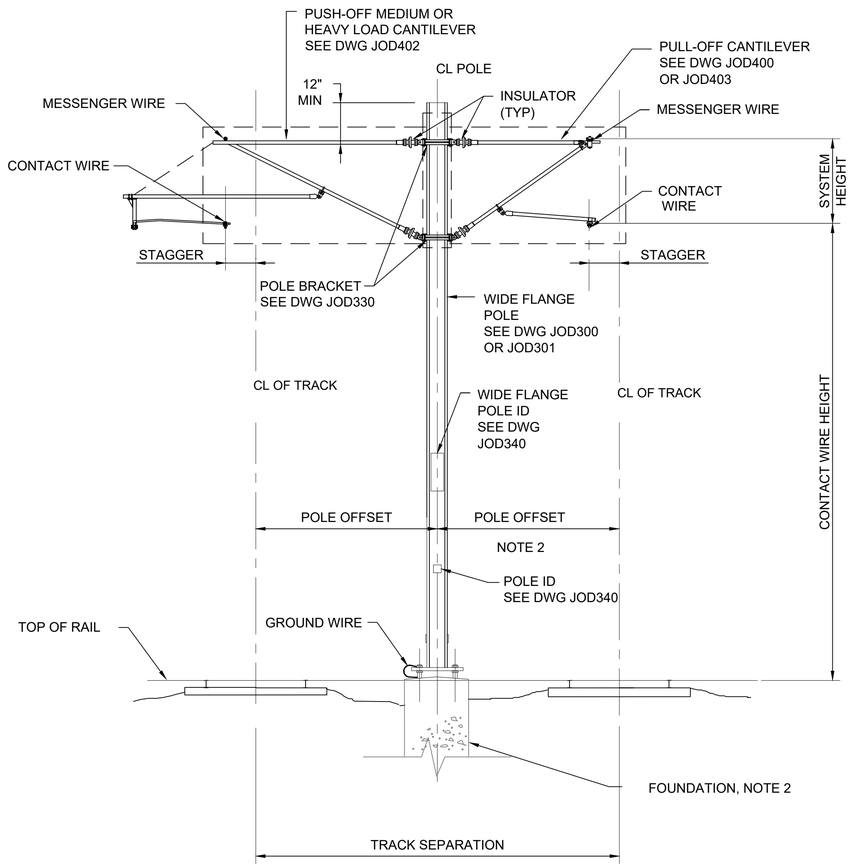
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT MIDPOINT ANCHOR ON SIDE POLES

DRAWING No.: **STD-JOD215**
FACILITY ID:
SHEET No.: REV: 1

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DRAWINGS JZN001, JZN002 AND JZN006.
2. SITE SPECIFIC DETAILS AT EACH LOCATION TO BE SPECIFIED ON OCS LAYOUT PLANS.

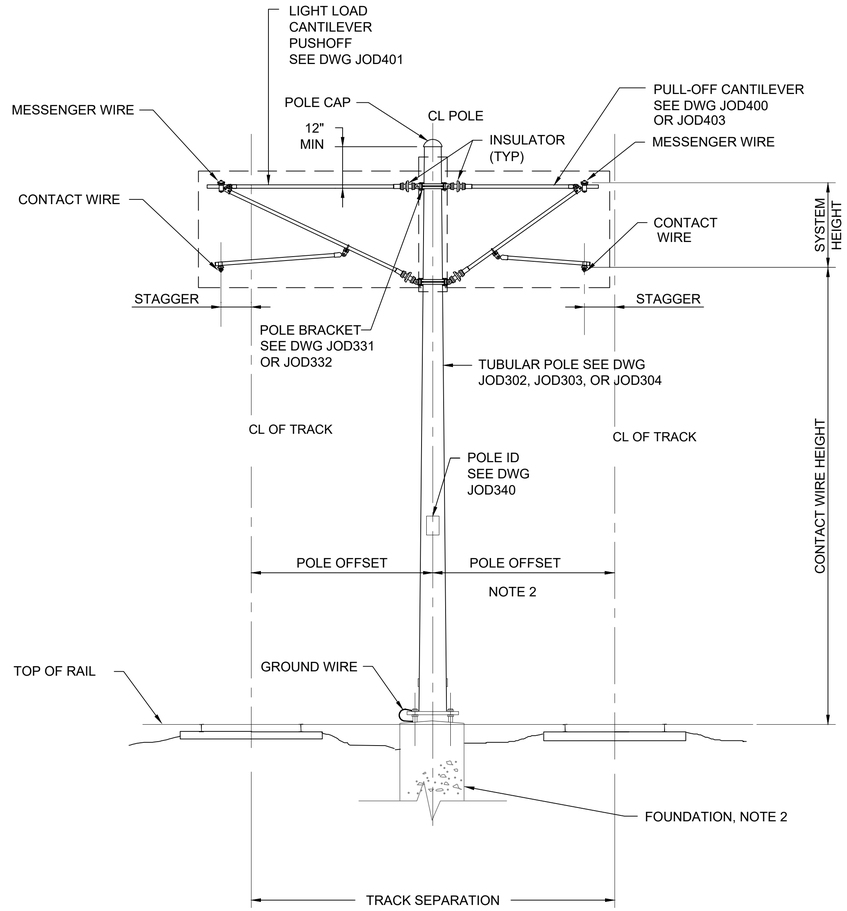


PUSH-PULL OFF **PULL OFF**

WIDE FLANGE CENTER POLE

NTS

1
-



DIRECT PUSH OFF **PULL OFF**

TAPERED TUBULAR CENTER POLE

NTS

2
-

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD220
CONTRACT No.: RTA/LR
DATE: 2/2024

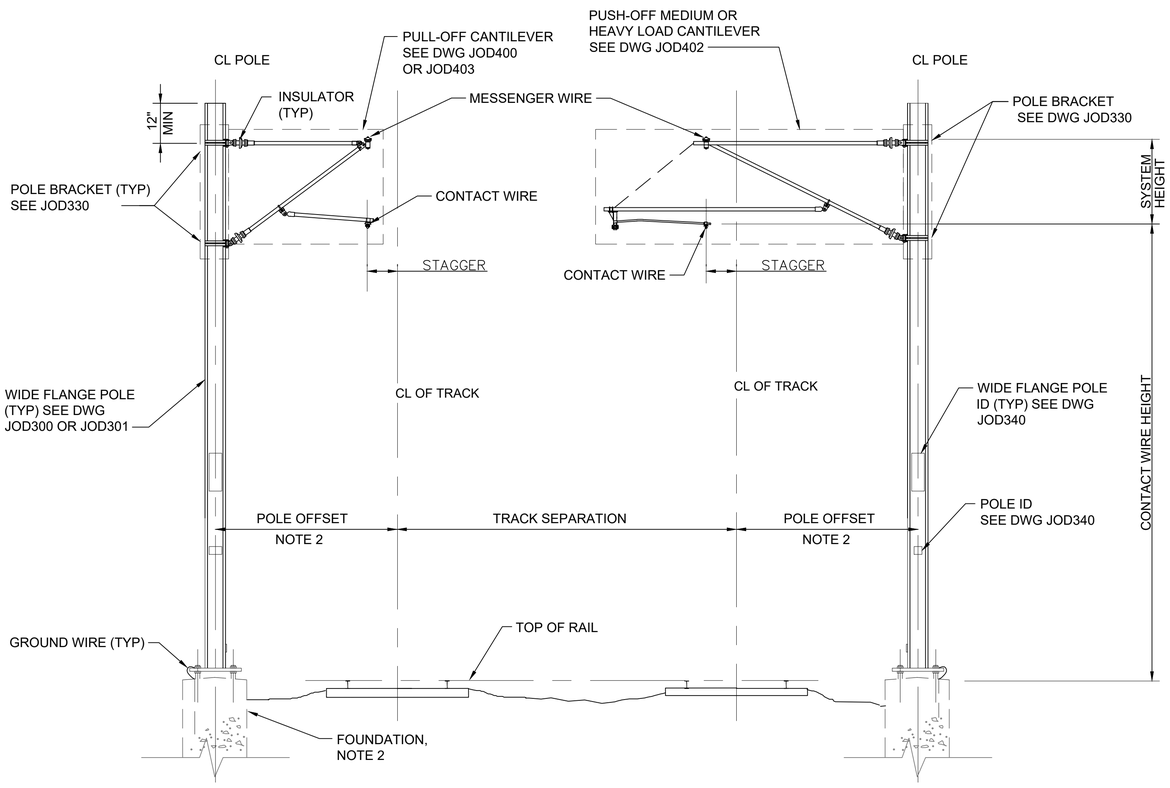
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT CENTER POLE CANTILEVER

DRAWING No.: **STD-JOD220**
FACILITY ID:
SHEET No.: 1 REV:

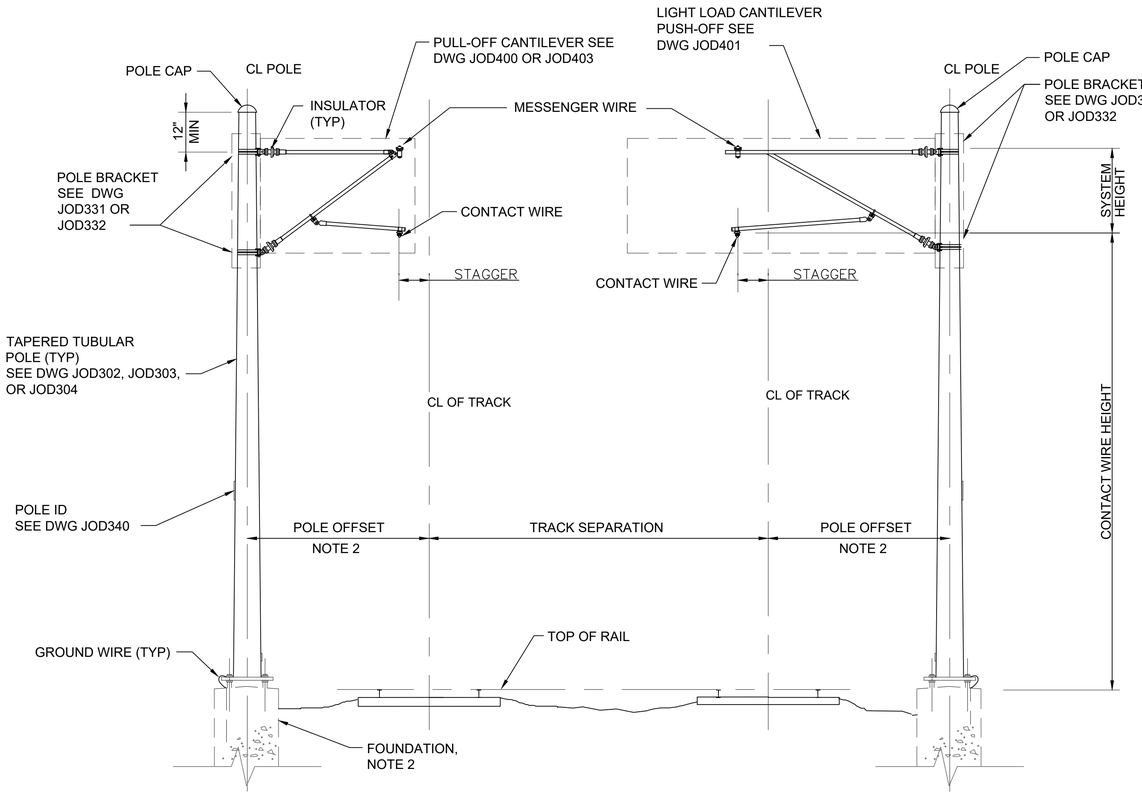
GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DRAWINGS JZN001, JZN002 AND JZN006.
2. SITE SPECIFIC DETAILS AT EACH LOCATION TO BE SPECIFIED ON OCS LAYOUT PLANS.



PULL OFF **PUSH-PULL OFF**

WIDE FLANGE OUTSIDE POLES 1
NTS -



PULL OFF **DIRECT PUSH OFF**

TAPERED TUBULAR OUTSIDE POLES 2
NTS -

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

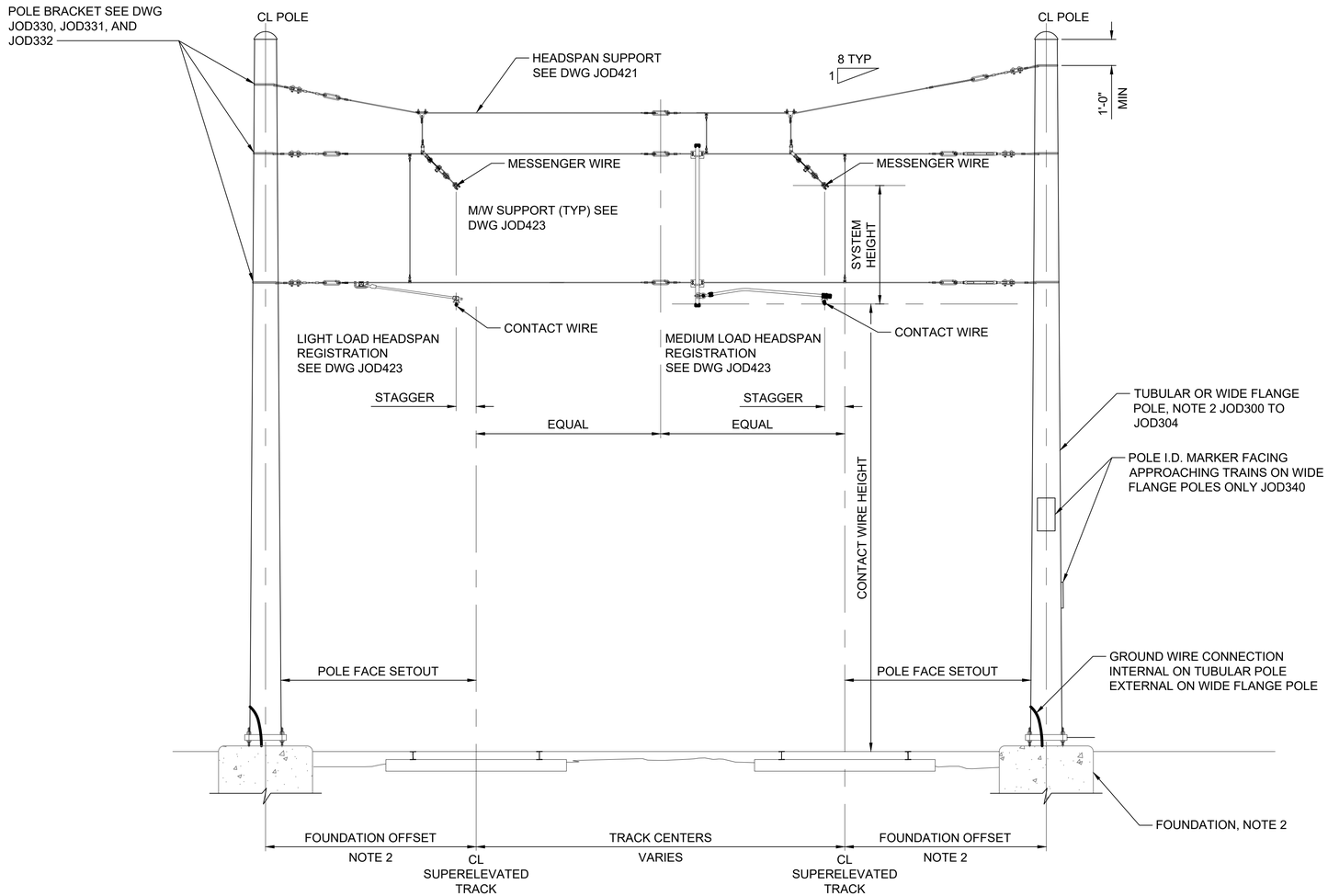
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD221
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT SIDE POLE CANTILEVER

DRAWING No.: **STD-JOD221**
FACILITY ID:
SHEET No.: REV: 1



TYPICAL LIGHT AND MEDIUM LOAD TWO TRACK HEADSPAN STRUCTURE

NTS

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DWG JZN001, JZN002 AND JZN006.
2. SITE SPECIFIC DETAILS AT EACH LOCATION TO BE SPECIFIED ON OCS LAYOUT PLANS.
3. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
4. CONTRACTOR TO ENSURE THAT PANTOGRAPH CLEARANCE AND STEADY ARM CLEARANCE REQUIREMENTS AND ELECTRICAL CLEARANCE REQUIREMENTS ARE MET.
5. MESSENGER SUSPENSION AS SHOWN FOR AUTO-TENSIONED SIMPLE CATENARY. WITH SOUND TRANSIT APPROVAL, ALTERNATIVE MESSENGER SUSPENSION METHODS MAY BE USED TO ACCOMMODATE ALONG-TRACK MOVEMENT OR PROVIDE BODY SPAN WIRE CLEARANCE.
6. STEADY ARM ASSEMBLY SHALL BE CAPABLE OF ACCOMMODATING ALONG TRACK MOVEMENT. CONTRACTOR SHALL FURNISH ALTERNATIVE SUSPENSION DESIGN IF STANDARD STEADY ARM CANNOT BE USED DUE TO SPACE LIMITATIONS.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

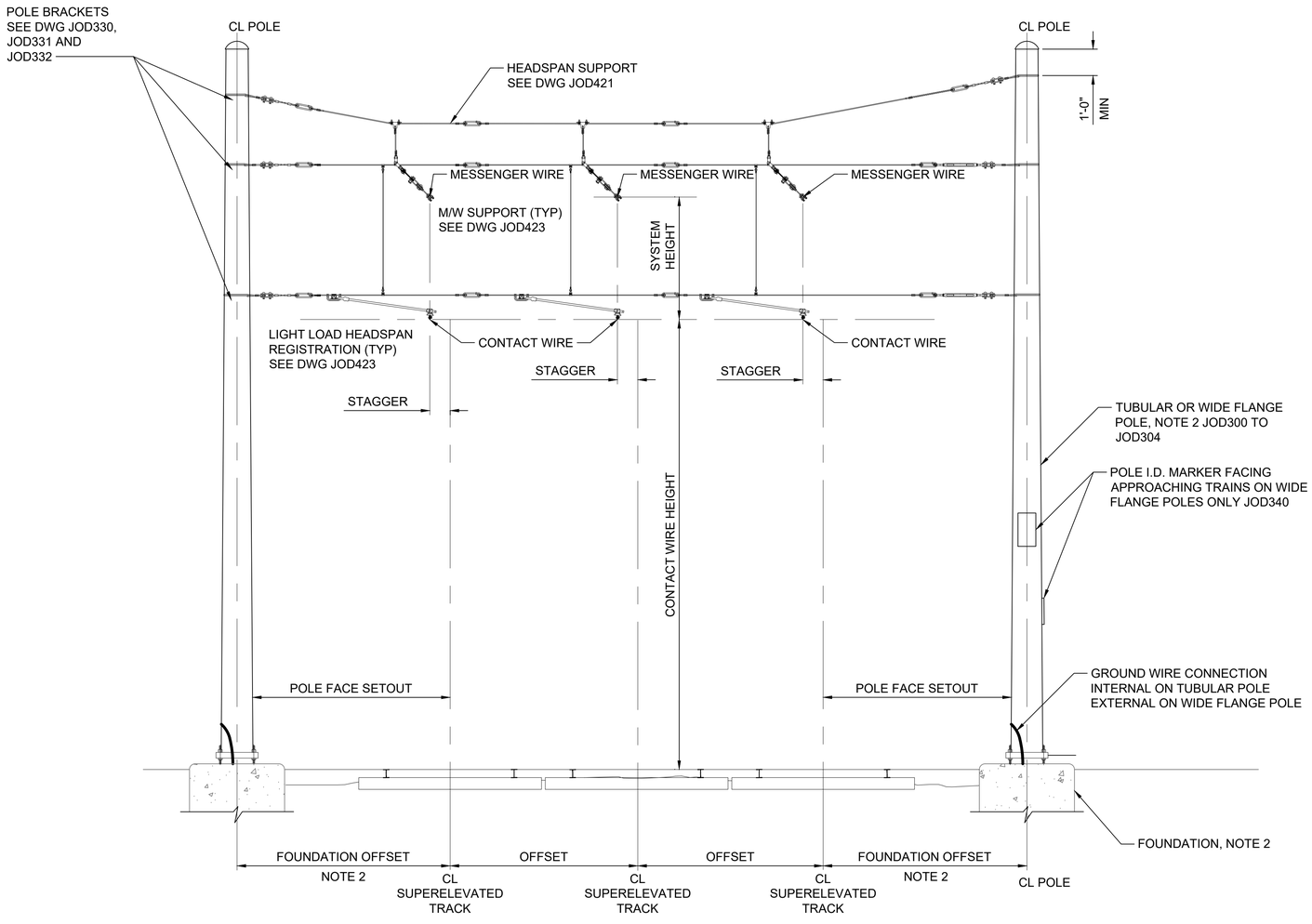
LINE IS 1" AT FULL SCALE

SCALE: NTS
FILENAME: STD-JOD230
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT TWO TRACK HEADSPAN

DRAWING No.: **STD-JOD230**
FACILITY ID:
SHEET No.: 1 REV:

01/30/25 | 11:08 AM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD230.DWG



TYPICAL LIGHT LOAD THREE TRACK HEADSPAN STRUCTURE

NTS

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DWG JZI001, JZI002 AND JZN007.
2. SITE SPECIFIC DETAILS AT EACH LOCATION TO BE SPECIFIED ON OCS LAYOUT PLANS.
3. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
4. CONTRACTOR TO ENSURE THAT PANTOGRAPH CLEARANCE AND STEADY ARM CLEARANCE REQUIREMENTS AND ELECTRICAL CLEARANCE REQUIREMENTS ARE MET.
5. MESSENGER SUSPENSION AS SHOWN IN FOR AUTO-TENSIONED SIMPLE CATENARY. WITH SOUND TRANSIT APPROVAL, ALTERNATIVE MESSENGER SUSPENSION METHODS MAY BE USED TO ACCOMMODATE ALONG-TRACK MOVEMENT OR PROVIDE BODY SPAN WIRE CLEARANCE.
6. STEADY ARM ASSEMBLY SHALL BE CAPABLE OF ACCOMMODATING ALONG TRACK MOVEMENT. CONTRACTOR SHALL FURNISH ALTERNATIVE SUSPENSION DESIGN IF STANDARD STEADY ARM CANNOT BE USED DUE TO SPACE LIMITATIONS.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

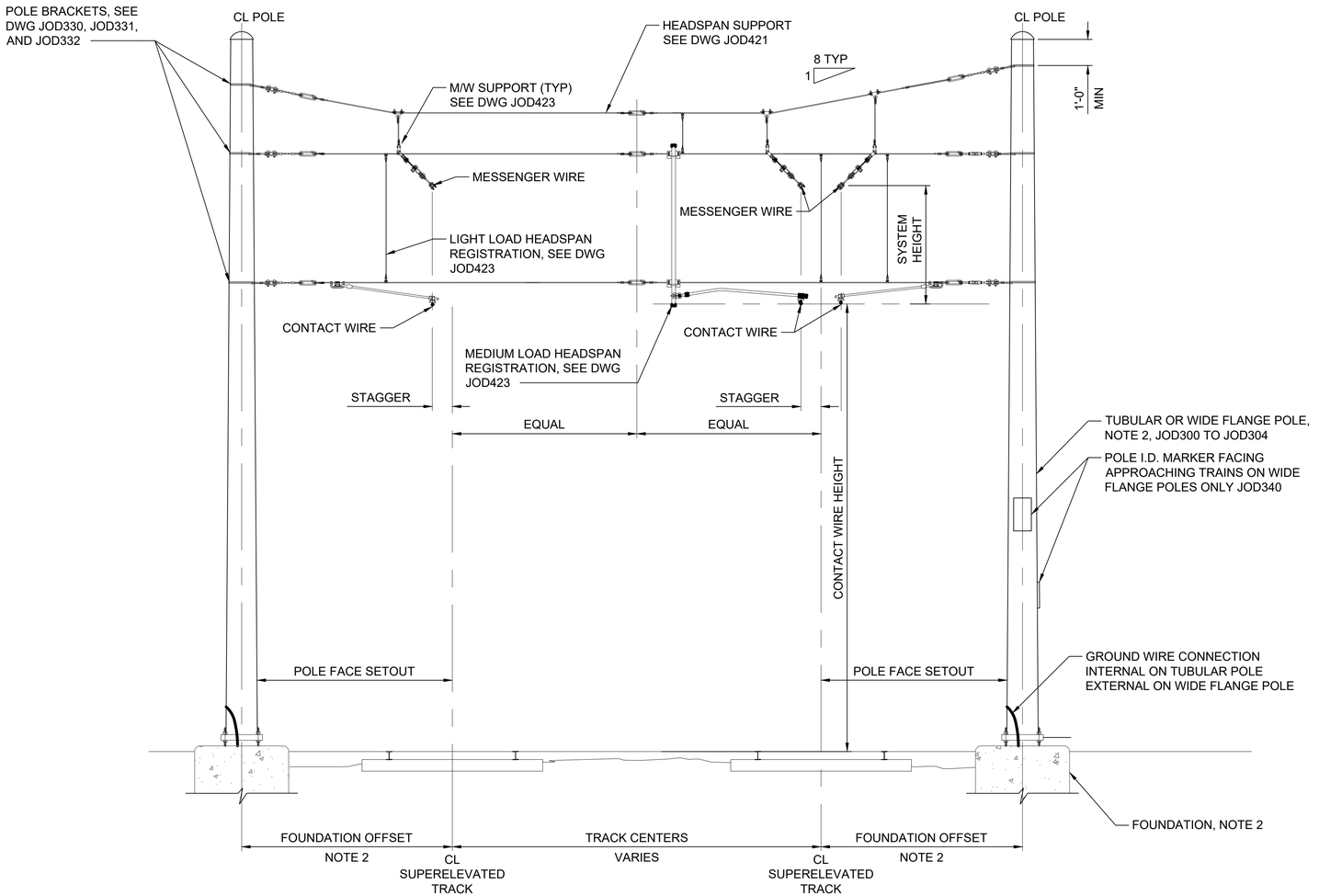
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD231
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT THREE TRACK HEADSPAN

DRAWING No.: **STD-JOD231**
FACILITY ID:
SHEET No.: REV: 1



TYPICAL LIGHT AND MEDIUM LOAD TURNOUT HEADSPAN STRUCTURE

NTS

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DWG JZI001, JZI002 AND JZN007.
2. SITE SPECIFIC DETAILS AT EACH LOCATION TO BE SPECIFIED ON OCS LAYOUT PLANS.
3. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
4. CONTRACTOR TO ENSURE THAT PANTOGRAPH CLEARANCE AND STEADY ARM CLEARANCE REQUIREMENTS AND ELECTRICAL CLEARANCE REQUIREMENTS ARE MET.
5. MESSENGER SUSPENSION AS SHOWN IN FOR AUTO-TENSIONED SIMPLE CATENARY. WITH SOUND TRANSIT APPROVAL, ALTERNATIVE MESSENGER SUSPENSION METHODS MAY BE USED TO ACCOMMODATE ALONG-TRACK MOVEMENT OR PROVIDE BODY SPAN WIRE CLEARANCE.
6. STEADY ARM ASSEMBLY SHALL BE CAPABLE OF ACCOMMODATING ALONG TRACK MOVEMENT. CONTRACTOR SHALL FURNISH ALTERNATIVE SUSPENSION DESIGN IF STANDARD STEADY ARM CANNOT BE USED DUE TO SPACE LIMITATIONS.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

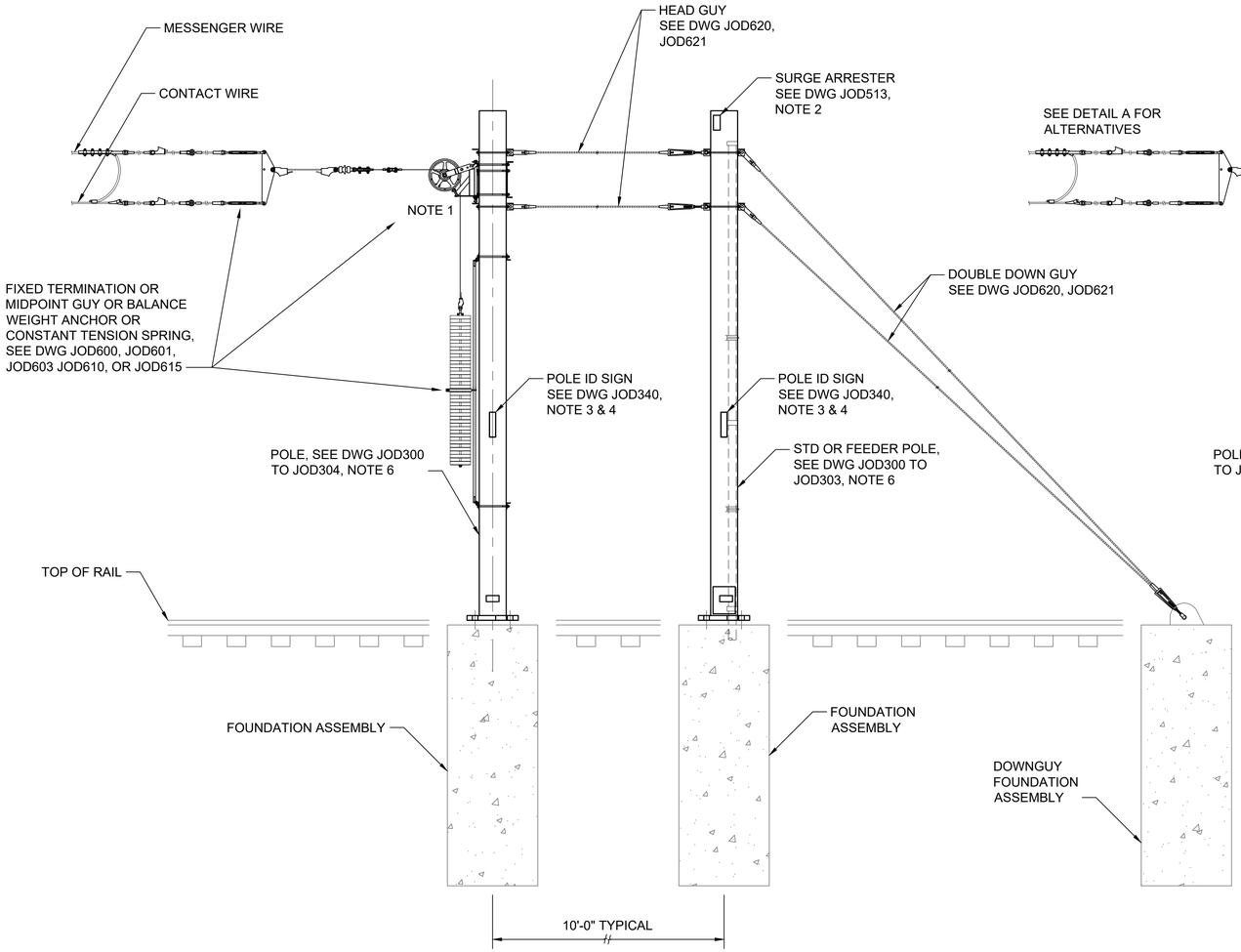
SCALE: NTS
FILENAME: STD-JOD232
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT TURNOUT HEADSPAN

DRAWING No.: **STD-JOD232**
FACILITY ID:
SHEET No.: 1
REV:

GENERAL NOTES:

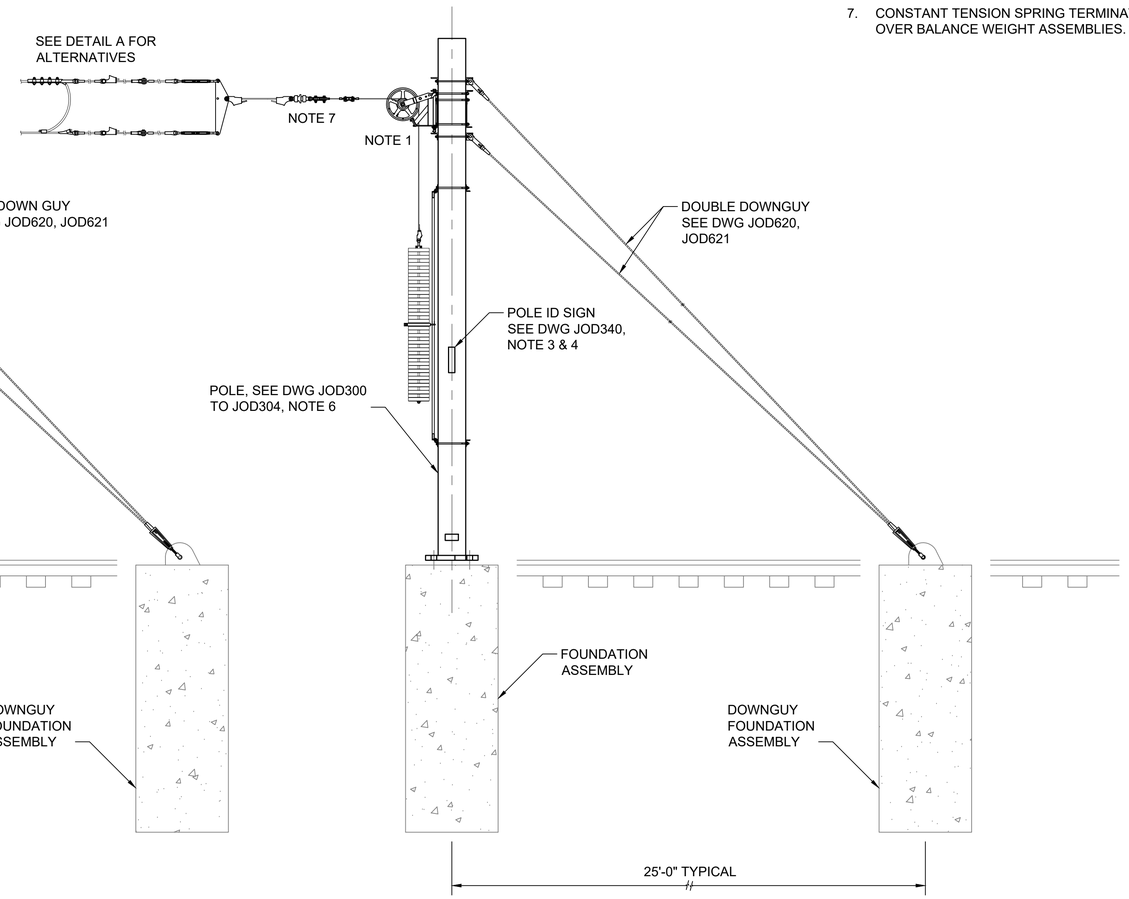
1. CANTILEVER BRACKETS SHALL NOT INTERFERE WITH AUTO-TENSION TERMINATION ASSEMBLY MOVEMENT.
2. ALL FEEDER RISER CABLES SHALL BE PROTECTED BY SURGE ARRESTERS.
3. POLE ID SIGN SHALL BE INSTALLED FOR MAXIMUM VISIBILITY.
4. POLE ID SIGN MAY BE LOCATED ON A TRACKSIDE POLE FACE WHEN VISIBILITY IS OBSTRUCTED BY BW, DOWNGUY, OR CONDUIT.
5. THE INSTALLATION OF FITTINGS FOR CONDUITS, TERMINATIONS, BALANCE WEIGHT BRACKETS, STOPS, AND DOWN GUYS SHALL BE COORDINATED BY THE CONTRACTOR.
6. POLE TYPES TO BE SPECIFIED ON OCS LAYOUT PLANS.
7. CONSTANT TENSION SPRING TERMINATIONS ARE PREFERRED OVER BALANCE WEIGHT ASSEMBLIES. SEE DWG JOD603.



TYPICAL TERMINATION STRUCTURE WITH HEADGUY AND DOWNGUY

NTS

A
-



TYPICAL TERMINATION STRUCTURE WITH DOWNGUY

NTS

B
-

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

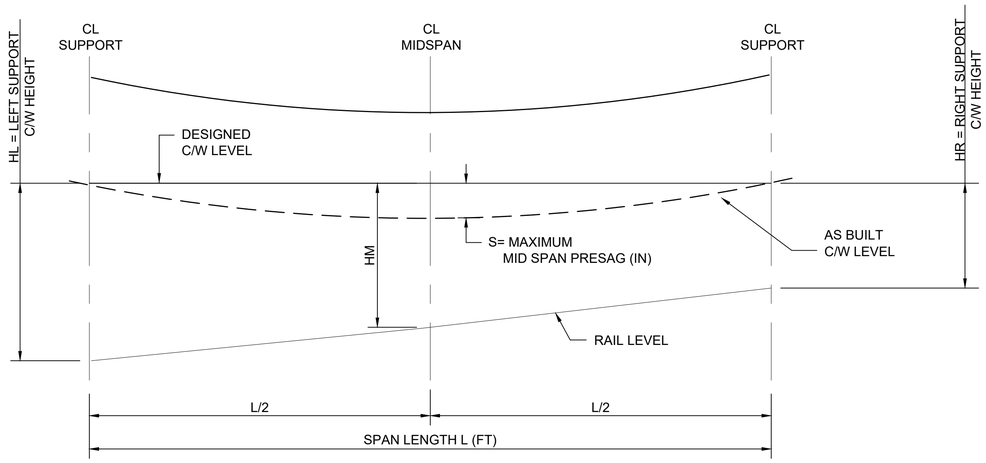
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD240
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT TYPICAL ANCHOR

DRAWING No.: **STD-JOD240**
FACILITY ID:
SHEET No.: 1
REV:



DESIGNED MIDSPAN HEIGHT: HM = (HL+HR)/2

MAXIMUM MID SPAN PRESAG: S = [Lx0.05/(LINE SPEED) (MPH)] x 12
EXCEPT THAT S SHALL NOT
EXCEED 3" OR BE LESS THAN 0".
CONTACT WIRE IS NOT TO HOG.

STANDARD SPAN CONTACT WIRE PRESAG REQUIREMENTS

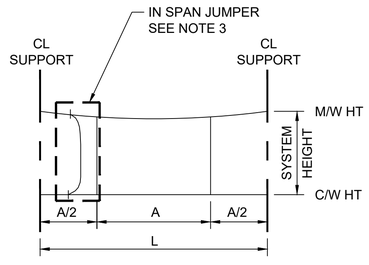
1 / -

NTS

SEE NOTE 1

GENERAL NOTES:

1. STANDARD SPANS SHALL HAVE HANGER LENGTHS DETERMINED AND INSTALLED BY THE CONTRACTOR TO MEET THE STANDARD SPAN CONTACT WIRE PROFILE REQUIREMENTS SHOWN.
2. HANGER LENGTHS SHALL BE DETERMINED TO SUIT THE AS-BUILT SPAN LENGTHS.
3. IN SPAN JUMPERS TO BE INSTALLED TO ASSEMBLY JS-1 ON DWG JOD502 AND MARKED ON OCS LAYOUT PLANS.
4. AS-BUILT HANGER SET SHALL PROVIDE A SMOOTH PATH FOR A PANTOGRAPH OVER THE LENGTH OF EACH SPAN.
5. THE CONTRACTOR'S HANGER LENGTH CALCULATIONS SHALL INCLUDE CONSIDERATION OF THE MASS OF THE CONTRACTOR'S HANGER ASSEMBLIES, POINT LOADS, SPAN INCLINATION, AND CONTACT WIRE PROFILES.
6. FOR TYPICAL HANGER ASSEMBLIES SEE DWG JOD500.
7. FOR SPANS OVER 200 FEET INSTALL SECOND JUMPER AT THIS LOCATION

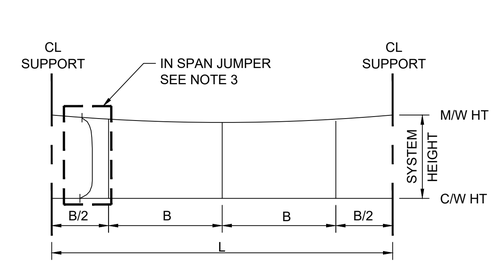


STANDARD SPANS 28' TO 57'

2 / -

NTS

NOTE: A= L/2

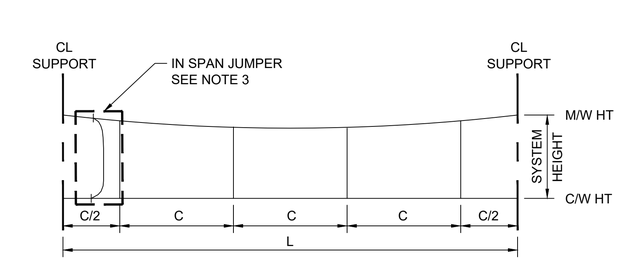


STANDARD SPANS 58' TO 87'

3 / -

NTS

NOTE: B= L/3

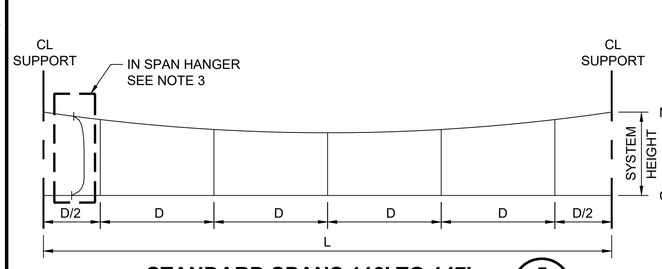


STANDARD SPANS 88' TO 117'

4 / -

NTS

NOTE: C= L/4

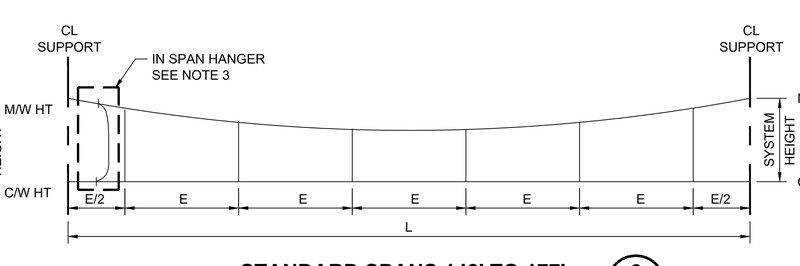


STANDARD SPANS 118' TO 147'

5 / -

NTS

NOTE: D= L/5

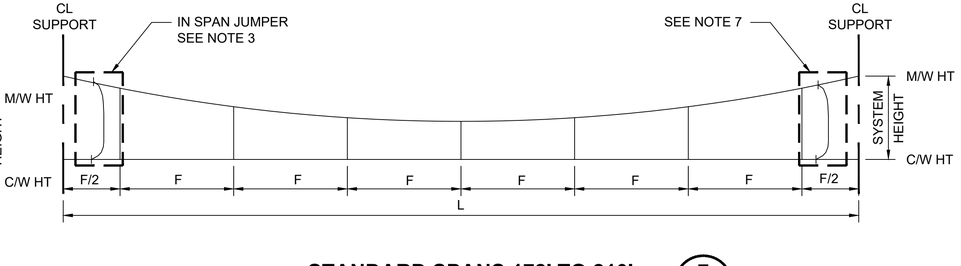


STANDARD SPANS 148' TO 177'

6 / -

NTS

NOTE: E= L/6



STANDARD SPANS 178' TO 210'

7 / -

NTS

NOTE: F= L/7

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

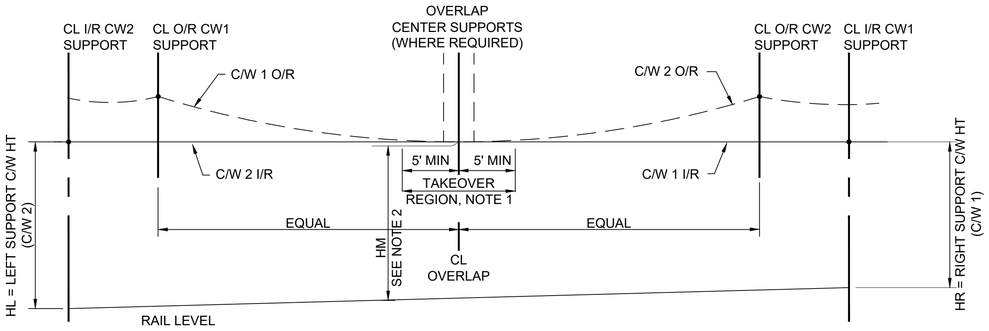
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD250
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT STANDARD SPANS

DRAWING No.: STD-JOD250
FACILITY ID:
SHEET No.: REV: 1

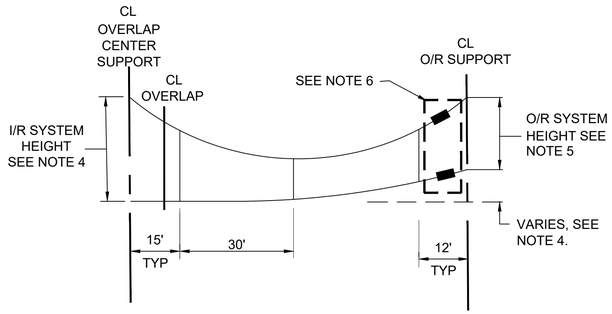
01/30/25 | 1:00 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD250.DWG



WIRE PROFILES REQUIREMENTS FOR OVERLAP SPANS AND HALF OVERLAP SPANS

NTS

1 / -



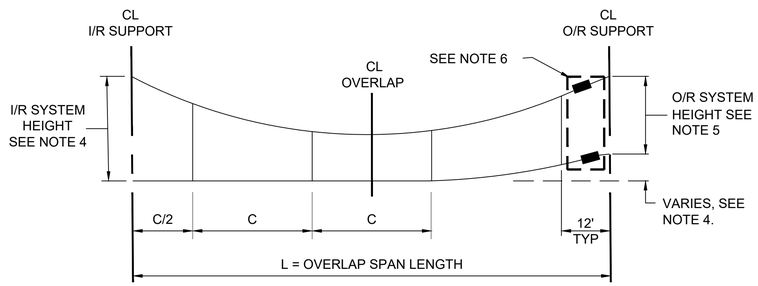
HALF OVERLAP SPAN 58' TO 87'

NTS

2 / -

GENERAL NOTES:

1. HANGER LENGTHS ARE TO BE FIELD ADJUSTED FOR BOTH CONTACT WIRES OF THE OVERLAP. CONTACT WIRES ARE TO BE IN CONTACT WITH THE PANTOGRAPH THROUGHOUT THE TAKE OVER REGION SHOWN, AND BE AT THE MIDSPAN HEIGHT (HM) DESCRIBED IN NOTE 2.
2. REQUIRED AS-BUILT MIDSPAN HEIGHT HM = (HL+HR)/2, TOLERANCE ON HM IS +/- 1 INCH.
3. FINAL HANGER ADJUSTMENTS SHALL BE MADE ONLY AFTER ALL INSULATION, JUMPERS, AND FEEDER CABLES ARE INSTALLED.
4. AT IN-RUNNING SUPPORTS, SYSTEM HEIGHT VALUES WILL TYPICALLY BE:
   - 5 FT WHERE THE WIRING IS CLOSEST TO THE SUPPORTING POLE.
   - 4 FT WHERE THE WIRING IS FURTHEST FROM THE SUPPORTING POLE.
   - SITE SPECIFIC DETAILS TO BE SHOWN ON OCS LAYOUT PLANS.
5. AT OUT-OF-RUNNING SUPPORTS, SYSTEM HEIGHT VALUES WILL TYPICALLY BE:
   - 4'-3" WHERE THE WIRING IS CLOSET TO THE SUPPORTING POLE
   - 3'-3" WHERE THE WIRING IS FURTHEREST FROM THE SUPPORTING POLE.
6. IN SPAN INSULATION ASSEMBLIES ARE REQUIRED IN INSULATED OVERLAPS SHOWN ON OCS LAYOUT PLANS. SEE DWG JOD503 FOR TYPICAL ASSEMBLIES.
7. FOR TYPICAL HANGER ASSEMBLIES, SEE DWG JOD500.

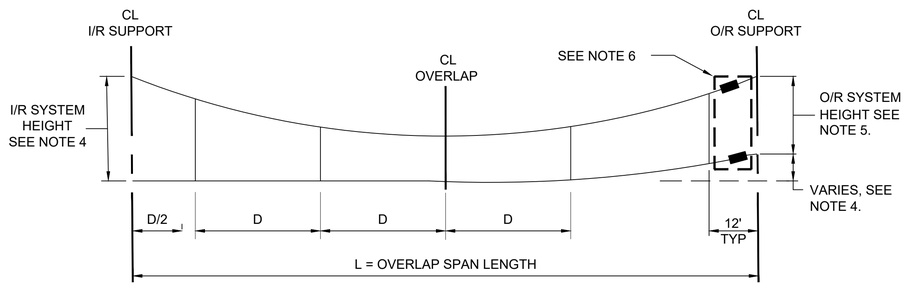


OVERLAP SPAN 88' TO 117'

NTS

3 / -

NOTE: C= L/4

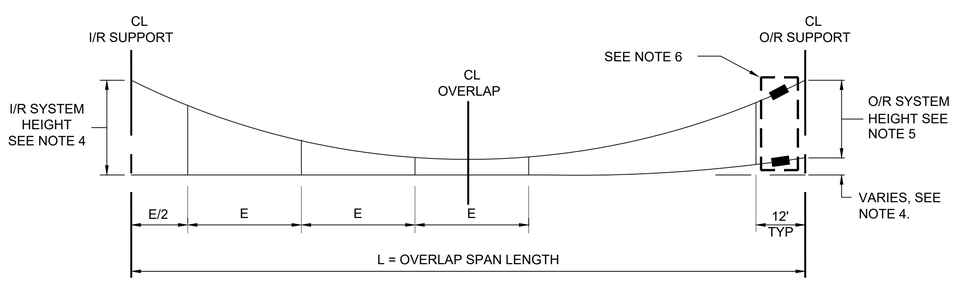


OVERLAP SPAN 118' TO 147'

NTS

4 / -

NOTE: D= L/5

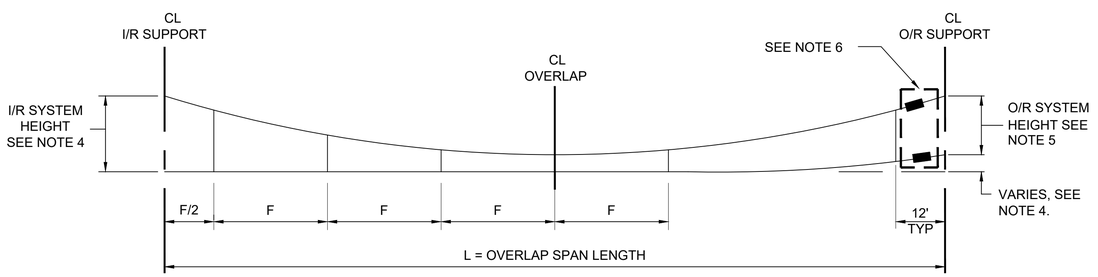


OVERLAP SPAN 148' TO 177'

NTS

5 / -

NOTE: E= L/6



OVERLAP SPAN 178' TO 210'

NTS

6 / -

NOTE: F= L/7

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

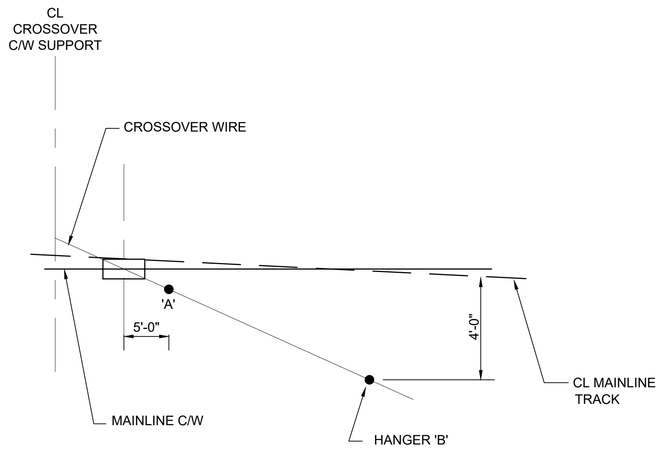
SCALE: NTS
FILENAME: STD-JOD251
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT OVERLAP SPANS

DRAWING No.: STD-JOD251
FACILITY ID:
SHEET No.: 1 REV:

01/30/25 | 1:00 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD251.DWG

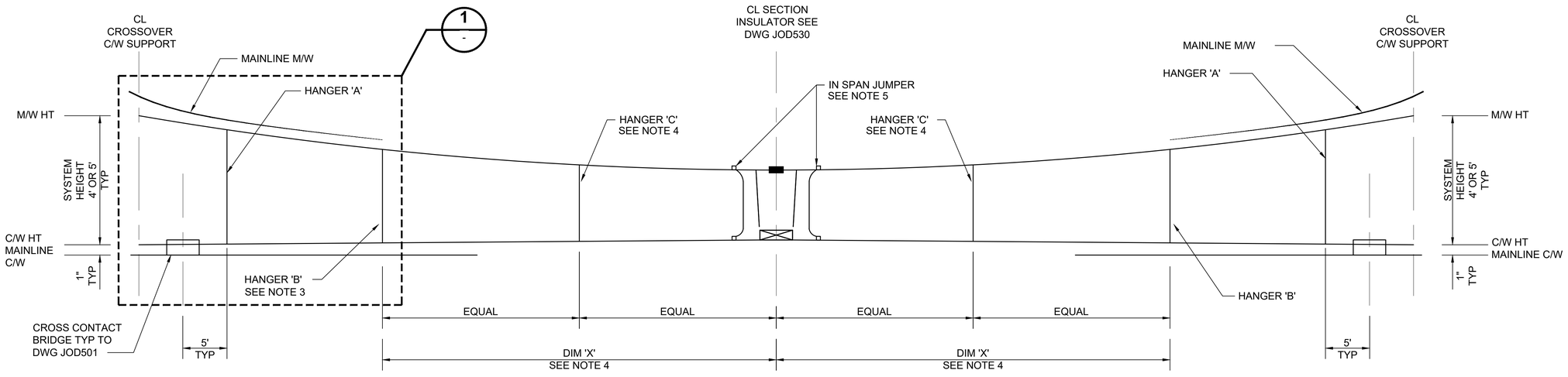


PLAN - SHOWING PALCEMENT OF HANGER 'B'

1 / -

NTS

SEE NOTE 3



CROSSOVER SPAN

NTS

SEE NOTE 2

GENERAL NOTES:

1. SECTION INSULATORS ARE TO BE LOCATED WITHIN 2" OF TRACK CENTERLINE UNLESS OTHERWISE NOTED ON OCS LAYOUT PLANS.
2. CROSSOVER SPAN SHALL HAVE THE CONTACT WIRE HOGGED TO 1 1/2" ± 1", UNLESS INSTRUCTED OTHERWISE BY THE SECTION INSULATOR MANUFACTURER AND APPROVED BY THE RESIDENT ENGINEER.
3. HANGER 'B' IS TO BE POSITIONED RELATIVE TO THE MAINLINE PANTOGRAPH CENTERLINE AS SHOWN IN DETAIL A.
4. HANGER 'C' MAY BE OMITTED IF DIM 'X' IS LESS THAN 30FT.
5. IN SPAN JUMPERS TO BE INSTALLED, SEE JS-1 ON DWG JOD502. LOCATION TO BE SHOWN ON OCS LAYOUT PLANS.
6. HANGERS TO BE FIELD ADJUSTED TO MINIMIZE CONTACT WITH MAINLINE PANTOGRAPHS.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

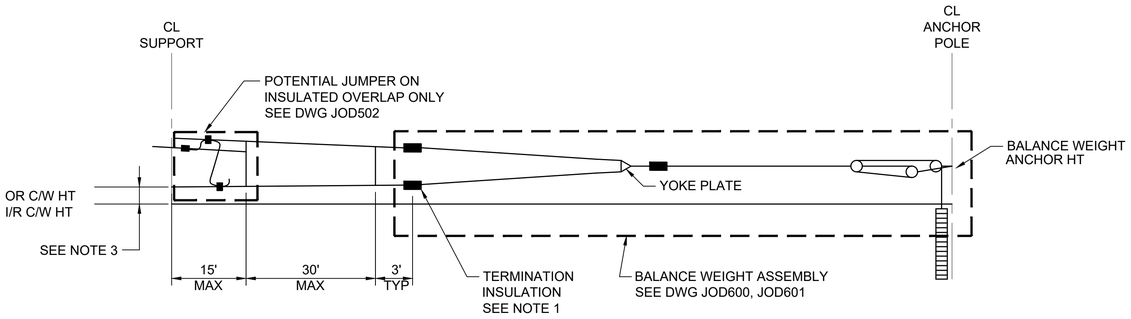
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

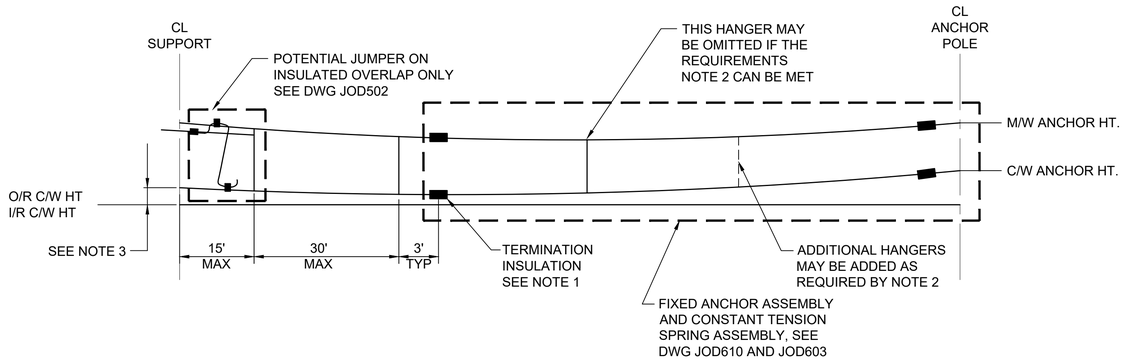
SCALE: NTS
FILENAME: STD-JOD252
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT CROSSOVER SPANS

DRAWING No.: STD-JOD252
FACILITY ID:
SHEET No.: 1
REV:



BALANCE WEIGHT ANCHOR SPAN 1 -



CONSTANT TENSION SPRING AND FIXED ANCHOR SPAN 2 -

GENERAL NOTES:

1. TERMINATION INSULATION SUB-ASSEMBLIES ARE TO BE LOCATED AT 4'-0 MIN HORIZONTAL OFFSET FROM SUPER ELEVATED CENTERLINE.
2. HANGERS ARE TO BE LOCATED AND ADJUSTED TO CAUSE THE O/R CONTACT TO BE ABOVE I/R CONTACT WIRE LEVEL OVER THE WHOLE SPAN.
3. THE VERTICAL DISTANCE BETWEEN IN RUNNING C/W AND OUT OF RUNNING C/W WILL BE 1 INCH FOR TURNOUT ARRANGEMENTS, OR TYPICALLY 9 INCHES FOR OVERLAP ARRANGEMENTS. SITE SPECIFIC REQUIREMENTS TO BE SHOWN ON OCS LAYOUT PLANS.
4. FOR TYPICAL HANGER ASSEMBLIES, SEE DWG JOD500.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

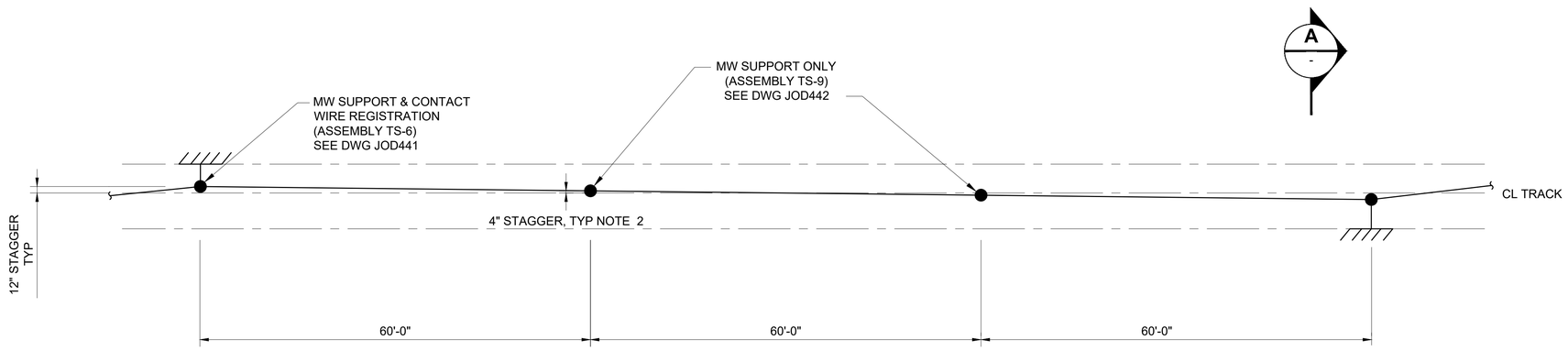
SCALE: NTS
FILENAME: STD-JOD253
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT TERMINATION SPANS

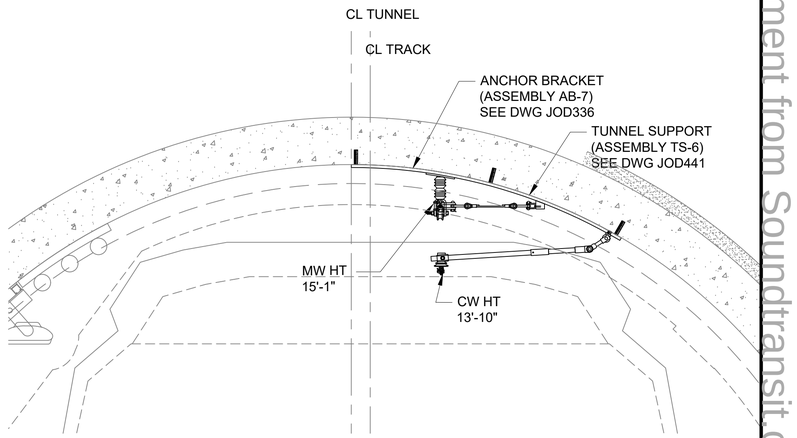
DRAWING No.: **STD-JOD253**
FACILITY ID:
SHEET No.: REV: 1

GENERAL NOTES:

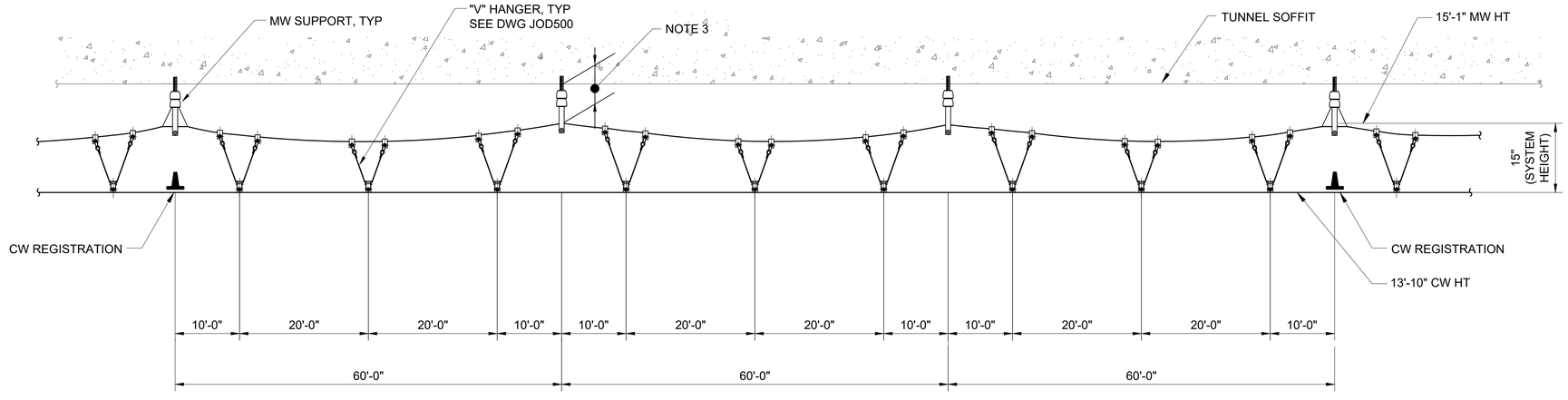
1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DWG JZN001, JZN002 AND JZN006.
2. CONTRACTOR SHALL INSTALL SUPPORT ASSEMBLIES DIRECTLY IN LINE FROM ADJACENT CONTACT WIRE.
3. CLEARANCE BETWEEN DESIGNED MESSENGER WIRE HEIGHT AND TUNNEL SOFFIT VARIES.
4. HEIGHTS, STAGGERS AND ASSEMBLY CALL-OUTS TO BE SPECIFIED ON OCS LAYOUT PLANS AND SCHEDULES.



PLAN



SECTION A -
NTS



ELEVATION

TYPICAL OCS ARRANGEMENT (TANGENT TRACK) TUNNEL

NTS

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

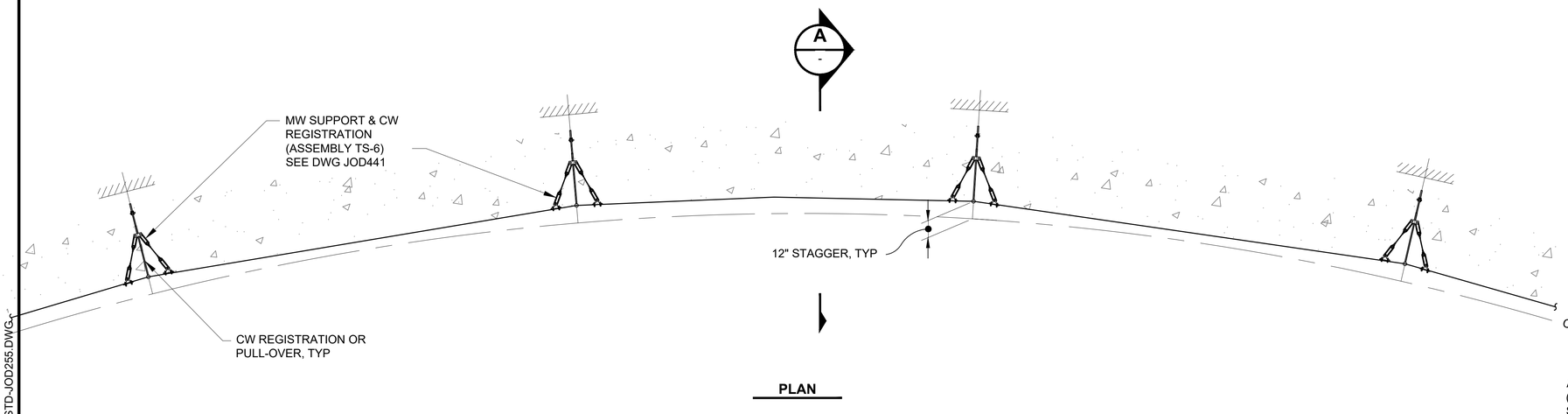
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD254
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT TANGENT SPAN IN TUNNEL

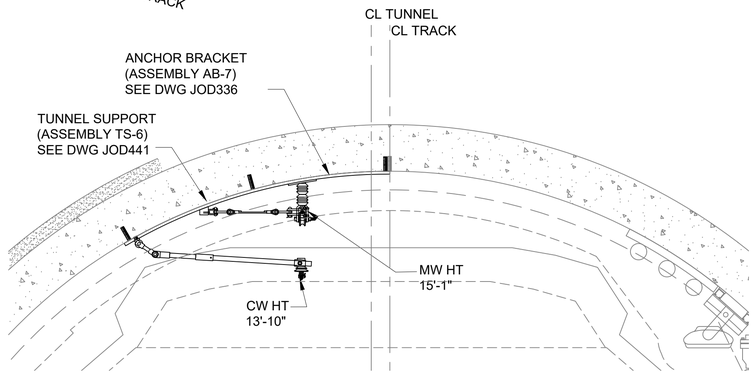
DRAWING No.: **STD-JOD254**
FACILITY ID:
SHEET No.: REV: 1



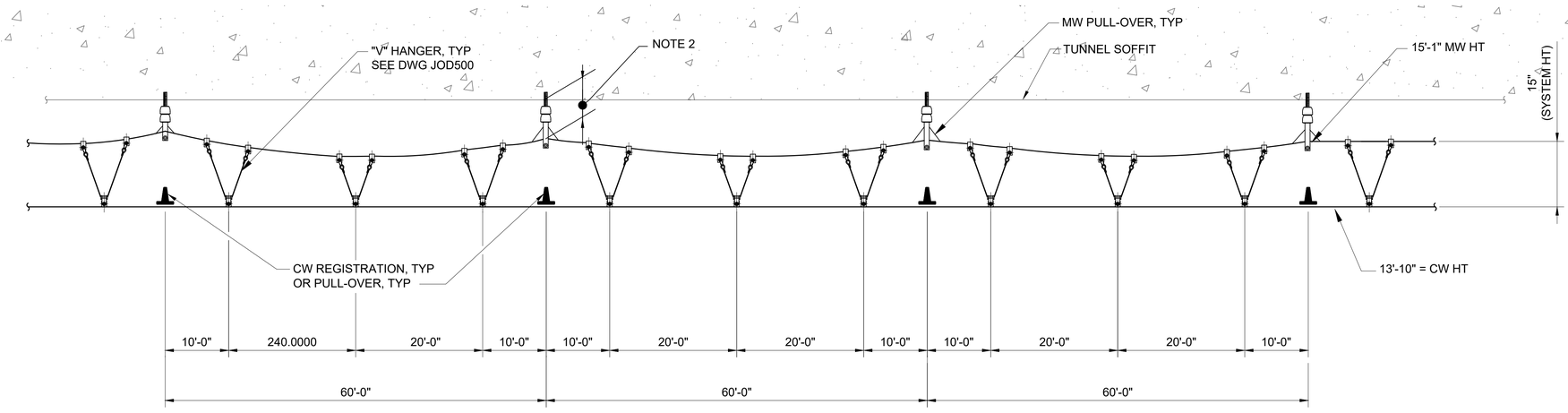
PLAN

GENERAL NOTES:

1. FOR SYMBOLS, ABBREVIATIONS AND LEGEND SEE DWG JZN001, JZN002 AND JZN006.
2. CLEARANCE BETWEEN DESIGNED MESSENGER WIRE HEIGHT AND TUNNEL SOFFIT VARIES.
3. HEIGHTS, STAGGERS AND ASSEMBLY CALL-OUTS TO BE SPECIFIED ON OCS LAYOUT PLANS AND SCHEDULES.



SECTION A -
NTS



ELEVATION

TYPICAL OCS ARRANGEMENT (CURVE TRACK) TUNNEL

NTS

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

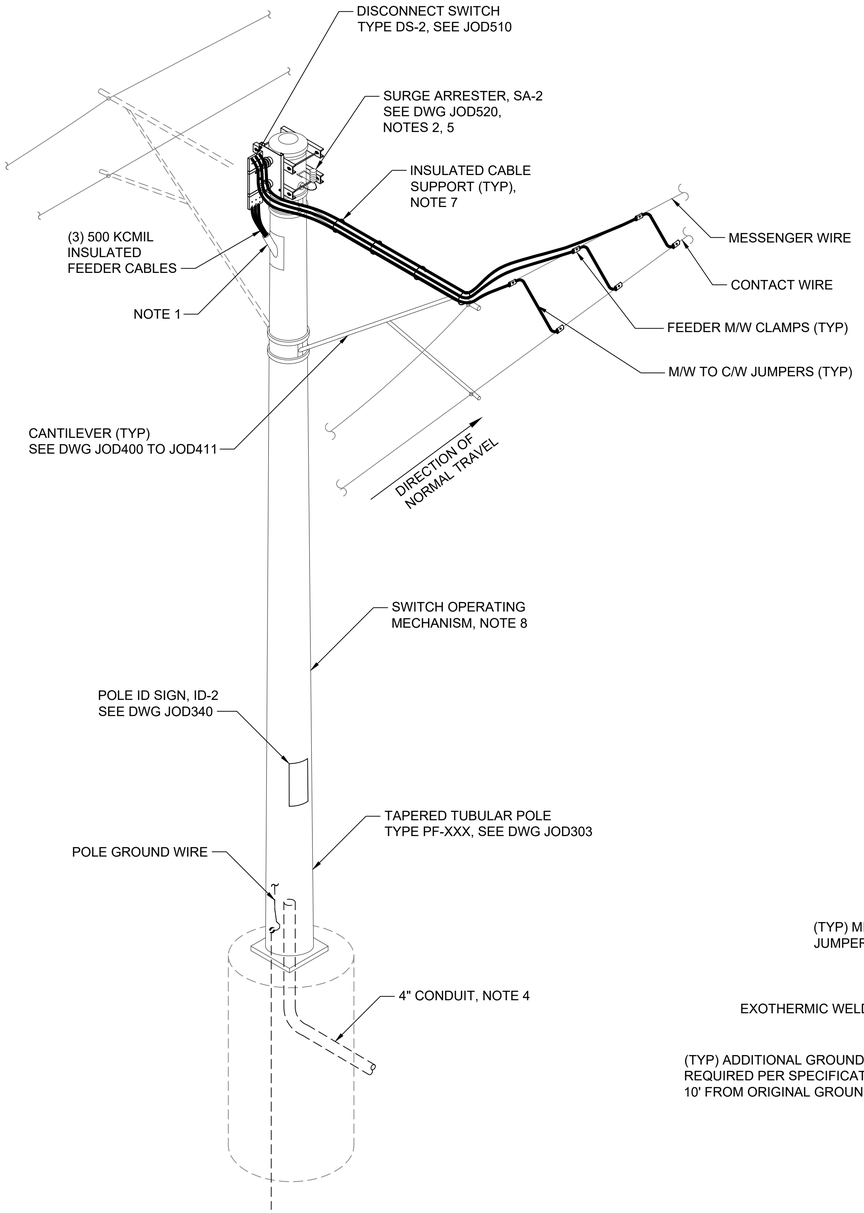
LINE IS 1" AT FULL SCALE

SCALE: NTS
FILENAME: STD-JOD255
CONTRACT No.: RTA/LR
DATE: 2/2024

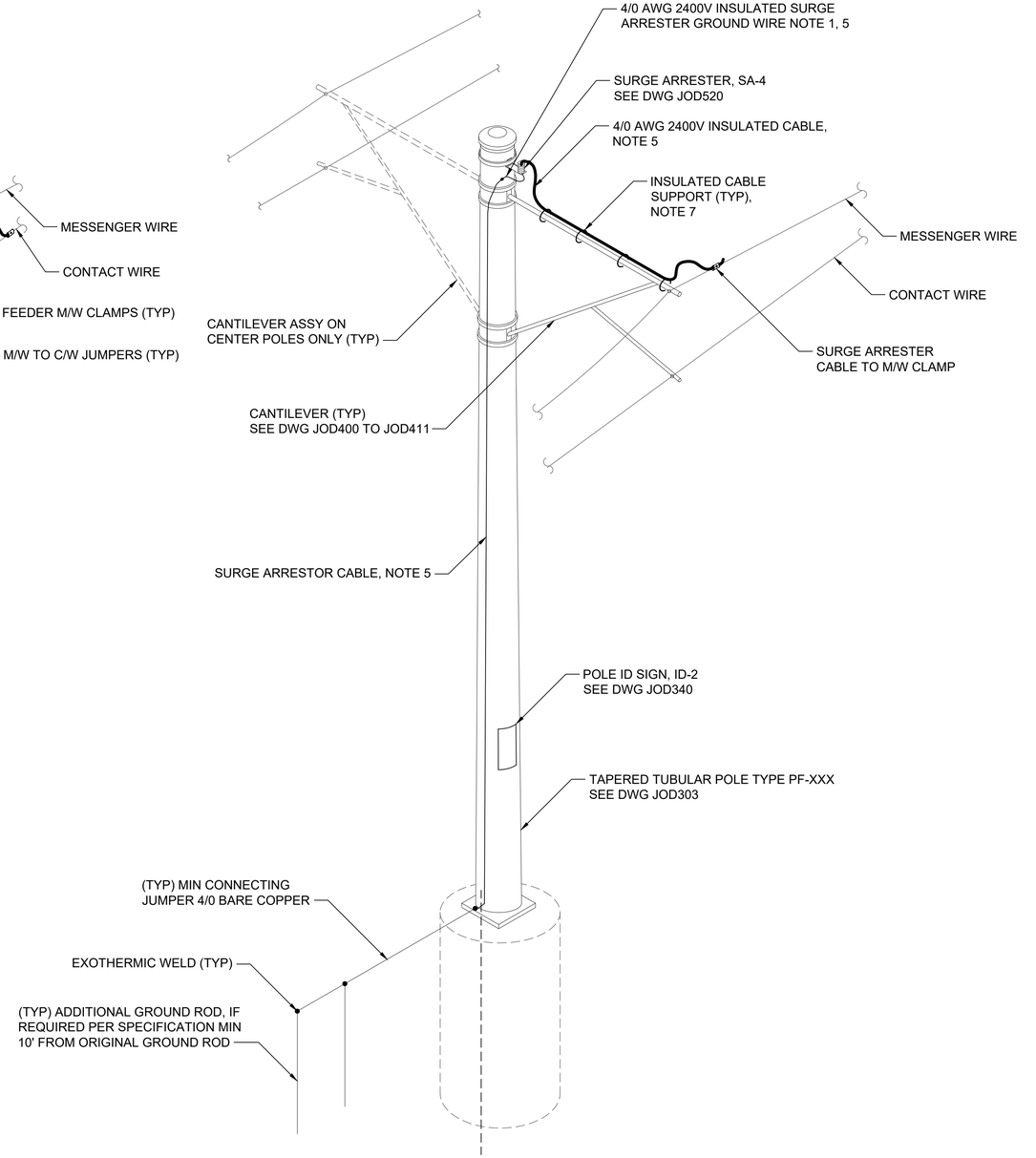
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT CURVE SPAN IN TUNNEL

DRAWING No.: STD-JOD255
FACILITY ID:
SHEET No.: REV: 1



FEEDER ARRANGEMENT-CANTILEVER 1
NTS -



SURGE ARRESTER ARRANGEMENT 2
NTS -

GENERAL NOTES:

1. PROVIDE SEALING AND STRAIN RELIEF BUSHINGS ON SPOUTS AND CABLE ENTRY HOLES.
2. IN AREAS USING POLE-MOUNTED DISCONNECT SWITCHES, EACH FEEDER CABLE ASSEMBLY TO BE PROTECTED BY A SURGE ARRESTER ASSEMBLY CONNECTED TO THE LOAD SIDE OF EACH DISCONNECT SWITCH.
3. LOCATIONS OF FEEDING ARRANGEMENTS, AND SURGE ARRESTER ARRANGEMENTS TO BE SHOWN ON SECTIONING DIAGRAMS AND OCS LAYOUT PLANS.
4. THE FEEDER CONDUIT FOR TAPERED TUBULAR FEEDER POLE ENTERS THE CENTER OF THE FOUNDATION.
5. SURGE ARRESTOR CONNECTIONS TO OCS AND GROUND SHALL BE CONTINUOUS. ALL GROUND CONNECTIONS SHALL BE BY EXOTHERMIC WELD. FOR BORED FOUNDATIONS, SURGE ARRESTER GROUND CABLE IS TO BE CONNECTED TO A DEDICATED SURGE ARRESTOR GROUND ROD. FOR AERIAL STRUCTURE MOUNTED POLES, SURGE ARRESTER GROUND CABLE IS TO BE CONNECTED TO A SEPARATE GROUND SYSTEM. MAXIMUM ALLOWABLE TESTED RESISTANCE TO GROUND TO BE INCLUDED IN SPECIFICATIONS.
6. SITE SPECIFIC FEEDER CABLE QUANTITIES TO BE SHOWN ON OCS LAYOUT PLANS AND ASSEMBLY DRAWINGS.
7. INSULATED CABLE SUPPORT REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.
8. THE SWITCH OPERATING MECHANISM AND SCADA JB SHALL NOT ENCROACH ON THE CLEARANCE ENVELOPE. DEFINED AS THE VEHICLE DYNAMIC ENVELOPE PLUS 2.0" FOR EMBEDDED TRACK MAINTENANCE TOLERANCE OR 4.0" FOR BALLASTED TRACK MAINTENANCE TOLERANCE PLUS 2" RUNNING CLEARANCE.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

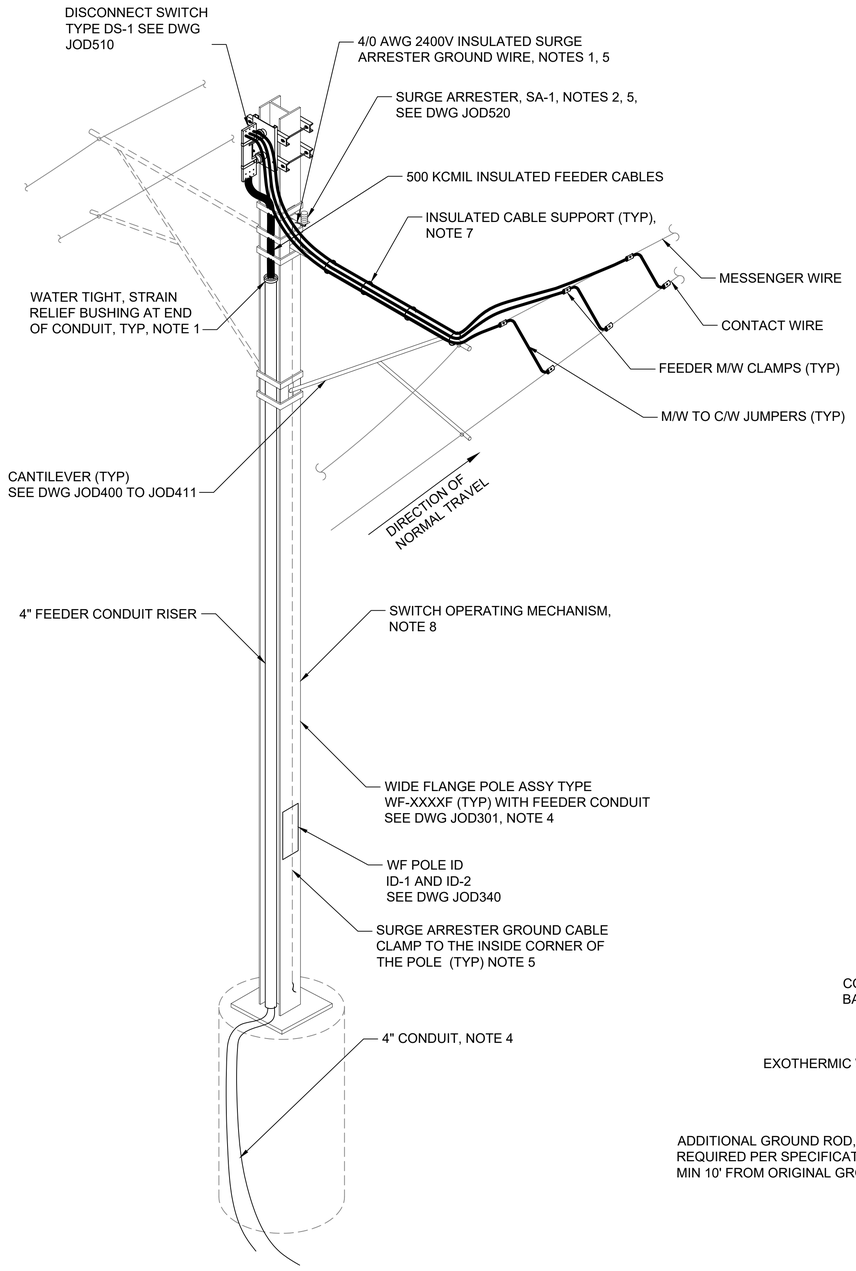
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD260
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT TAPERED TUBULAR
FEEDER POLE & SURGE ARRESTER

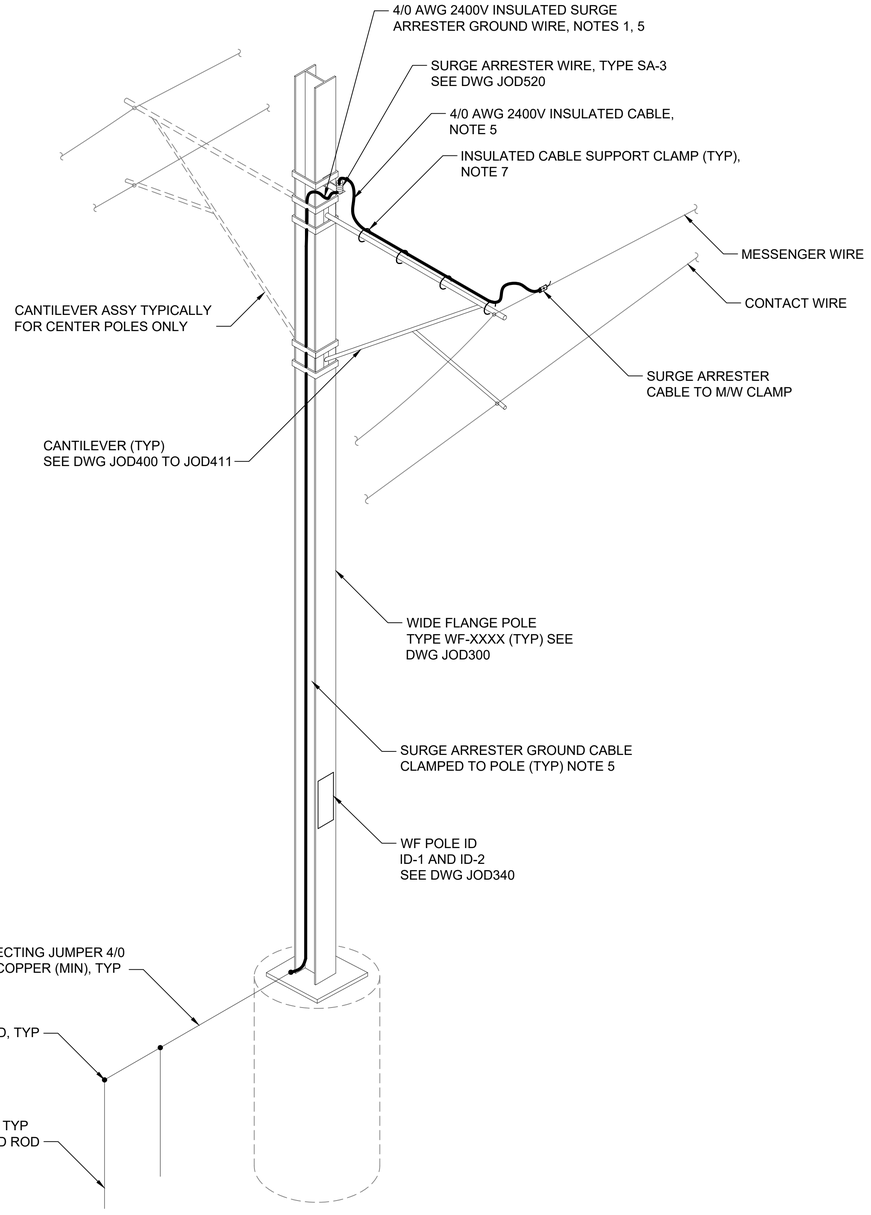
DRAWING No.: **STD-JOD260**
FACILITY ID:
SHEET No.: 1
REV:



FEEDER ARRANGEMENT-CANTILEVER

NTS

1 / -



SURGE ARRESTER ARRANGEMENT

NTS

2 / -

GENERAL NOTES:

1. PROVIDE SEALING AND STRAIN RELIEF BUSHINGS ON THE HIGH END OF ALL CONDUITS.
2. IN AREAS USING POLE-MOUNTED DISCONNECT SWITCHES, EACH FEEDER CABLE ASSEMBLY IS TO BE PROTECTED BY A SURGE ARRESTER ASSEMBLY CONNECTED TO THE LOAD SIDE OF EACH DISCONNECT SWITCH.
3. LOCATIONS OF FEEDER ARRANGEMENTS AND SURGE ARRESTER ARRANGEMENTS TO BE SHOWN ON SECTIONING DIAGRAM AND OCS LAYOUT PLANS.
4. THE FEEDER CONDUIT FOR WIDE FLANGE FEEDER POLE ENTERS NEAR THE PERIMETER OF THE FOUNDATION AND SHOULD BE ROUTED BETWEEN THE FLANGES.
5. SURGE ARRESTOR CONNECTIONS TO OCS AND GROUND SHALL BE CONTINUOUS. ALL GROUND CONNECTIONS SHALL BE EXOTHERMIC WELD. FOR BORED FOUNDATIONS, SURGE ARRESTER GROUND CABLE IS TO BE CONNECTED TO A DEDICATED SURGE ARRESTOR GROUND ROD. FOR AERIAL STRUCTURE MOUNTED POLES, SURGE ARRESTOR GROUND CABLE IS TO BE CONNECTED TO A SEPARATE GROUND SYSTEM. MAXIMUM ALLOWABLE TESTED RESISTANCE TO GROUND TO BE INCLUDED IN SPECIFICATIONS.
6. SITE SPECIFIC FEEDER CABLE QUANTITIES TO BE SHOWN ON OCS LAYOUT PLANS AND ASSEMBLY DRAWINGS.
7. INSULATED CABLE SUPPORT REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.
8. THE SWITCH OPERATING MECHANISM AND SCADA JB SHALL NOT ENCROACH ON THE CLEARANCE ENVELOPE. DEFINED AS THE VEHICLE DYNAMIC ENVELOPE PLUS 2.0" FOR EMBEDDED TRACK MAINTENANCE TOLERANCE OR 4.0" FOR BALLASTED TRACK MAINTENANCE TOLERANCE PLUS 2" RUNNING CLEARANCE.

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

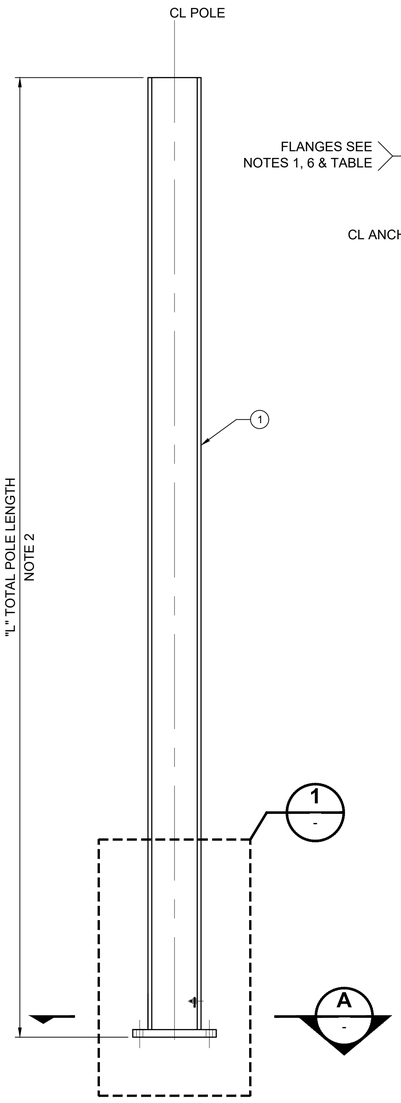
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD261
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT WIDE FLANGE FEEDER POLE & SURGE ARRESTER

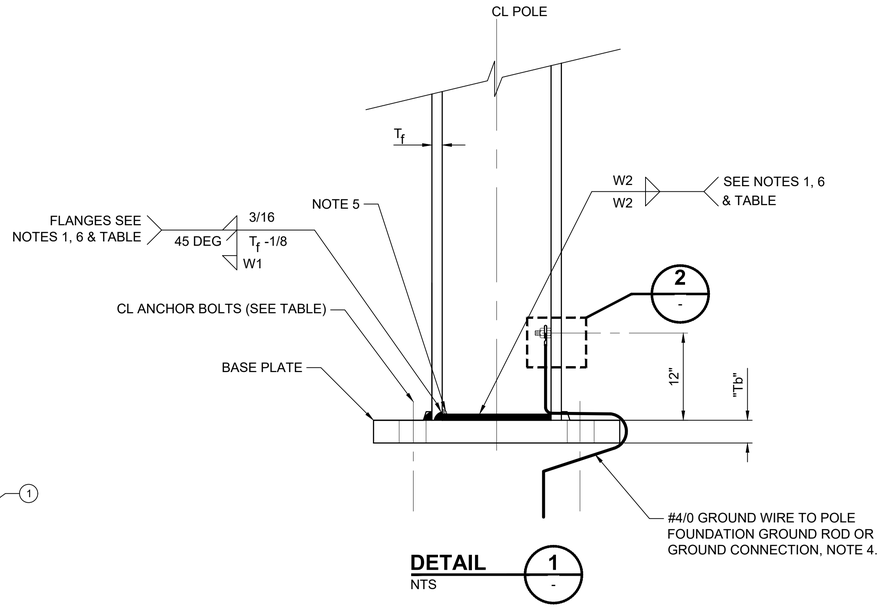
DRAWING No.: STD-JOD261
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:01 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD261.DWG



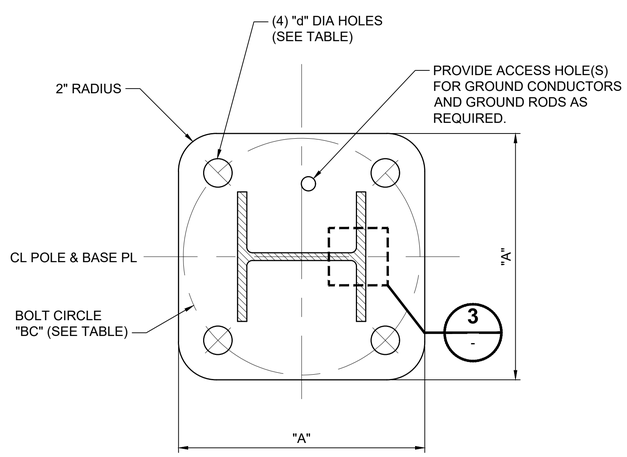
WIDE FLANGE POLE

NTS
NOTE 3



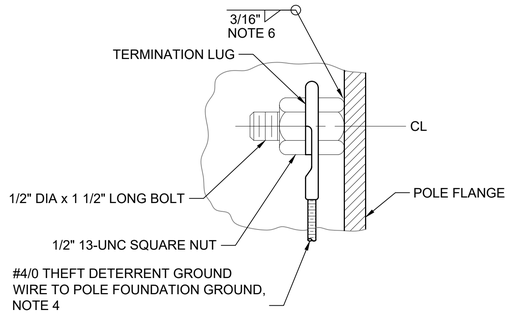
DETAIL 1

NTS



SECTION A

NTS

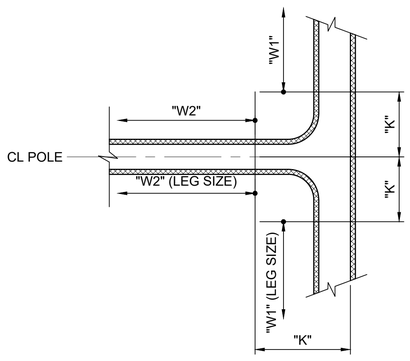


DETAIL 2

NTS

GENERAL NOTES:

1. WELDING AT THE BASE SHALL BE CONTINUOUS, EXCEPT AS DEFINED IN DETAIL 3, ALONG THE PERIMETER OF THE CROSS SECTION OF THE POLE.
2. POLE LENGTHS TO BE SHOWN ON OCS LAYOUT PLAN AND SCHEDULE DRAWINGS.
3. ANY ADDITIONAL HOLES REQUIRED BY CONTRACTOR ARE DETAILED BY CONTRACTOR, AND MADE BY POLE MANUFACTURER PRIOR TO GALVANIZING. NO FIELD HOLE DRILLING ALLOWED.
4. CONNECT GROUNDING STUD TO FOUNDATION GROUND ROD OR GROUND CONNECTION TO REBAR MAT OF STRUCTURE OR SLAB TO PROVIDE AN EFFECTIVE GROUND-FAULT CURRENT PATH ACCORDING TO NEC ARTICLE 100. SEE SPECIFICATIONS FOR THEFT DETERRENT GROUNDING.
5. MANUFACTURER MAY FABRICATE 1/2" WEEP HOLE FOR IMPROVED GALVANIZING.
6. MANUFACTURER TO VERIFY WELD SIZES AND LENGTHS.



FLANGE TO BASE PLATE WELDING

DETAIL 3

NTS
NOTES 1, 6

POLE ASSEMBLY

POLE TYPE	MAX WORKING MOMENT (K-FT)	SHAFT SIZE	BASE PLATE (INCHES)				WELDING DIMENSIONS (INCHES)			FOUNDATION TYPE
			A	BC	Tb	d	W1	W2	K	
WF-08XX	29.1	W8X31	16"	16"	1 1/2"	1 3/4"	3/8"	3/8"	15/16"	FD-08W
WF-10XX	44.7	W10X39	18"	18"	1 3/4"	2"	7/16"	3/8"	1 1/16"	FD-10W
WF-20XX	61.9	W10X49	20"	20"	2"	2 3/8"	1/2"	3/8"	1 3/16"	FD-20W
WF-21XX	73.2	W12X53	20"	20"	2"	2 3/8"	1/2"	3/8"	1 3/16"	FD-21W
WF-22XX	113.7	W12X72	24"	24"	2 1/2"	3"	9/16"	1/2"	1 3/8"	FD-22W
WF-32XX	156.2	W12X96	24"	24"	2 1/2"	3"	11/16"	1/2"	1 11/16"	FD-32W

'XX' - DENOTES LENGTH OF POLE IN INTEGRAL FEET IN POLE ASSEMBLY REFERENCE.

BILL OF MATERIALS

QUANTITIES EACH TYPE						UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
WF-08XX	WF-10XX	WF-20XX	WF-21XX	WF-22XX	WF-32XX				
1	1	1	1	1	1	EACH	POLE SHAFT & BASE PLATE	1	

No.	DATE	DSN	CHK	APP	REVISION
2	2/2024				2024 REVISED STANDARD DRAWINGS
1	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019				2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

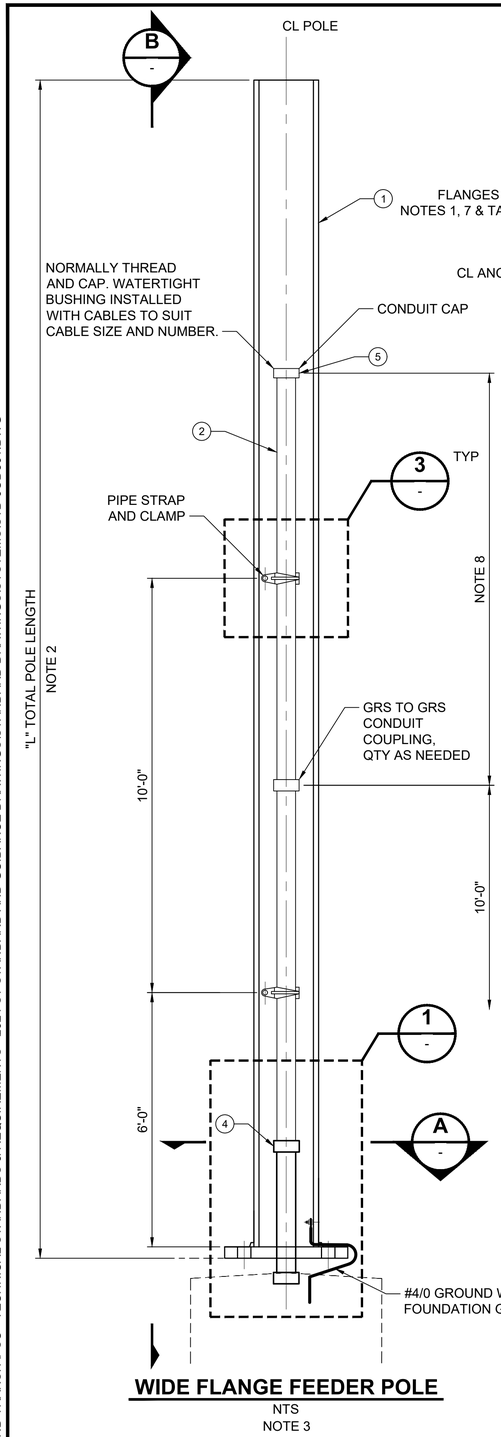
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD300
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

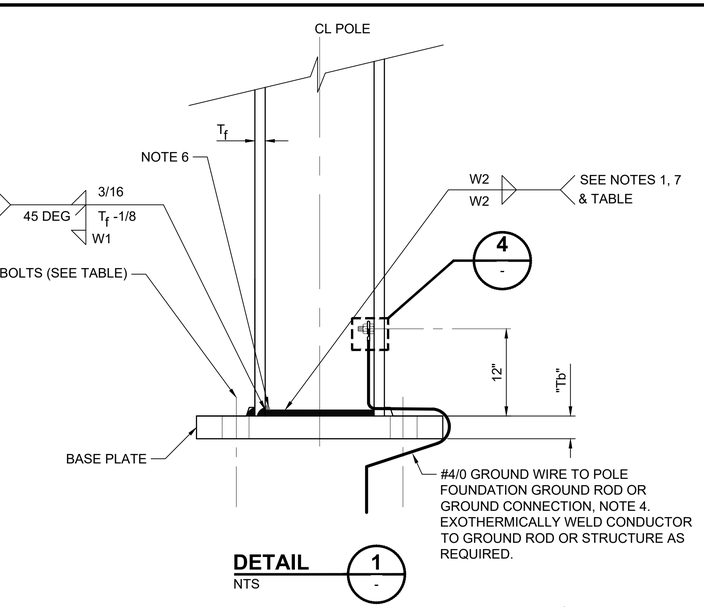
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT WIDE FLANGE
POLE ASSEMBLIES WF-XXXXF

DRAWING No.: STD-JOD300
FACILITY ID:
SHEET No.: REV: 2

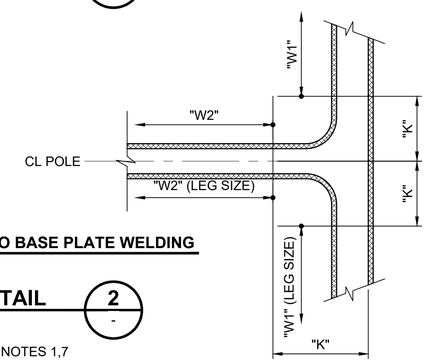


WIDE FLANGE FEEDER POLE

NTS
NOTE 3



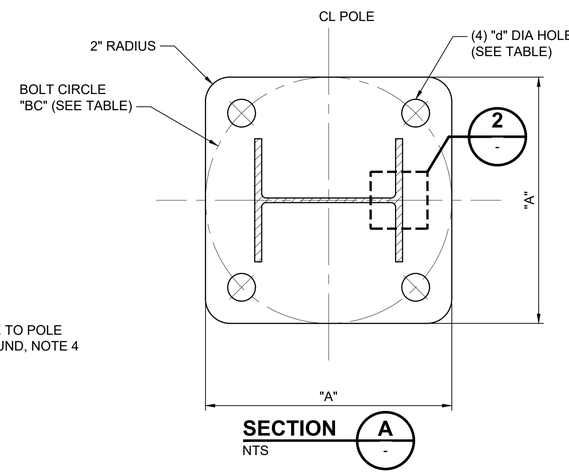
DETAIL 1
NTS



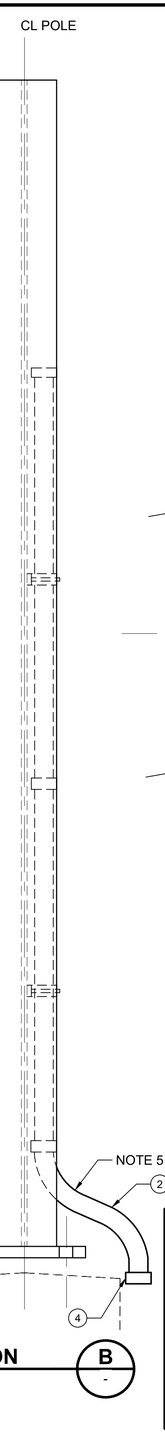
FLANGE TO BASE PLATE WELDING

DETAIL 2
NTS

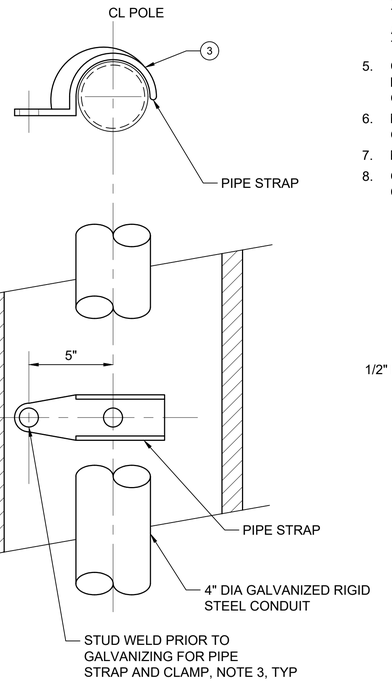
SEE NOTES 1,7



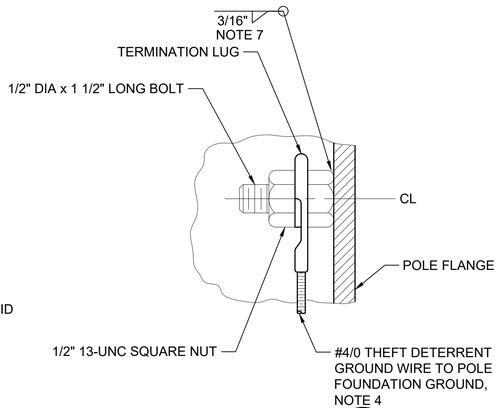
SECTION A
NTS



SECTION B
NTS



DETAIL 3
NTS



DETAIL 4
NTS

GENERAL NOTES:

1. FOR TYPICAL OCS WIDE FLANGE POLE ASSEMBLY NOTES, SEE DRAWING JOD300.
2. POLE LENGTHS TO BE SHOWN ON OCS LAYOUT PLAN AND SCHEDULE DRAWINGS.
3. ANY ADDITIONAL HOLES REQUIRED BY CONTRACTOR ARE DETAILED BY CONTRACTOR, AND MADE BY POLE MANUFACTURER PRIOR TO GALVANIZING. NO FIELD HOLE DRILLING ALLOWED.
4. CONNECT GROUNDING STUD TO FOUNDATION GROUND ROD OR GROUND CONNECTION TO REBAR MAT OR STRUCTURE OR SLAB TO PROVE AN EFFECTIVE GROUND-FAULT CURRENT PATH ACCORDING TO NEC ARTICLE 100. SEE SPECIFICATIONS FOR THEFT DETERRENT GROUNDING.
5. CONDUIT BEND SHALL BE FACTORY ELBOWS. CONNECT TO DUCTBANK STUB-UP AT POLE FOUNDATION OR STUB-OUT ON GUIDEWAY.
6. MANUFACTURER MAY FABRICATE1/2" WEEP HOLE FOR IMPROVED GALVANIZING.
7. MANUFACTURER TO VERIFY ALL WELD SIZES AND LENGTHS.
8. OVERALL HEIGHT OF FEEDER RISER TO BE DETERMINED BY CONTRACTOR.

POLE ASSEMBLY

POLE TYPE	MAX WORKING MOMENT (K-FT)	SHAFT SIZE	BASE PLATE				WELDING DIMENSIONS			FOUNDATION TYPE
			A	BC	Tb	d	W1	W2	K	
			(INCHES)							
WF-10XXF	44.7	W10X39	18"	18"	1 3/4"	2"	7/16"	1/4"	1 1/16"	FD-10W
WF-21XXF	73.2	W12X53	20"	20"	2"	2 3/8"	1/2"	5/16"	1 3/16"	FD-21W
WF-22XXF	113.7	W12X72	24"	24"	2 1/2"	3"	9/16"	3/8"	1 3/8"	FD-22W
WF-32XXF	153.2	W12X96	24"	24"	2 1/2"	3"	3/4"	1/2"	1 3/8"	FD-32W

"XX" - DENOTES LENGTH OF POLE IN INTEGRAL FEET IN POLE ASSEMBLY REFERENCE.

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO. /REMARKS
WF-10XXF	WF-21XXF	WF-22XXF	WF-32XXF				
1	1	1	1	EACH	POLE SHAFT & BASE PLATE	1	
AS REQD	AS REQD	AS REQD	AS REQD	LF	4" GRS CONDUIT	2	
AS REQD	AS REQD	AS REQD	AS REQD	EACH	PIPE STRAP COMPLETE	3	
2	2	2	2	EACH	PIPE COUPLING	4	
AS REQD	AS REQD	AS REQD	AS REQD	EACH	CONDUIT CAP	5	

No.	DATE	DSN	CHK	APP	REVISION
2	2/2024				2024 REVISED STANDARD DRAWINGS
1	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019				2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

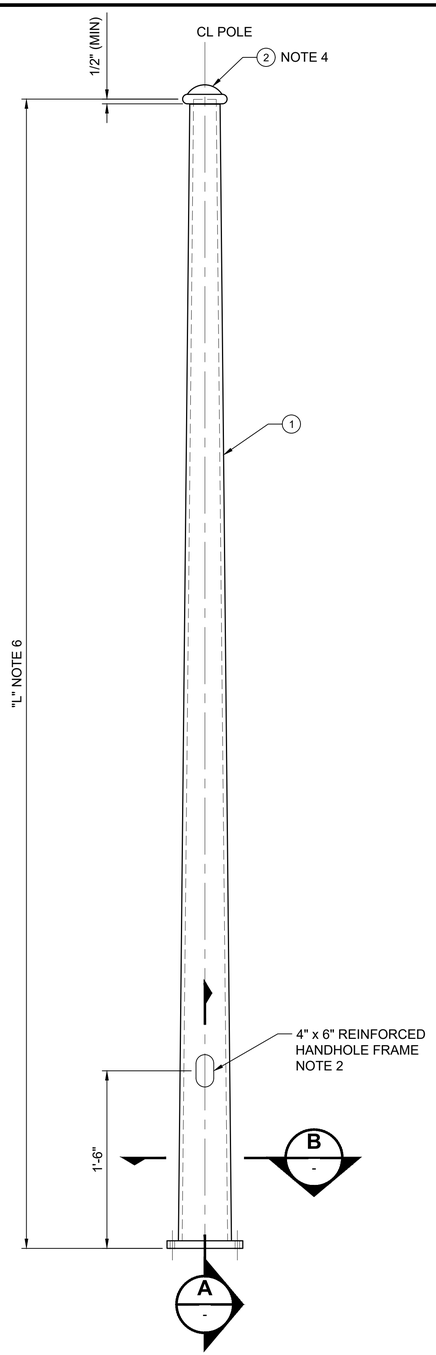
SCALE: NTS
FILENAME: STD-JOD301
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

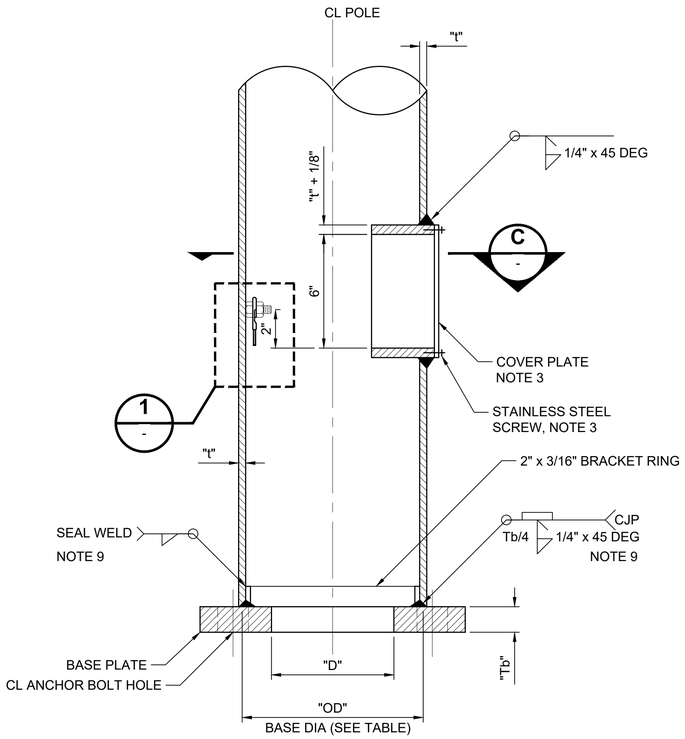
OVERHEAD CATENARY SYSTEM
GENERAL ARRANGEMENT WIDE FLANGE
POLE ASSEMBLIES WF-XXXXF

DRAWING No.: STD-JOD301
FACILITY ID:
SHEET No.: REV: 2

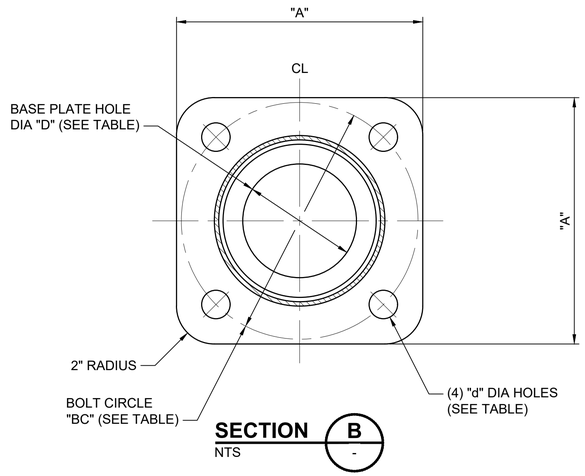
01/30/25 | 1:01 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD301.DWG



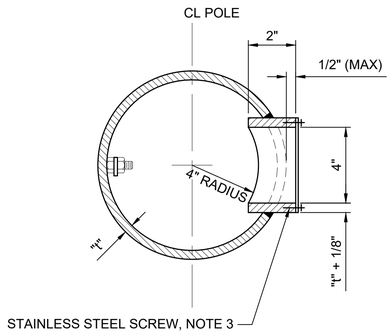
OCS TAPERED TUBULAR POLE PS-XXX
NTS



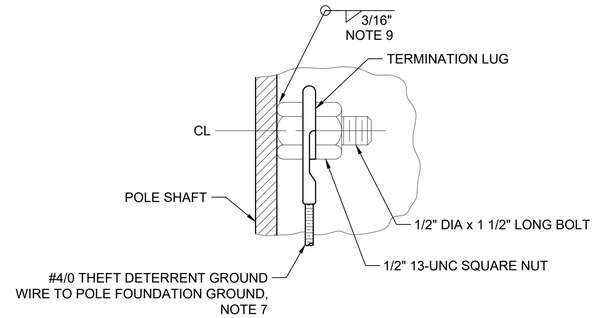
SECTION A
NTS



SECTION B
NTS



SECTION C
NTS



DETAIL 1
NTS

GENERAL NOTES:

1. POLES SHALL HAVE IDENTIFICATION MARKED FOR THEIR TYPE REFERENCE WITH A 3/8" LETTER PUNCH ON TOP OF THE BASE PLATE.
2. HANDHOLE SHALL BE ORIENTED ON SIDE OF POLE OPPOSITE APPROACHING VEHICLE UNDER NORMAL OPERATION OF ITS REFERENCE TRACK.
3. HANDHOLE SHALL BE COVERED WITH A MINIMUM OF 7 GAGE PLATE BY FASTENING OF (4) 3/16" DIA STAINLESS STEEL SET SCREWS.
4. POLE CAP SHALL BE REMOVABLE, DOMED, GALVANIZED STEEL CAP FASTENED TO POLE USING 3/16" DIA STAINLESS STEEL SET SCREWS (3 REQD). FOR PAINTED POLES, POLE CAP SHALL BE PAINTED TO MATCH.
5. ANY ADDITIONAL HOLES REQUIRED BY CONTRACTOR ARE DETAILED BY CONTRACTOR, AND MADE BY POLE MANUFACTURER PRIOR TO GALVANIZING. NO FIELD HOLE DRILLING ALLOWED.
6. POLE LENGTHS TO BE SHOWN ON OCS LAYOUT PLAN AND SCHEDULE DRAWINGS.
7. CONNECT GROUNDING STUD TO FOUNDATION GROUND ROD OR GROUND CONNECTION TO REBAR MAT OF STRUCTURE OR SLAB TO PROVIDE AN EFFECTIVE GROUND-FAULT CURRENT PATH ACCORDING TO NEC ARTICLE 100.SEE SPECIFICATIONS FOR THEFT DETERRENT GROUNDING.
8. POLE TAPER TO BE 0.14 INCH DIAMETER REDUCTION PER FOOT OF POLE LENGTH.
9. MANUFACTURER TO VERIFY ALL WELD SIZES AND LENGTHS.

POLE ASSEMBLY TABLE

POLE TYPE	MAX WORKING MOMENT (K-FT)	OD	t	d	A	D	BC	Tb	FOUNDATION TYPE
		(INCHES)							
PS-1XX	40.0	10"	0.2391"	1 3/4"	16"	8"	16"	1 1/2"	FD-1T
PS-2XX	75.0	12"	0.3125"	2"	18"	10"	18"	1 3/4"	FD-2T
PS-3XX	103.0	14"	0.3125"	2 1/4"	20"	11"	20"	2 1/4"	FD-3T
PS-4XX	166.5	15"	0.4500	2 3/4"	22"	12"	22"	2 1/2"	FD-4T
PS-5XX	243.5	18"	0.4500	2 3/4"	24"	12"	24"	2 1/2"	FD-5T

'XX' - DENOTES LENGTH OF POLE IN INTEGRAL FEET IN POLE ASSEMBLY REFERENCE.

BILL OF MATERIALS

QUANTITIES EACH TYPE					UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
PS-1XX	PS-2XX	PS-3XX	PS-4XX	PS-5XX				
1	1	1	1	1	EACH	POLE SHAFT, BASE PLATE, HANDHOLE	1	
1	1	1	1	1	EACH	POLE CAP & SCREWS	2	

NOTE 5

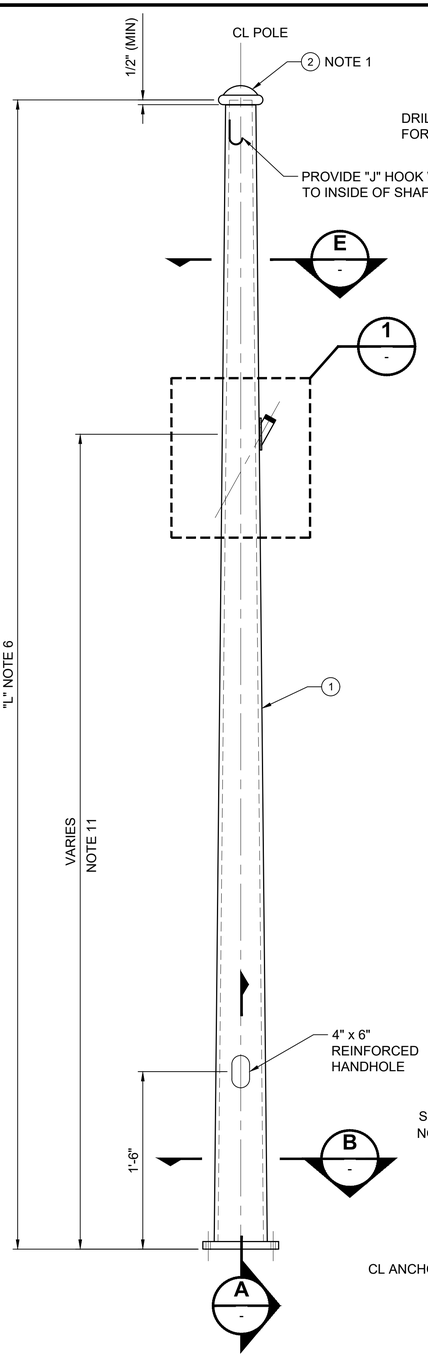
No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SCALE: NTS
FILENAME: STD-JOD302
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
TAPERED TUBULAR POLE ASSEMBLIES
PF-XXX

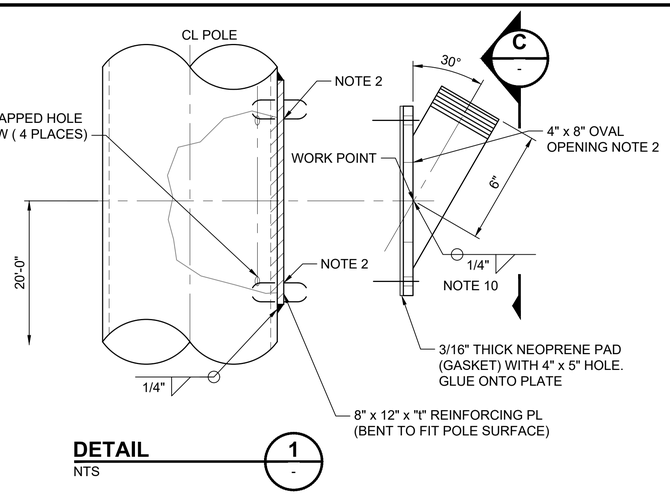
DRAWING No.: STD-JOD302
FACILITY ID:
SHEET No.: 1
REV:

01/30/25 | 1:02 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD302.DWG



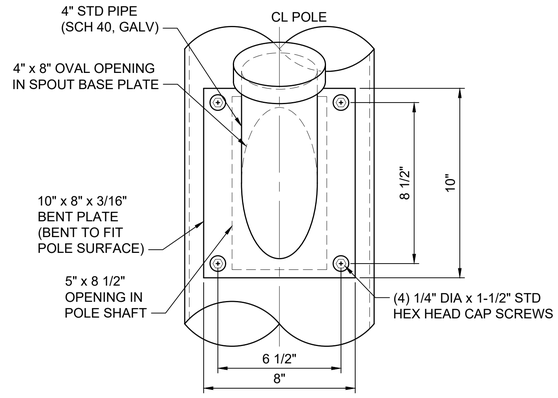
OCS TAPERED TUBULAR FEEDER POLE PF-XXX

NTS
NOTE 7



DETAIL 1

NTS

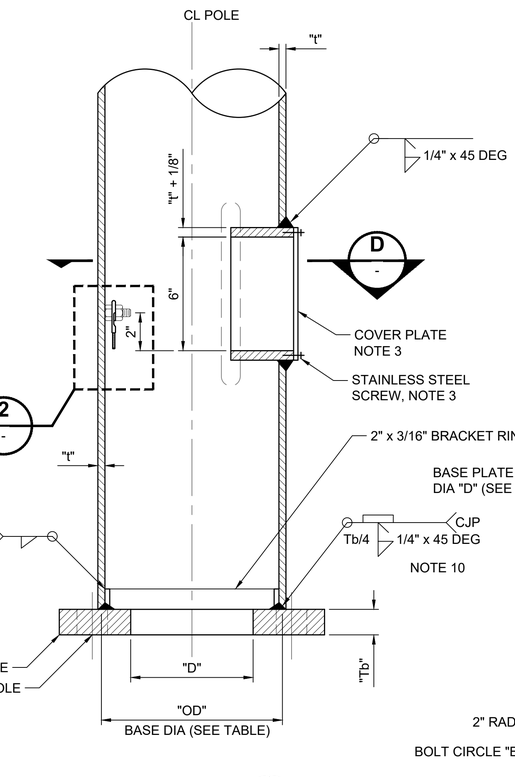


SECTION C

NTS

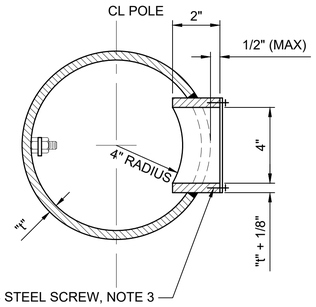
GENERAL NOTES:

1. POLE CAP SHALL BE REMOVABLE DOMED, GALVANIZED STEEL CAP FASTENED TO POLE USING 3/16" DIA STAINLESS STEEL SET SCREWS (3 REQ'D) FOR PAINTED POLES, POLE CAP SHALL BE PAINTED TO MATCH.
2. ROUND-OFF THE INSIDE EDGES TO PROTECT CABLE INSULATION DURING FEEDER CABLE INSTALLATION.
3. HANDHOLE SHALL BE COVERED BY A MINIMUM OF 7 GAGE THICK PLATE AND FASTENED BY (4) 3/16" DIA STAINLESS STEEL SET SCREWS.
4. POLE SHALL HAVE IDENTIFICATION MARKED FOR THEIR TYPE REFERENCE WITH A 3/8" LETTER PUNCH ON TOP OF THE BASE PLATE.
5. HANDHOLE SHALL BE ORIENTED ON SIDE OF POLE OPPOSITE APPROACHING VEHICLE UNDER NORMAL OPERATION OF ITS REFERENCE TRACK.
6. POLE LENGTHS TO BE SHOWN ON OCS LAYOUT PLAN AND SCHEDULE DRAWINGS.
7. ANY ADDITIONAL HOLES REQUIRED BY CONTRACTOR ARE DETAILED BY CONTRACTOR, AND MADE BY POLE MANUFACTURER PRIOR TO GALVANIZING. NO FIELD HOLE DRILLING ALLOWED
8. CONNECT GROUNDING STUD TO FOUNDATION GROUND ROD OR GROUND CONNECTION TO REBAR MAT OF STRUCTURE OR SLAB TO PROVIDE AN EFFECTIVE GROUND-FAULT CURRENT PATH ACCORDING TO NEC ARTICLE 100. SEE SPECIFICATIONS FOR THEFT DETERRENT GROUNDING.
9. POLE TAPER TO BE 0.14 INCH DIAMETER REDUCTION PER FOOT OF POLE LENGTH.
10. MANUFACTURER TO VERIFY ALL WELD SIZES AND LENGTHS.
11. CONTRACTOR TO COORDINATE FEEDER SPOUT HEIGHT BASED ON MATERIAL SELECTION AND INFORMATION FROM OCS LAYOUT PLANS AND SCHEDULES.



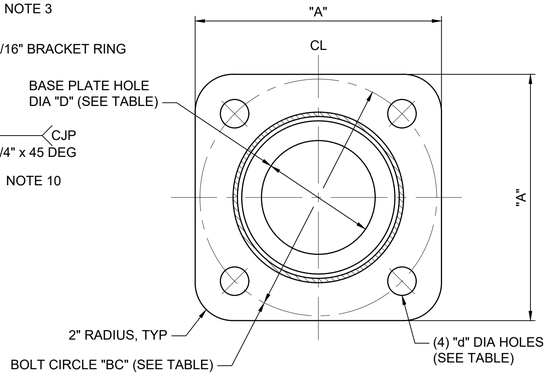
SECTION A

NTS



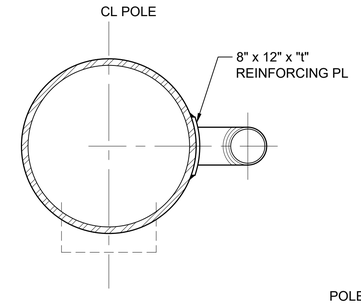
SECTION D

NTS



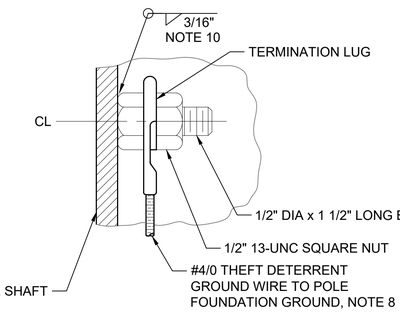
SECTION B

NTS



SECTION E

NTS



DETAIL 2

NTS

POLE ASSEMBLY

POLE TYPE	MAX WORKING MOMENT (K-FT)	OD	t	d	A	D	BC	Tb	FOUNDATION TYPE	REMARKS
		(INCHES)								
PF-1XX	40.0	10"	0.2391"	1 3/4"	16"	8"	16"	1 1/2"	FD-1FT	SINGLE SPOUT
PF-2XX	75.0	12"	0.3125"	2"	18"	10"	18"	1 3/4"	FD-2FT	SINGLE SPOUT
PF-3XX	103.0	14"	0.3125"	2 1/4"	20"	11"	20"	2 1/4"	FD-3FT	SINGLE SPOUT
PF-4XX	166.5	15"	0.45"	2 3/4"	22"	12"	22"	2 1/2"	FD-4FT	SINGLE SPOUT
PF-5XX	243.5	18"	0.45"	2 3/4"	24"	12"	24"	2 1/2"	FD-5FT	SINGLE SPOUT

'XX' - DENOTES LENGTH OF POLE IN INTEGRAL FEET IN POLE ASSEMBLY REFERENCE.

BILL OF MATERIALS

QUANTITIES EACH TYPE					UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
PF-1XX	PF-2XX	PF-3XX	PF-4XX	PF-5XX				
1	1	1	1	1	EACH	POLE SHAFT, BASE PLATE, SPOUT & HH	1	
1	1	1	1	1	EACH	POLE CAP & SCREWS	2	
1	1	1	1	1	EACH	CONDUIT CAP	3	

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

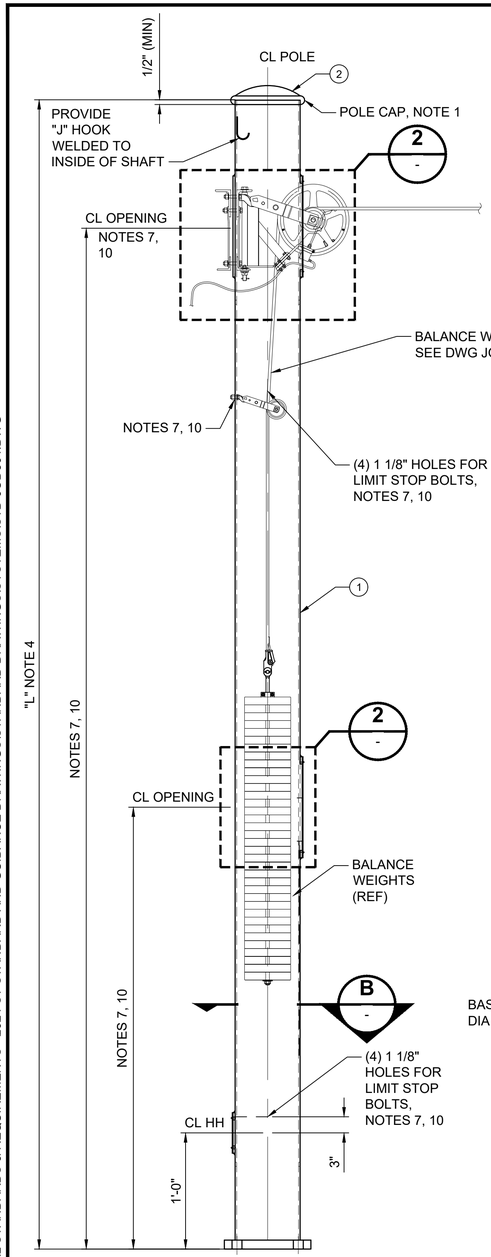
SCALE: NTS
FILENAME: STD-JOD303
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TAPERED TUBULAR FEEDER POLE ASSEMBLIES
PF-XXX

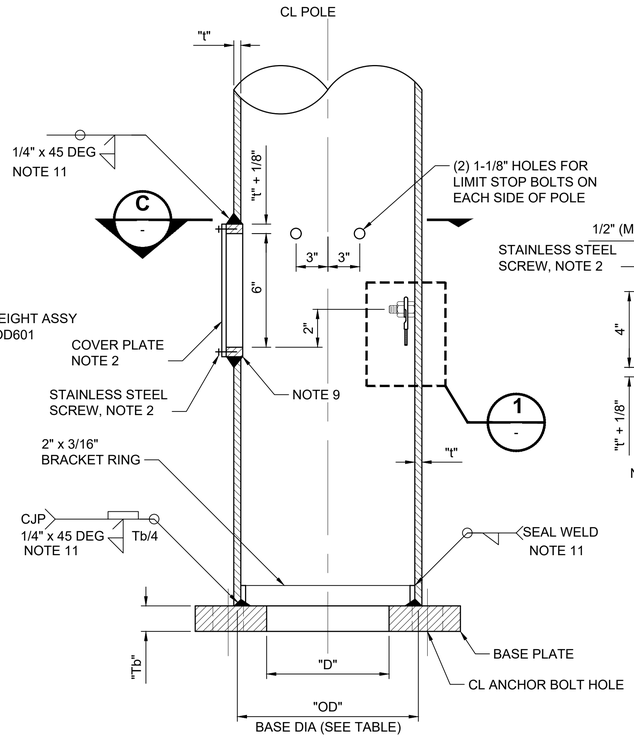
DRAWING No.: STD-JOD303
FACILITY ID:
SHEET No.: 1 REV:

01/30/25 | 1:02 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD303.DWG



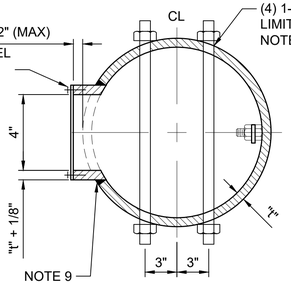
TUBULAR BALANCE WEIGHT ANCHOR POLE PBWA-5XX

NTS
NOTE 7



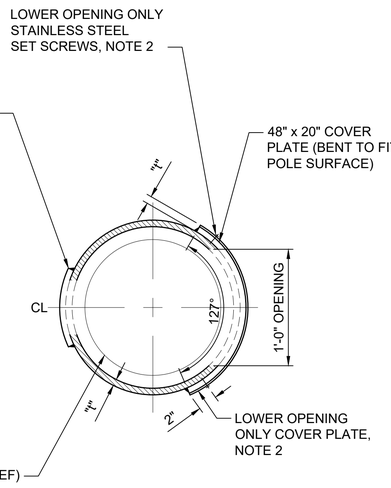
SECTION A

NTS



SECTION C

NTS
NOTE 7

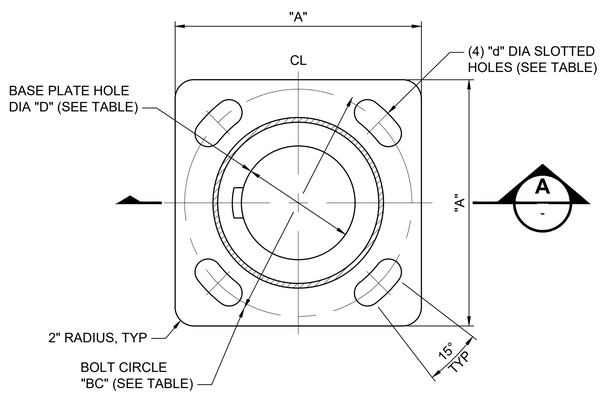


SECTION D

NTS

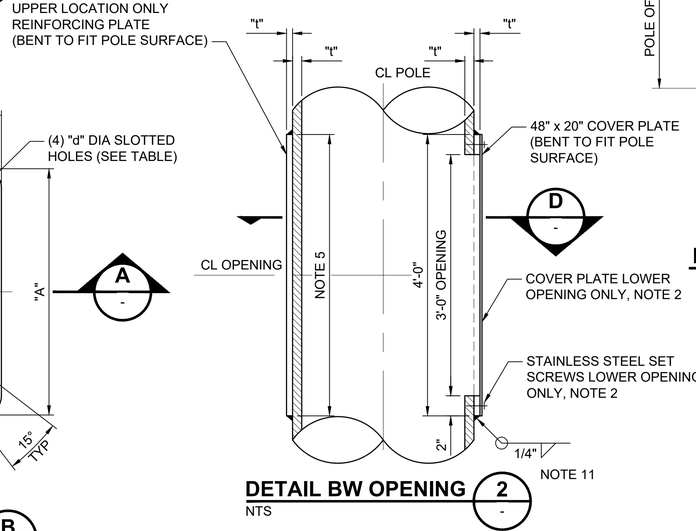
GENERAL NOTES:

1. POLE CAP SHALL BE REMOVABLE DOMED, GALVANIZED STEEL CAP FASTENED TO POLE USING 3/16" DIA STAINLESS STEEL SET SCREWS (3 REQUIRED). FOR PAINTED POLES, POLE CAP SHALL BE PAINTED TO MATCH.
2. HANDHOLE SHALL BE COVERED BY A MINIMUM OF 7 GAGE THICK PLATE AND FASTENED BY (4) 3/16" DIA STAINLESS STEEL SET SCREWS.
3. POLE SHALL HAVE IDENTIFICATION MARKED FOR THEIR TYPE REFERENCE WITH A 3/8" LETTER PUNCH ON TOP OF THE BASE PLATE.
4. POLE LENGTHS TO BE SHOWN ON OCS LAYOUT PLAN AND SCHEDULE DRAWINGS.
5. CONTRACTOR TO SIZE PLATE SUCH THAT 1-1/2" MIN EDGE DISTANCE IS MAINTAINED FROM EQUIPMENT MOUNTING HOLES TO EDGE OF PLATE.
6. CONTRACTOR TO INSTALL POLE SUCH THAT 12"x24" OPENINGS ARE PERPENDICULAR TO TERMINATION SPAN.
7. ANY ADDITIONAL HOLES OR HANDHOLES REQUIRED BY CONTRACTOR ARE DETAILED BY CONTRACTOR, AND MADE BY POLE MANUFACTURER PRIOR TO GALVANIZING. NO FIELD HOLE DRILLING ALLOWED.
8. CONNECT GROUNDING STUD TO FOUNDATION GROUND ROD OR GROUND CONNECTION TO REBAR MAT OF STRUCTURE OR SLAB TO PROVIDE AN EFFECTIVE GROUND-FAULT CURRENT PATH ACCORDING TO NEC ARTICLE 100. SEE SPECIFICATIONS FOR THEFT DETERRENT GROUNDING.
9. PROVIDE HANDHOLE REINFORCEMENT FLUSH WITH INSIDE OF POLE. ENSURE HANDHOLE DOES NOT COMPROMISE POLE STRENGTH.
10. LOCATION OF HOLES TO BE DETERMINED BASED ON CONTRACTORS MATERIAL SELECTION AND FIELD VERIFIED TERMINATION HEIGHTS.
11. MANUFACTURER TO VERIFY ALL WELD SIZES AND LENGTHS.
12. TUBULAR POLES WITH INTERNAL BALANCE WEIGHTS ARE NON-PREFERRED COMPARED TO EXTERNAL BALANCE WEIGHTS. USE OF BW-2 INTERNAL BALANCE WEIGHT ASSEMBLIES SHOWN ON DWG JOD601 MUST BE APPROVED BY SOUND TRANSIT ON A SITE SPECIFIC BASIS.



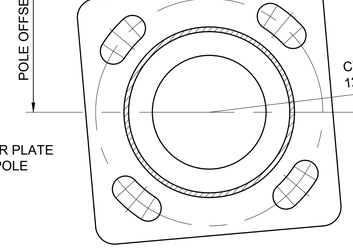
SECTION POLE BASE

NTS



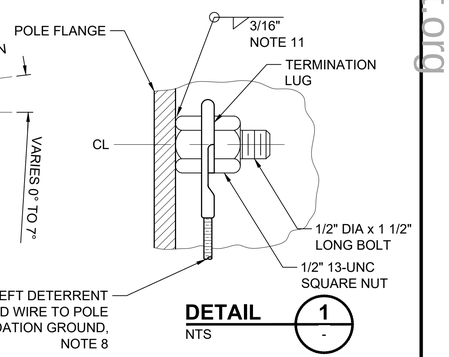
DETAIL BW OPENING 2

NTS



INSTALLATION ORIENTATION

NOTE 6



DETAIL 1

NTS

POLE ASSEMBLY

POLE TYPE	MAX WORKING MOMENT (K-FT)	OD	t	d	A	D	BC	Tb	FOUNDATION TYPE	REMARKS
		(INCHES)								
PBWA-5XX	243.5	18"	0.45"	2 3/4"	26"	12"	24"	2 1/2"	FD-5T	

'XX' - DENOTES LENGTH OF POLE IN INTEGRAL FEET IN POLE ASSEMBLY REFERENCE.

BILL OF MATERIALS

QUANTITIES EACH TYPE PBWA-5XX	UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
1	EACH	POLE SHAFT, BASE PLATE, HANDHOLE	1	
1	EACH	POLE CAP & SCREWS	2	

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

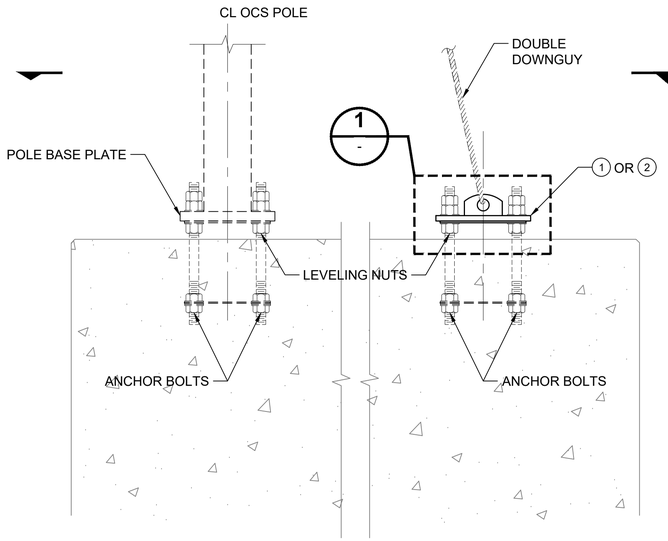
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD304
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
TUBULAR BALANCE WEIGHT ANCHOR POLE ASSEMBLIES
PBWA-5XX

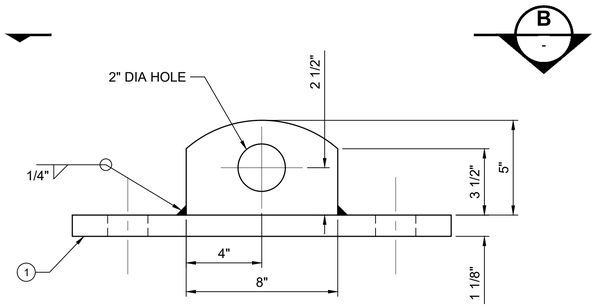
DRAWING No.: STD-JOD304
FACILITY ID:
SHEET No.: 1
REV:

01/30/25 | 1:02 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\SYSTEMS\STD-JOD304.DWG



FOUR BOLT ANCHORAGE FOR DOWNGUY ANCHOR PLATE AP-3

SCALE: NTS



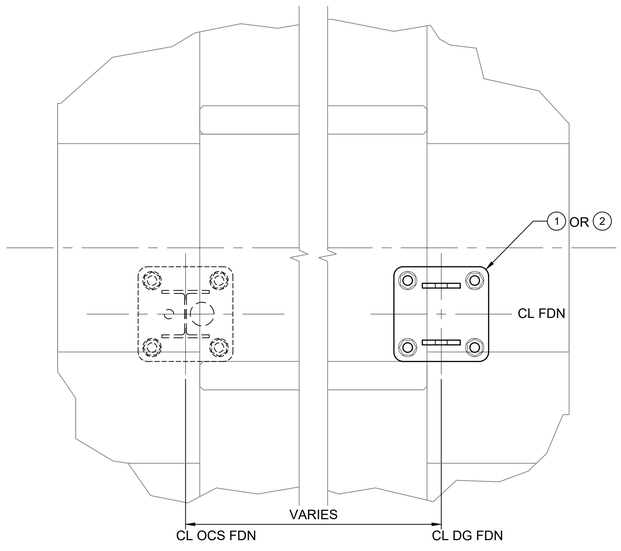
DOWNGUY ANCHOR PLATE AP-3

NTS

1
-

GENERAL NOTES:

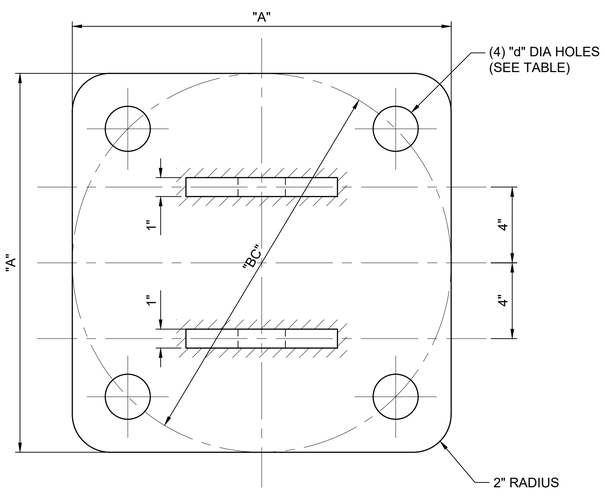
1. MANUFACTURER TO VERIFY ALL WELD SIZES AND LENGTHS.



SECTION A

NTS

A
-



SECTION B

NTS

B
-

DOWNGUY ANCHOR PLATE ASSEMBLY								
TYPE	UNITS	BASE PLATE				FOUNDATION TYPE	ITEM NO.	PART NO./REMARKS
		A	BC	d	B			
AP-3	EA	20"	20"	2-3/8"	N/A	FD-3T	1	

No.	DATE	DSN	CHK	APP	REVISION
1	2/2024				2024 REVISED STANDARD DRAWINGS
0	8/2019				REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

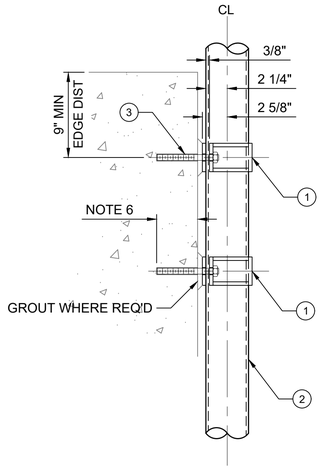
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD310
CONTRACT No.: RTA/LR
DATE: 2/2024

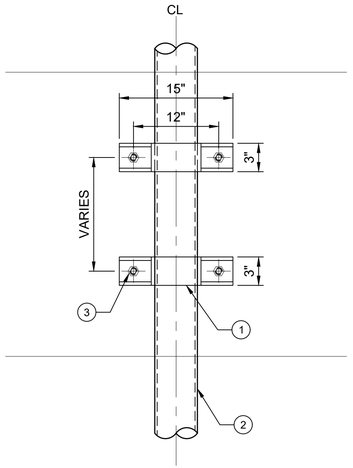
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
DOWN GUY ANCHOR PLATE ASSEMBLIES
AP-3 AND AP-4

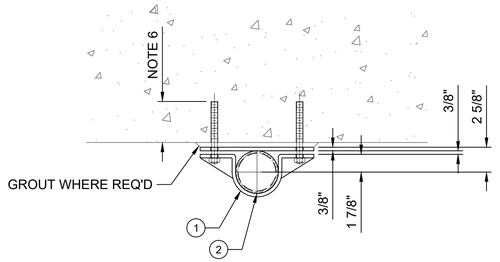
DRAWING No.: STD-JOD310
FACILITY ID:
SHEET No.: REV: 1



SIDE ELEVATION



FRONT ELEVATION



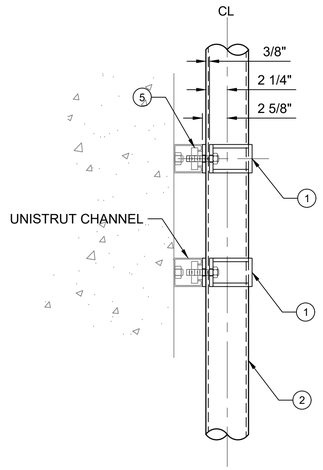
PLAN

OCS TUNNEL SUPPORT PIPE TSP-1

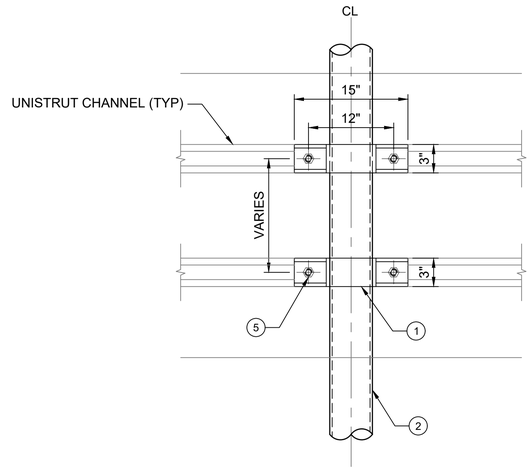
NTS

GENERAL NOTES:

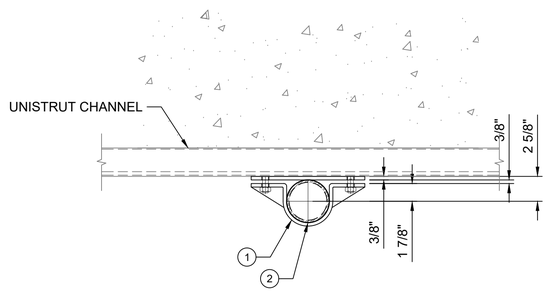
1. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
2. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
3. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
4. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
5. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
6. CONCRETE ANCHORS SHALL BE SS PRESET UNDERCUT ANCHORS. EMBEDMENT LENGTH AS REQUIRED BY ANCHOR MANUFACTURER. THREAD PROJECTION LENGTH AS REQUIRED TO ATTACH SUPPORT ASSEMBLY.
7. CONTRACTOR SHALL VERIFY STEEL REINFORCEMENT LOCATIONS IN CONCRETE STRUCTURES PRIOR TO DRILLING AT OCS SUPPORT LOCATIONS. DETAILED REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.



SIDE ELEVATION



FRONT ELEVATION



PLAN

OCS TUNNEL SUPPORT PIPE TSP-2

NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
TSP-2	TSP-1				
2	2	EA	3/8" PIPE BRACKET	1	
1	1	EA	4" SCH 80 PIPE	2	LENGTH AS REQ'D
-	4	EA	5/8" CONCRETE ANCHOR	3	NOTE 6
			NOT USED	4	
4	-	EA	CHANNEL NUT W/SPRING	5	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

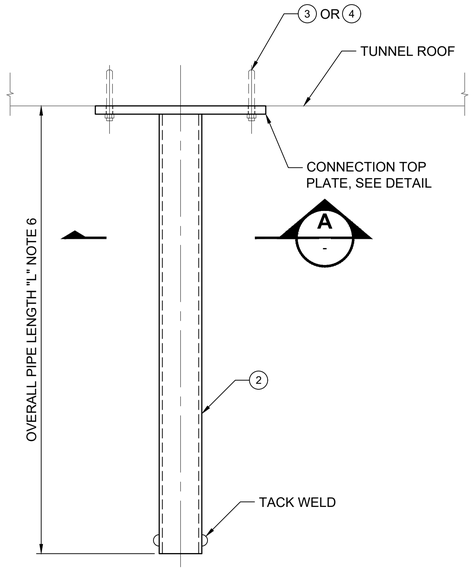
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD320
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TUNNEL & AERIAL SUPPORT ASSEMBLIES
TSP-1 & TSP-2

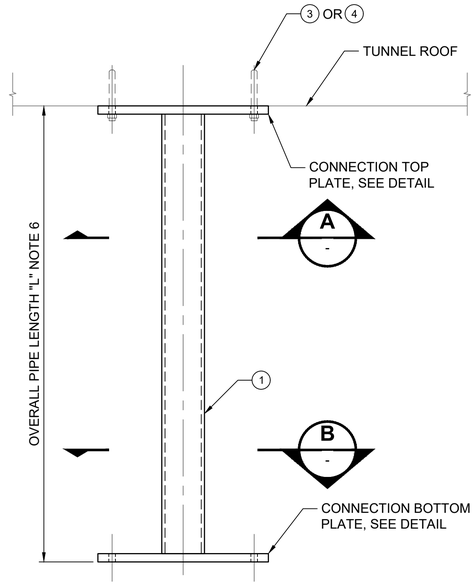
DRAWING No.: **STD-JOD320**
FACILITY ID:
SHEET No.: REV: 1



TUNNEL SUPPORT PIPE DETAIL TSP-3

NTS

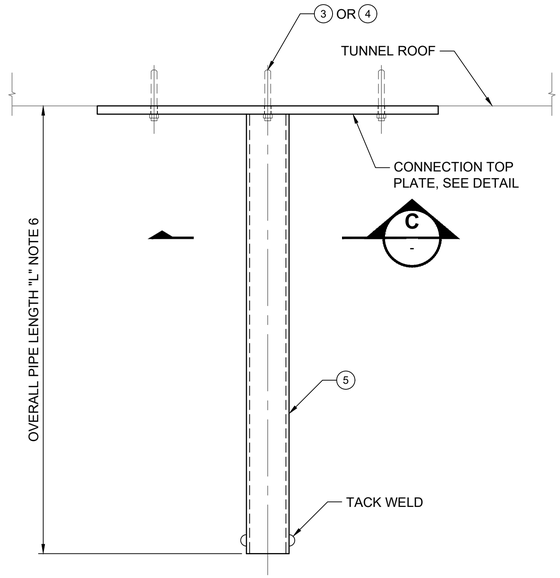
TSP-3	FOR ATTACHMENT TO CONCRETE ANCHORS
TSP-3F	FOR ATTACHMENT TO FRAMING INSERTS



TUNNEL SUPPORT PIPE DETAIL TSP-4

NTS

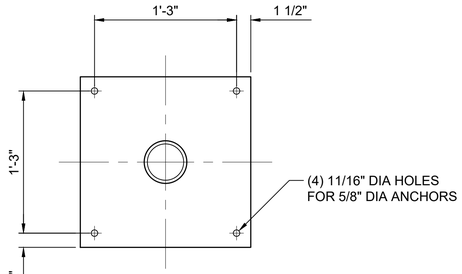
TSP-4	FOR ATTACHMENT TO CONCRETE ANCHORS
TSP-4F	FOR ATTACHMENT TO FRAMING INSERTS



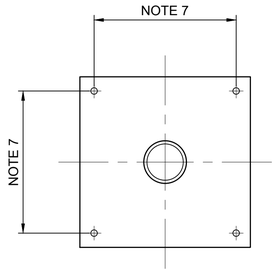
TUNNEL SUPPORT PIPE DETAIL TSP-5

NTS

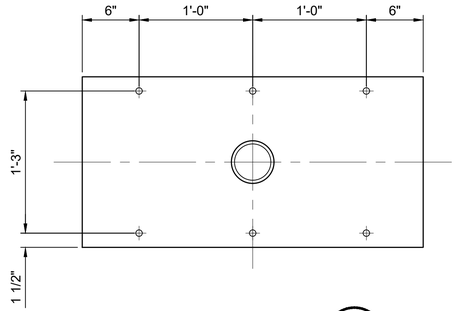
TSP-5	FOR ATTACHMENT TO CONCRETE ANCHORS
TSP-5F	FOR ATTACHMENT TO FRAMING INSERTS



SECTION A -
NTS



SECTION B -
NTS



SECTION C -
NTS

GENERAL NOTES:

1. DROP PIPE STEEL SHALL CONFORM TO ASTM A53 GRADE B.
2. CONNECTION PLATE STEEL SHALL CONFORM TO ASTM A572 GRADE 50 WITH A MINIMUM YIELD STRESS Fy = 50 KSI.
3. DROP PIPE ASSEMBLY SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123.
4. WELDING OF CONNECTION SHALL BE IN ACCORDANCE WITH AWS D1.1 SPECIFICATIONS, LATEST EDITION, USING E70XX WELDING ELECTRODES.
5. THE DROP PIPE ASSEMBLY NUMBER SHALL BE HAND MARKED WITH A MINIMUM INDENTATION OF 1/16". THE HAND MARK SHALL BE STAMPED ON THE EXPOSED FACE OF THE CONNECTION PLATE
6. CONTRACTOR TO DETERMINE LENGTH OF EACH PIPE BASED ON GEOMETRY OF CANTILEVER ASSEMBLY AND PANTOGRAPH CLEARANCE PARAMETERS.
7. DIMENSIONS OF CONNECTION BOTTOM PLATE TO BE DETERMINED BY CONTRACTOR TO FIT THE ATTACHED REGISTRATION ASSEMBLIES.
8. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
9. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
10. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
12. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
13. CONCRETE ANCHORS SHALL BE SS PRESET UNDERCUT ANCHORS. EMBEDMENT LENGTH AS REQUIRED BY ANCHOR MANUFACTURER. THREAD PROJECTION LENGTH AS REQUIRED TO ATTACH SUPPORT ASSEMBLY.
14. THE CONTRACTOR SHALL DETERMINE OVERALL PIPE DIAMETER FOR THE APPLICATION.
15. AT FERRULE LOCATIONS PROVIDE BOLTS AND WASHERS INSTEAD OF UNISTRUT HARDWARE.
16. CONTRACTOR SHALL VERIFY STEEL REINFORCEMENT LOCATIONS IN CONCRETE STRUCTURES PRIOR TO DRILLING AT OCS SUPPORT LOCATIONS. DETAILED REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.

BILL OF MATERIALS

QUANTITIES EACH TYPE						UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
TSP-5F	TSP-4F	TSP-3F	TSP-5	TSP-4	TSP-3				
-	1	-	-	1	-	EA	4" SCH 80 PIPE W/ TOP AND BOTTOM PLATE	1	LENGTH AS REQ'D
-	-	1	-	-	1	EA	4" SCH 80 PIPE W/ TOP PLATE	2	
-	-	-	6	4	4	EA	5/8" CONCRETE ANCHORS	3	NOTE 13
6	4	4	-	-	-	EA	FRAMING CHANNEL HARDWARE	4	NOTE 15
1	-	-	1	-	-	EA	PIPE W/ LARGE TOP PLATE	5	NOTE 14

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

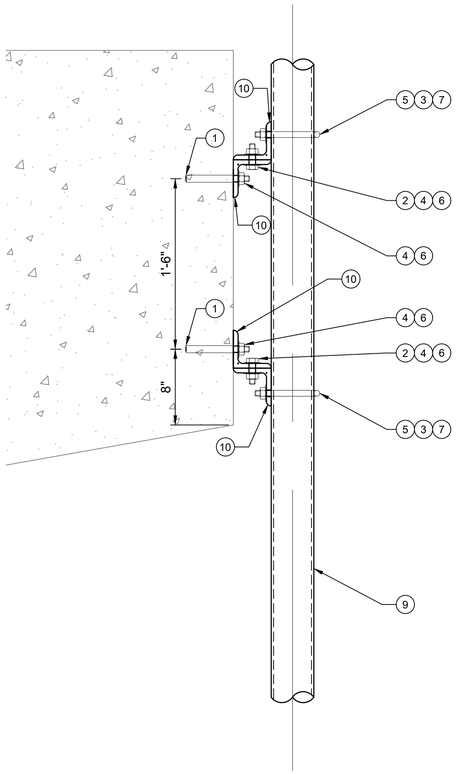
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD321
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

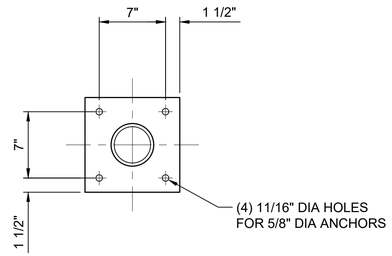
OVERHEAD CATENARY SYSTEM
TUNNEL & AERIAL SUPPORT ASSEMBLIES
TSP-3, TSP-4, TSP-5

DRAWING No.: **STD-JOD321**
FACILITY ID:
SHEET No.: REV: 1

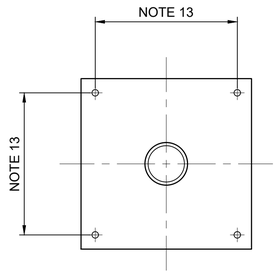


BRACKET ASSEMBLY FOR STRUT ATTACHMENT TSP-6

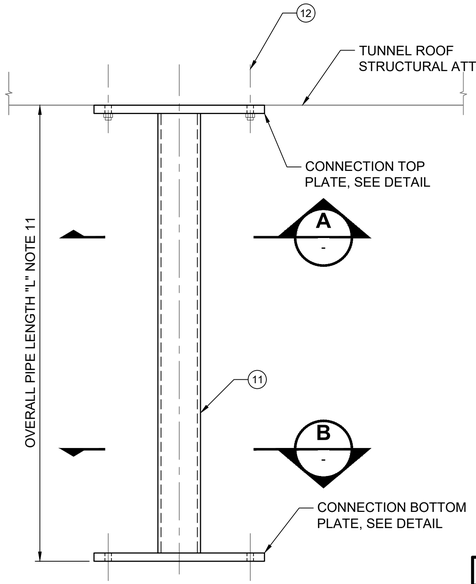
NTS



SECTION A -
NTS



SECTION B -
NTS



TUNNEL SUPPORT PIPE DETAIL TSP-7

NTS

GENERAL NOTES:

1. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
2. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
3. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
4. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
5. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
6. CONCRETE ANCHORS SHALL BE SS PRESET UNDERCUT ANCHORS. EMBEDMENT LENGTH AS REQUIRED BY ANCHOR MANUFACTURER. THREAD PROJECTION LENGTH AS REQUIRED TO ATTACH SUPPORT ASSEMBLY.
7. DROP PIPE STEEL SHALL CONFORM TO ASTM A53 GRADE B.
8. CONNECTION PLATE STEEL SHALL CONFORM TO ASTM A572 GRADE 50 WITH A MINIMUM YIELD STRESS Fy = 50 KSI.
9. WELDING OF CONNECTION SHALL BE IN ACCORDANCE WITH AWS D1.1 SPECIFICATIONS LATEST EDITION, USING E70XX WELDING ELECTRODES.
10. THE DROP PIPE ASSEMBLY NUMBER SHALL BE HAND MARKED WITH A MINIMUM INDENTATION OF 1/16" THE HAND MARK SHALL BE STAMPED ON THE EXPOSED FACE OF THE CONNECTION PLATE.
11. CONTRACTOR TO DETERMINE LENGTH OF EACH PIPE BASED ON GEOMETRY OF CANTILEVER ASSEMBLY AND PANTOGRAPH CLEARANCE PARAMETERS.
12. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
13. DIMENSIONS OF CONNECTION BOTTOM PLATE TO BE DETERMINED BY CONTRACTOR TO FIT THE ATTACHED REGISTRATION ASSEMBLIES.
14. CONTRACTOR SHALL VERIFY STEEL REINFORCEMENT LOCATIONS IN CONCRETE STRUCTURES PRIOR TO DRILLING AT OCS SUPPORT LOCATIONS. DETAILED REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
TSP-7	TSP-6				
-	4	EA	5/8" CONCRETE ANCHORS	1	NOTE 6
-	4	EA	HEX BOLT 3/4" HDG	2	
-	4	EA	HEX NUT 5/8" HDG	3	
-	12	EA	HEX NUT 3/4" HDG	4	
-	2	EA	U BOLT 5/8" HDG	5	
-	16	EA	WASHER 3/4" HDG	6	
-	4	EA	WASHER 5/8" HDG	7	
			NOT USED		
-	1	EA	4" SCH 80 PIPE	9	LENGTH AS REQ'D
-	4	EA	STAND OFF ANGLES	10	
1	-	EA	4" SCH 80 PIPE W/ TOP AND BOTTOM PLATE	11	LENGTH AS REQ'D
4	-	EA	HARDWARE AS REQ'D	12	

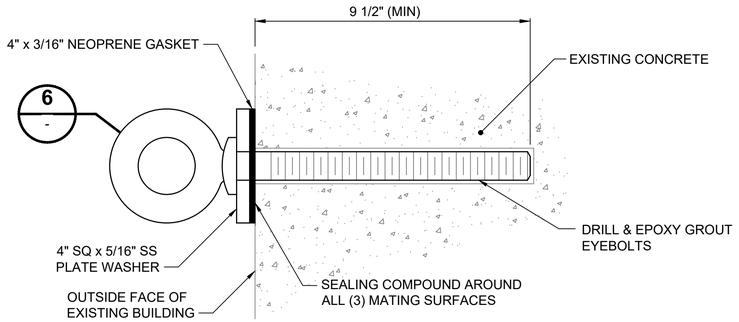
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SCALE: NTS
FILENAME: STD-JOD322
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

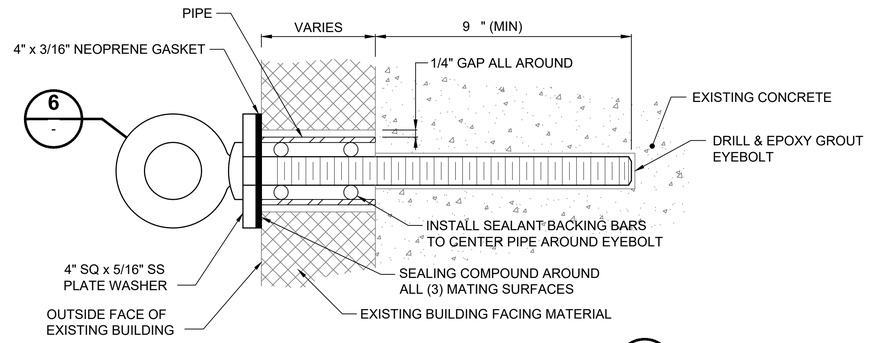
OVERHEAD CATENARY SYSTEM
TUNNEL & AERIAL SUPPORT ASSEMBLIES
TSP-6, TSP-7

DRAWING No.: **STD-JOD322**
FACILITY ID:
SHEET No.: REV: 1



BUILDING ATTACHMENT 1

NTS ASSEMBLY EB-1 FOR EXISTING CONCRETE

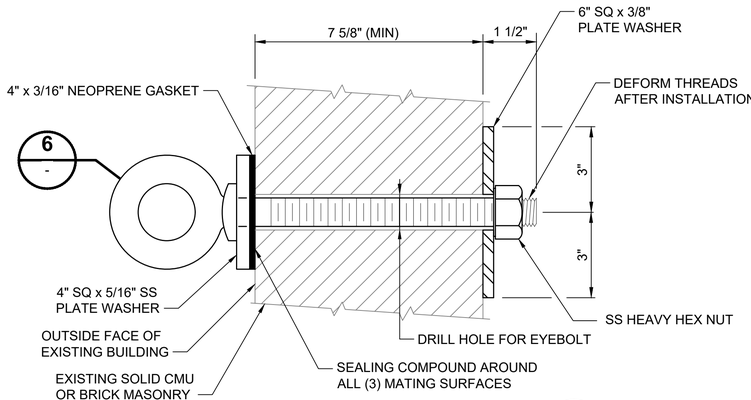


BUILDING ATTACHMENT 2

NTS ASSEMBLY EB-2 FOR EXISTING CONCRETE WITH FACING

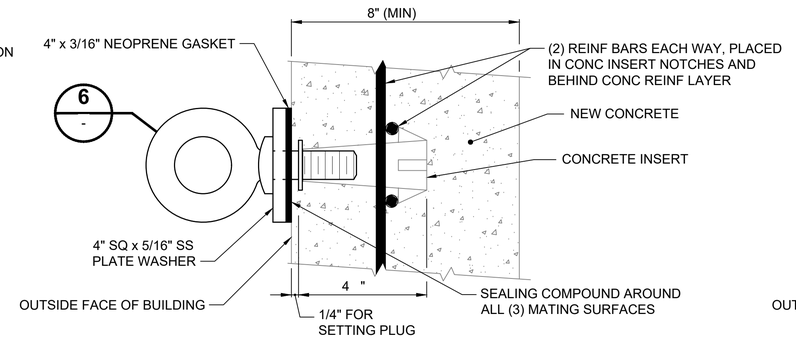
GENERAL NOTES:

1. EYEBOLT BUILDING ATTACHMENT DETAILS SHOWN ARE TYPICAL.
2. EYEBOLTS AND NUTS ARE TO BE STAINLESS STEEL AISI TYPE 304.
3. STRUCTURAL STEEL IS TO BE ASTM A36.
4. PIPE IS TO BE ASTM A500, GRADE B, HOT DIP GALVANIZED.
5. SEALING COMPOUND IS TO BE SINGLE COMPONENT ELASTOMERIC TYPE.
6. EXTERIOR PLATE WASHER IS TO BE AISI TYPE 304 STAINLESS STEEL.
7. SITE SPECIFIC INVESTIGATION IS REQUIRED TO DETERMINE EYEBOLT CONFIGURATIONS.
8. TEST EYEBOLTS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION.
9. SIZE AND SUITABILITY OF EACH EYEBOLT TO BE CONFIRMED AT EACH SITE BY THE CONTRACTOR. EYEBOLT LENGTH AND THREAD LENGTH TO BE THEN DETERMINED TO SUIT SITE DIMENSIONS AND FASTENER MANUFACTURER'S INSTRUCTIONS.
10. EYEBOLT MINIMUM WORKING LOAD SHALL BE 8,500 LBS.



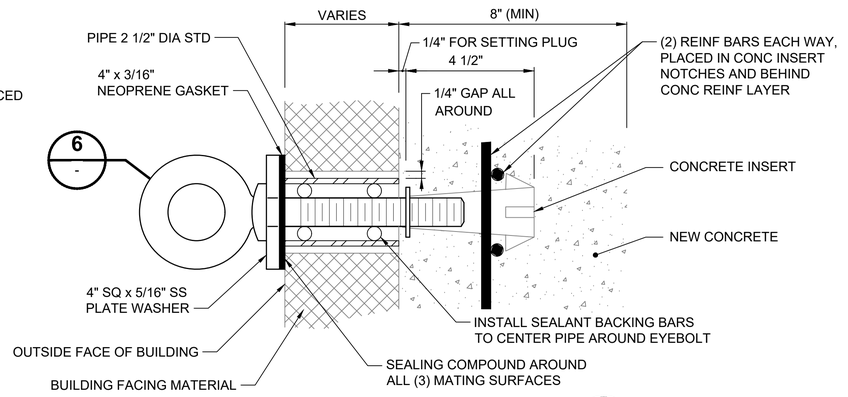
BUILDING ATTACHMENT 3

NTS ASSEMBLY EB-3 FOR EXISTING MASONRY



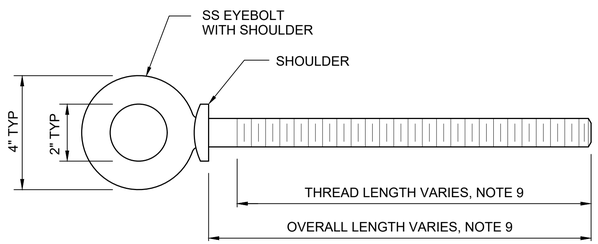
BUILDING ATTACHMENT 4

NTS ASSEMBLY EB-4 FOR NEW CONCRETE
NOTE: OPTIONALLY USE TYPE EB-1 INSTALLATION



BUILDING ATTACHMENT 5

NTS ASSEMBLY EB-5 FOR NEW CONCRETE WITH FACING



SS EYEBOLT - 1" DIAMETER 6

NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE	DESCRIPTION	ITEM NO.	PART NO./ REMARKS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

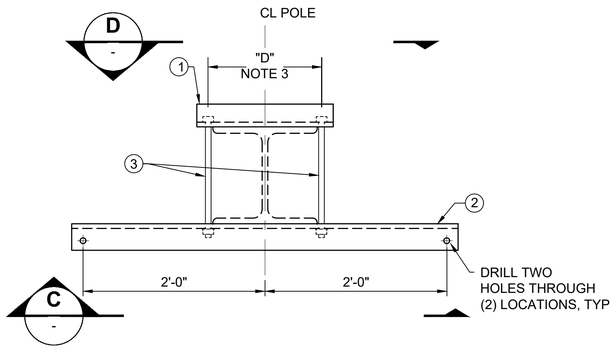
LINE IS 1" AT FULL SCALE

SCALE: NTS
FILENAME: STD-JOD323
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

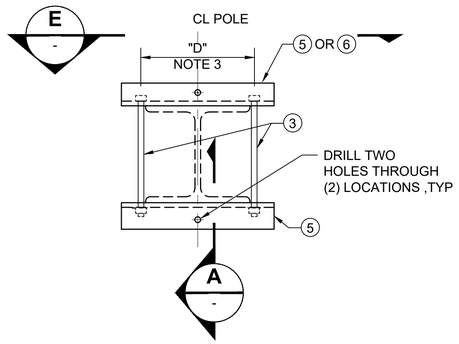
OVERHEAD CATENARY SYSTEM
BUILDING EYEBOLT ASSEMBLIES
EB-1, EB-2, EB-3, EB-4 & EB-5

DRAWING No.: **STD-JOD323**
FACILITY ID:
SHEET No.: 1 REV:



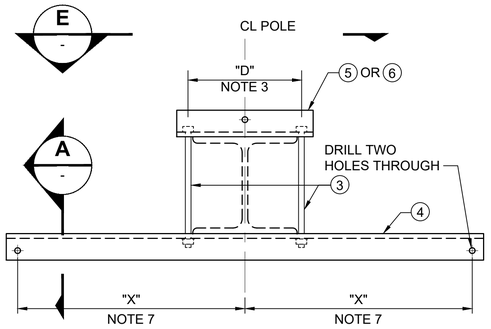
POLE BRACKET ASSEMBLY FOR ACROSS TRACK FEEDER BTF-XX

NTS



POLE BRACKET ASSEMBLY FOR BACK TO BACK CANTILEVERS BTB-XX, OR SINGLE SIDE CANTILEVER BTS-XX

NTS



POLE BRACKET ASSEMBLY FOR TWO OR THREE CANTILEVERS BT2-XX, BT3-XX

NTS

GENERAL NOTES:

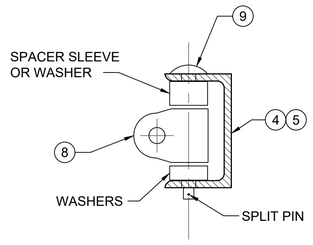
1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. ALL DIMENSIONS AND BOLT SIZES SHALL BE DETERMINED BY CONTRACTOR BASED ON FURNISHED CATENARY COMPONENTS.
3. CONTRACTOR TO COORDINATE POLE SIZE WITH DESIGN OF BRACKET.
4. BOLT LENGTHS "XX":
   "XX" IS 08 FOR WF08 SECTION, POLE TYPE WF-08XX SEE DWG JOD300.
   "XX" IS 10 FOR WF10 SECTION, POLE TYPES WF-10XX, WF-10XXF AND WF-20XX SEE DWGS JOD300 AND JOD301.
   "XX" IS 12 FOR WF12 SECTION, POLE TYPES WF-21XX, WF-21XXF, WF-22XX, WF-22XXF, WF-32XX AND WF-32XXF SEE DWGS JOD300 AND JOD301.
5. SPREADER AND CHANNELS MAY BE SLOTTED OR MULTIPLE DRILLED BY CONTRACTOR FOR UNIVERSAL APPLICATION.
6. BOLT THREAD PROJECTION THROUGH NUTS SHALL NOT EXCEED 2" IN LENGTH.
7. "X" = 2'-6" NOMINAL OR AS SPECIFIED IN OCS LAYOUT PLANS.
8. ALL BRACKETS TO BE SUPPLIED WITH BOLTS TO SUIT THE POLE SIZE.
9. SWIVEL SHALL BE DESIGNED BY THE CONTRACTOR TO SUIT MATING CANTILEVER ASSEMBLY COMPONENTS.

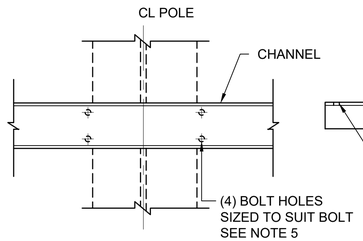
POLE BRACKET ASSEMBLY FOR FOUR CANTILEVERS BT4-XX

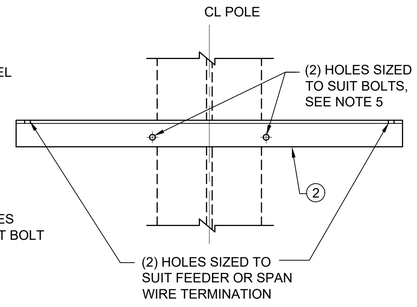
NTS

POLE ANCHOR BRACKET ASSEMBLY BTA-XX

NTS



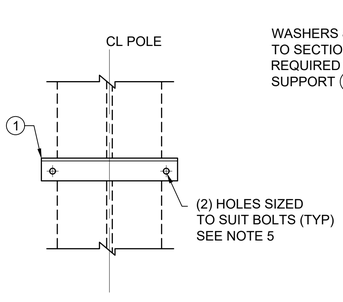




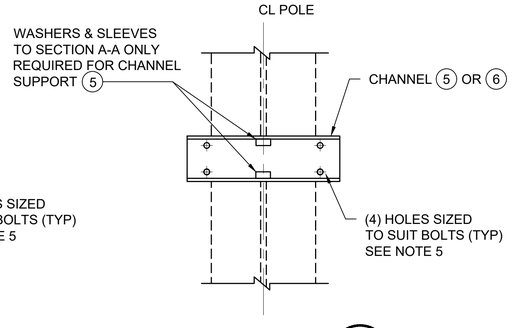
SECTION A - NTS, ITEMS 4 & 5 ONLY

SECTION B - NTS, (BOLTS OMITTED)

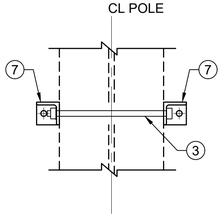
SECTION C - NTS



SECTION D - NTS



SECTION E - NTS



SECTION F - NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE							UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
BT4-XX	BT3-XX	BT2-XX	BTS-XX	BTB-XX	BTA-XX	BTF-XX				
-	-	-	-	-	-	1	EA	BACKING ANGLE	1	
-	-	-	-	-	-	1	EA	FEEDER SPREADER	2	
4	4	4	4	4	2	2	EA	BOLT WITH NUT & FLAT WASHERS	3	NOTE 4, 8
2	1	1	-	-	-	-	EA	CHANNEL SPREADER	4	
-	1	-	1	2	-	-	EA	CHANNEL SUPPORT	5	
-	-	1	1	-	-	-	EA	BACKING CHANNEL	6	
-	-	-	-	-	2	-	EA	ANCHOR SUPPORT	7	
4	3	2	1	2	-	-	EA	SWIVEL WITH PIN	8	NOTE 9
4	3	2	1	2	-	-	EA	HINGE PIN	9	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/30/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

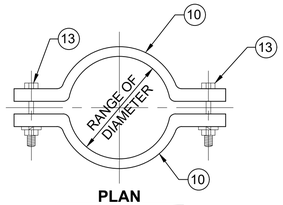
SCALE: NTS
FILENAME: STD-JOD330
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

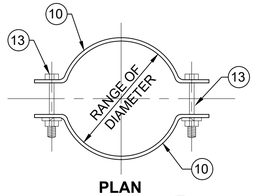
OVERHEAD CATENARY SYSTEM
BRACKET ASSEMBLIES
BTF, BTA, BTB, BTS, BT2, BT3 & BT4

DRAWING No.: STD-JOD330
FACILITY ID:
SHEET No.: REV: 1

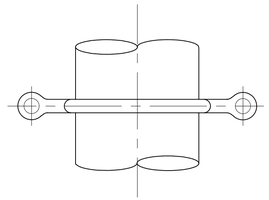
01/30/25 | 1:03 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD330.DWG



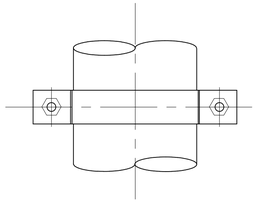
PLAN
ROUND BAR OPTION



PLAN
PLATE OPTION

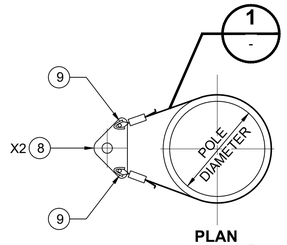


ELEVATION
ROUND BAR OPTION

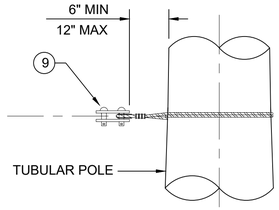


ELEVATION
PLATE OPTION

TWO PIECE POLE BRACKET ASSEMBLY BA-XX
NTS

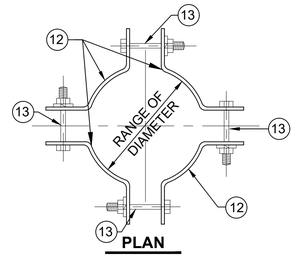


PLAN



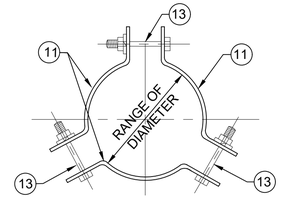
ELEVATION

STEEL GUY STRAND ASSEMBLY FOR CROSS-SPANS & TERMINATIONS BE-XX
NTS



PLAN

FOUR PIECE POLE BRACKET ASSEMBLY FOR GUY WIRES BD-XX
NTS

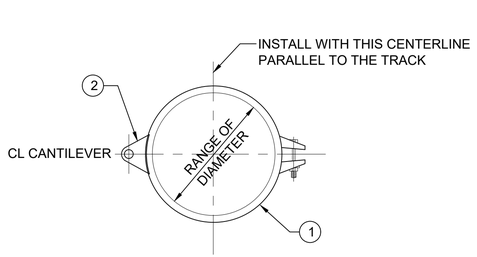


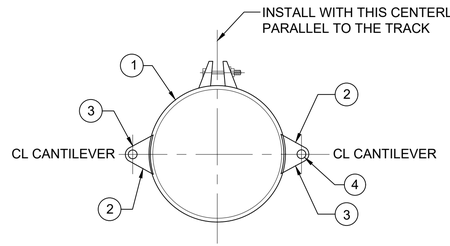
PLAN

THREE PIECE POLE BRACKET ASSEMBLY FOR GUY WIRES BC-XX
NTS

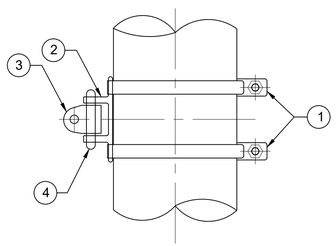
GENERAL NOTES:

1. ALL DIMENSIONS AND BOLT SIZES SHALL BE DETERMINED BY CONTRACTOR BASED ON FURNISHED CATENARY COMPONENTS PRIOR TO FABRICATION.
2. CONTRACTOR TO DETERMINE POLE DIAMETER AT ATTACHMENT HEIGHT PRIOR TO FABRICATION OF BRACKET ASSEMBLIES.
3. IN ASSEMBLY REFERENCE, "XX" INDICATES POLE BASE DIAMETER TO THE NEAREST INCH.
4. BOLT THREAD PROJECTION THROUGH NUTS SHALL NOT EXCEED 2 INCHES IN LENGTH.
5. SWIVEL SHALL BE DESIGNED BY THE CONTRACTOR TO SUIT MATING CANTILEVER ASSEMBLY COMPONENTS.
6. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
7. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.

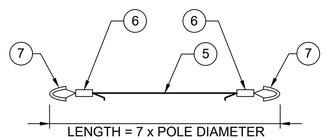




HINGE BRACKET ASSEMBLY FOR BACK-TO-BACK CANTILEVER BB-XX
NTS



HINGE BRACKET ASSEMBLY FOR SINGLE CANTILEVER BH-XX
NTS



TYPICAL POLE SLING SUB-ASSEMBLY 1 -
NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE						UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
BH-XX	BE-XX	BD-XX	BC-XX	BB-XX	BA-XX				
2	-	-	-	2	-	EA	POLE CLAMP ASSY	1	
1	-	-	-	2	-	EA	POLE CLEVIS	2	
1	-	-	-	2	-	EA	SWIVEL WITH PIN	3	NOTE 5
1	-	-	-	2	-	EA	HINGE PIN	4	
-	AS REQ'D	-	-	-	-	LF	WIRE ROPE	5	STAINLESS STEEL
-	2	-	-	-	-	EA	COMPRESSION SLEEVE	6	
-	2	-	-	-	-	EA	THIMBLE	7	
-	2	-	-	-	-	EA	PLATE, 3 PIN	8	
-	3	-	-	-	-	EA	PIN, WITH SLIT PIN	9	
-	-	-	-	-	2	EA	HALF BRACKET	10	
-	-	-	3	-	-	EA	THIRD BRACKET	11	
-	-	4	-	-	-	EA	QUARTER BRACKET	12	
-	-	4	3	-	2	EA	BOLT	13	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

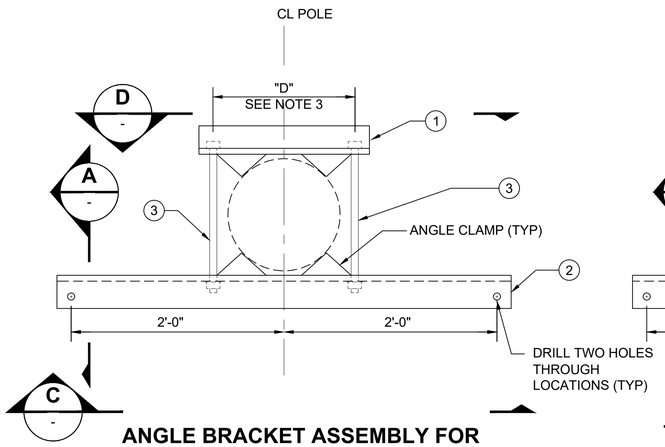
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD331
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

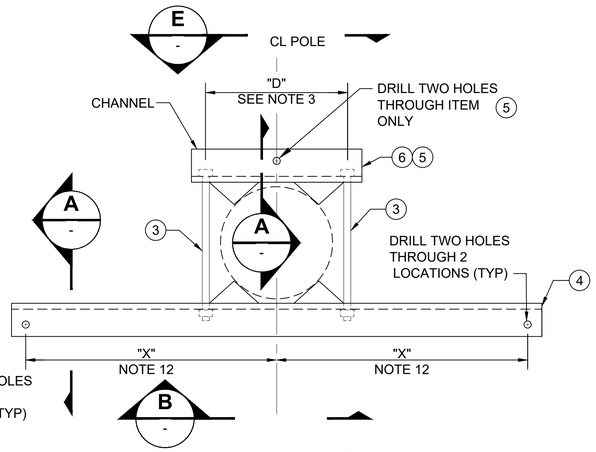
OVERHEAD CATENARY SYSTEM
BRACKET ASSEMBLIES
BA, BB, BC, BD, BE & BH

DRAWING No.: **STD-JOD331**
FACILITY ID:
SHEET No.: 1
REV:



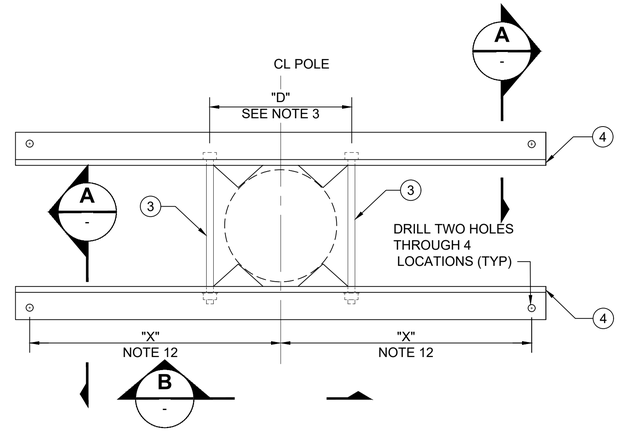
ANGLE BRACKET ASSEMBLY FOR ACROSS TRACK FEEDER BRF-XX

NTS



TUBULAR POLE BRACKET ASSEMBLY FOR TWO OR THREE CANTILEVERS BR2-XX, BR3-XX

NTS

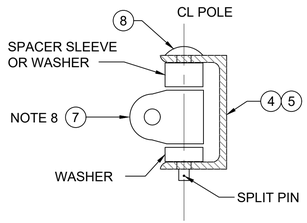


TUBULAR POLE BRACKET ASSEMBLY FOR FOUR CANTILEVERS BR4-XX

NTS

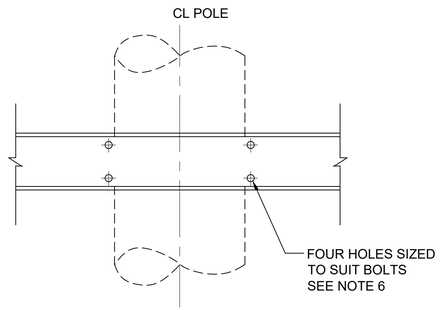
GENERAL NOTES:

1. ROUGHEN THE SURFACE OF ANGLE CLAMP IN CONTACT WITH STEEL POLE.
2. ALL DIMENSIONS AND BOLT SIZES SHALL BE VERIFIED BY CONTRACTOR BASED ON FURNISHED CATENARY COMPONENTS PRIOR TO FABRICATION.
3. CONTRACTOR SHALL DETERMINE POLE DIAMETER AT ATTACHMENT HEIGHT PRIOR TO FABRICATION OF POLE BASE BRACKET.
4. IN ASSEMBLY REFERENCE, "XX" INDICATES POLE BASE DIAMETER TO NEAREST INCH.
5. TYPICALLY CANTILEVER ASSEMBLIES REQUIRE TWO CHANNEL BRACKETS EACH.
6. SPREADER AND CHANNELS MAY BE SLOTTED OR MULTIPLE DRILLED BY CONTRACTOR FOR UNIVERSAL APPLICATION.
7. BOLT THREAD PROJECTION THROUGH NUTS SHALL NOT EXCEED 2" IN LENGTH.
8. SWIVEL SHALL BE DESIGNED BY THE CONTRACTOR TO SUIT MATING CANTILEVER ASSEMBLY COMPONENTS.
9. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
10. IF ASSEMBLY BEGINS TO ROTATE AFTER CANTILEVERS ARE INSTALLED AND WIRE PULLED AND REGISTERED, THE CONTRACTOR MUST TACK WELD THE ASSEMBLY TO THE POLE ALONG WITH COLD GALVANIZING AND PAINT OR UTILIZE ANOTHER APPROVED METHOD TO KEEP ASSEMBLY FROM ROTATING.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
12. "X" = 2'-6" NOMINAL OR AS SPECIFIED IN OCS LAYOUT PLANS.



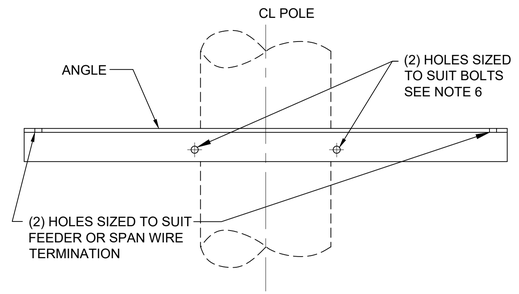
SECTION A

NTS
ITEMS 4 & 5 ONLY
(DETAIL BEYOND SWIVEL OMITTED)



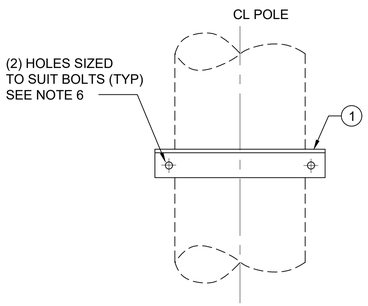
SECTION B

NTS
(BOLTS OMITTED)



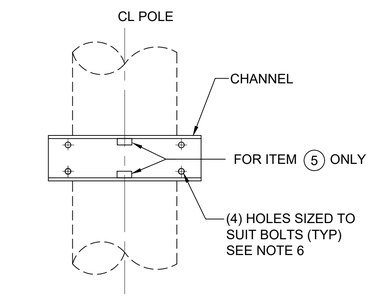
SECTION C

NTS
(BOLTS OMITTED)



SECTION D

NTS
(BOLTS OMITTED)



SECTION E

NTS
(BOLTS OMITTED)

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
BR4-XX	BR3-XX	BR2-XX	BRF-XX				
-	-	-	1	EA	BACKING ANGLE	1	W/ CLAMP ANGLES
-	-	-	1	EA	FEEDER SPREADER	2	W/ CLAMP ANGLES
4	4	4	2	EA	BOLT FOR "XX" DIA POLE W/ NUT AND WASHER	3	LENGTH AS REQ'D
2	1	1	-	EA	CHANNEL SPREADER	4	W/ CLAMP ANGLES
-	1	-	-	EA	CHANNEL SUPPORT	5	W/ CLAMP ANGLES
-	-	1	-	EA	BACKING CHANNEL	6	W/ CLAMP ANGLES
4	3	2	-	EA	SWIVEL WITH PIN	7	NOTE 8
4	3	2	-	EA	HINGE PIN	8	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD332
CONTRACT No.: RTA/LR
DATE: 2/2024

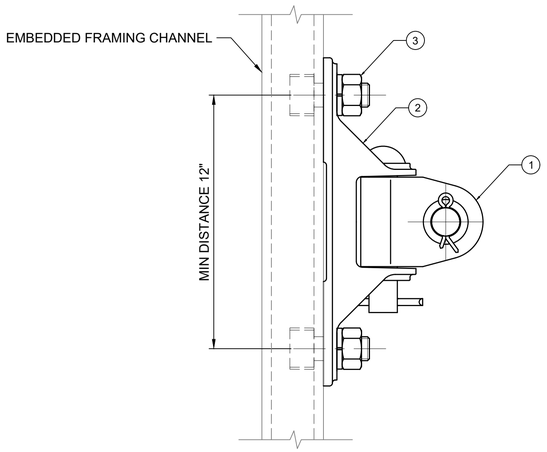
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
BRACKET ASSEMBLIES
BRF, BR2, BR3 & BR4

DRAWING No.: STD-JOD332
FACILITY ID:
SHEET No.: 1
REV:

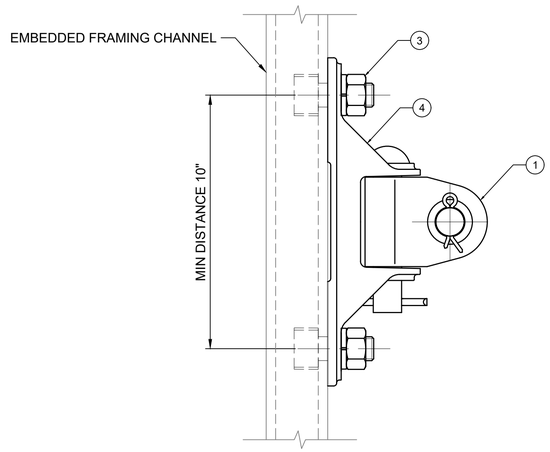
01/30/25 | 1:03 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD332.DWG

GENERAL NOTES:

1. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
4. SWIVEL SHALL BE DESIGNED BY THE CONTRACTOR TO SUIT MATING CANTILEVER ASSEMBLY COMPONENTS.



BRACKET ASSEMBLY FOR CANTILEVER TO VERTICAL EMBEDDED UNISTRUT BFI-1
NTS



BRACKET ASSEMBLY FOR CANTILEVER TO VERTICAL EMBEDDED UNISTRUT BFI-2
NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
BFI-2	BFI-1				
1	1	EA	SWIVEL CLEVIS W/ PIN	1	
-	1	EA	CANTILEVER SWIVEL BRACKET 12"	2	
AS REQ'D	AS REQ'D	EA	HARDWARE FOR FRAMING CHANNEL	3	
1	-	EA	CANTILEVER SWIVEL BRACKET 10"	4	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SCALE: NTS
FILENAME: STD-JOD333
CONTRACT No.: RTA/LR
DATE: 2/2024

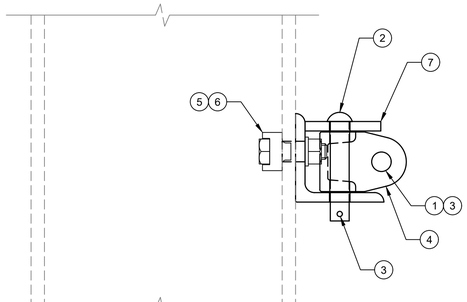
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
FRAMING INSERT BRACKET ASSEMBLIES
BFI-1 & BFI-2

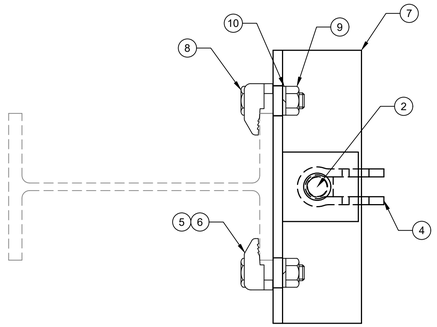
DRAWING No.: **STD-JOD333**
FACILITY ID:
SHEET No.: REV: 1

GENERAL NOTES:

1. BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. CONTRACTOR TO DETERMINE POLE SIZE AT ATTACHMENT HEIGHT AND COORDINATE DESIGN OF POLE BRACKET PRIOR TO FABRICATION.
3. ALL DIMENSIONS AND BOLT SIZES SHALL BE DETERMINED BY CONTRACTOR BASED ON FURNISHED CATENARY COMPONENTS PRIOR TO FABRICATION.
4. BOLT THREAD PROJECTION THROUGH NUTS SHALL NOT EXCEED 2 INCHES IN LENGTH.
5. SWIVEL SHALL BE DESIGNED BY THE CONTRACTOR TO SUIT MATING CANTILEVER ASSEMBLY COMPONENTS.
6. FOR SQUARE TUBE POLES REPLACE LINDAPTERS WITH THREADED RODS (HDG) AND A BACK PLATE.



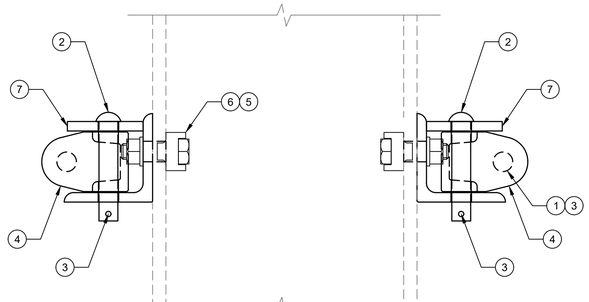
ELEVATION



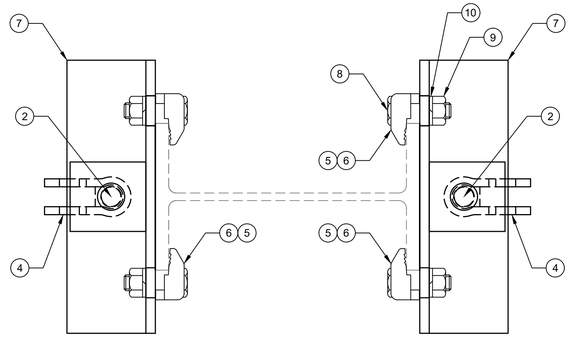
PLAN

SINGLE CANTILEVER BRACKET FOR WIDE FLANGE POLE BR-1

NTS



ELEVATION



PLAN

BACK TO BACK CANTILEVER BRACKET FOR WIDE FLANGE POLE BR-2

NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
BR-2	BR-1				
2	1	EA	PIN WITH ROUND HEAD	1	
2	1	EA	PIN WITH ROUND HEAD	2	
4	2	EA	SPLIT PIN	3	
2	1	EA	SWIVEL WITH CLEVIS	4	NOTE 5
4	2	EA	BEAM CLAMP, LINDAPTER OR EQUAL	5	
4	2	EA	SHIM, FOR LINDAPTER BEAM CLAMP OR EQUAL	6	
2	1	EA	BRACKET FOR CANTILEVER - WIDE FLANGE POLE - ACROSS FLANGE	7	
4	2	EA	HEX BOLT	8	
4	2	EA	HEX NUT	9	
4	2	EA	SPRING LOCK WASHER	10	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

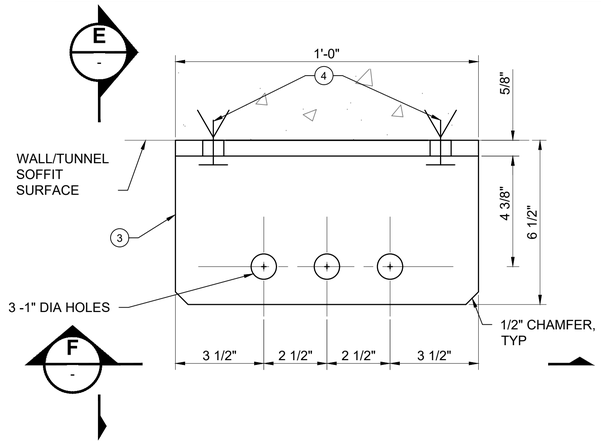
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD334
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

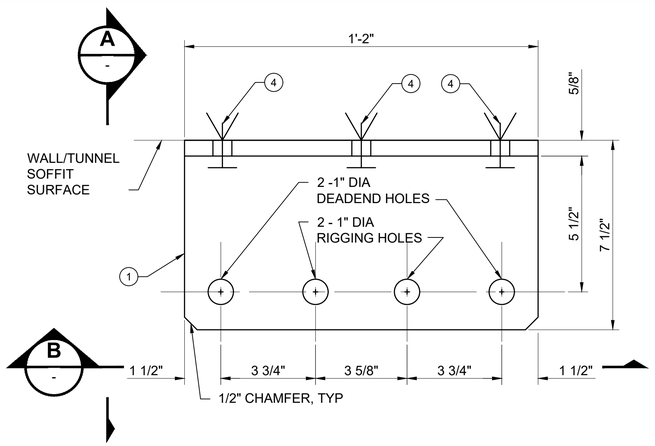
OVERHEAD CATENARY SYSTEM
WIDE FLANGE POLE BRACKET ASSEMBLIES
BR-1 &BR-2

DRAWING No.: **STD-JOD334**
FACILITY ID:
SHEET No.: REV: 1



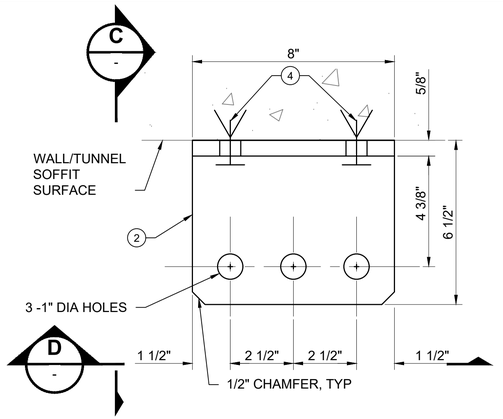
TERMINATION BRACKET IN TUNNELS ASSEMBLY AB-4

NTS



MESSENGER WIRE TERMINATION BRACKET IN TUNNELS ASSEMBLY AB-5

NTS

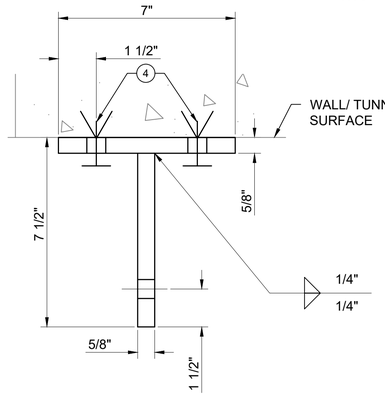


CONTACT WIRE TERMINATION BRACKET IN TUNNELS ASSEMBLY AB-6

NTS

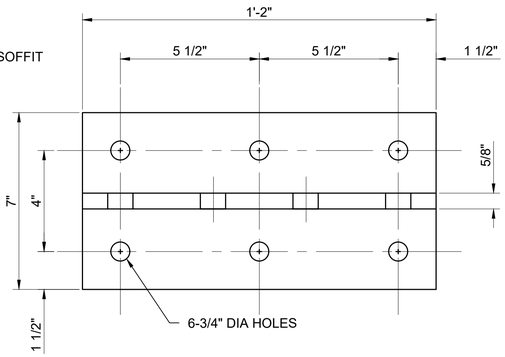
GENERAL NOTES:

1. FOR ABBREVIATIONS, LEGENDS AND SYMBOLS, SEE DWGS JZN001 AND JZN002.
2. ANCHOR BOLT REQUIREMENTS TO BE PROVIDED IN OVERHEAD CONTACT SYSTEM ANCHORAGE TO CONCRETE SPECIFICATIONS.
3. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
4. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
5. ANCHOR BRACKET STEEL SHALL CONFORM TO ASTM A53 GRADE B.
6. CONNECTION PLATE STEEL SHALL CONFORM TO ASTM A572 GRADE 50 WITH A MINIMUM YIELD STRESS Fy = 50 KSI.
7. ANCHOR BRACKET SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123.
8. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
9. CONTRACTOR SHALL VERIFY STEEL REINFORCEMENT LOCATIONS IN CONCRETE STRUCTURES PRIOR TO DRILLING AT OCS SUPPORT LOCATIONS. DETAILED REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.



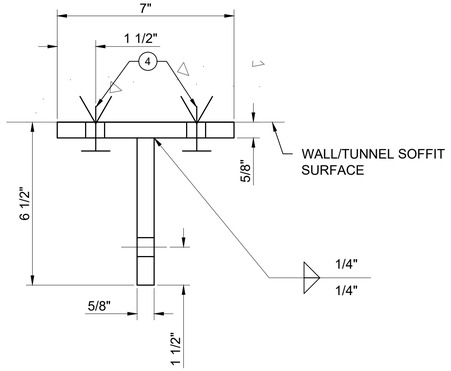
SECTION A

NTS



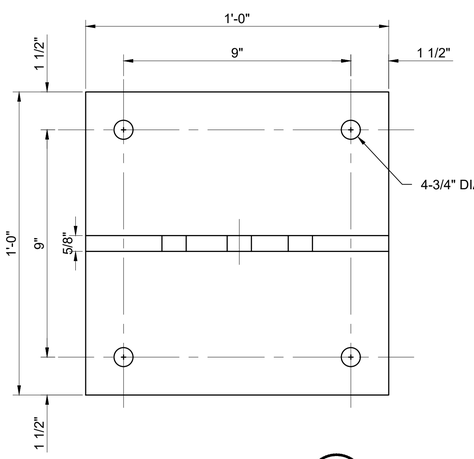
SECTION B

NTS



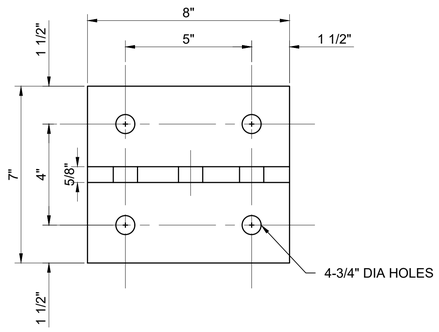
SECTION C

NTS



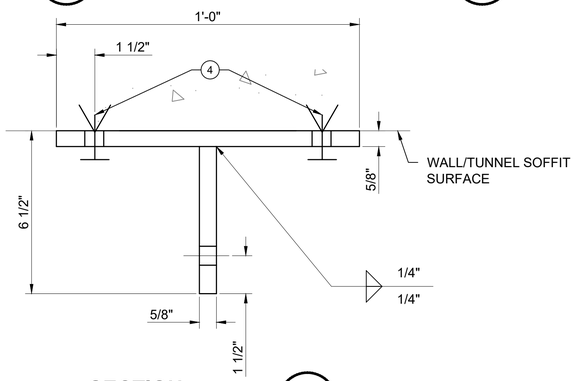
SECTION F

NTS



SECTION D

NTS



SECTION E

NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE			UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
AB-6	AB-5	AB-4				
-	1	-	EA	MESSENGER WIRE TERM BRACKET	1	
1	-	-	EA	CONTACT WIRE TERM BRACKET	2	
-	-	1	EA	TERM BRACKET	3	
4	6	4	EA	ANCHOR BOLT	4	SEE NOTE 2

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

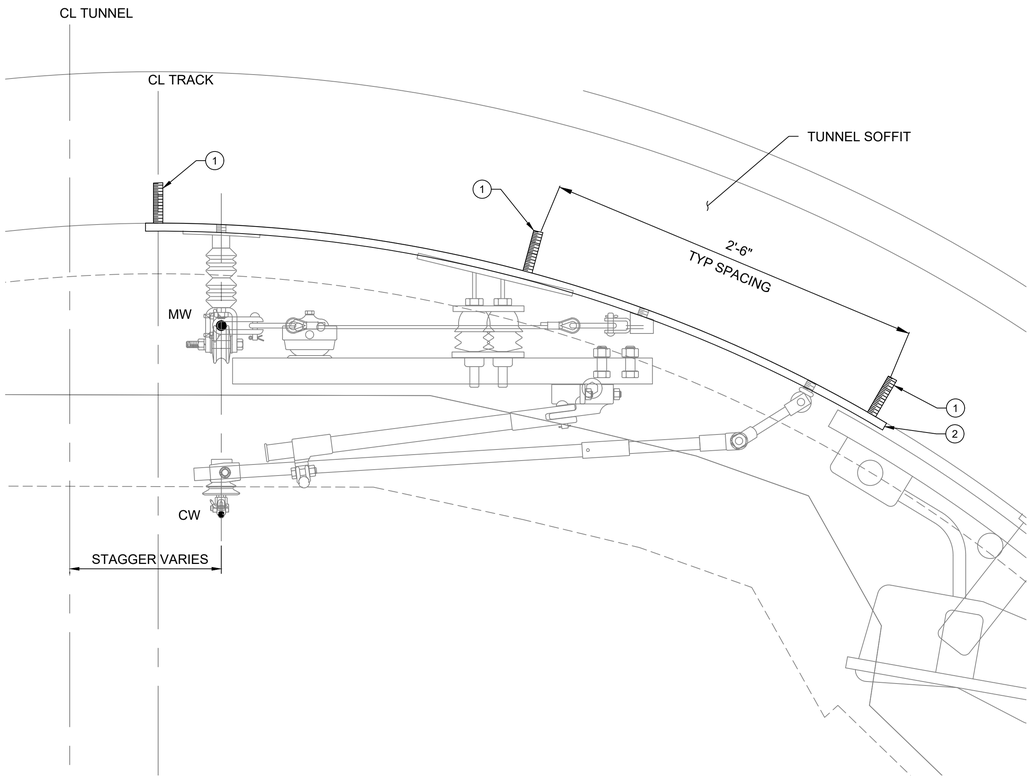
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD335
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

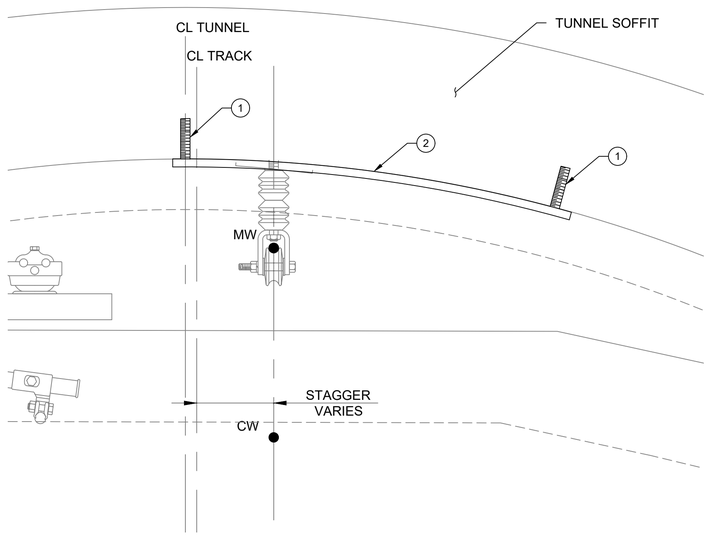
OVERHEAD CATENARY SYSTEM
ANCHOR BRACKET ASSEMBLIES
AB-5 & AB-6

DRAWING No.: STD-JOD335
FACILITY ID:
SHEET No.: REV: 1



FRAMING CHANNEL IN TUNNELS ASSEMBLY AB-7

NTS



FRAMING CHANNEL FOR MESSENGER WIRE VERTICAL SUPPORT ASSEMBLY AB-8

NTS

GENERAL NOTES:

1. FOR ABBREVIATIONS, LEGENDS AND SYMBOLS, SEE DWGS JZN001 AND JZN002.
2. VALUE AND DIRECTION OF STAGGERS TO BE SHOWN ON OCS LAYOUT PLANS.
3. ACTUAL CATENARY SYSTEM HEIGHT AND INDIVIDUAL WIRE HEIGHTS TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
4. FOR TS-9 ASSEMBLY, STAGGER IS NOT GIVEN. INSTALL SUPPORT DIRECTLY IN-LINE FROM CW REGISTRATION TO CW REGISTRATION. DETAILS TO BE SHOWN ON OCS LAYOUT PLANS.
5. CURVE FRAMING CHANNEL TO FIT SHAPE OF TUNNEL.
6. USE 5/8" HILTI KWIK II AISI 304/316 WITH 4" EMBED OR EQUIVALENT
   ALLOWABLE TENSION = 2400 LB IN 3000 PSI CONCRETE
   ALLOWABLE SHEAR = 3300 LB
7. USE 1/2" HILTI KWIK II AISI 304/316 SS BOLT WITH 3 1/2" EMBED OR EQUIVALENT
   ALLOWABLE TENSION = 1730 LB IN 3000 PSI CONCRETE
   ALLOWABLE SHEAR - 2200 LB
8. INSTALL ANCHOR BOLTS AT PREDETERMINED DIMPLES PROVIDED BY CIVIL CONTRACTOR IN PRECAST TUNNEL LINING. WHERE NO DIMPLES ARE AVAILABLE, XRAY ACCEPTABLE DRILLING LOCATIONS TO PREVENT DAMAGE TO INTERNAL STRUCTURAL REBAR.
9. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
11. CONTRACTOR SHALL VERIFY STEEL REINFORCEMENT LOCATIONS IN CONCRETE STRUCTURES PRIOR TO DRILLING AT OCS SUPPORT LOCATIONS. DETAILED REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
AB-8	AB-7				
2	3	EA	ANCHOR BOLT	1	SEE NOTES 6, 7, 11
3	5.25	LF	FRAMING CHANNEL STAINLESS STEEL	2	P3300T SS x 2' UNISTRUT OR EQ

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

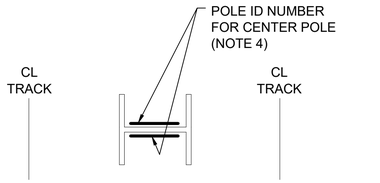
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD336
CONTRACT No.: RTA/LR
DATE: 2/2024

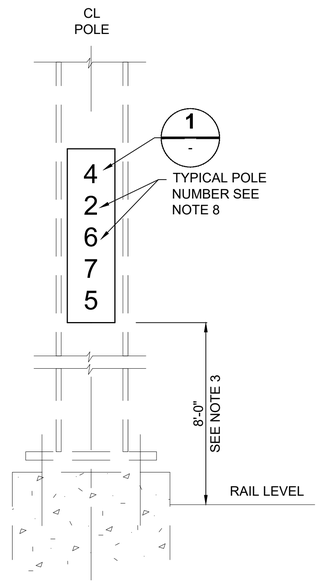
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
ANCHOR BRACKET ASSEMBLIES
AB-7 & AB-8

DRAWING No.: STD-JOD336
FACILITY ID:
SHEET No.: REV: 1

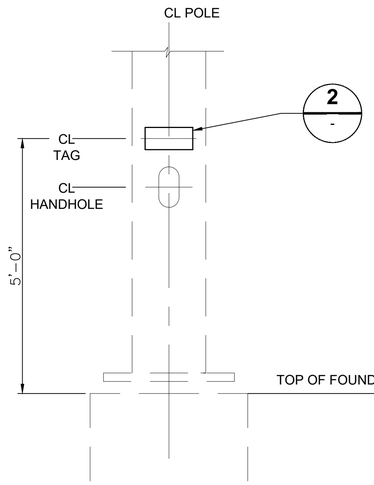


TOP VIEW



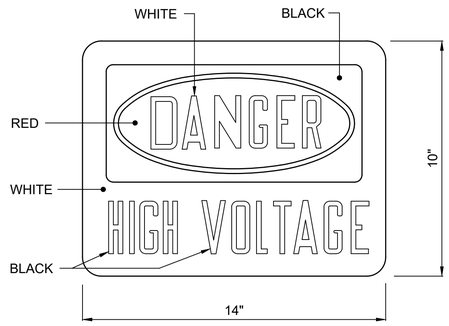
ALONG TRACK VIEW

WIDE FLANGE POLE ID SIGN ID-1
NTS

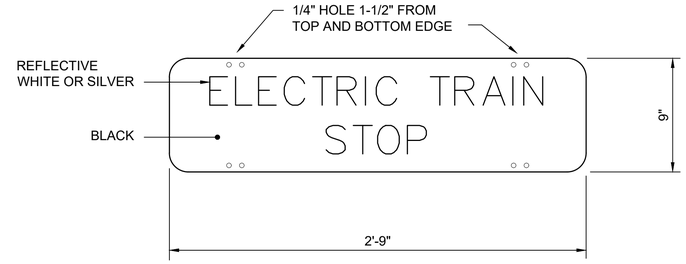


POLE ID LABEL ID-2
NTS

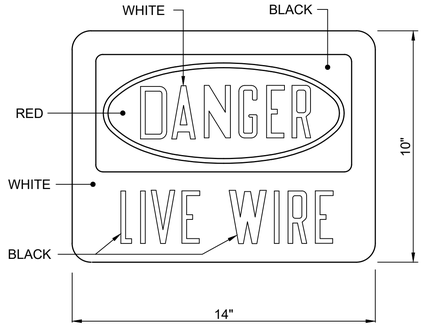
SEE NOTE 6



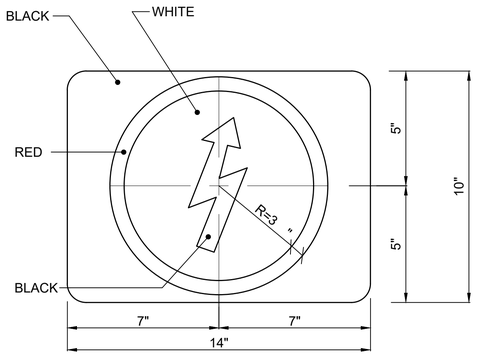
WARNING SIGN FOR STATION PLATFORM SN-2
NTS



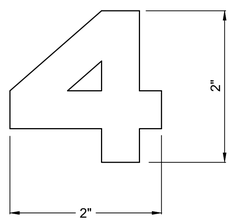
WARNING SIGN, END OF ELECTRIFICATION SN-1
NTS



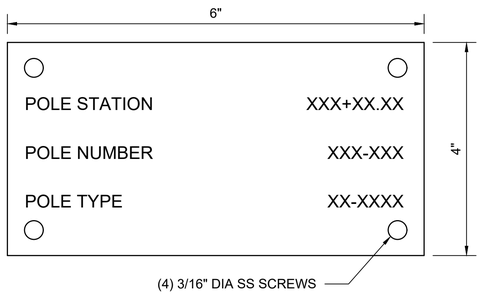
WARNING SIGN FOR GRADE CROSSING SN-4
NTS



LIVE WIRE WARNING SIGN SN-3
NTS



TYPICAL NUMERAL DETAIL 1
NTS



POLE ID LABEL DETAIL 2
NTS
SEE NOTES 6, 13

GENERAL NOTES:

1. SIGNS SHALL BE MADE WITH 0.04" THICK RIGID ALUMINUM BACKING PLATE, WITH BAKED ENAMEL FINISH. ALL EDGES SHALL BE ROUNDED.
2. LETTERS SHALL BE ON FRONT OF SIGN ONLY. REAR OF SIGNS SHALL BE BLACK COLOR.
3. THE 8'-0" NOMINAL VERTICAL DISTANCE FROM RAIL LEVEL TO THE LOWER EDGE OF THE POLE ID NUMBER MAY REQUIRE ADJUSTMENT TO IMPROVE VISIBILITY FROM AN APPROACHING TRAIN.
4. ON CENTER POLES, A POLE ID SIGN IS REQUIRED ON EACH SIDE OF POLE. ON SIDE POLES, POLE ID SIGN SHOULD BE INSTALLED ON SIDE OF POLE FACING NORMAL DIRECTION OF ONCOMING TRAFFIC.
5. LOCATION OF WARNING SIGNS TO BE SHOWN ON OCS LAYOUT PLANS OR PRESCRIBED IN SPECIFICATIONS. WHERE MULTIPLE SIGNS ARE REQUIRED ON THE SAME POLE FACE "DANGER" SIGNS SHALL BE THE HIGHEST.
6. STAINLESS STEEL TAG TO BE INSTALLED ON ALL POLES AT POSITION INDICATED.
7. ALL NUMBERS AND LETTERS TO BE 1/2" HIGH AND TO BE HARD MARKED ON STAINLESS STEEL TAG.
8. POLE STATIONING, POLE NUMBER AND POLE TYPE ARE SITE SPECIFIC AND SHALL BE SHOWN ON OCS LAYOUT PLANS AND POLE SCHEDULE.
9. I.D. TAGS AND WARNING SIGNS SHALL BE PERMANENTLY ATTACHED TO OCS POLES BY CONTRACTOR USING POWER DRIVEN NAILS, DRIVE PINS OR SS SET SCREWS. NAILS SHALL BE CAPABLE OF HOLDING SIGNS AND ANCHORING INTO BASE MATERIAL.
10. THE CONTRACTOR SHALL COMPLETE THE BILL OF MATERIALS TABLE. EACH ASSEMBLY SHALL BE ITEMIZED TO INCLUDE PART NUMBERS, AND MISCELLANEOUS ITEMS REQUIRED FOR FIXING EACH SIGN TYPE.
11. ADDITIONAL DETAILS TO BE SHOWN IN SPECIFICATIONS.
12. SOUND TRANSIT TO APPROVE SIGN WORDING AND LETTER STYLE PRIOR TO MANUFACTURE.
13. CATENARY DETAILS INCLUDING POLE STATION AND POLE/STRUCTURE ID NUMBERS TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.

BILL OF MATERIALS

QUANTITIES EACH TYPE						UNITS	DESCRIPTION	ITEM NO	PART NO/ REMARK
ID-1	ID-2	SN-1	SN-2	SN-3	SN-4				
2	-	-	-	-	-	EACH	WIDE FLANGE POLE ID SIGN	1	
-	2	-	-	-	-	EACH	TAPERED TUBULAR POLE ID SIGN	2	
-	-	1	-	-	-	EACH	END OF ELECTRIFICATION SIGN	3	
-	-	-	-	-	2	EACH	GRADE CROSSING SIGN	4	
-	-	-	1	-	-	EACH	STATION PLATFORM SIGN	5	
-	-	-	-	1	-	EACH	LIVE WIRE SIGN	6	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

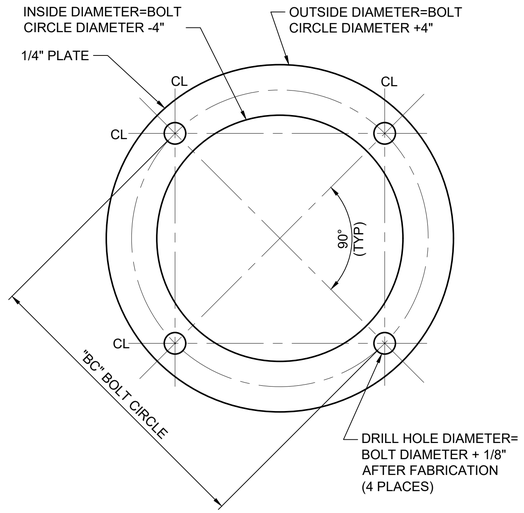
SCALE: NTS
FILENAME: STD-JOD340
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
POLE AND WARNING SIGN ASSEMBLIES
ID-1, ID-2, SN-1, SN-2, SN-3 & SN4

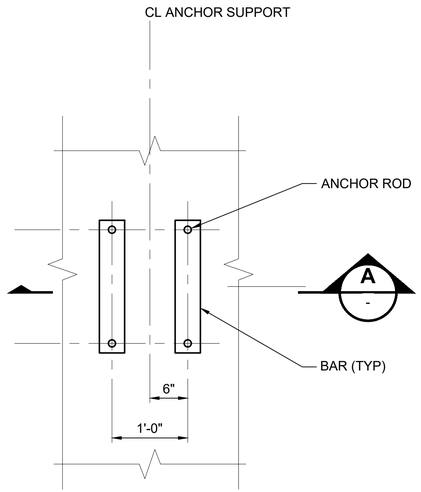
DRAWING No.: **STD-JOD340**
FACILITY ID:
SHEET No.: 1
REV:

01/30/25 | 1:03 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD340.DWG



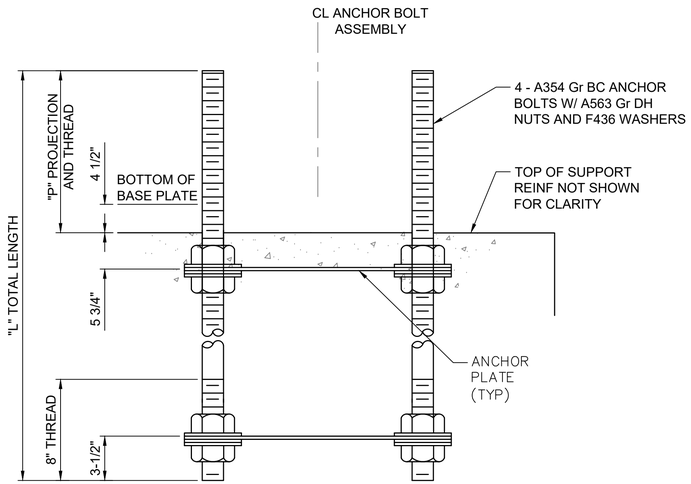
OCS POLE ANCHOR PLATE DETAIL

NTS



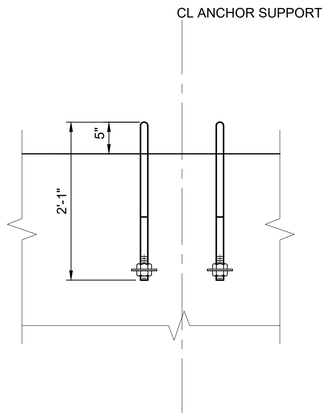
DOWNGUY ANCHOR SUPPORT PLAN

SCALE: 1" = 1'-0"



OCS POLE ANCHOR PLATE DETAIL

NTS

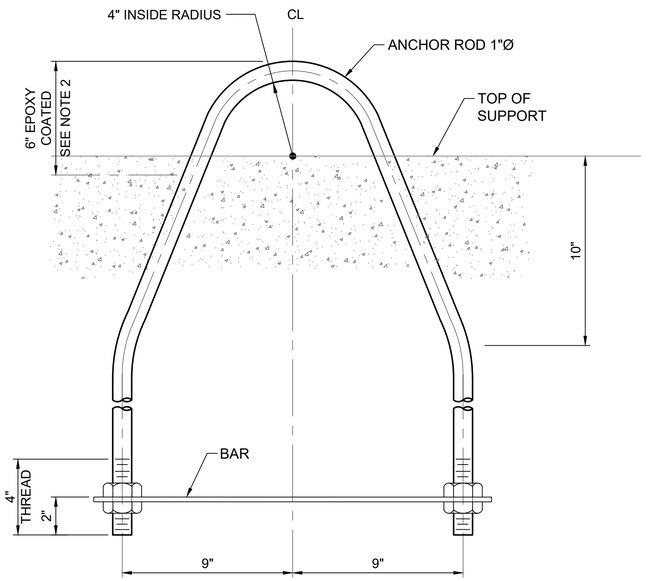


TYPE FD-3AG DOWNGUY ANCHOR SUPPORT - SECTION A

SCALE: 1" = 1'-0"

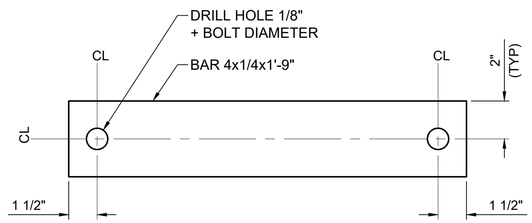
OCS POLE SUPPORT SCHEDULE
TUBULAR POLES ON AERIAL GUIDEWAY

FOUNDATION	ANCHOR BOLTS			
TYPE	BC	DIA	L	P
FG-1T	1'-4"	1 1/2"	2'-5"	9"
FG-2T	1'-6"	1 3/4"	2'-6"	10"
FG-3T	1'-8"	2"	2'-8"	12"
FG-4T	1'-10"	2 1/2"	2'-10"	14"
FG-5T	2'-0"	2 1/2"	2'-10"	14"



DOWNGUY ANCHOR DETAIL

SCALE: 3" = 1'-0"



DOWNGUY ANCHOR BAR DETAIL

SCALE: 3" = 1'-0"

GENERAL NOTES:

1. DOWNGUY ANCHOR MATERIAL SPECIFICATIONS
   ANCHOR BOLTS/ROD: M314/GRADE 55
   HEAVY HEXNUTS: M291/GRADE A
   FLAT WASHERS: M293
2. THE DOWNGUY ANCHOR ROD SHALL BE COATED WITH EPOXY AS INDICATED. EPOXY MATERIAL SHALL BE APPLIED UNIFORMLY TO ALL REQUIRED SURFACES.
3. OCS POLE ANCHOR BOLTS TO BE GALVANIZED PER ASTM A153/A153M WITH OVERTAPPED THREADS PER AISC REQUIREMENTS FOR UNC SERIES.
4. OCS POLE ANCHOR BOLT ASSEMBLY NUTS TO BE HOT-DIP GALVANIZED WITH OVERTAPPED THREADS.

OCS POLE SUPPORT SCHEDULE
TUBULAR POLES ON SLAB-ON-GRADE

FOUNDATION	ANCHOR BOLTS			
TYPE	BC	DIA	L	P
FS-1T	1'-4"	1 1/2"	5'-0"	9"
FS-2T	1'-6"	1 3/4"	5'-0"	10"
FS-3T	1'-8"	2"	5'-0"	12"
FS-4T	1'-10"	2 1/2"	5'-0"	14"
FS-5T	2'-0"	2 1/2"	5'-0"	14"

OCS POLE SUPPORT SCHEDULE
WIDE FLANGE POLES ON AERIAL GUIDEWAY

FOUNDATION	ANCHOR BOLTS			
TYPE	BC	DIA	L	P
FG-08W	1'-4"	1 1/2"	2'-5"	9"
FG-10W	1'-6"	1 3/4"	2'-6"	10"
FG-20W	1'-8"	2"	2'-8"	12"
FG-21W	1'-8"	2"	2'-8"	12"
FG-22W	2'-0"	2 1/2"	2'-10"	14"
FG-32W	2'-0"	2 1/2"	2'-10"	14"

OCS POLE SUPPORT SCHEDULE
WIDE FLANGE ON SLAB-ON-GRADE

FOUNDATION	ANCHOR BOLTS			
TYPE	BC	DIA	L	P
FS-08W	1'-4"	1 1/2"	5'-0"	9"
FS-10W	1'-6"	1 3/4"	5'-0"	10"
FS-20W	1'-8"	2"	5'-0"	12"
FS-21W	1'-8"	2"	5'-0"	12"
FS-22W	2'-0"	2 1/2"	5'-0"	14"
FS-32W	2'-0"	2 1/2"	5'-0"	14"

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

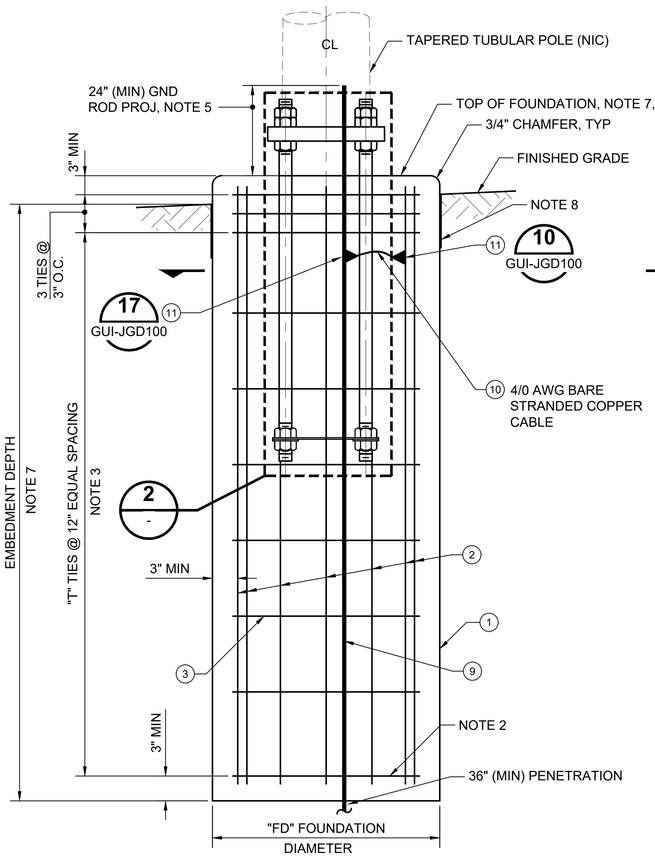
SCALE: NTS
FILENAME: STD-JOD351
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
SLAB ON GRADE - OCS POLE AND DOWN GUY ANCHOR SUPPORT DETAILS

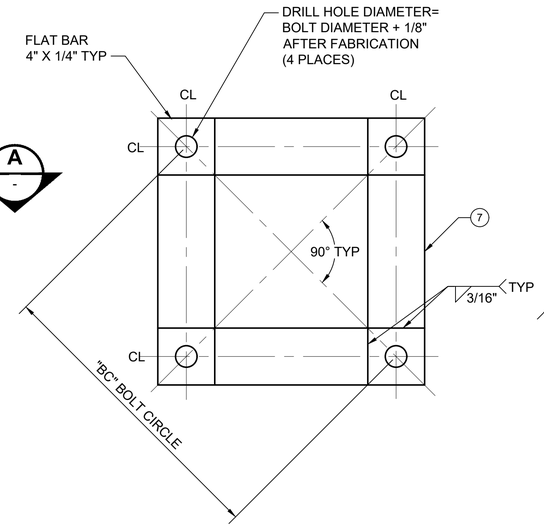
DRAWING No.: **STD-JOD351**
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:04 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD351.DWG



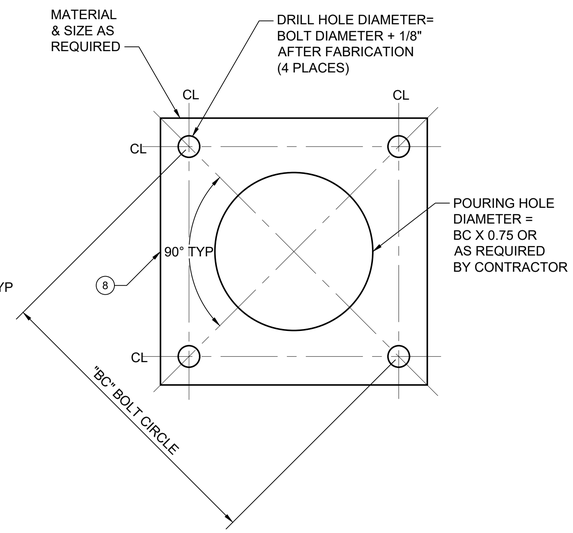
TYPE FD-XT POLE FOUNDATION ELEVATION 1

NTS



ANCHOR PLATE DETAIL B

NTS

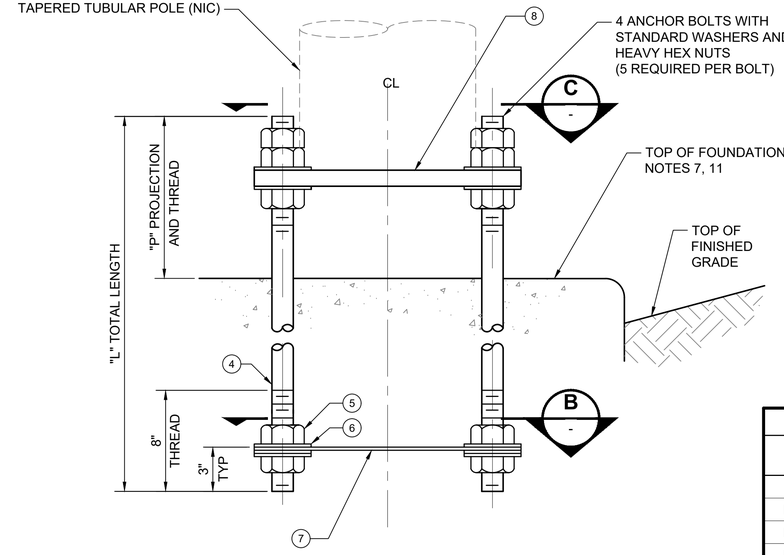


BOLT PATTERN TEMPLATE DETAIL C

NTS

SECTION A

NTS



ANCHOR BOLT DETAIL 2

NTS

GENERAL NOTES:

1. PROVIDE UNGALVANIZED ANCHOR PLATE (LOWER) AND UNGALVANIZED BOLT PATTERN TEMPLATE (UPPER) FOR ANCHOR BOLT INSTALLATION.
2. REFER TO CRSI MANUAL OF STANDARD PRACTICE FOR REINFORCEMENT ASSEMBLY REQUIREMENTS.
3. #4 SPIRALS AT 4" (MAXIMUM) PITCH MAY BE SUBSTITUTED FOR REBAR TIES. SPACE AT 2" FOR TOP 8".
4. FOUNDATION DEPTH MAY BE INCREASED 2'-0" WITHOUT CHANGING REINFORCEMENT LENGTH. THE REINFORCING SHALL THEN BE INSTALLED 3" FROM THE TOP OF THE FOUNDATION. ANY INCREASE OVER 2'-0" SHALL REQUIRE A CORRESPONDING INCREASE IN REINFORCEMENT LENGTH.
5. EXTEND GROUND ROD A MINIMUM OF 24" ABOVE TOP OF FOUNDATION WITHIN THE CENTER AREA. BOND GROUND ROD TO VERTICAL REBAR USING EXOTHERMIC WELD. PLACE GROUND ROD PARALLEL TO TRACK CENTERLINE IN THE INCREASING TRACK STATIONING DIRECTION.
6. REBAR AND EMBEDDED ANCHOR BOLT STEEL SHALL HAVE 3" MINIMUM COVERAGE.
7. FOR FOUNDATION ELEVATION ABOVE TOR, EMBEDMENT DEPTH AND STRUCTURE OFFSET INFORMATION, SEE OCS FOUNDATION PLANS DRAWINGS.
8. PROVIDE FIBER EXPANSION BOARD WITH FLEXIBLE SEALANT BETWEEN FOUNDATION AND CONCRETE PAVING.
9. ANCHOR BOLTS (INCLUDING ALL EXPOSED NUTS AND WASHERS) AND ALL EXPOSED STEEL SHALL BE GALVANIZED PER SPECIFICATIONS.
10. SEE SPECIFICATIONS FOR GROUND REQUIREMENTS.
11. PROVIDE 1" WATERSHED.
12. VERTICAL AND HORIZONTAL REBAR SHALL BE ELECTRICALLY CONTINUOUS.

BILL OF MATERIALS

QUANTITIES EACH TYPE					UNITS	DESCRIPTION	ITEM NO	PART NO/ REMARK
FD-1T	FD-2T	FD-3T	FD-4T	FD-5T				
AS REQUIRED					CU YD	CONCRETE	1	
AS REQUIRED					LB	VERTICAL REBAR	2	
AS REQUIRED					LB	HORIZONTAL REBAR	3	
4	4	4	4	4	EACH	ANCHOR BOLT	4	
20	20	20	20	20	EACH	ANCHOR BOLT NUT	5	
16	16	16	16	16	EACH	ANCHOR BOLT WASHER	6	
1	1	1	1	1	EACH	ANCHOR PLATE	7	NOTE 1
1	1	1	1	1	EACH	BOLT PATTERN TEMPLATE	8	NOTE 1
AS REQUIRED					EACH	GROUND ROD	9	NOTES 5,10
AS REQUIRED					FT	COPPER CABLE	10	
AS REQUIRED					EACH	GROUND CONNECTOR	11	

(X) X DENOTES ITEM NO IN BILL OF MATERIALS

OCS FOUNDATION SCHEDULES - TYPE FD-XT

FOUNDATION		REINFORCEMENT		ANCHOR BOLTS				MAX ALLOWABLE MOMENT
TYPE	"FD" (DIA)	"VR"	"T"	"BC"	BOLT DIA	"L"	"P"	KIP-FT
FD-1T	2'-6"	12 - #6	#3	16"	1-1/2"	60"	9"	40.0
FD-2T	3'-0"	12 - #8	#4	18"	1-3/4"	60"	10"	75.0
FD-3T	3'-0"	12 - #8	#4	20"	2"	60"	12"	103.0
FD-4T	3'-0"	12 - #8	#4	22"	2-1/2"	60"	14"	166.5
FD-5T	3'-0"	12 - #8	#4	24"	2-1/2"	60"	14"	243.5

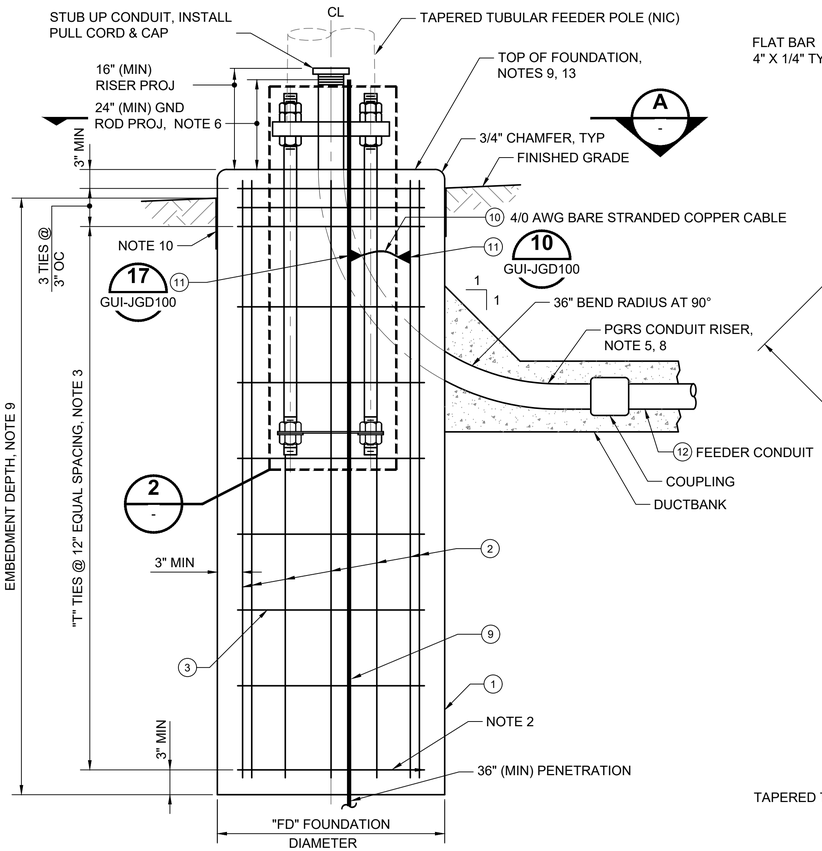
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD352
CONTRACT No.: RTA/LR
DATE: 2/2024

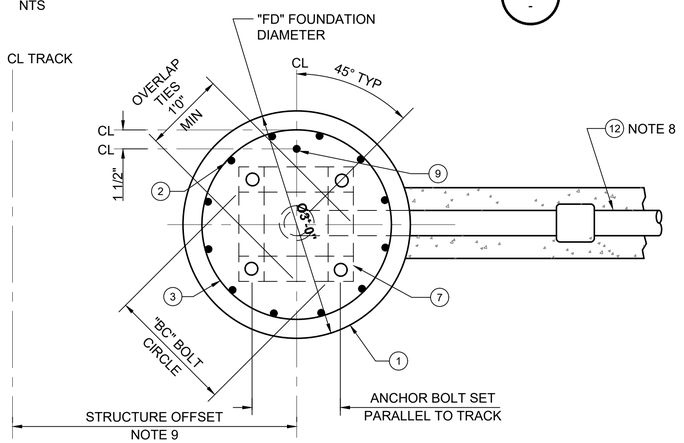
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
OCS TYPICAL TAPERED TUBULAR POLE
FOUNDATION ASSEMBLY DETAILS

DRAWING No.: STD-JOD352
FACILITY ID:
SHEET No.: 2
REV:

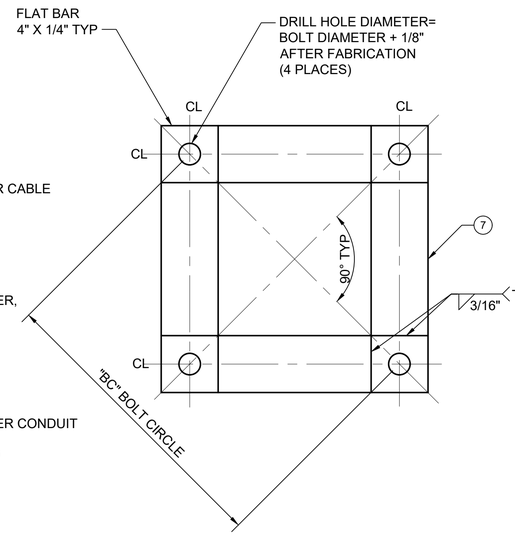
01/30/25 | 1:04 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD352.DWG



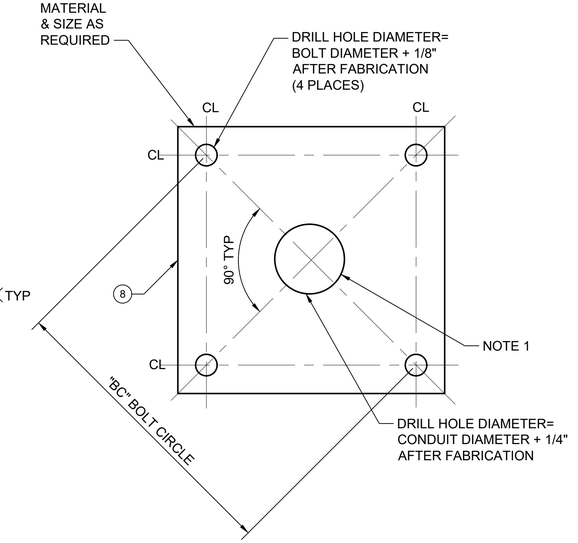
TYPE FD-XFT POLE FOUNDATION ELEVATION 1
NTS



SECTION A
NTS



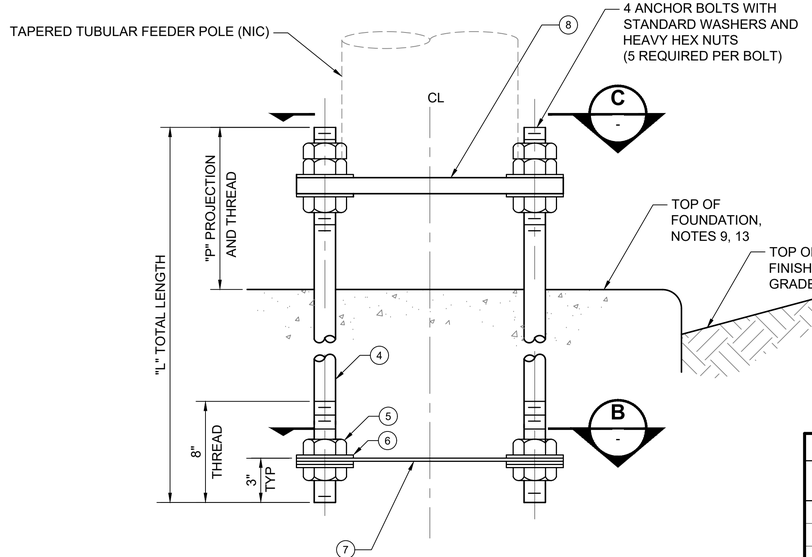
ANCHOR PLATE DETAIL B
NTS



BOLT PATTERN TEMPLATE DETAIL C
NTS

GENERAL NOTES:

1. PROVIDE UNGALVANIZED ANCHOR PLATE (LOWER) AND UNGALVANIZED BOLT PATTERN TEMPLATE (UPPER) FOR ANCHOR BOLT INSTALLATION.
2. REFER TO CRSI MANUAL OF STANDARD PRACTICE FOR REINFORCEMENT ASSEMBLY REQUIREMENTS.
3. #4 SPIRALS AT 4" (MAXIMUM) PITCH MAY BE SUBSTITUTED FOR REBAR TIES. SPACE AT 2" FOR TOP 8".
4. FOUNDATION DEPTH MAY BE INCREASED 2'-0" WITHOUT CHANGING REINFORCEMENT LENGTH. THE REINFORCING SHALL THEN BE INSTALLED 3" FROM THE TOP OF THE FOUNDATION. ANY INCREASE OVER 2'-0" SHALL REQUIRE A CORRESPONDING INCREASE IN REINFORCEMENT LENGTH.
5. INSTALL CONDUIT RISERS IN FOUNDATION WHERE SHOWN. DURING CONSTRUCTION ROTATE REBAR CAGE TO AVOID INTERFERENCE WITH CONDUIT IF NECESSARY. FOR DUCTBANK LAYOUT, REFER TO TRACTION ELECTRIFICATION SYSTEM DRAWINGS.
6. EXTEND GROUND ROD A MINIMUM OF 24" ABOVE TOP OF FOUNDATION WITHIN THE CENTER AREA. BOND GROUND ROD TO VERTICAL REBAR USING EXOTHERMIC WELD. PLACE GROUND ROD PARALLEL TO TRACK CENTERLINE IN THE INCREASING TRACK STATIONING DIRECTION.
7. REBAR AND EMBEDDED ANCHOR BOLT STEEL SHALL HAVE 3" MINIMUM COVERAGE.
8. INSTALL CENTERLINE OF FEEDER CONDUIT AT THE CENTERLINE OF ANCHOR BOLT CIRCLE "BC". FOR CONDUIT SIZES, SEE OCS FOUNDATION SCHEDULE DR
9. FOR FOUNDATION ELEVATION ABOVE TOR, EMBEDMENT DEPTH AND STRUCTURE OFFSET INFORMATION, SEE OCS FOUNDATION PLANS DRAWINGS.
10. PROVIDE FIBER EXPANSION BOARD WITH FLEXIBLE SEALANT BETWEEN FOUNDATION AND CONCRETE PAVING.
11. ANCHOR BOLTS (INCLUDING ALL EXPOSED NUTS AND WASHERS) AND ALL EXPOSED STEEL SHALL BE GALVANIZED PER SPECIFICATIONS..
12. SEE SPECIFICATION FOR GROUNDING REQUIREMENTS.
13. PROVIDE 1" WATERSHED.
14. VERTICAL AND HORIZONTAL REBAR SHALL BE ELECTRICALLY CONTINUOUS.



ANCHOR BOLT DETAIL 2
NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE FD-1FT	FD-2FT	FD-3FT	FD-4FT	FD-5FT	UNITS	DESCRIPTION	ITEM NO	PART NO/ REMARK
AS REQUIRED					CU YD	CONCRETE	1	
AS REQUIRED					LB	VERTICAL REBAR	2	
AS REQUIRED					LB	HORIZONTAL REBAR	3	
4	4	4	4	4	EACH	ANCHOR BOLT	4	
20	20	20	20	20	EACH	ANCHOR BOLT NUT	5	
16	16	16	16	16	EACH	ANCHOR BOLT WASHER	6	
1	1	1	1	1	EACH	ANCHOR PLATE	7	NOTE 1
1	1	1	1	1	EACH	BOLT PATTERN TEMPLATE	8	NOTE 1
AS REQUIRED					EACH	GROUND ROD	9	NOTES 6, 12
AS REQUIRED					FT	COPPER CABLE	10	
AS REQUIRED					EACH	GROUND CONNECTOR	11	
AS REQUIRED					LF	4" FEEDER CONDUIT	12	NOTE 8

(X) X DENOTES ITEM NO IN BILL OF MATERIALS

OCS FOUNDATION SCHEDULES - TYPE FD-XFT

FOUNDATION TYPE	"FD" (DIA)	REINFORCEMENT "VR"	"T"	ANCHOR BOLTS "BC"	BOLT DIA	"L"	"P"	MAX ALLOWABLE MOMEMT
FD-1FT	2'-6"	12 - #6	#3	16"	1-1/2"	60"	9"	40.0
FD-2FT	3'-0"	12 - #8	#4	18"	1-3/4"	60"	10"	75.0
FD-3FT	3'-0"	12 - #8	#4	20"	2"	60"	12"	103.0
FD-4FT	3'-0"	12 - #8	#4	22"	2-1/2"	60"	14"	166.5
FD-5FT	3'-0"	12 - #8	#4	24"	2-1/2"	60"	14"	243.5

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
2	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
1	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS
0	1/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

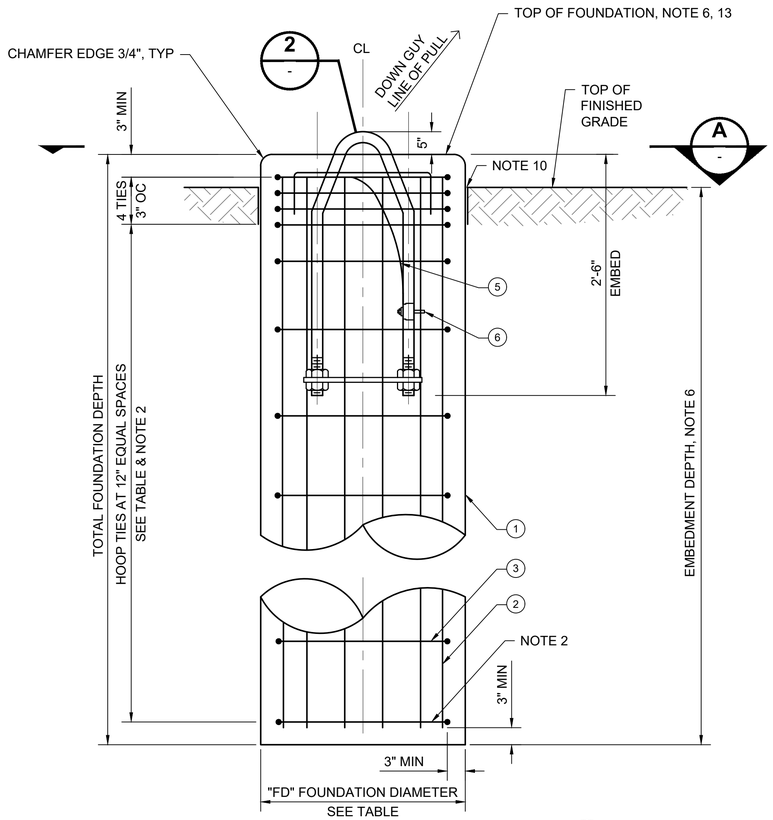
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD353
CONTRACT No.: RTA/LR
DATE: 2/2024

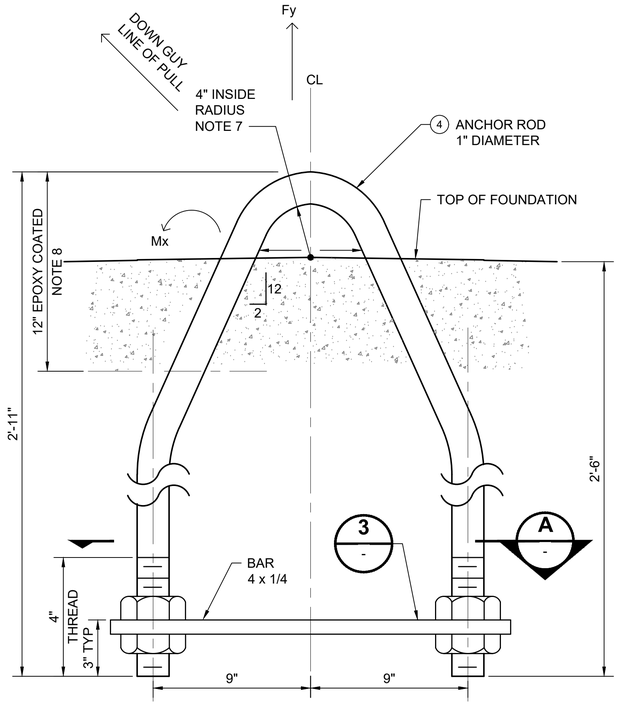
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
OCS TYPICAL TAPERED TUBULAR FEEDER POLE FOUNDATION ASSEMBLY DETAILS

DRAWING No.: STD-JOD353
FACILITY ID:
SHEET No.: 2 REV:

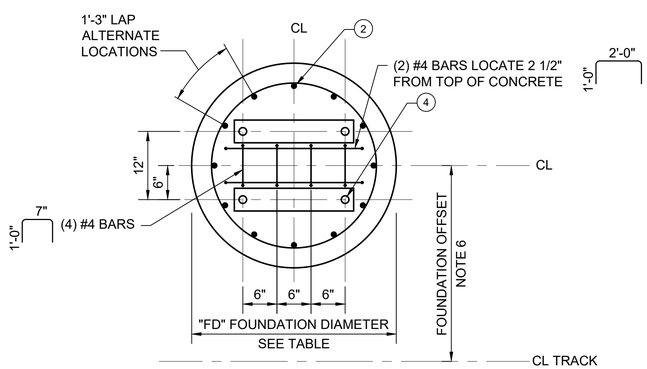
01/30/25 | 1:04 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD353.DWG



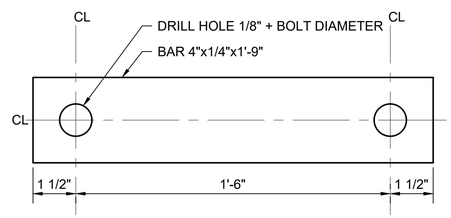
TYPE FD-3A GUY ANCHOR FOUNDATION (1)
NTS — JOD354



ANCHOR ROD DETAIL (2)
NTS



SECTION (A)
NTS — -



BAR SECTION DETAIL (3)
NTS — -

GENERAL NOTES:

1. REFER TO CRSI MANUAL OF STANDARD PRACTICE FOR REINFORCEMENT ASSEMBLY REQUIREMENTS.
2. NO.4 SPIRALS AT 4" (MAXIMUM) PITCH MAY BE SUBSTITUTED FOR REBAR TIES. SPACE AT 2" PITCH FOR TOP 8".
3. FOUNDATION DEPTH MAY BE INCREASED 2'-0" WITHOUT CHANGING REINFORCEMENT LENGTH. THE REINFORCING SHALL THEN BE INSTALLED 3" FROM THE TOP OF THE FOUNDATION. ANY INCREASE OVER 2'-0" SHALL REQUIRE A CORRESPONDING INCREASE IN REINFORCEMENT LENGTH.
4. MATERIAL SPECIFICATIONS TO BE INCLUDED IN OCS POLE AND FOUNDATION SPECIFICATIONS.
5. REBAR AND EMBEDDED ANCHOR BOLT STEEL SHALL HAVE 3" MINIMUM COVER.
6. FOUNDATION ELEVATIONS ABOVE TOR, EMBEDMENT DEPTH AND STRUCTURE OFFSET INFORMATION TO BE SHOWN ON OCS FOUNDATION PLAN DRAWINGS.
7. CENTER OF BEND RADIUS ELEVATIONS AT TOP OF LOW RAIL.
8. THE ANCHOR ROD SHALL BE COATED WITH EPOXY AS INDICATED. EPOXY MATERIAL SHALL BE APPLIED UNIFORMLY TO ALL REQUIRED SURFACES.
9. CASE TOP HALF OF POLE FOUNDATIONS AS REQUIRED.
10. PROVIDE FIBER EXPANSION BOARD WITH FLEXIBLE SEALANT BETWEEN FOUNDATION AND CONCRETE PAVING.
11. EACH ANCHOR ROD SHALL BE ELECTRICALLY CONNECTED TO THE REINFORCEMENT WITH A 2/0 COPPER WIRE.
12. 2/0 COPPER WIRE SHALL BE CLAMPED TO THE ANCHOR ROD WITH A BURGUNDY GAR GROUND CONNECTOR OR APPROVED EQUAL AND EXOTHERMICALLY WELDED TO THE VERTICAL REINFORCEMENT.
13. PROVIDE 1" WATERSHED.

BILL OF MATERIALS

QUANTITIES FD-3A	UNITS	DESCRIPTION	ITEM NO	PART NO/ REMARK
AS REQUIRED	CU YD	CONCRETE	1	
AS REQUIRED	LB	VERTICAL REBAR	2	
AS REQUIRED	LB	HORIZONTAL REBAR	3	
2	EACH	ANCHOR ROD	4	
AS REQUIRED	FT	COPPER CABLE	5	NOTE 11
2	EACH	GROUND CONNECTOR	6	NOTE 12

(X) X DENOTES ITEM NO IN BILL OF MATERIALS

OCS FOUNDATION SCHEDULES - TYPE A

FOUNDATION		REINFORCEMENT		25' DGA SPACING		17' DGA SPACING	
TYPE	"FD" (DIA)	"VR"	"T"	Mx	Fy	Mx	Fy
FD-3A	3'-0"	12 - #8	#4	13.6 KF	12,500 LBS	13.6 KF	18,500 LBS

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

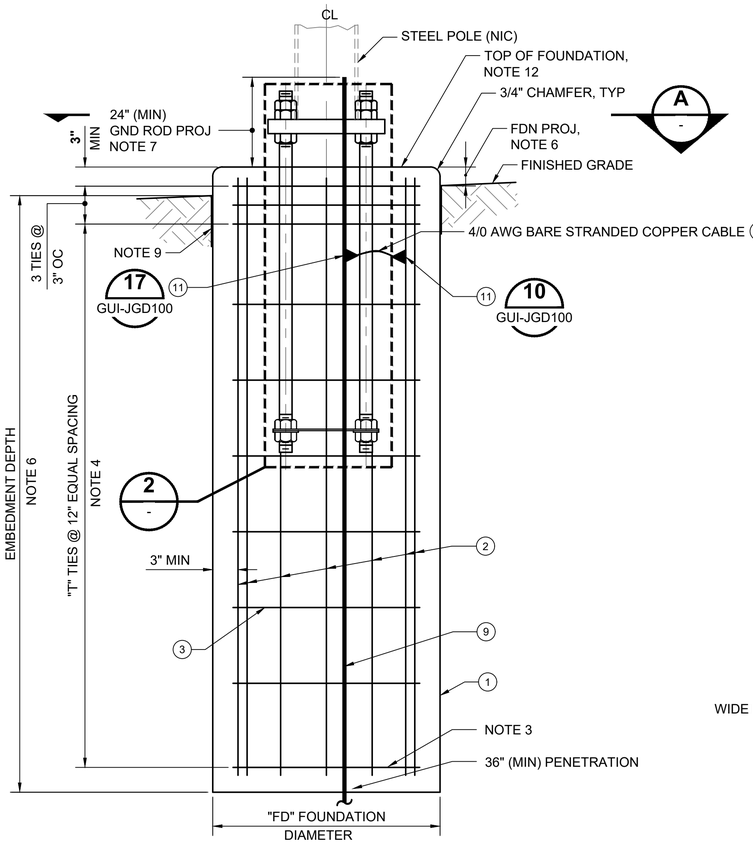
SCALE: NTS
FILENAME: STD-JOD354
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
OCS TYPICAL DOWN GUY ANCHOR
FOUNDATION ASSEMBLY DETAILS

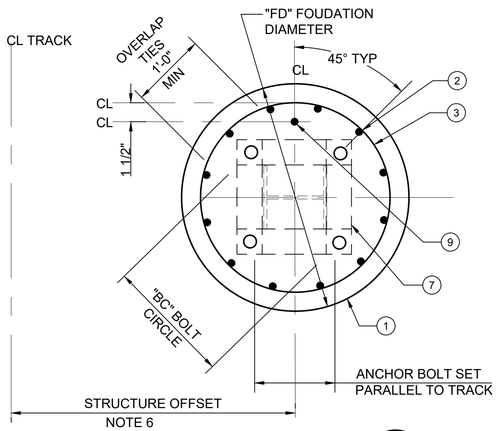
DRAWING No.: STD-JOD354
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:04 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD354.DWG



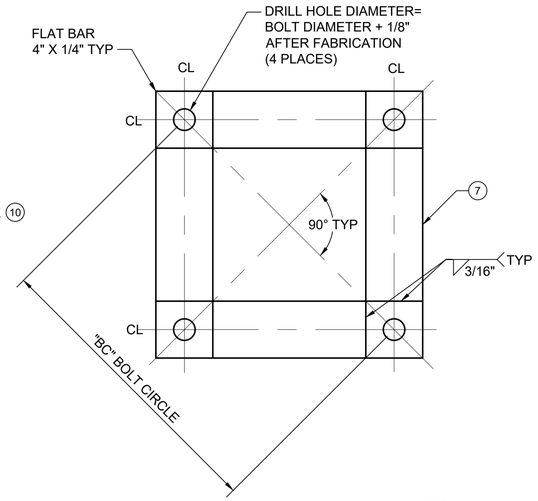
TYPE FD-XXW POLE FOUNDATION ELEVATION 1 -

NTS



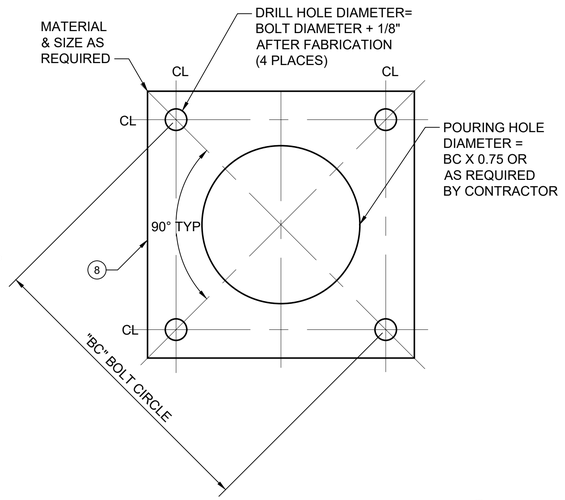
SECTION A -

NTS



ANCHOR PLATE DETAIL B -

NTS

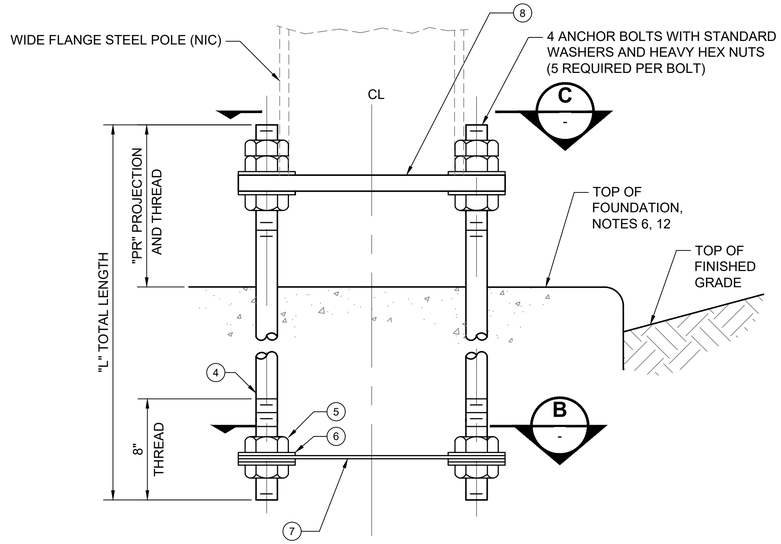


BOLT PATTERN TEMPLATE DETAIL C -

NTS

GENERAL NOTES:

1. ANCHOR BOLTS (INCLUDING ALL EXPOSED NUTS AND WASHERS) AND ALL EXPOSED STEEL, SHALL BE GALVANIZED PER SPECIFICATIONS.
2. PROVIDE UNGALVANIZED ANCHOR PLATE (LOWER) AND UNGALVANIZED BOLT PATTERN TEMPLATE (UPPER) FOR ANCHOR BOLT INSTALLATION.
3. REFER TO CRSI MANUAL OF STANDARD PRACTICE FOR REINFORCEMENT ASSEMBLY REQUIREMENTS.
4. #4 SPIRALS AT 4" (MAXIMUM) PITCH MAY BE SUBSTITUTED FOR REBAR TIES. SPACE AT 2" FOR TOP 8"
5. FOUNDATION DEPTH MAY BE INCREASED 2'-0" WITHOUT CHANGING REINFORCEMENT LENGTH. THE REINFORCING SHALL THEN BE INSTALLED 3" FROM THE TOP OF THE FOUNDATION. AN INCREASE OVER 2'-0" SHALL REQUIRE A CORRESPONDING INCREASE IN REINFORCEMENT LENGTH.
6. FOR FOUNDATION ELEVATION ABOVE TOR, EMBEDMENT DEPTH AND STRUCTURE OFFSET INFORMATION, SEE OCS FOUNDATION PLANS DRAWINGS.
7. EXTEND GROUND ROD A MINIMUM OF 24" ABOVE TOP OF FOUNDATION WITHIN THE CENTER AREA. BOND GROUND ROD TO VERTICAL REBAR USING EXOTHERMIC WELD. PLACE GROUND ROD PARALLEL TO TRACK CENTERLINE IN THE INCREASING TRACK STATIONING DIRECTION.
8. REBAR AND EMBEDDED ANCHOR BOLT STEEL SHALL HAVE 3" MINIMUM COVERAGE.
9. PROVIDE FIBER EXPANSION BOARD WITH FLEXIBLE SEALANT BETWEEN FOUNDATION AND CONCRETE PAVING.
10. SEE SPECIFICATIONS FOR CASING REQUIREMENTS.
11. SEE SPECIFICATIONS FOR GROUND REQUIREMENTS.
12. PROVIDE 1" WATERSHED.
13. VERTICAL AND HORIZONTAL REBAR SHALL BE ELECTRICALLY CONTINUOUS.



ANCHOR BOLT DETAIL 2 -

NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE						UNITS	DESCRIPTION	ITEM NO	PART NO/ REMARK
FD-08W	FD-10W	FD-20W	FD-21W	FD-22W	FD-32W				
AS REQUIRED						CU YD	CONCRETE	1	
AS REQUIRED						LB	VERTICAL REBAR	2	
AS REQUIRED						LB	HORIZONTAL REBAR	3	
4	4	4	4	4	4	EACH	ANCHOR BOLT	4	
20	20	20	20	20	20	EACH	ANCHOR BOLT NUT	5	
16	16	16	16	16	16	EACH	ANCHOR BOLT WASHER	6	
1	1	1	1	1	1	EACH	ANCHOR PLATE	7	NOTE 2
1	1	1	1	1	1	EACH	BOLT PATTERN TEMPLATE	8	NOTE 2
AS REQUIRED						EACH	GROUND ROD	9	NOTE 7, 11
AS REQUIRED						FT	COPPER CABLE	10	
AS REQUIRED						EACH	GROUND CONNECTOR	11	

(X) X DENOTES ITEM NO IN BILL OF MATERIALS

OCS FOUNDATION SCHEDULES - TYPE FD-XXW

FOUNDATION		REINFORCEMENT		ANCHOR BOLTS				MAX ALLOWABLE MOMENT
TYPE	"FD" (DIA)	"VR"	"T"	"BC"	BOLT DIA	"L"	"P"	KIP-FT
FD-08W	2'-6"	12 - #6	#3	16"	1-1/2"	60"	9"	29.1
FD-10W	3'-0"	12 - #8	#4	18"	1-3/4"	60"	10"	44.7
FD-20W	3'-0"	12 - #8	#4	20"	2"	60"	12"	61.9
FD-21W	3'-0"	12 - #8	#4	20"	2"	60"	12"	73.2
FD-22W	3'-0"	12 - #8	#4	24"	2-1/2"	60"	14"	113.7
FD-32W	3'-0"	12 - #8	#4	24	2-1/2"	60"	14"	156.2

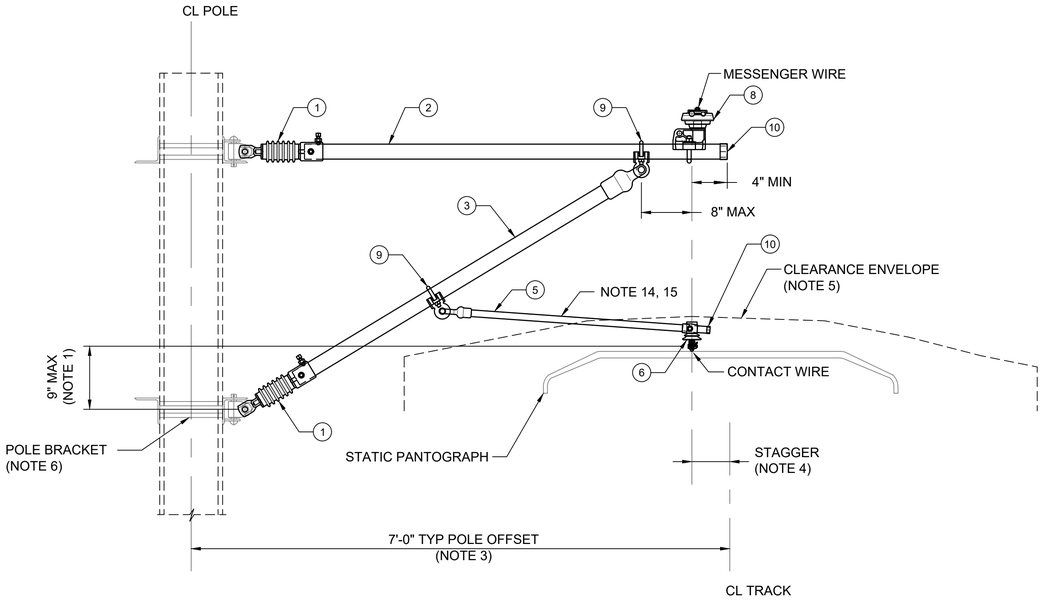
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	2019 GUIDANCE DWG REVISIONS - GENERAL UPDATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD355
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
OCS TYPICAL WIDE FLANGE POLE FOUNDATION ASSEMBLY DETAILS

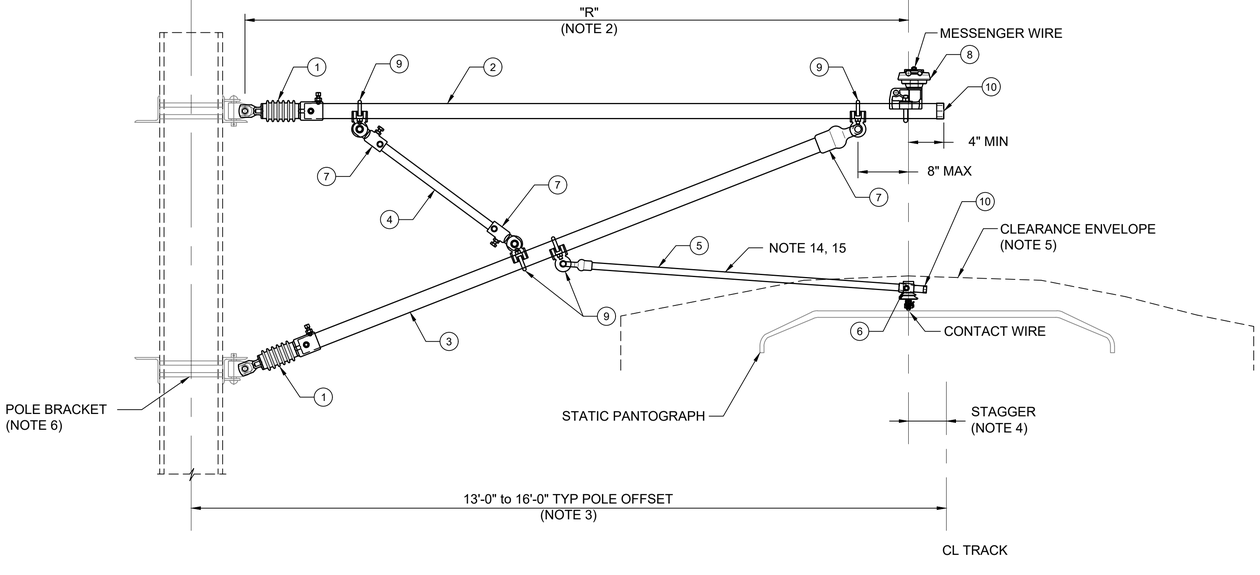
DRAWING No.: STD-JOD355
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:04 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\SYSTEMS\STANDARD DRAWINGS\STD-JOD355.DWG



PULL-OFF CANTILEVER ASSEMBLY CA-01L LIGHT LOAD

NTS



LONG REACH PULL-OFF CANTILEVER ASSEMBLY CL-01L LIGHT LOAD

NTS

GENERAL NOTES:

1. LOWER BRACKET TO CONTACT WIRE DIMENSION OF 9" IS FOR 7'-0" POLE TO CENTERLINE OF TRACK OFFSET. THIS DIMENSION MAY BE INCREASED 1" FOR EACH 6" INCREASE IN POLE OFFSET DIMENSION.
2. FOR LONG REACH CANTILEVERS USE THIS FORMULA TO CALCULATE "H" (THE DISTANCE BETWEEN THE LOWER POLE BRACKET AND THE CONTACT WIRE).

   "R" = LENGTH OF TOP PIPE

   $H = 6" + \frac{R - 6'}{6}$

   EXAMPLE FOR 13'-0" TOP PIPE:

   $H = 6" + \frac{13' - 6'}{6}$ H = 6" + 1.16' H = 1.66' OR 1'-8"
3. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
4. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND
5. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
6. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
7. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
8. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
9. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
10. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
12. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
13. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
14. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
15. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
16. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

MAXIMUM ASSEMBLY LOADING

	CL-01L	CA-01L
MESSENGER WIRE RADIAL LOAD	350 LBS	350 LBS
CONTACT WIRE RADIAL LOAD	200 LBS	200 LBS
VERTICAL LOAD	1000 LBS	1000 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CL-01L	CA-01L				
2	2	EA	INSULATOR	1	
1	1	EA	TOP PIPE	2	LENGTH AS REQ'D
1	1	EA	STRUT PIPE	3	LENGTH AS REQ'D
1	-	EA	BRACE	4	LENGTH AS REQ'D
1	1	EA	STEADY ARM	5	LENGTH AS REQ'D
1	1	EA	CONTACT WIRE SWIVEL CLAMP	6	INSULATED
3	1	EA	CLEVIS FITTING	7	
1	1	EA	INSULATED MESSENGER CLAMP	8	
4	2	EA	EYE CLAMP	9	
2	2	EA	PIPE CAP	10	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

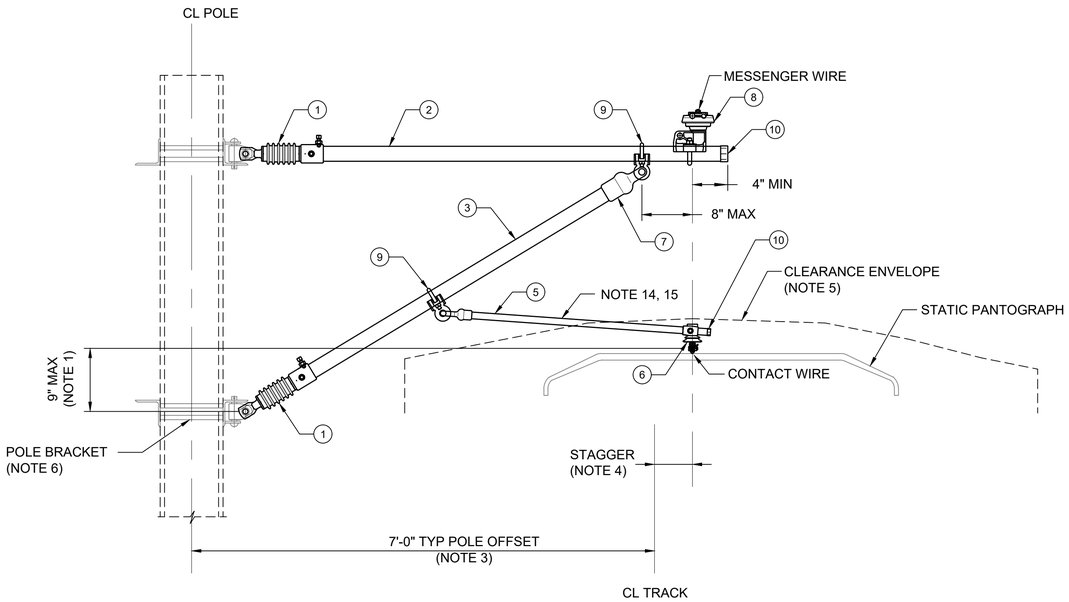
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD400
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

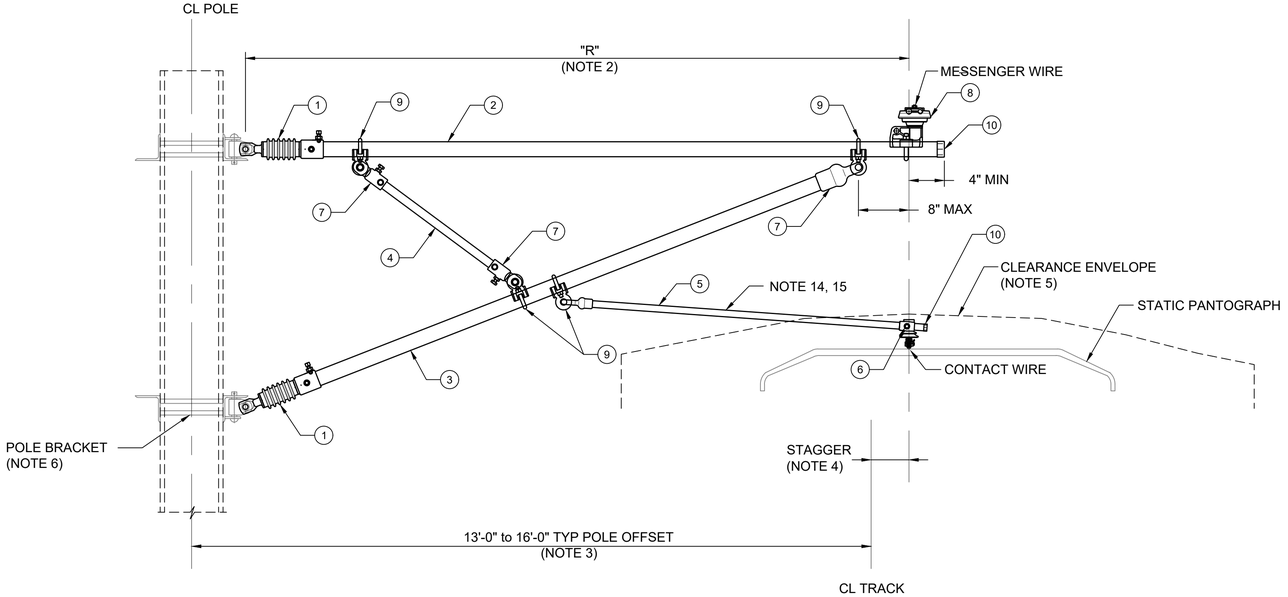
OVERHEAD CATENARY SYSTEM
CANTILEVER PULL-OFF ASSEMBLIES
CA-01L & CL-01L

DRAWING No.: **STD-JOD400**
FACILITY ID:
SHEET No.: REV: 1



PUSH-OFF CANTILEVER ASSEMBLY CA-02L LIGHT LOAD

NTS



LONG REACH PUSH-OFF CANTILEVER ASSEMBLY CL-02L LIGHT LOAD

NTS

GENERAL NOTES:

1. LOWER BRACKET TO CONTACT WIRE DIMENSION OF 9" IS FOR 7'-0" POLE TO CENTERLINE OF TRACK OFFSET. THIS DIMENSION MAY BE INCREASED 1" FOR EACH 6" INCREASE IN POLE OFFSET DIMENSION.
2. FOR LONG REACH CANTILEVERS USE THIS FORMULA TO CALCULATE "H" (THE DISTANCE BETWEEN THE LOWER POLE BRACKET AND THE CONTACT WIRE).
   "R" = LENGTH OF TOP PIPE
   $H = 6" + \frac{R - 6'}{6}$
   EXAMPLE FOR 13'-0" TOP PIPE:
   $H = 6" + \frac{13' - 6'}{6}$ H = 6" + 1.16' H = 1.66' OR 1'-8"
3. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
4. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
5. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
6. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
7. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
8. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
9. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
10. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
12. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
13. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
14. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
15. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
16. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

MAXIMUM ASSEMBLY LOADING

	CL-02L	CA-02L
MESSENGER WIRE RADIAL LOAD	350 LBS	350 LBS
CONTACT WIRE RADIAL LOAD	80 LBS	80 LBS
VERTICAL LOAD	1000 LBS	1000 LBS

BILL OF MATERIALS

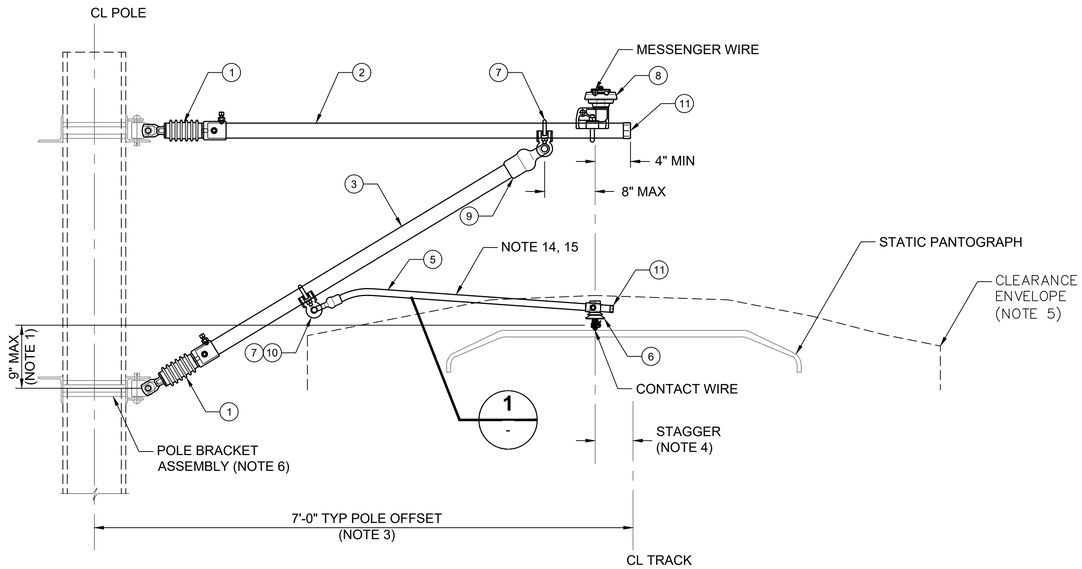
QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CL-02L	CA-02L				
2	2	EA	INSULATOR	1	
1	1	EA	TOP PIPE	2	LENGTH AS REQ'D
1	1	EA	STRUT PIPE	3	LENGTH AS REQ'D
1	-	EA	BRACE	4	LENGTH AS REQ'D
1	1	EA	STEADY ARM	5	LENGTH AS REQ'D
1	1	EA	CONTACT WIRE SWIVEL CLAMP	6	INSULATED
3	1	EA	CLEVIS FITTING	7	
1	1	EA	INSULATED MESSENGER CLAMP	8	
4	2	EA	EYE CLAMP	9	
2	2	EA	PIPE CAP	10	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

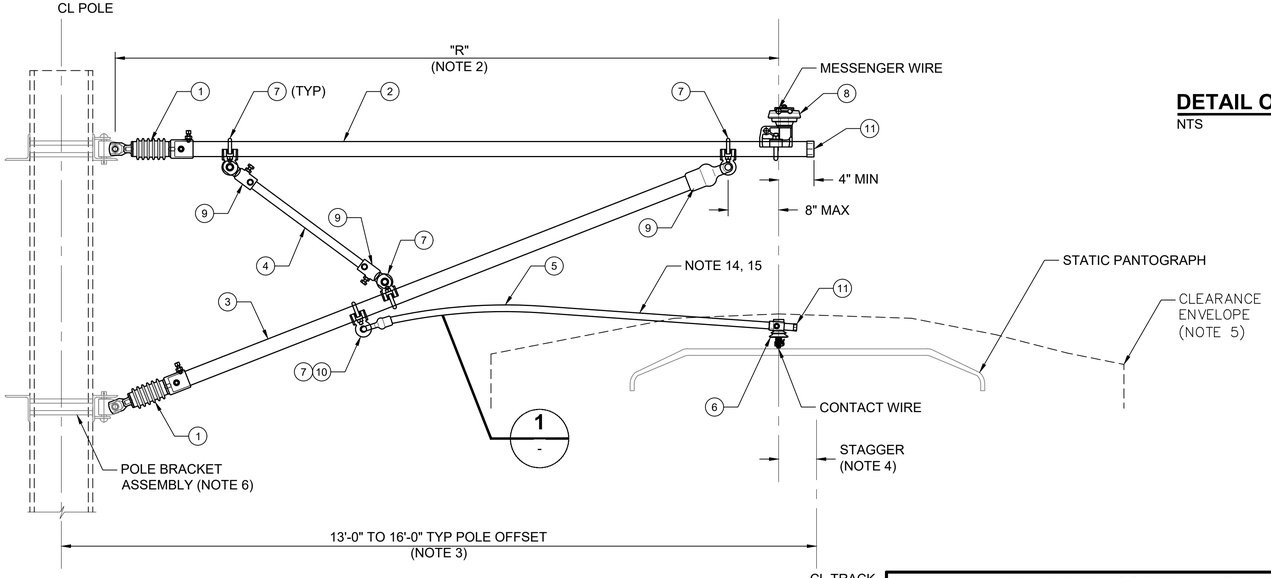
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD401
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
CANTILEVER PULL-OFF ASSEMBLIES
CA-02L & CL-02L

DRAWING No.: STD-JOD401
FACILITY ID:
SHEET No.: REV: 1

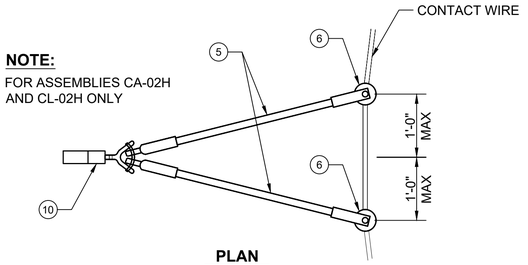


PULL-OFF CANTILEVER ASSEMBLY
CA-01 M OR H MEDIUM OR HEAVY LOAD
NTS



LONG REACH PULL-OFF ASSEMBLY
CL-01 M OR H MEDIUM OR HEAVY LOAD
NTS

NOTE:
FOR ASSEMBLIES CA-02H AND CL-02H ONLY



PLAN

DETAIL OF TWIN STEADY ARMS
NTS

1
-

GENERAL NOTES:

1. LOWER BRACKET TO CONTACT WIRE DIMENSION OF 9" IS FOR 7'-0" POLE TO CENTERLINE OF TRACK OFFSET. THIS DIMENSION MAY BE INCREASED 1" FOR EACH 6" INCREASE IN POLE OFFSET DIMENSION.
2. FOR LONG REACH CANTILEVERS USE THIS FORMULA TO CALCULATE "H" (THE DISTANCE BETWEEN THE LOWER POLE BRACKET AND THE CONTACT WIRE).
   "R" = LENGTH OF TOP PIPE
   $H = 6" + \frac{R - 6'}{6}$
   EXAMPLE FOR 13'-0" TOP PIPE:
   $H = 6" + \frac{13' - 6'}{6}$ H = 6" + 1.16' H = 1.66' OR 1'-8"
3. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
4. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT SCHEDULE.
5. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
6. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
7. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
8. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
9. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
10. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
12. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
13. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
14. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
15. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
16. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.
17. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

MAXIMUM ASSEMBLY LOADING

	CL-01H	CA-01H	CL-01M	CA-01M
MESSENGER WIRE RADIAL LOAD	1450 LBS	1450 LBS	750 LBS	750 LBS
CONTACT WIRE RADIAL LOAD	1000 LBS	1000 LBS	500 LBS	500 LBS
VERTICAL LOAD	350 LBS	350 LBS	650 LBS	650 LBS

BILL OF MATERIALS

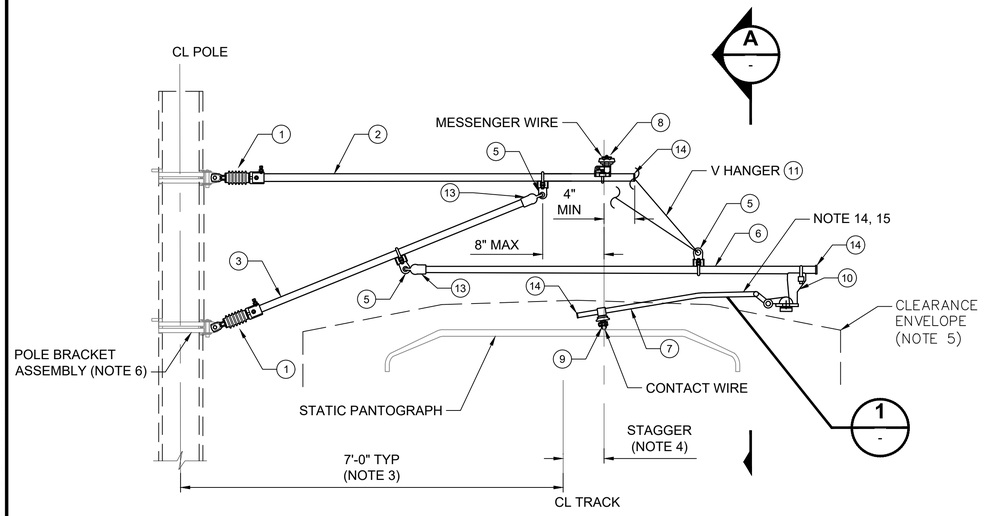
QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CL-01H	CA-01H	CL-01M	CA-01M				
2	2	2	2	EA	INSULATOR	1	
1	1	1	1	EA	TOP PIPE	2	LENGTH AS REQ'D
1	1	1	1	EA	STRUT PIPE	3	LENGTH AS REQ'D
1	-	1	-	EA	BRACE	4	LENGTH AS REQ'D
2	2	1	1	EA	STEADY ARM, CURVED	5	LENGTH AS REQ'D
2	2	1	1	EA	CONTACT WIRE SWIVEL CLAMP	6	INSULATED
4	2	4	2	EA	EYE CLAMP	7	
1	1	1	1	EA	INSULATED MESSENGER CLAMP	8	
3	1	3	1	EA	CLEVIS FITTING	9	
1	1	-	-	EA	Y-CLEVIS CLAMP OR EQUAL	10	
3	3	2	2	EA	PIPE CAP	11	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD402
CONTRACT No.: RTA/LR
DATE: 2/2024

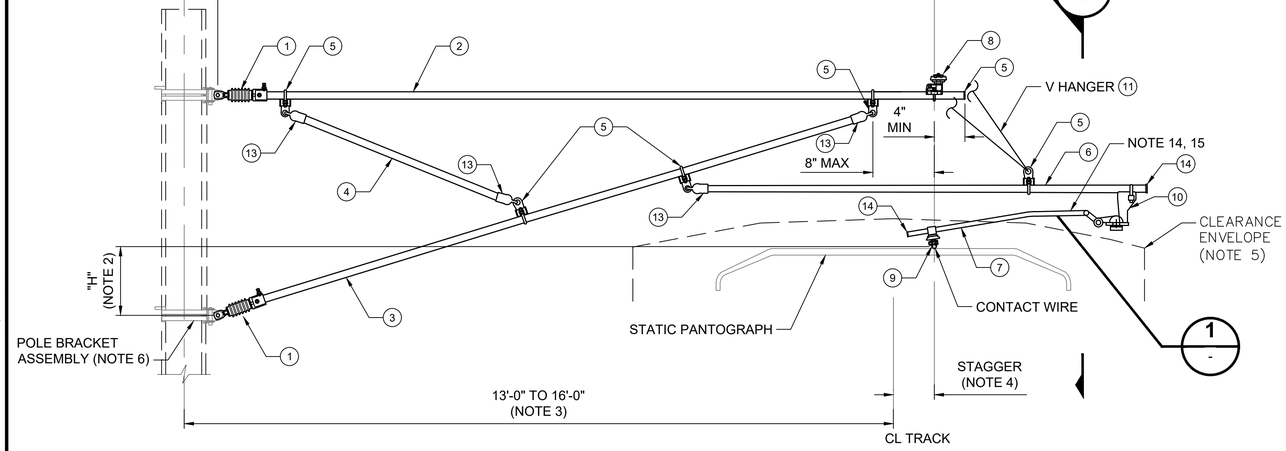
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
CANTILEVER PULL-OFF ASSEMBLIES
CA-01M, CA-01H, CL-01M, CA-01H, CL-01M & CL-01H

DRAWING No.: STD-JOD402
FACILITY ID:
SHEET No.: REV: 1



PUSH-OFF CANTILEVER ASSEMBLY
CA-02 M OR H MEDIUM OR HEAVY LOAD

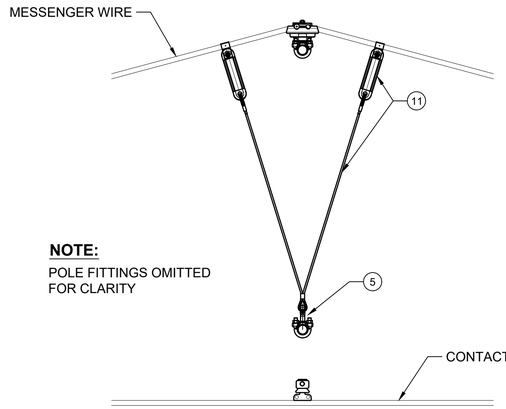
NTS



LONG REACH PUSH-OFF CANTILEVER ASSEMBLY
CL-02 M OR H MEDIUM OR HEAVY LOAD

NTS

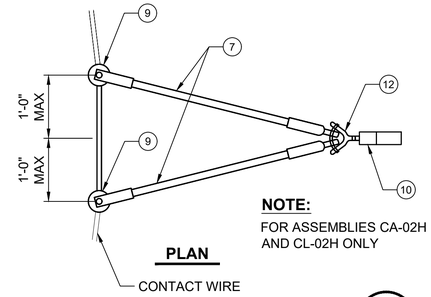
MAXIMUM ASSEMBLY LOADING				
	CL-02H	CA-02H	CL-02M	CA-02M
MESSENGER WIRE RADIAL LOAD	1450 LBS	1450 LBS	750 LBS	750 LBS
CONTACT WIRE RADIAL LOAD	1000 LBS	1000 LBS	500 LBS	500 LBS
VERTICAL LOAD	350 LBS	350 LBS	650 LBS	650 LBS



NOTE:
POLE FITTINGS OMITTED FOR CLARITY

SECTION
NTS

A -



NOTE:
FOR ASSEMBLIES CA-02H AND CL-02H ONLY

PLAN

DETAIL OF TWIN STEADY ARMS
NTS

1 -

GENERAL NOTES:

1. LOWER BRACKET TO CONTACT WIRE DIMENSION OF 9" IS FOR 7'-0" POLE TO CENTERLINE OF TRACK OFFSET. THIS DIMENSION MAY BE INCREASED 1" FOR EACH 6" INCREASE IN POLE OFFSET DIMENSION.
2. FOR LONG REACH CANTILEVERS USE THIS FORMULA TO CALCULATE "H" (THE DISTANCE BETWEEN THE LOWER POLE BRACKET AND THE CONTACT WIRE).
   "R" = LENGTH OF TOP PIPE
   $H = 6" + \frac{R - 6'}{6}$
   EXAMPLE FOR 13'-0" TOP PIPE:
   $H = 6" + \frac{13' - 6'}{6}$ H = 6" + 1.16' H = 1.66' OR 1'-8"
3. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
4. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
5. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
6. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
7. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
8. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
9. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
10. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
12. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
13. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
14. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
15. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
16. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.
17. THE MAXIMUM LOADS IN THIS TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CL-02H	CA-02H	CL-02M	CA-02M				
2	2	2	2	EA	INSULATOR	1	
1	1	1	1	EA	TOP PIPE	2	LENGTH AS REQ'D
1	1	1	1	EA	STRUT PIPE	3	LENGTH AS REQ'D
1	-	1	-	EA	BRACE	4	LENGTH AS REQ'D
5	3	5	3	EA	EYE CLAMP	5	
1	1	1	1	EA	REGISTRATION PIPE	6	LENGTH AS REQ'D
2	2	1	1	EA	STEADY ARM, CURVED	7	LENGTH AS REQ'D
1	1	1	1	EA	INSULATED MESSENGER CLAMP	8	
2	2	1	1	EA	C/W SWIVEL CLAMP	9	INSULATED
1	1	1	1	EA	DROP BRACKET	10	
1	1	1	1	EA	V-HANGER W/LOOP INSULATOR	11	
1	1	-	-	EA	"Y" CLEVIS CLAMP OR EQUAL	12	
4	2	4	2	EA	CLEVIS FITTING	13	
3	3	3	3	EA	PIPE CAP	14	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

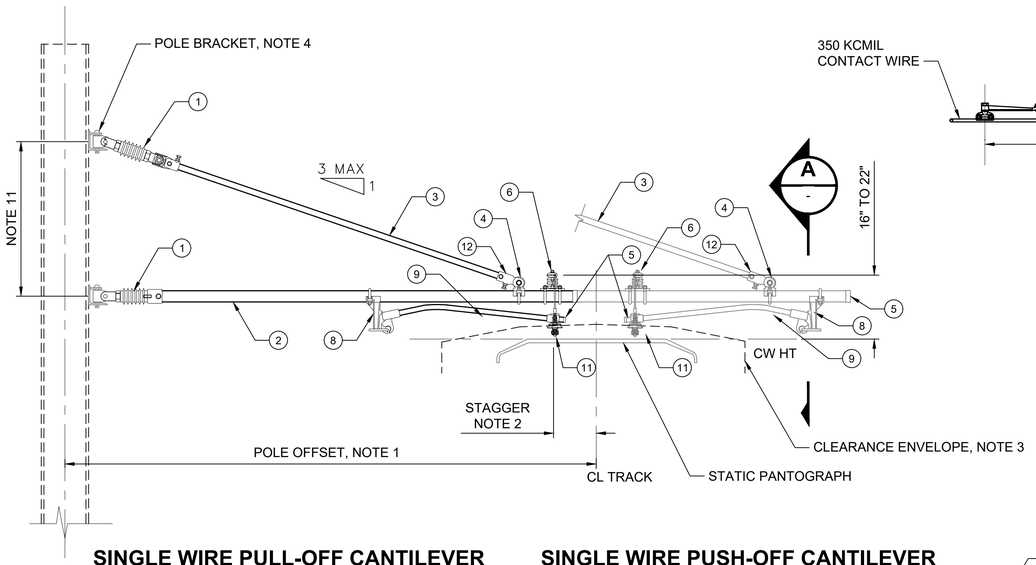
SCALE: NTS
FILENAME: STD-JOD403
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
CANTILEVER PULL-OFF ASSEMBLIES
CA02M, CA-02H, CL-02M & CL-02H

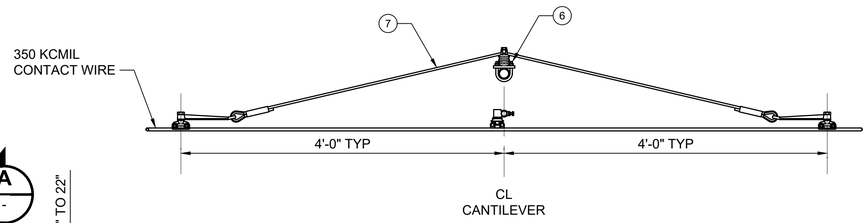
DRAWING No.: STD-JOD403
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:05 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD403.DWG



SINGLE WIRE PULL-OFF CANTILEVER ASSEMBLY CA-03M MEDIUM LOAD

NTS

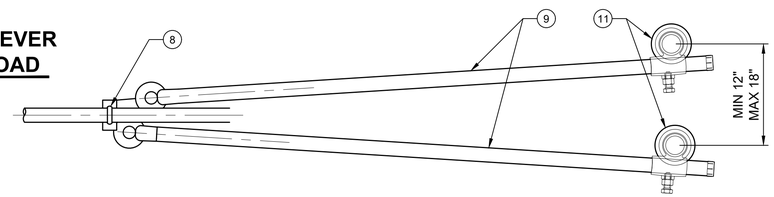


SECTION A

NTS

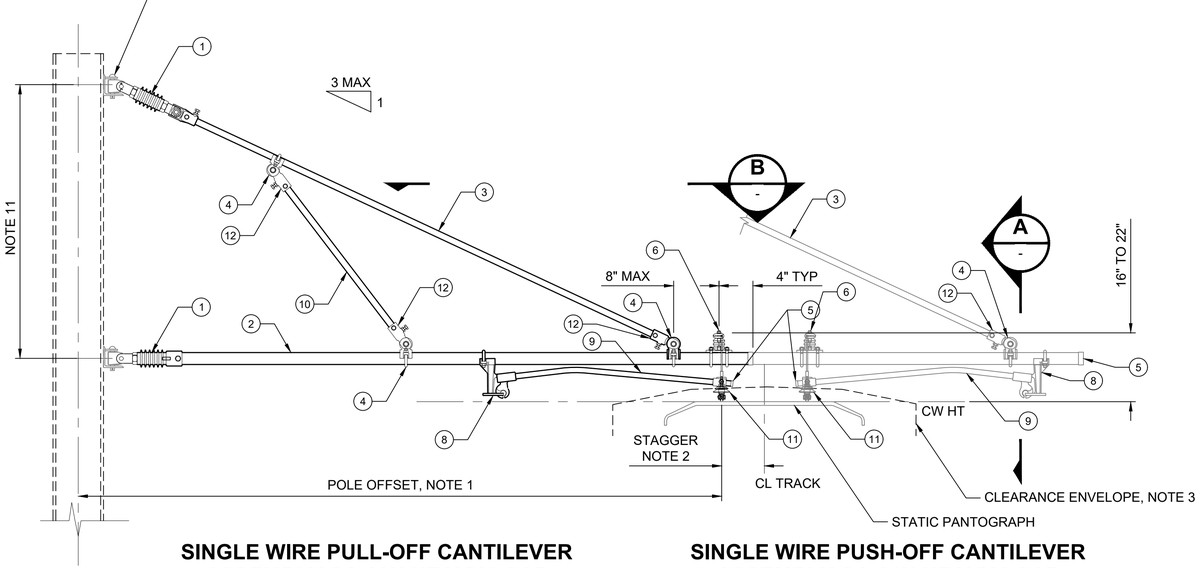
SINGLE WIRE PUSH-OFF CANTILEVER ASSEMBLY CA-04M MEDIUM LOAD

NTS



SECTION B

NTS



SINGLE WIRE PULL-OFF CANTILEVER ASSEMBLY CA-03H HEAVY LOAD

NTS

SINGLE WIRE PUSH-OFF CANTILEVER ASSEMBLY CA-04H HEAVY LOAD

NTS

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
2. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
4. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
5. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
6. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
10. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
11. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
12. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
13. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
14. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
15. CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.

MAXIMUM ASSEMBLY LOADING

	CA-03H	CA-03M	CA-04H	CA-04M
CONTACT WIRE RADIAL LOAD	1000 LBS	500 LBS	1000 LBS	500 LBS
VERTICAL LOAD	150 LBS	275 LBS	150 LBS	275 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
CA-04H	CA-04M	CA-03H	CA-03M				
2	2	2	2	EA	INSULATOR	1	
1	1	1	1	EA	REGISTRATION PIPE	2	LENGTH AS REQ'D
1	1	1	1	EA	TOP PIPE	3	LENGTH AS REQ'D
3	1	3	1	EA	EYE CLAMP	4	
3	2	3	2	EA	PIPE CAP	5	
1	1	1	1	EA	BRIDLE SUPPORT INSULATOR	6	
1	1	1	1	EA	SUPPORT BRIDLE SUB ASSEMBLY	7	
1	1	1	1	EA	DROP BRACKET	8	
2	1	2	1	EA	STEADY ARM, CURVED	9	LENGTH AS REQ'D
1	-	1	-	EA	BRACE	10	LENGTH AS REQ'D
2	1	2	1	EA	CONTACT WIRE SWIVEL CLAMP	11	INSULATED
2	1	2	1	EA	CLEVIS FITTING	12	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

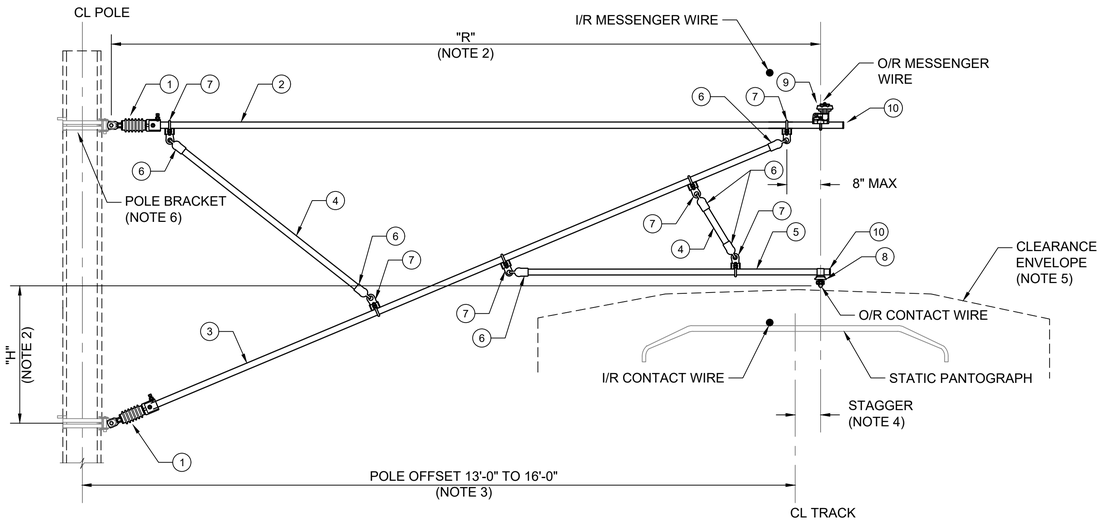
SCALE: NTS
FILENAME: STD-JOD404
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
SINGLE WIRE CANTILEVER ASSEMBLIES
CA-03M, CA-02H, CL-02M & CL-02H

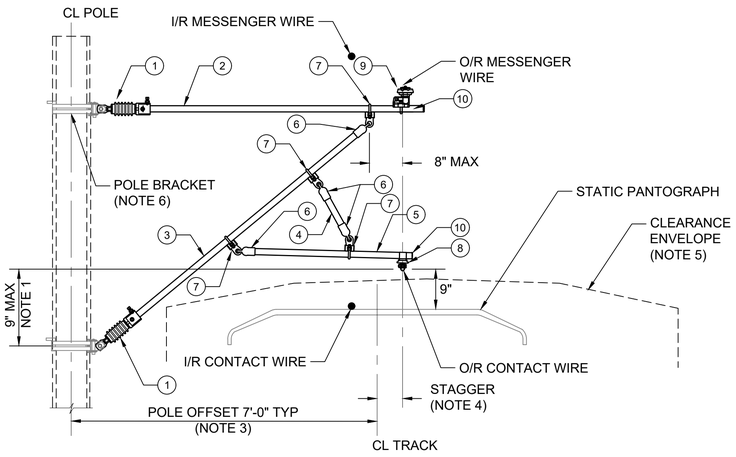
DRAWING No.: STD-JOD404
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:05 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD404.DWG



LONG REACH OUT-OF-RUNNING OUTSIDE CANTILEVER ASSEMBLY CL-06

NTS

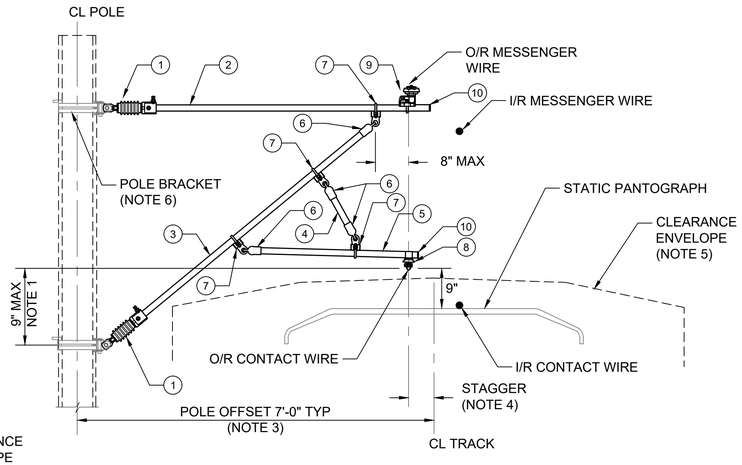


OUT-OF-RUNNING OUTSIDE CANTILEVER ASSEMBLY CA-06

NTS

LONG REACH OUT-OF-RUNNING INSIDE CANTILEVER ASSEMBLY CL-07

NTS



OUT-OF-RUNNING INSIDE CANTILEVER ASSEMBLY CA-07

NTS

MAXIMUM ASSEMBLY LOADING

	CA-06	CA-07	CL-06	CL-07
MESSENGER WIRE RADIAL LOAD	1450 LBS	1450 LBS	1450 LBS	1450 LBS
CONTACT WIRE RADIAL LOAD	1000 LBS	1000 LBS	1000 LBS	1000 LBS
VERTICAL LOAD	650 LBS	650 LBS	650 LBS	650 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CA-06	CA-07	CL-06	CL-07				
2	2	2	2	EA	INSULATOR	1	
1	1	1	1	EA	TOP PIPE	2	LENGTH AS REQ'D
1	1	1	1	EA	STRUT PIPE	3	LENGTH AS REQ'D
1	1	2	2	EA	BRACE	4	LENGTH AS REQ'D
1	1	1	1	EA	REGISTRATION PIPE	5	LENGTH AS REQ'D
4	4	6	6	EA	CLEVIS FITTING	6	
4	4	6	6	EA	EYE CLAMP	7	
1	1	1	1	EA	CONTACT WIRE SWIVEL CLAMP	8	INSULATED
1	1	1	1	EA	INSULATED MESSENGER CLAMP	9	
2	2	2	2	EA	PIPE CAP	10	

GENERAL NOTES:

1. LOWER BRACKET TO CONTACT WIRE DIMENSION OF 9" IS FOR 7'-0" POLE TO CENTERLINE OF TRACK OFFSET. THIS DIMENSION MAY BE INCREASED 1" FOR EACH 6" INCREASE IN POLE OFFSET DIMENSION.
2. FOR LONG REACH CANTILEVERS USE THIS FORMULA TO CALCULATE "H" (THE DISTANCE BETWEEN THE LOWER POLE BRACKET AND THE CONTACT WIRE).

   $$\text{"R" = LENGTH OF TOP PIPE } H = 9" + \frac{R-6'}{6}$$

   EXAMPLE FOR 13'-0" TOP PIPE:

   $$H = 9" + \frac{13'-6'}{6} \quad H = 9" + 1.16' \quad H = 1'-11"$$
3. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
4. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
5. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
6. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
7. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
8. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
9. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
10. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
12. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
13. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
14. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
15. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
16. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

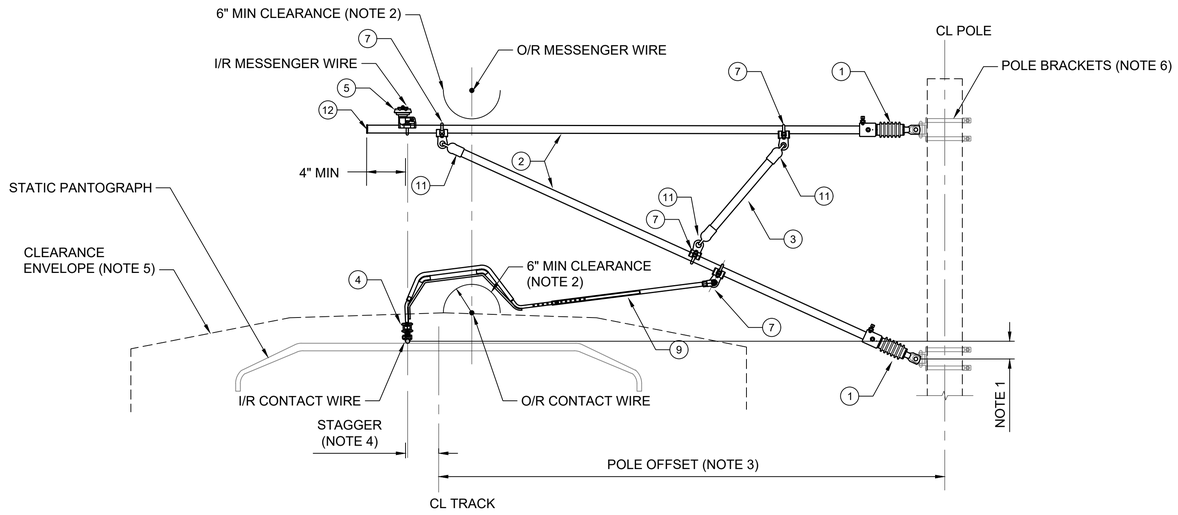
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD405
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

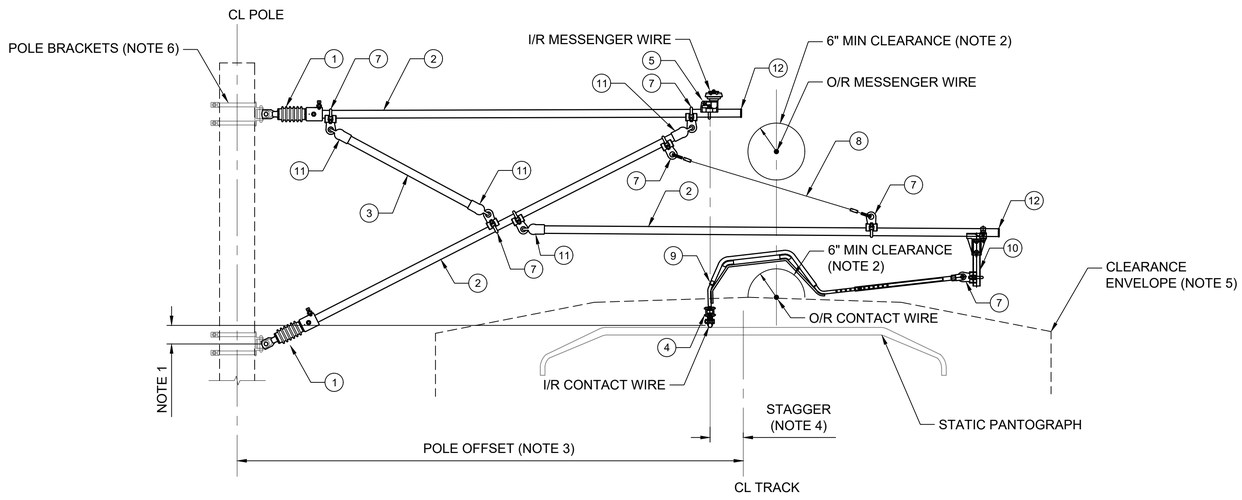
OVERHEAD CATENARY SYSTEM
OUT-OF-RUNNING CANTILEVER ASSEMBLIES
CA-06, CA-07, CL-06 & CL-07

DRAWING No.: STD-JOD405
FACILITY ID:
SHEET No.: REV: 1



OVER-REACH PULL-OFF CANTILEVER ASSEMBLY CA-10M OR CA-10H

NTS



OVER-REACH PUSH-OFF CANTILEVER ASSEMBLY CA-11M OR CA-11H

NTS

GENERAL NOTES:

1. LOWER BRACKET TO CONTACT WIRE DIMENSION OF 9" IS FOR 7'-0" POLE TO CENTERLINE OF TRACK OFFSET. THIS DIMENSION MAY BE INCREASED 1" FOR EACH 6" INCREASE IN POLE OFFSET DIMENSION.
2. CONTRACTOR SHALL ENSURE THAT THE PANTOGRAPH AND ELECTRICAL CLEARANCE REQUIREMENTS ARE MET.
3. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
4. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
5. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
6. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
7. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
8. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
9. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
10. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
12. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
13. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
14. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
15. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
16. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

MAXIMUM ASSEMBLY LOADING

	CA-11H	CA-11M	CA-10H	CA-10M
MESSENGER WIRE RADIAL LOAD	1450 LBS	750 LBS	1450 LBS	750 LBS
CONTACT WIRE RADIAL LOAD	1000 LBS	500 LBS	1000 LBS	500 LBS
VERTICAL LOAD	350 LBS	650 LBS	350 LBS	650 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CA-11M/H	CA-10M/H				
2	2	EA	INSULATOR	1	
3	2	EA	PIPE	2	LENGTH AS REQ'D
1	1	EA	BRACE	3	LENGTH AS REQ'D
1	1	EA	C/W SWIVEL CLAMP	4	INSULATED
1	1	EA	INSULATED MESSENGER CLAMP	5	
-	-	EA	NOT USED	6	
7	4	EA	EYE CLAMP	7	
1	-	EA	HANGER ASSEMBLY	8	
1	1	EA	OVERLAP STEADY ARM	9	ADJUSTABLE LENGTH
1	-	EA	DROP BRACKET	10	
4	3	EA	CLEVIS FITTING	11	
2	1	EA	PIPE CAP	12	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/1/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

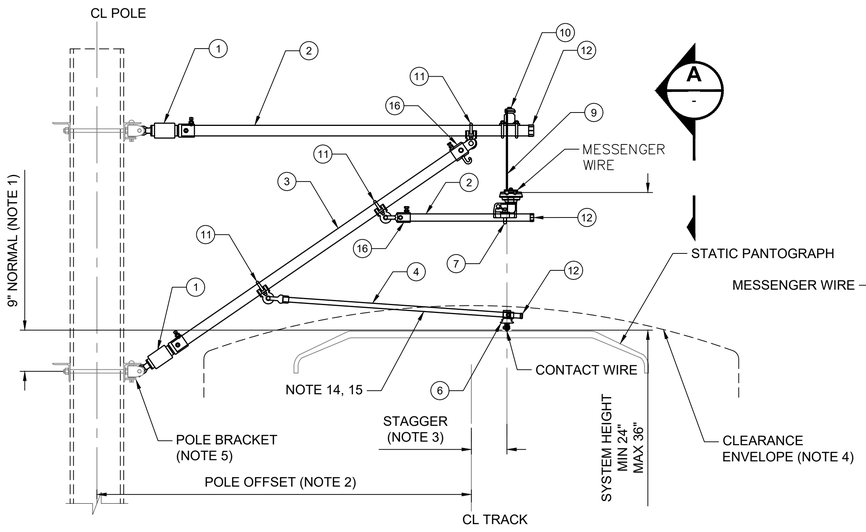
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD406
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
OVER-REACH CANTILEVER ASSEMBLIES
CA-10M, CA-10H, CA-11M & CA-11H

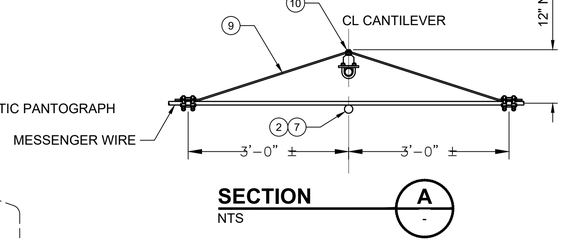
DRAWING No.: STD-JOD406
FACILITY ID:
SHEET No.: 1 REV:



REDUCED SYSTEM HEIGHT PUSH/PULL CANTILEVER ASSEMBLY CA-12L OR CA-14L LIGHT LOAD

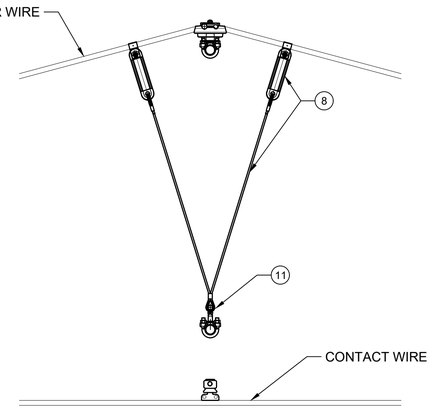
NTS

SHOWN IN DIRECT PUSH MODE



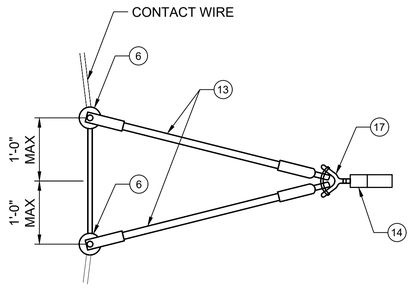
SECTION A (-)

NTS



SECTION B (-)

NTS



DETAIL OF TWIN STEADY ARMS (1)

NTS

REDUCED SYSTEM HEIGHT PUSH/PULL CANTILEVER ASSEMBLY CA-12M, CA-14M, CA-12H OR CA-14H MEDIUM OR HEAVY LOAD

NTS

SHOWN IN DIRECT PUSH MODE

GENERAL NOTES:

1. LOWER BRACKET TO CONTACT WIRE DIMENSION OF 9" IS FOR 7'-0" POLE TO CENTERLINE OF TRACK OFFSET. THIS DIMENSION MAY BE INCREASED 1" FOR EACH 6" INCREASE IN POLE OFFSET DIMENSION.
2. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
3. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
4. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
5. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
7. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
8. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
9. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
11. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
12. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
13. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
14. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
15. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
16. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.

ASSEMBLY	APPLICATION
CA-12L	PULL-OFF
CA-14L	DIRECT-PUSH
CA-12M	PULL-OFF
CA-14M	PUSH-OFF
CA-12H	PULL-OFF
CA-14H	PUSH-OFF

MAXIMUM ASSEMBLY LOADING

	CA-14H	CA-14M	CA-14L	CA-12H	CA-12M	CA-12L
MESSENGER WIRE RADIAL LOAD	1450 LBS	750 LBS	350 LBS	1450 LBS	750 LBS	350 LBS
CONTACT WIRE RADIAL LOAD	1000 LBS	500 LBS	200 LBS	1000 LBS	500 LBS	200 LBS
VERTICAL LOAD	350 LBS	650 LBS	1000 LBS	350 LBS	650 LBS	1000 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE						UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CA-14H	CA-14M	CA-14L	CA-12H	CA-12M	CA-12L				
2	2	2	2	2	2	EA	INSULATOR	1	
2	2	2	2	2	2	EA	TOP PIPE	2	LENGTH AS REQ'D
1	1	1	1	1	1	EA	STRUT PIPE	3	LENGTH AS REQ'D
-	-	1	-	-	1	EA	STEADY ARM, STRAIGHT	4	LENGTH AS REQ'D
1	1	-	-	-	-	EA	REGISTRATION PIPE	5	LENGTH AS REQ'D
2	1	1	2	1	1	EA	CONTACT WIRE SWIVEL CLAMP	6	INSULATED
1	1	1	1	1	1	EA	MESSENGER WIRE CLAMP	7	INSULATED
1	1	-	-	-	-	EA	V-HANGER ASSEMBLY	8	INSULATED
1	1	1	1	1	1	EA	M/W BRIDLE ASSEMBLY W/ M/W CLAMPS	9	
1	1	1	1	1	1	EA	BRIDLE INSULATOR	10	
6	4	3	5	3	3	EA	EYE CLAMP	11	
4	3	3	4	3	3	EA	PIPE CAP	12	
2	1	-	2	1	-	EA	STEADY ARM, CURVED	13	LENGTH AS REQ'D
1	1	-	-	-	-	EA	DROP BRACKET	14	
1	-	-	1	-	-	EA	BRACE	15	LENGTH AS REQ'D
5	5	2	5	5	2	EA	CLEVIS FITTING	16	
1	-	-	1	-	-	EA	"Y" CLEVIS CLAMP OR EQUAL	17	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/19	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

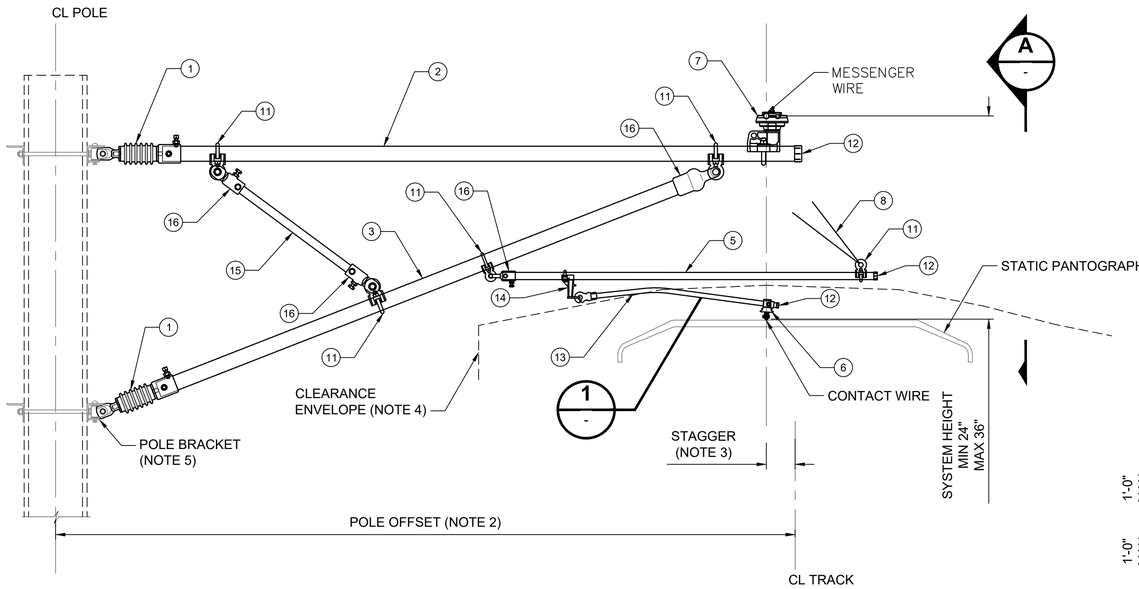
SCALE: NTS
FILENAME: STD-JOD407
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
REDUCED SYS HT CANT ASSEMBLIES
CA-12L, CA-12M,, CA-12H, CA-14L, CA14M & CA-14H

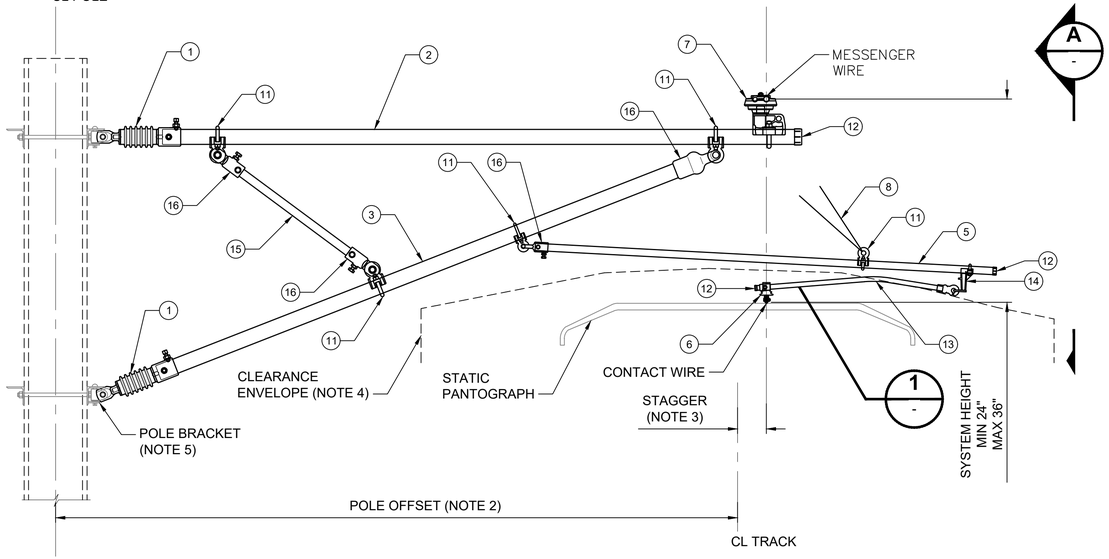
DRAWING No.: STD-JOD407
FACILITY ID:
SHEET No.: 1
REV:

01/30/25 | 1:05 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD407.DWG



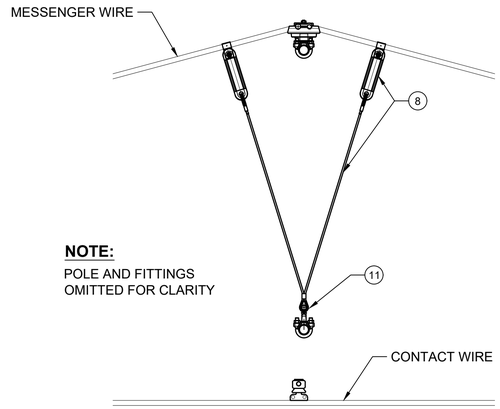
REDUCED SYSTEM HEIGHT LONG REACH PULL-OFF CANTILEVER ASSEMBLY
CL-12L, CL-12M OR CL-12H LIGHT MEDIUM OR HEAVY LOAD

NTS



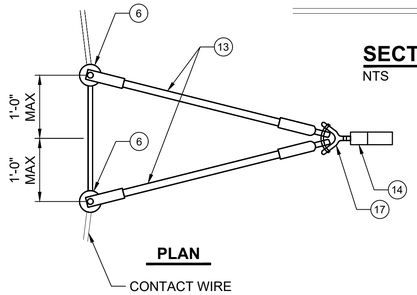
REDUCED SYSTEM HEIGHT LONG REACH PUSH-OFF CANTILEVER ASSEMBLY
CL-14L, CL-14M, OR CL-14H LIGHT MEDIUM OR HEAVY LOAD

NTS



NOTE:
POLE AND FITTINGS
OMITTED FOR CLARITY

SECTION A
NTS



PLAN
DETAIL OF TWIN STEADY ARMS 1
NTS

GENERAL NOTES:

1. LOWER BRACKET TO CONTACT WIRE DIMENSION OF 9" IS FOR 7'-0" POLE TO CENTERLINE OF TRACK OFFSET. THIS DIMENSION MAY BE INCREASED 1" FOR EACH 6" INCREASE IN POLE OFFSET DIMENSION.
2. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
3. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
4. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
5. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
7. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
8. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
9. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
11. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
12. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
13. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
14. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
15. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
16. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.

MAXIMUM ASSEMBLY LOADING

	CL-14H	CL-14M	CL-14L	CL-12H	CL-12M	CL-12L
MESSENGER WIRE RADIAL LOAD	1450 LBS	750 LBS	350 LBS	1450 LBS	750 LBS	350 LBS
CONTACT WIRE RADIAL LOAD	1000 LBS	500 LBS	200 LBS	1000 LBS	500 LBS	200 LBS
VERTICAL LOAD	350 LBS	650 LBS	1000 LBS	350 LBS	650 LBS	1000 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE						UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CL-14H	CL-14M	CL-14L	CL-12H	CL-12M	CL-12L				
2	2	2	2	2	2	EA	INSULATOR	1	
1	1	1	1	1	1	EA	TOP PIPE	2	LENGTH AS REQ'D
1	1	1	1	1	1	EA	STRUT PIPE	3	LENGTH AS REQ'D
-	-	1	-	-	1	EA	STEADY ARM, STRAIGHT	4	LENGTH AS REQ'D
1	1	1	1	1	1	EA	REGISTRATION PIPE	5	LENGTH AS REQ'D
2	1	1	2	1	1	EA	CONTACT WIRE SWIVEL CLAMP	6	INSULATED
1	1	1	1	1	1	EA	INSULATED MESSENGER CLAMP	7	INSULATED
1	1	1	1	1	1	EA	V-HANGER ASSEMBLY	8	INSULATED
-	-	-	-	-	-	EA	NOT USED	9	
-	-	-	-	-	-	EA	NOT USED	10	
5	3	3	5	3	3	EA	EYE CLAMPS	11	
4	3	3	4	3	3	EA	PIPE CAP	12	
2	1	-	2	1	-	EA	STEADY ARM, CURVED	13	LENGTH AS REQ'D
1	1	1	1	1	1	EA	DROP BRACKET	14	
1	-	-	1	-	-	EA	BRACE	15	LENGTH AS REQ'D
4	2	2	4	2	2	EA	CLEVIS FITTING	16	
1	-	-	1	-	-	EA	"Y" CLEVIS CLAMP OR EQUAL	17	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

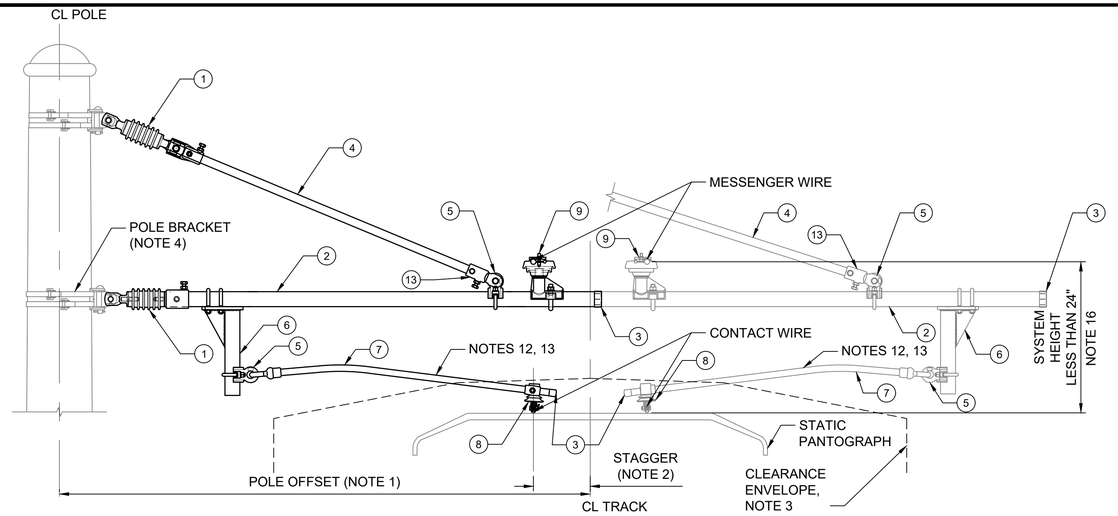
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD408
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
REDUCED SYS HT LONG-REACH CANT ASSYS
CL-12L, CL-12M, CL-12H, CL-14L, CL-14M & CL-14H

DRAWING No.: **STD-JOD408**
FACILITY ID:
SHEET No.: REV: 1

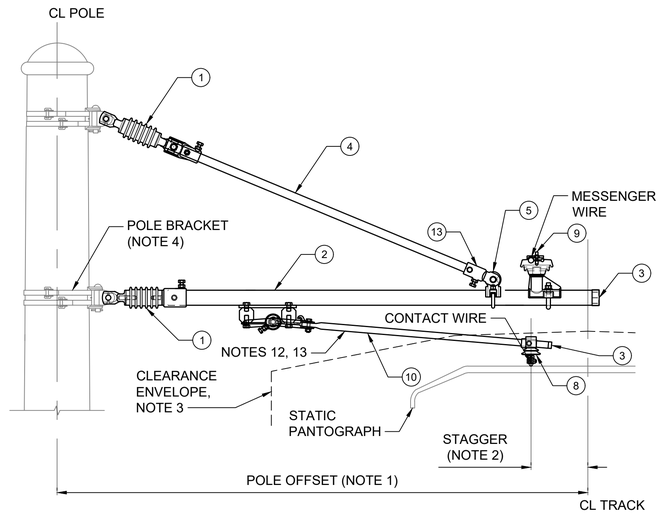


REDUCED SYSTEM HEIGHT PULL-OFF CANTILEVER ASSEMBLY CA-15L OR CA-15M

NTS

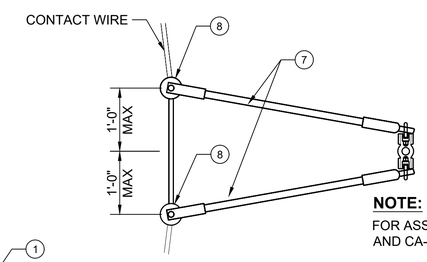
REDUCED SYSTEM HEIGHT PUSH-OFF CANTILEVER ASSEMBLY CA-16L OR CA-16M

NTS



REDUCED SYSTEM HEIGHT CANTILEVER ASSEMBLY W/ ELASTIC ARM CA-15E

NTS

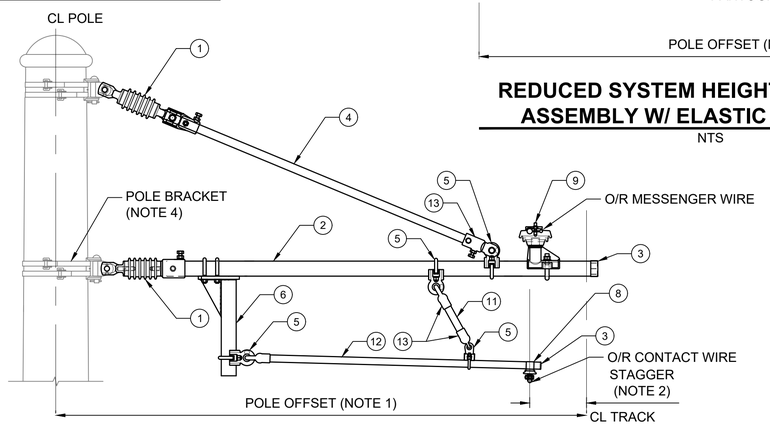


NOTE:

FOR ASSEMBLIES CA-15H AND CA-16H ONLY

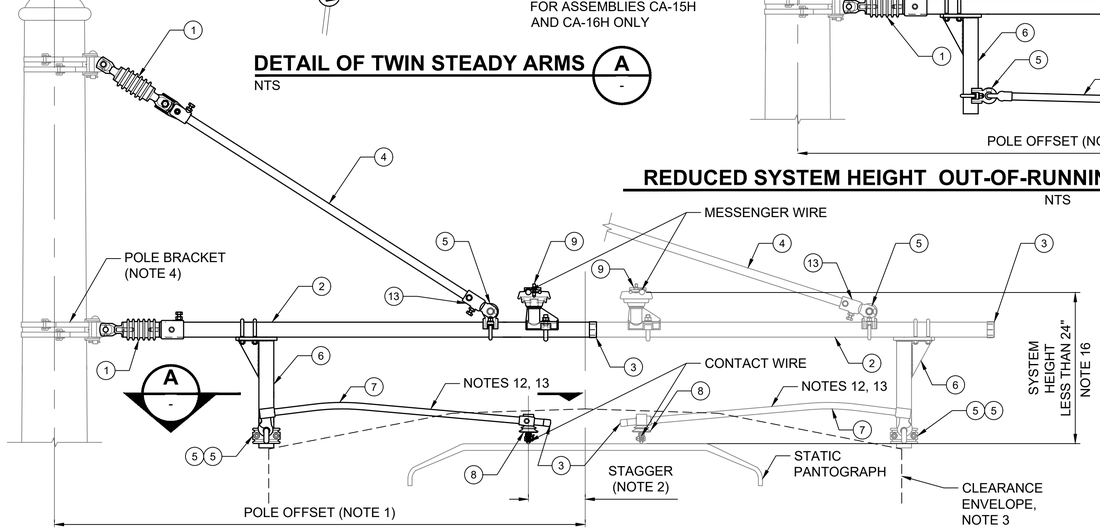
DETAIL OF TWIN STEADY ARMS (A)

NTS



REDUCED SYSTEM HEIGHT OUT-OF-RUNNING CANTILEVER ASSEMBLY CA-15X

NTS



REDUCED SYSTEM HEIGHT PULL-OFF CANTILEVER ASSEMBLY CA-15H

NTS

REDUCED SYSTEM HEIGHT PUSH-OFF CANTILEVER ASSEMBLY CA-16H

NTS

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
2. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
4. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
5. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
6. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF M
8. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
10. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
11. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
12. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
13. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
14. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.
15. THE MAXIMUM LOADS IN THE TABLE ARE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
16. RECONFIGURE ASSEMBLY FOR SYSTEM HEIGHTS LESS THAN 15".

MAXIMUM ASSEMBLY LOADING

	CA-15L	CA-15M	CA-15H	CA-15E	CA-15X	CA-16L	CA-16M	CA-16H
MESSENGER WIRE RADIAL LOAD	350 LBS	750 LBS	1450 LBS	250 LBS	1450 LBS	350 LBS	750 LBS	1450 LBS
CONTACT WIRE RADIAL LOAD	200 LBS	500 LBS	1000 LBS	150 LBS	1000 LBS	200 LBS	500 LBS	1000 LBS
VERTICAL LOAD	1000 LBS	650 LBS	350 LBS	450 LBS	350 LBS	1000 LBS	650 LBS	350 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE								UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CA-15X	CA-15L	CA-15M	CA-15H	CA-15E	CA-16L	CA-16M	CA-16H				
2	2	2	2	2	2	2	2	EA	INSULATOR	1	
1	1	1	1	1	1	1	1	EA	REGISTRATION PIPE	2	LENGTH AS REQ'D
2	2	2	3	2	2	2	3	EA	PIPE CAP	3	
1	1	1	1	1	1	1	1	EA	TOP PIPE	4	LENGTH AS REQ'D
4	2	2	3	1	2	2	3	EA	EYE CLAMP	5	
1	1	1	1	-	1	1	1	EA	DROP BRACKET	6	LENGTH AS REQ'D
-	-	1	2	-	-	1	2	EA	STEADY ARM, CURVED	7	LENGTH AS REQ'D
1	1	1	2	1	1	1	2	EA	C/W SWIVEL CLAMP	8	INSULATED
1	1	1	1	1	1	1	1	EA	INSULATED MESSENGER CLAMP	9	
-	-	-	-	1	-	-	-	EA	ELASTIC ARM	10	
1	-	-	1	-	-	-	1	EA	BRACE	11	LENGTH AS REQ'D
1	1	-	-	-	1	-	-	EA	STEADY ARM, STRAIGHT	12	LENGTH AS REQ'D
3	1	1	3	1	1	1	3	EA	CLEVIS FITTING	13	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/1/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

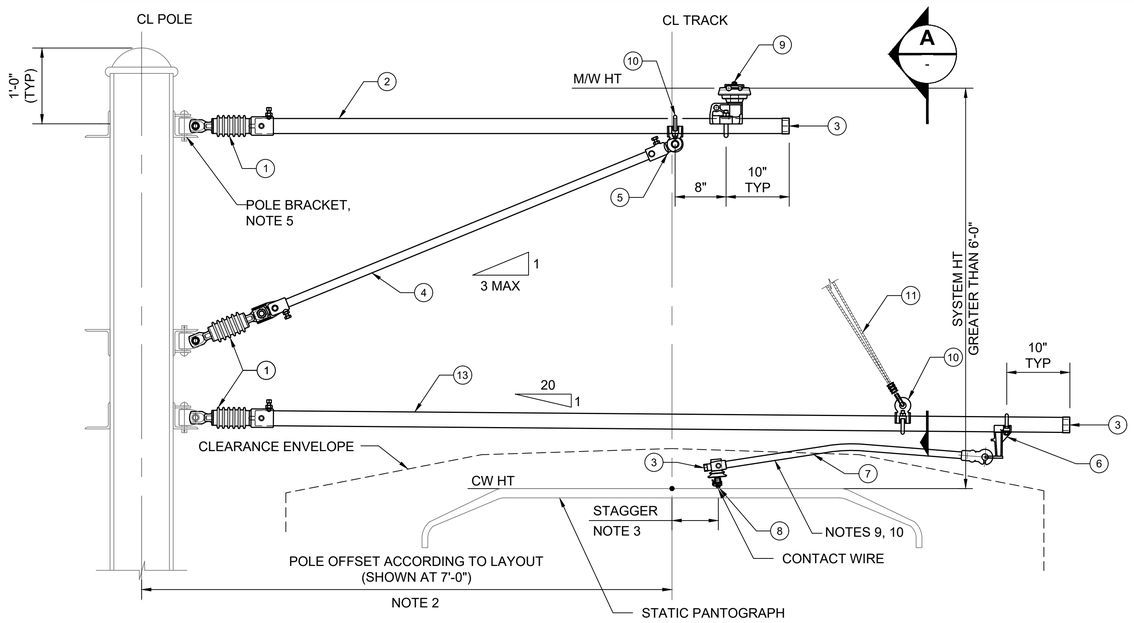
SCALE: NTS
FILENAME: STD-JOD409
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
REDUCED SYS HT CANT ASSYS CA15L, CA-15M, CA-15H, CA-15E, CA-15X, CA-16L, CA-16M, CA-16H

DRAWING No.: **STD-JOD409**
FACILITY ID:
SHEET No.: REV: 1

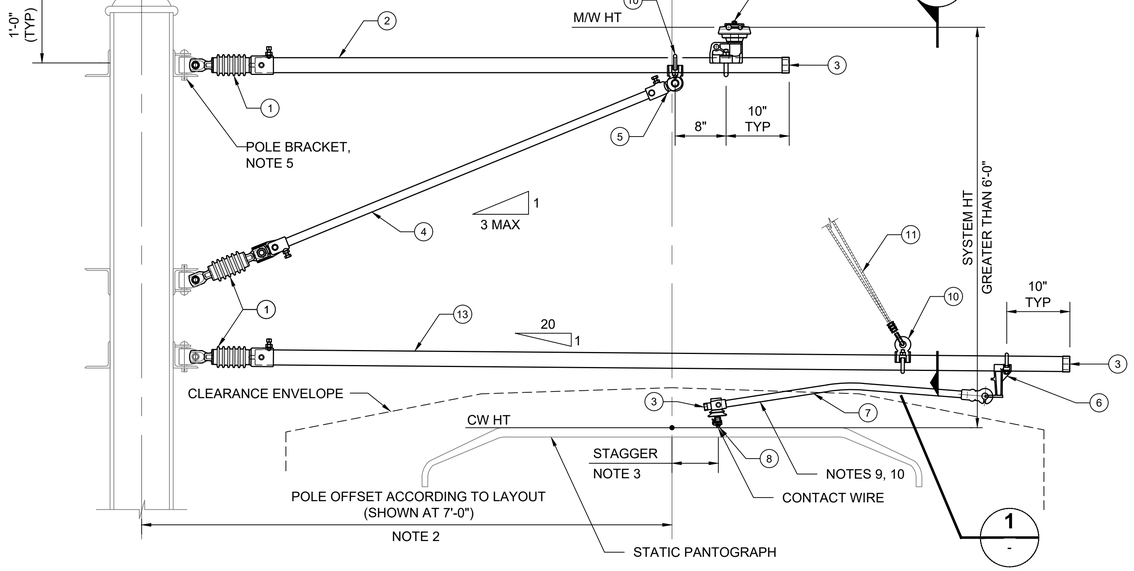
01/30/25 | 1:06 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD409.DWG



INCREASED SYSTEM HEIGHT PUSH/PULL CANTILEVER ASSEMBLY CA-17M OR CA-18M MEDIUM LOAD

NTS

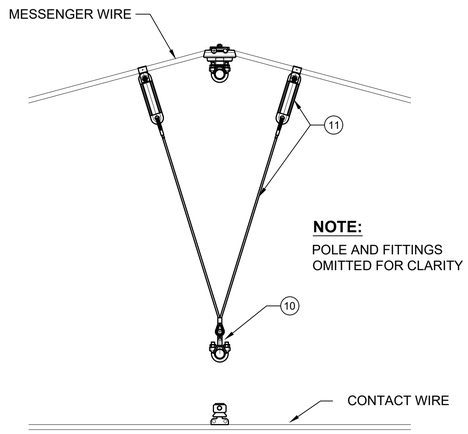
SHOWN IN PUSH OFF MODE



INCREASED SYSTEM HEIGHT PUSH/PULL CANTILEVER ASSEMBLY CA-17H OR CA-18H HEAVY LOAD

NTS

SHOWN IN PUSH OFF MODE



NOTE:

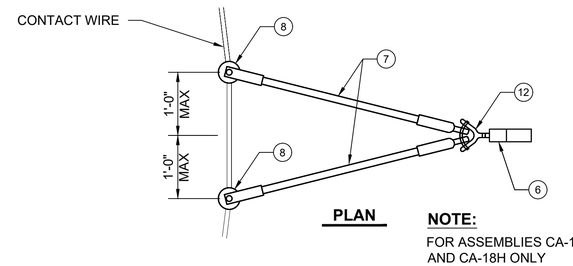
POLE AND FITTINGS OMITTED FOR CLARITY

SECTION A

NTS

GENERAL NOTES:

1. SUPPLIER MAY OFFER ALTERNATIVE CANTILEVER
2. CONTRACTOR SHALL FIELD VERIFY POLE OFFSET DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES & WIRES. DESIGN VALUES TO BE SHOWN ON OCS LAYOUT PLANS.
3. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
4. FOR DETAILS OF PANTOGRAPH CLEARANCE ENVELOPE SEE DWG JOD112 AND JOD114.
5. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY. POLE BRACKET HEIGHTS TO BE DETERMINED BY THE CONTRACTOR.
6. FOR SYMBOLS, LEGEND AND ABBREVIATIONS, SEE DRAWINGS JZN001 AND JZN002.
7. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
8. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
9. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
10. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.



PLAN

NOTE:

FOR ASSEMBLIES CA-17H AND CA-18H ONLY

DETAIL OF TWIN STEADY ARMS

NTS

MAXIMUM ASSEMBLY LOADING				
	CA-18H	CA-18M	CA-17H	CA-17M
MESSENGER WIRE RADIAL LOAD	1450 LBS	750 LBS	1450 LBS	750 LBS
CONTACT WIRE RADIAL LOAD	1000 LBS	500 LBS	1000 LBS	500 LBS
VERTICAL LOAD	350 LBS	650 LBS	350 LBS	650 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CA-18H	CA-18M	CA-17H	CA-17M				
3	3	3	3	EA	INSULATOR	1	
1	1	1	1	EA	TOP PIPE	2	LENGTH AS REQ'D
3	3	3	3	EA	PIPE CAP	3	
1	1	1	1	EA	STRUT PIPE	4	LENGTH AS REQ'D
1	1	1	1	EA	CLEVIS FITTING	5	
1	1	1	1	EA	DROP BRACKET	6	
2	1	2	1	EA	STEADY ARM, CURVED	7	LENGTH AS REQ'D
2	1	2	1	EA	C/W SWIVEL CLAMP	8	INSULATED
1	1	1	1	EA	INSULATED MESSENGER CLAMP	9	
2	2	2	2	EA	EYE CLAMP	10	
1	1	1	1	EA	"V" HANGER W/LOOP INSUL	11	
1	-	1	-	EA	"Y" CLEVIS CLAMP OR EQUAL	12	
1	1	1	1	EA	REGISTRATION PIPE	13	LENGTH AS REQ'D

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY: | DRAWN BY: | CHECKED BY: | APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

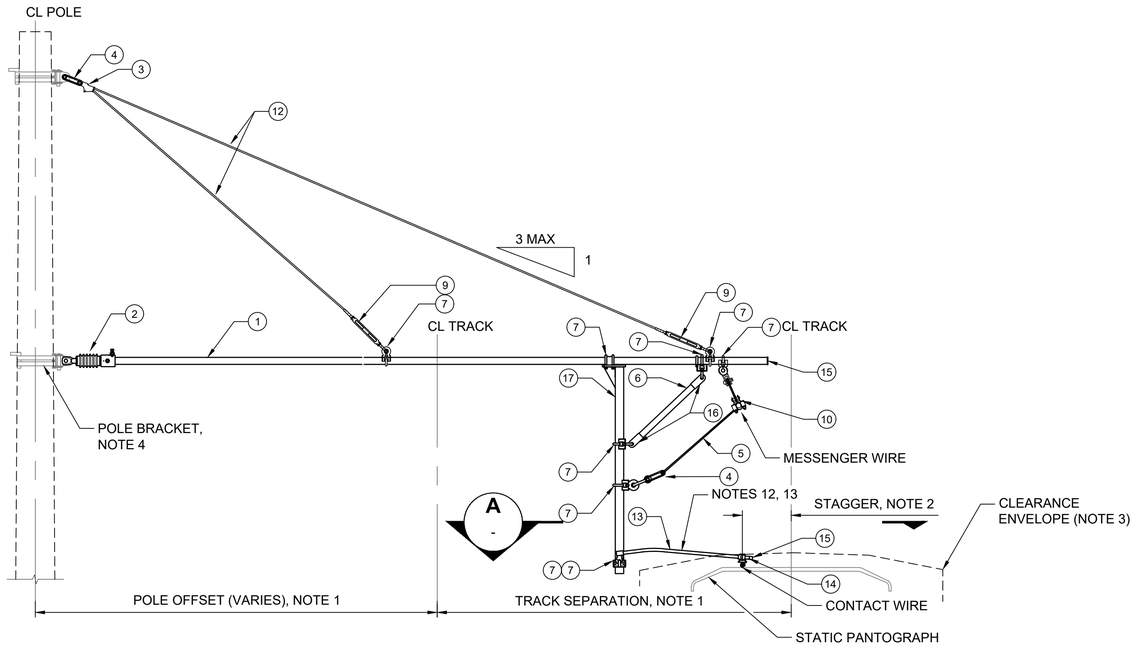
SCALE: NTS
FILENAME: STD-JOD410
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
INCREASED SYSTEM HEIGHT CANTILEVER ASSEMBLIES
CA-17M, CA-17H, CA-18M & CA-18H

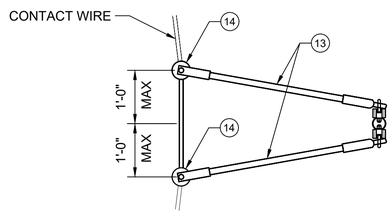
DRAWING No.: STD-JOD410
FACILITY ID:
SHEET No.: 1 REV:

01/30/25 | 1:06 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD410.DWG

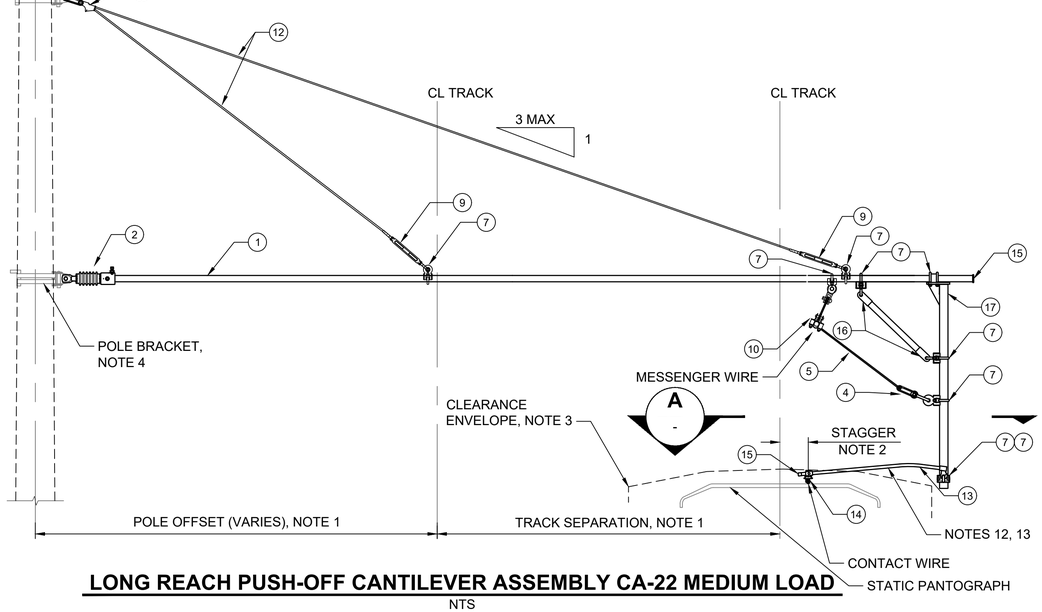


LONG REACH PULL-OFF CANTILEVER ASSEMBLY CA-21 MEDIUM LOAD

NTS



SECTION A
NTS



LONG REACH PUSH-OFF CANTILEVER ASSEMBLY CA-22 MEDIUM LOAD

NTS

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
2. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
4. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
5. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
6. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
10. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
11. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
12. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
13. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
14. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

MAXIMUM ASSEMBLY LOADING

	CA-22M	CA-21M	CA-22H	CA-21H
MESSENGER WIRE RADIAL LOAD	750 LBS	750 LBS	1500 LBS	1500 LBS
CONTACT WIRE RADIAL LOAD	500 LBS	500 LBS	1000 LBS	1000 LBS
VERTICAL LOAD	650 LBS	650 LBS	1300 LBS	1300 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CA-22M	CA-21M	CA-22H	CA-21H				
1	1	1	1	EA	PIPE	1	LENGTH AS REQ'D
1	1	1	1	EA	INSULATOR	2	
1	1	1	1	EA	WEDGE TYPE DEAD END CLAMP	3	
2	2	2	2	EA	STRAIN INSULATOR	4	
1	1	1	1	EA	GUY WIRE	5	LENGTH AS REQ'D
1	1	1	1	EA	BRACE	6	LENGTH AS REQ'D
3	9	3	9	EA	EYE CLAMP	7	
					NOT USED	8	
2	2	2	2	EA	TURNBUCKLE	9	
1	1	1	1	EA	MESSENGER SUSPENSION	10	INSULATED
1	1	1	1	EA	DROP PIPE	11	LENGTH AS REQ'D
1	1	1	1	EA	STAINLESS STEEL WIRE ROPE	12	LENGTH AS REQ'D
1	1	2	2	EA	STEADY ARM, CURVED	13	
1	1	2	2	EA	C/W SWIVEL CLAMP	14	INSULATED
2	2	2	2	EA	PIPE CAP	15	
2	2	2	2	EA	CLEVIS FITTING	16	
1	1	1	1	EA	DROP BRACKET	17	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

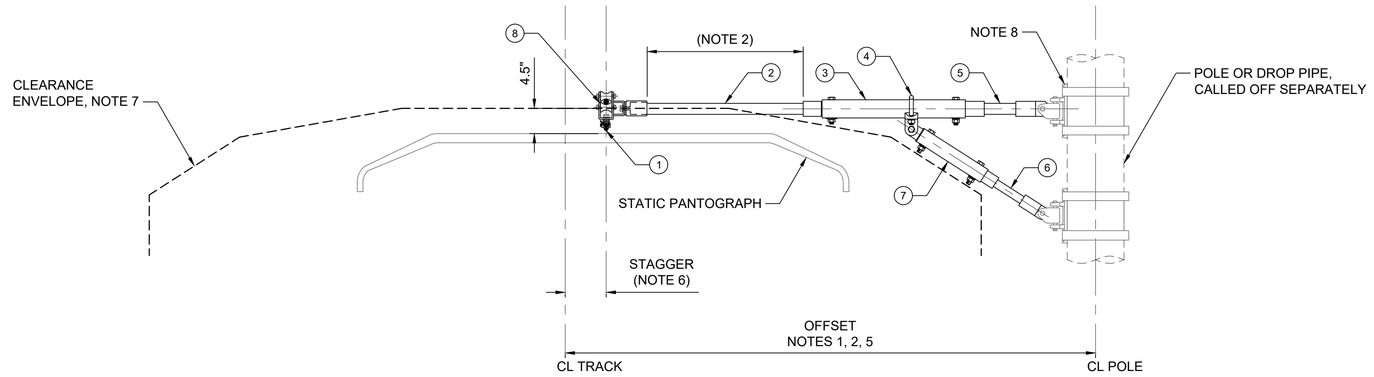
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD411
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
LONG REACH CANTILEVER ASSEMBLIES
CA-21 & CA-22

DRAWING No.: STD-JOD411
FACILITY ID:
SHEET No.: REV: 1



UNDER BRIDGE/TUNNEL SUPPORT ASSEMBLY CA-30E

NTS

GENERAL NOTES:

1. SHOP DRAWINGS SHALL CATER TO OFFSETS FROM 6'-6" TO 9'-3".
2. FOR SITE SPECIFIC APPLICATION INSULATED ARM ASSEMBLY SHALL HAVE INSULATION LENGTH (XX) AVAILABLE IN INCREMENTS OF 2 INCHES OR BE ADJUSTABLE TO CATER TO ALL STAGGERS FROM +12" TO -12".
3. ENSURE ALL PARTS OF THIS ASSEMBLY EXCEPT INSULATED ARM, ARE OUTSIDE THE PANTOGRAPH CLEARANCE ENVELOPE UNDER ALL OPERATING CONDITIONS.
4. INSULATED ARM TO BE CLEAR OF CLEARANCE ENVELOPE BY 1" MINUMUM FOR THE FULL RANGE OF VEHICLE MOVEMENT.
5. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
6. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
7. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
8. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
9. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
10. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
11. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
12. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
13. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
14. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
15. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

MAXIMUM ASSEMBLY LOADING

	CA-30E
COMBINED MW & CW RADIAL LOAD	250 LBS
COMBINED MW & CW VERITCAL LOAD	250 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE CA-30E	UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
1	EA	CW SWIVEL CLAMP	1	
1	EA	INSULATED ARM ASSEMBLY	2	NOTE 2
1	EA	TOP PIPE	3	LENGTH AS REQ'D
1	EA	CLEVIS FITTING	4	
1	EA	STRUT INSULATOR	5	
1	EA	STRUT INSULATOR	6	
1	EA	STRUT PIPE	7	LENGTH AS REQ'D
1	EA	MW CLAMP	8	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

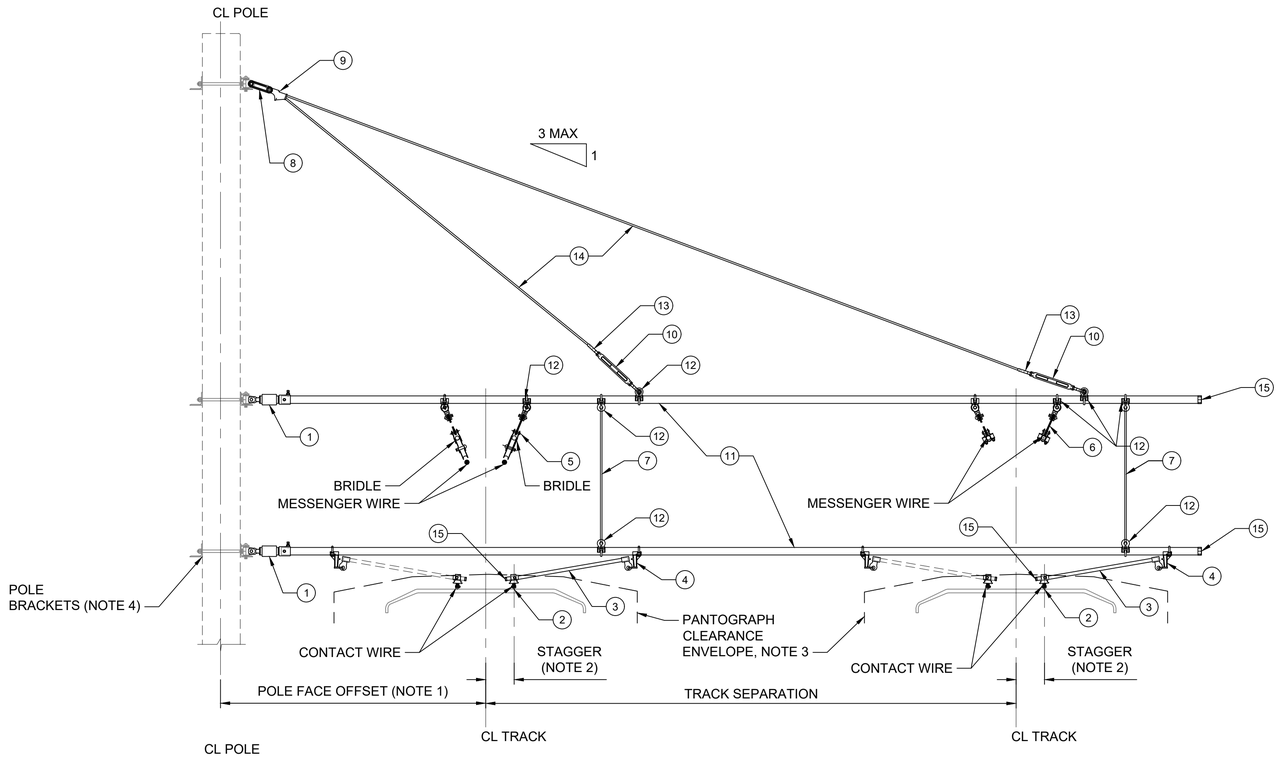
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD412
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
UNDER BRIDGE/TUNNEL SUPPORT ASSEMBLY
CA-30E

DRAWING No.: STD-JOD412
FACILITY ID:
SHEET No.: REV: 1

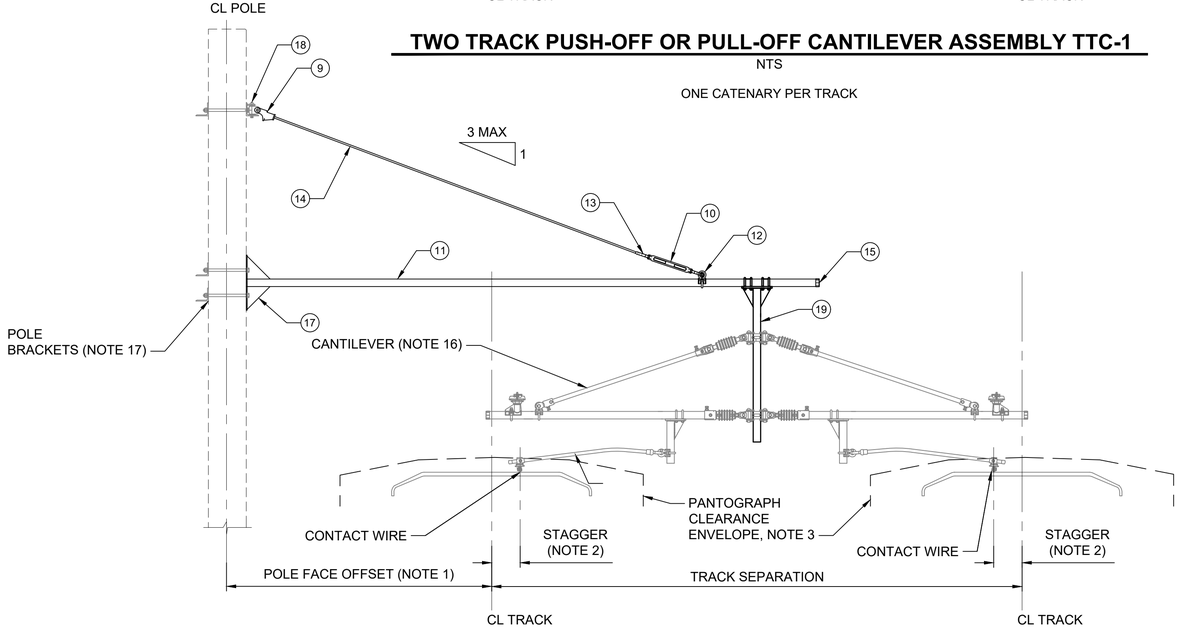
01/30/25 | 1:06 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD412.DWG



TWO TRACK PUSH-OFF OR PULL-OFF CANTILEVER ASSEMBLY TTC-1

NTS

ONE CATENARY PER TRACK



TWO TRACK LOW PROFILE CANTILEVER ASSEMBLY TTC-2

NTS

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY THIS DIMENSION PRIOR TO FABRICATION OF CANTILEVER PIPES.
2. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. FOR DETAILS OF PANTOGRAPH CLEARANCE, SEE DWG JOD112 AND JOD114.
4. POLE BRACKET ASSEMBLY TO BE CALLED OFF SEPARATELY.
5. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LIMITS.
6. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
10. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
11. CANTILEVER BRACKET SEPARATION SHALL BE DETERMINED USING THE TYPICAL 1:3 PIPE SLOPE AS A BASIS. IN SOME LOCATIONS A LARGER SLOPE MAY BE USED TO AVOID CONFLICTS WITH OTHER HARDWARE MOUNTED ON THE POLES.
12. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
13. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
14. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.
15. SUSPEND MESSENGER USING SS BRIDLE WIRE THROUGH PULLEY.
16. CANTILEVER ASSEMBLY TO BE CALLED OFF SEPARATELY.
17. THE TTC-2 BRACKETS ARE RIGID AND SHALL RESTRICT ROTATIONAL MOVEMENT.
18. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
19. LOADS ARE PER CATENARY.

MAXIMUM ASSEMBLY LOADING

	TTC-1, NOTE 20		TTC-2, NOTE 20	
MESSENGER WIRE RADIAL LOAD	1450 LBS	1450 LBS	1450 LBS	1450 LBS
CONTACT WIRE RADIAL LOAD	1000 LBS	1000 LBS	1000 LBS	1000 LBS
VERTICAL LOAD	1000 LBS	1000 LBS	1000 LBS	1000 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	NO. ITEM	PART NO./REMARKS
TTC-1	TTC-2				
2	-	EA	INSULATOR	1	
2	-	EA	CONTACT WIRE SWIVEL CLAMP	2	INSULATED
2	-	EA	STEADY ARM	3	LENGTH AS REQ'D
2	-	EA	DROP BRACKET	4	
1	-	EA	MESSENGER SUSP, W/ PULLEY & LOOP INSULATOR	5	
1	-	EA	MESSENGER SUSP, CLAMP W/ LOOP INSULATOR	6	
2	-	EA	SS HANGER	7	
1	-	EA	STRAIN INSULATOR	8	
1	1	EA	WEDGE TYPE DEAD END	9	
2	1	EA	TURNBUCKLE	10	
2	1	EA	PIPE	11	LENGTH AS REQ'D
8	1	EA	EYE CLAMP	12	
2	1	EA	THIMBLE & OVAL COMPRESSION SLEEVE	13	
2	1	EA	SS WIRE ROPE	14	LENGTH AS REQ'D
4	1	EA	PIPE CAP	15	
-	-	-	NOT USED	16	
-	1	EA	RIGID POLE BRACKET	17	
-	1	EA	POLE BRACKET	18	
-	1	EA	DROP PIPE	19	LENGTH AS REQ'D

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

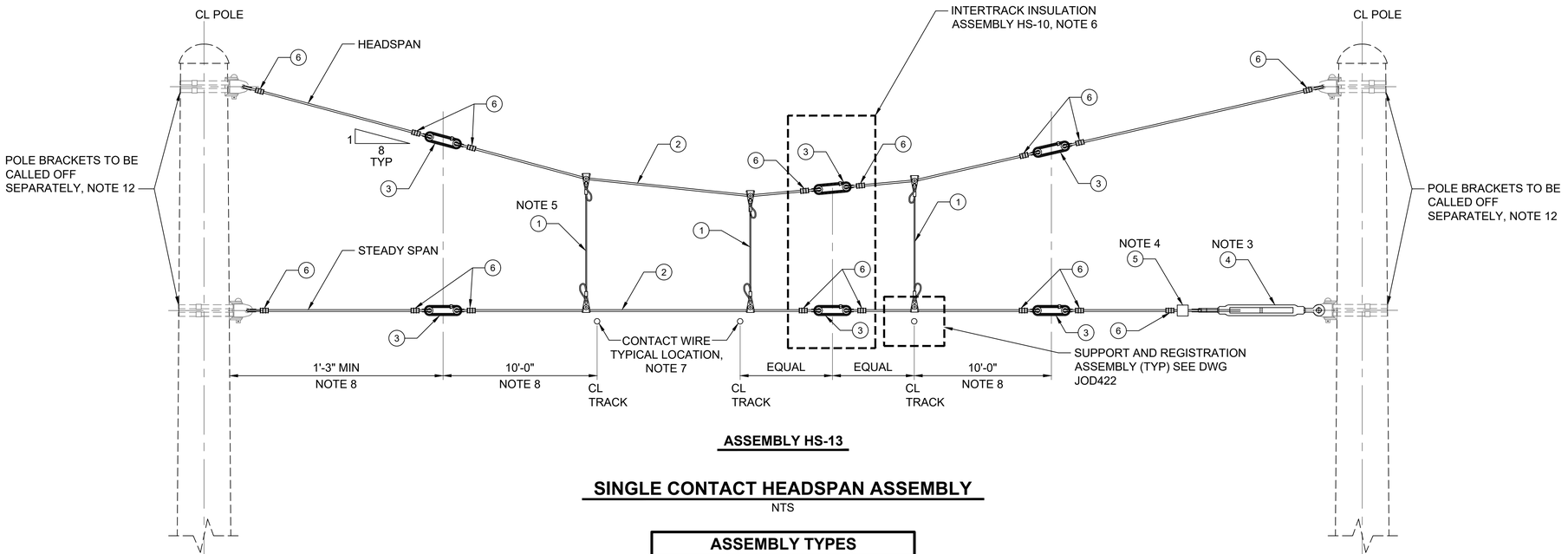
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD413
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TWO TRACK CANTILEVER ASSEMBLY
TTC-1 & TTC-2

DRAWING No.: **STD-JOD413**
FACILITY ID:
SHEET No.: REV: 1

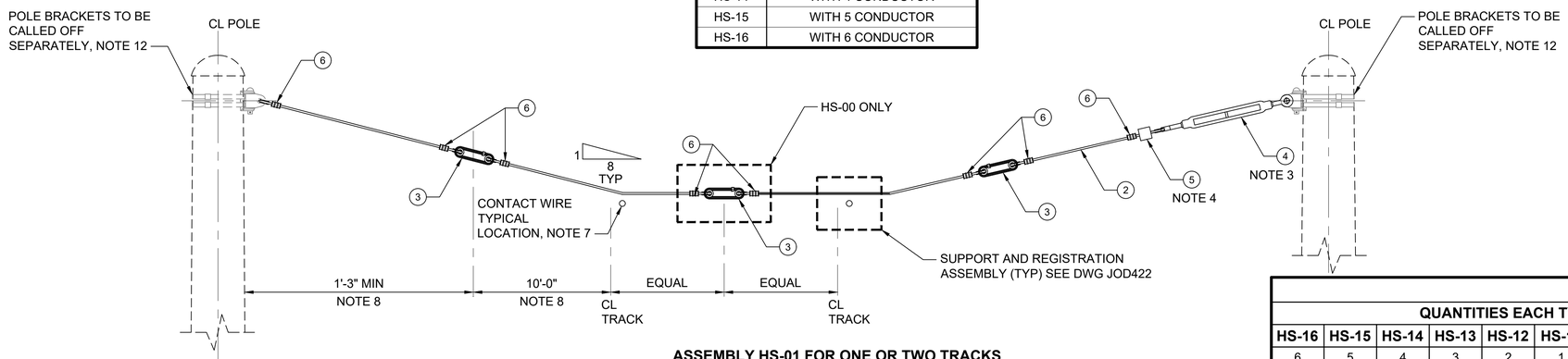


ASSEMBLY HS-13

SINGLE CONTACT HEADSPAN ASSEMBLY

NTS

ASSEMBLY TYPES	
HS-10	INTERTRACK INSULATION
HS-11	WITH 1 CONDUCTOR
HS-12	WITH 2 CONDUCTOR
HS-13	WITH 3 CONDUCTOR
HS-14	WITH 4 CONDUCTOR
HS-15	WITH 5 CONDUCTOR
HS-16	WITH 6 CONDUCTOR



ASSEMBLY HS-01 FOR ONE OR TWO TRACKS
ASSEMBLY HS-00 FOR INTERTRACK INSULATION

SPAN WIRE SUPPORT ASSEMBLY

NTS

GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. VALUE AND DIRECTION OF STAGGER TO BE AS SHOWN ON OCS LAYOUT PLANS.
3. LOCATE TURNBUCKLE ON THE SLACK SIDE OF THE SPAN WIRES, THIS IS TYPICALLY INSIDE OF CURVES.
4. A VIBRATION DAMPER IS REQUIRED ONLY IF ONE OR BOTH ENDS OF THE SPAN WIRE ARE ATTACHED TO A BUILDING, CONCRETE POLE, OR OTHER RIGID SUPPORT. THE SPRING IS TO BE LOCATED ADJACENT TO THE TURNBUCKLE.
5. TYPICALLY LOCATE A SPAN WIRE HANGER ABOVE OR NEAR EACH ATTACHED CONTACT WIRE SUPPORT.
6. INTERTRACK INSULATION ASSEMBLIES ARE REQUIRED TO BE INSTALLED BETWEEN TRACKS WHERE CONTACT WIRES ARE FED ELECTRICALLY THROUGH DIFFERENT SWITCHES, OR HAVE UNINSULATED WIRE SUPPORT ASSEMBLIES. DETAILS TO BE SHOWN ON SECTIONALIZING DIAGRAMS AND OCS LAYOUT PLANS.
7. THE CONTACT WIRE SHALL BE ATTACHED TO THESE SPAN WIRES USING INSULATED CONTACT WIRE SUPPORT AND REGISTRATION ASSEMBLIES. SEE DWG JOD422.
8. SECOND LEVEL INSULATION TO BE LOCATED 10'-0" FROM TRACK CENTERLINE EXCEPT IN CASES WHEN THE POLE FACE IS LESS THAN 11'-3" FROM TRACK CENTERLINE, A MINIMUM OF 1'-3" FROM FACE OF POLE IS REQUIRED.
9. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
10. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
12. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.

BILL OF MATERIALS

QUANTITIES EACH TYPE									UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
HS-16	HS-15	HS-14	HS-13	HS-12	HS-11	HS-10	HS-01	HS-00				
6	5	4	3	2	1	-	-	-	EA	HANGER ASSEMBLY	1	
2	2	2	2	2	2	-	1	-	AS REQ'D	STAINLESS STEEL WIRE	2	LENGTH AS REQ'D
4	4	4	4	4	4	2	2	1	EA	STRAIN INSULATOR	3	
1	1	1	1	1	1	-	1	-	EA	TURNBUCKLE	4	NOTE 3
-	-	-	-	-	-	-	-	-	EA	VIBRATION DAMPER	5	NOTE 4
12	12	12	12	12	12	4	6	2	EA	COMPRESSION CONNECTOR	6	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY: -
DRAWN BY: -
CHECKED BY: -
APPROVED BY: -

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

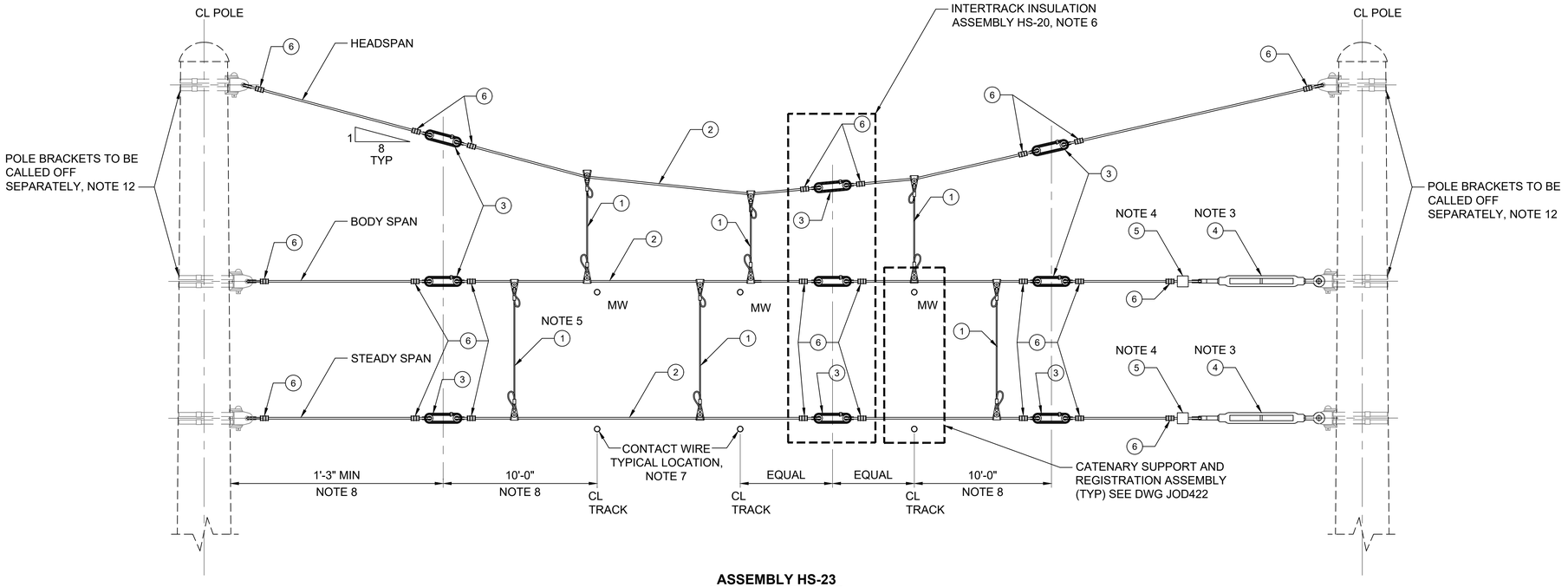
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD420
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
SPAN WIRE ASSEMBLIES
HS-00, HS-01 & HS-10 THRU HS-16

DRAWING No.: STD-JOD420
FACILITY ID: -
SHEET No.: - REV: 1



ASSEMBLY HS-23

CATENARY HEADSPAN ASSEMBLY

NTS

ASSEMBLY TYPES	
HS-20	INTERTRACK INSULATION
HS-21	WITH 1 CATENARY
HS-22	WITH 2 CATENARY
HS-23	WITH 3 CATENARY
HS-24	WITH 4 CATENARY
HS-25	WITH 5 CATENARY
HS-26	WITH 6 CATENARY

GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. VALUE AND DIRECTION OF STAGGER TO BE SHOWN ON OCS LAYOUT PLANS.
3. LOCATE TURNBUCKLE ON THE SLACK SIDE OF THE SPAN WIRES, THIS IS TYPICALLY INSIDE OF CURVES.
4. A VIBRATION DAMPER IS REQUIRED ONLY IF ONE OR BOTH ENDS OF THE SPAN WIRE ARE ATTACHED TO A BUILDING, CONCRETE POLE, OR OTHER RIGID SUPPORT. THE SPRING IS TO BE LOCATED ADJACENT TO THE TURNBUCKLE.
5. TYPICALLY LOCATE A SPAN WIRE HANGER ABOVE OR NEAR EACH ATTACHED CONTACT WIRE SUPPORT.
6. INTERTRACK INSULATION ASSEMBLIES ARE REQUIRED TO BE INSTALLED BETWEEN TRACKS WHERE CONTACT WIRES ARE FED ELECTRICALLY THROUGH DIFFERENT SWITCHES, OR HAVE UNINSULATED WIRE SUPPORT ASSEMBLIES. DETAILS TO BE SHOWN ON SECTIONALIZING DIAGRAMS AND OCS LAYOUT PLANS.
7. THE CONTACT WIRE SHALL BE ATTACHED TO THESE SPAN WIRES USING INSULATED CONTACT WIRE SUPPORT AND REGISTRATION ASSEMBLIES. SEE DWG JOD423.
8. SECOND LEVEL INSULATION TO BE LOCATED 10'-0" FROM TRACK CENTERLINE EXCEPT IN CASES WHEN THE POLE FACE IS LESS THAN 11'-3" FROM TRACK CENTERLINE, A MINIMUM OF 1'-3" FROM FACE OF POLE IS REQUIRED.
9. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
10. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
12. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.

BILL OF MATERIALS

QUANTITIES EACH TYPE							UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
HS-26	HS-25	HS-24	HS-23	HS-22	HS-21	HS-20				
12	10	8	6	4	2	-	EA	HANGER ASSEMBLY	1	
3	3	3	3	3	3	-	AS REQ'D	STAINLESS STEEL WIRE	2	LENGTH AS REQD
6	6	6	6	6	6	3	EA	STRAIN INSULATOR	3	
2	2	2	2	2	2	-	EA	TURNBUCKLE	4	NOTE 3
-	-	-	-	-	-	-	EA	VIBRATION DAMPER	5	NOTE 4
18	18	18	18	18	18	6	EA	COMPRESSION CONNECTOR	6	

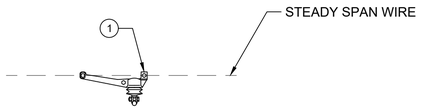
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD421
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
SPAN WIRE ASSEMBLIES
HS-20, THRU HS-26

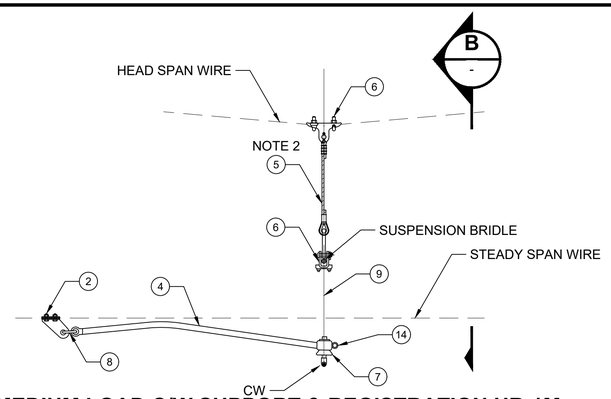
DRAWING No.: **STD-JOD421**
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:07 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD421.DWG



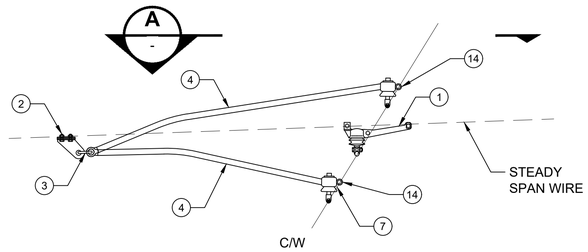
LIGHT LOAD C/W SUPPORT & REGISTRATION HR-1L

NTS



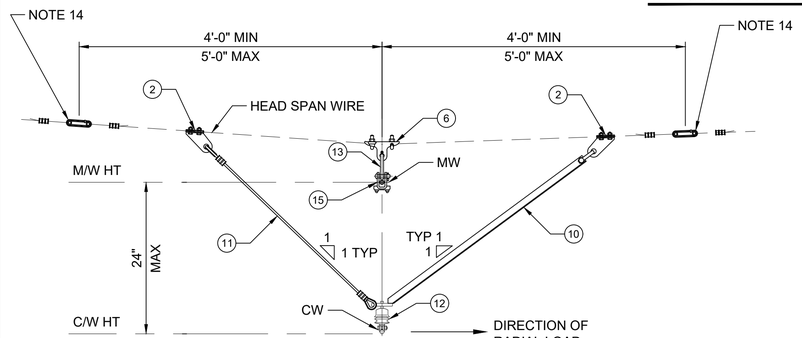
MEDIUM LOAD C/W SUPPORT & REGISTRATION HR-1M

NTS



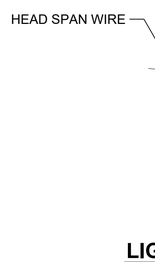
HEAVY LOAD C/W SUPPORT & REGISTRATION HR-1H

NTS



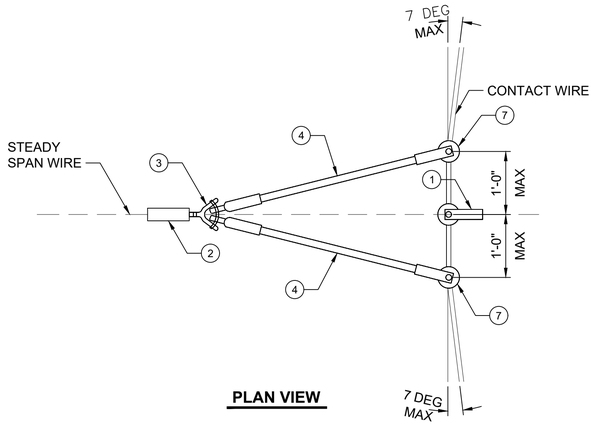
LOW PROFILE SUPPORT AND REGISTRATION, LIGHT LOAD HR-2

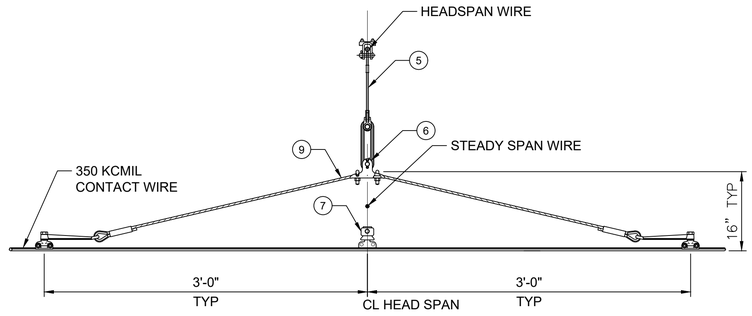
NTS



LIGHT LOAD M/W SUPPORT HR-MW

NTS





(SHOWN WITH STEADY ARM OMITTED FOR CLARITY)

SECTION A
NTS

SECTION B
NTS

GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. HANGER SUB-ASSEMBLIES SHALL BE FIELD ADJUSTED TO ACHIEVE SPECIFIED CONTACT WIRE HEIGHT.
3. SUPPORTING HANGERS FOR STEADY SPAN WIRE OR HEAD SPAN WIRE TO BE CALLED OUT SEPARATELY FROM HEADSPAN SUPPORT ASSEMBLIES SHOWN ON DWG JOD420.
4. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
5. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWG JOD112 AND JOD114.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
7. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
8. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
10. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
11. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
12. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.
13. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
14. ASSEMBLY INSULATION REFERENCED.

MAXIMUM ASSEMBLY LOADING

	HR-MW	HR-2	HR-1H	HR-1M	HR-1L
MESSENGER WIRE RADIAL LOAD	200 LBS	150 LBS	-	750 LBS	-
CONTACT WIRE RADIAL LOAD	-	80 LBS	1000 LBS	500 LBS	200 LBS
VERTICAL LOAD	1000 LBS	1000 LBS	350 LBS	650 LBS	425 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE					UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
HR-MW	HR-2	HR-1H	HR-1M	HR-1L				
-	-	1	-	1	EA	INSULATED C/W LINE HANGER	1	
-	2	1	1	-	EA	WIRE CLAMP	2	
-	-	1	-	-	EA	"Y" CLEVIS OR SHACKLE	3	
-	-	2	1	-	EA	STEADY ARM, CURVED	4	LENGTH AS REQ'D
1	-	-	1	-	EA	INSULATED HANGER SUB-A ASSY	5	
1	1	-	2	-	EA	SUSPENSION CLAMP	6	
-	-	2	1	-	EA	C/W SWIVEL CLAMP	7	INSULATED
-	-	-	1	-	EA	SHACKLE	8	
-	-	-	1	-	EA	SUPPORT BRIDLE	9	LENGTH AS REQ'D
-	1	-	-	-	EA	ARM	10	
-	1	-	-	-	EA	HANGER SUB ASSEMBLY	11	LENGTH AS REQ'D
-	1	-	-	-	EA	BOLT C/W SWIVEL & INSULATOR	12	
-	1	-	-	-	EA	TWISTED LINK	13	
-	-	2	1	-	EA	PIPE CAP	14	
1	1	-	-	-	EA	MW CLAMP	15	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

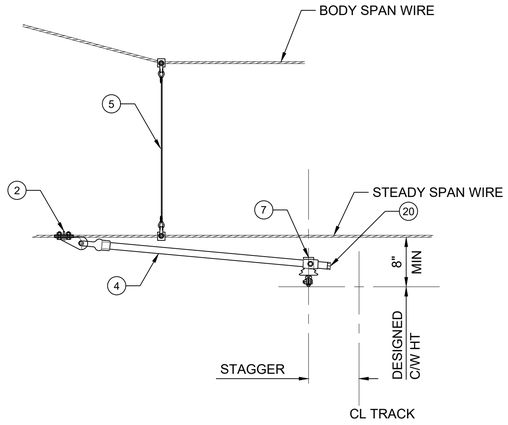
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD422
CONTRACT No.: RTA/LR
DATE: 2/2024

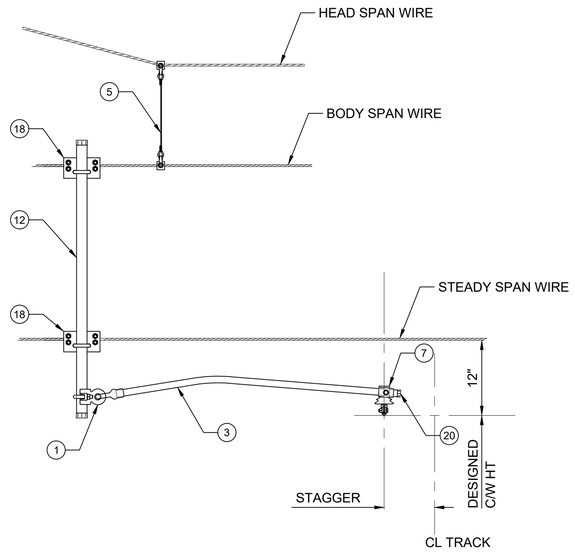
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
CROSS SPAN REGISTRATION ASSEMBLIES
HR-1L, HR-1M, HR-1H, HR-2 & HR-MW

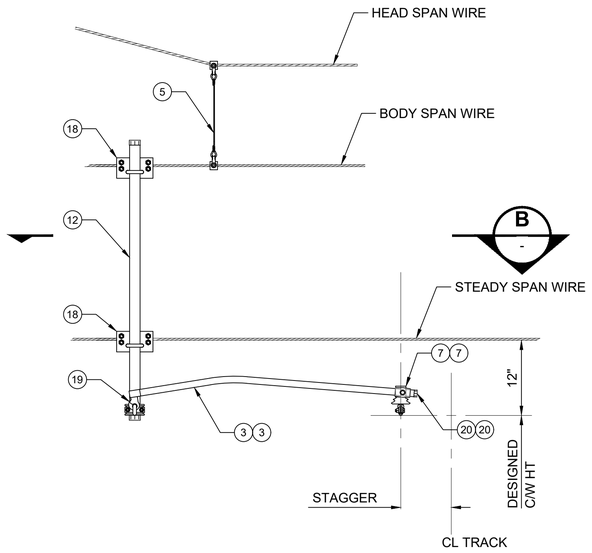
DRAWING No.: STD-JOD422
FACILITY ID:
SHEET No.: REV: 1



LIGHT LOAD REGISTRATION HR-3L
NTS



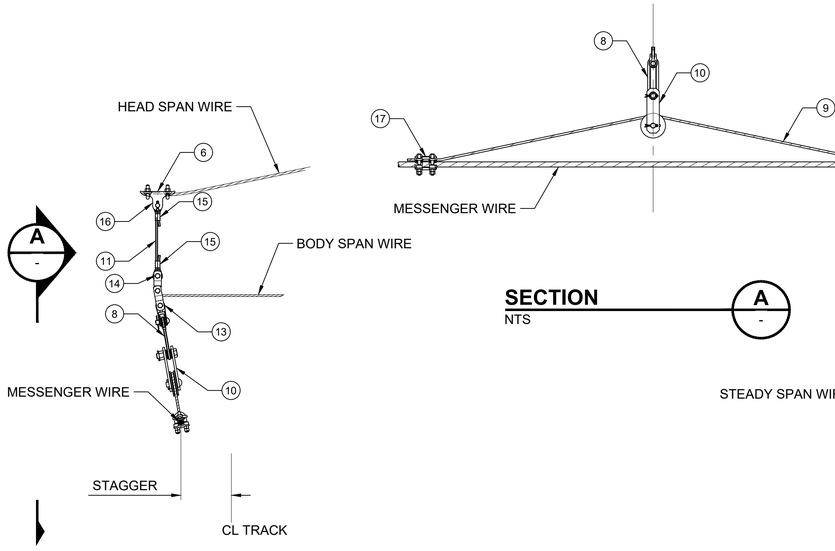
MEDIUM LOAD REGISTRATION HR-3M
NTS



HEAVY LOAD REGISTRATION HR-3H
NTS

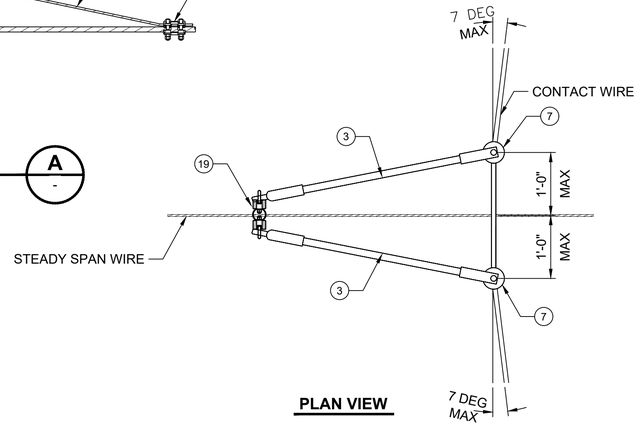
GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. HANGER SUB-ASSEMBLIES SHALL BE FIELD ADJUSTED TO ACHIEVE SPECIFIED CONTACT WIRE HEIGHT.
3. SUPPORTING HANGERS FOR STEADY SPAN WIRE OR HEAD SPAN WIRE TO BE CALLED OUT SEPARATELY FROM HEADSPAN SUPPORT ASSEMBLIES SHOWN ON DWG JOD421.
4. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
5. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWG JOD112 AND JOD114.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
7. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
8. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
10. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
11. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
12. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.
13. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.



HEAVY LOAD M/W SUPPORT HR-3MW
NTS

SECTION A
NTS



SECTION B
NTS

MAXIMUM ASSEMBLY LOADING

	HR-3MW	HR-3H	HR-3M	HR-3L
MESSENGER WIRE RADIAL LOAD	1450 LBS	-	-	-
CONTACT WIRE RADIAL LOAD	-	1000 LBS	500 LBS	200 LBS
VERTICAL LOAD	350 LBS	350 LBS	650 LBS	1000 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
HR-3MW	HR-3H	HR-3M	HR-3L				
-	-	1	-	EA	EYE CLAMP	1	
-	-	-	1	EA	WIRE CLAMP	2	
-	2	1	-	EA	CURVED STEADY ARM	3	NOTE 6
-	-	-	1	EA	STEADY ARM	4	NOTE 6
-	1	1	1	EA	HANGER SUB-ASSEMBLY	5	LENGTH AS REQ'D
1	-	-	-	EA	SUSPENSION CLAMP	6	
-	2	1	1	EA	C/W SWIVEL CLAMP	7	INSULATED
1	-	-	-	EA	INSULATOR	8	
1	-	-	-	EA	SUPPORT BRIDLE WIRE	9	
1	-	-	-	EA	BRIDLE PULLEY	10	
1	-	-	-	AS REQ'D	STAINLESS STEEL WIRE ROPE	11	LENGTH AS REQ'D
-	1	1	-	EA	DROP PIPE	12	LENGTH AS REQ'D
1	-	-	-	EA	CLEVIS-CLEVIS LINK	13	
1	-	-	-	EA	WIRE CLIP	14	
2	-	-	-	EA	COMPRESSION SLEEVE	15	
2	-	-	-	EA	THIMBLE	16	
2	-	-	-	EA	MESSENGER CLAMP	17	
-	2	2	-	EA	SPAN-PIPE CLAMP	18	
-	1	-	-	EA	DOUBLE STEADY ARM PIPE CLAMP	19	
-	2	1	1	EA	PIPE CAP	20	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

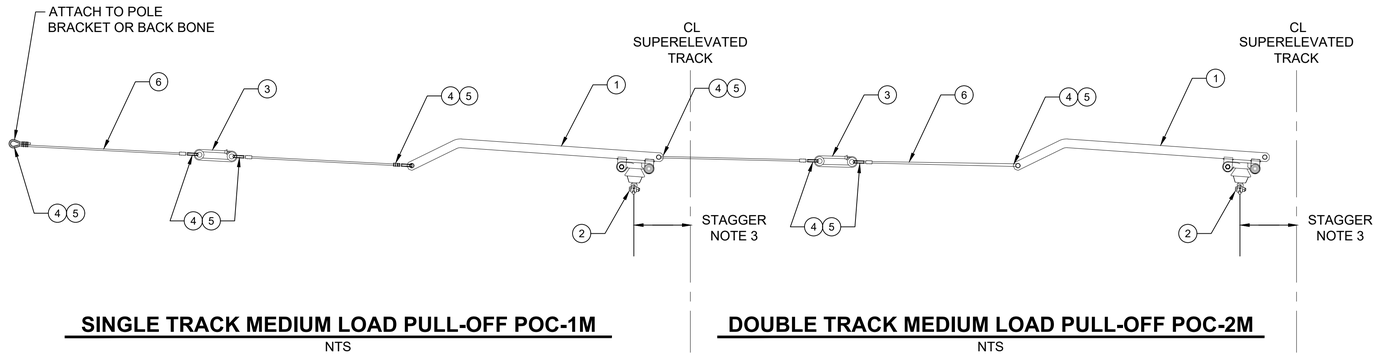
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD423
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

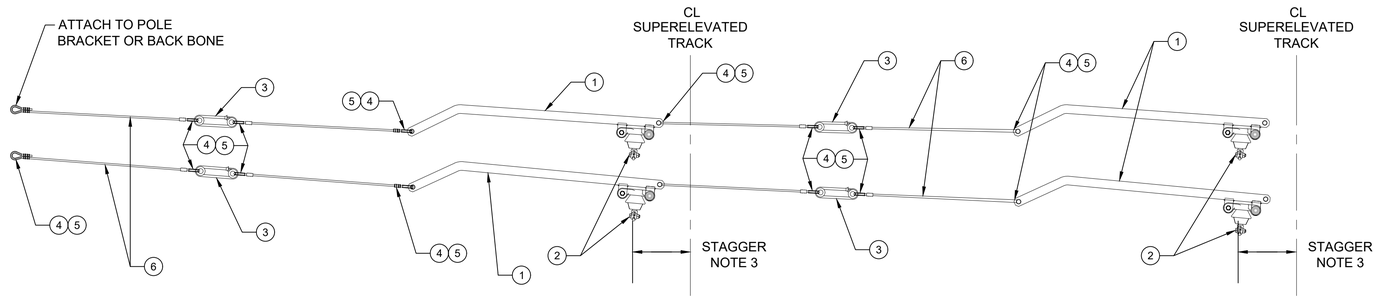
OVERHEAD CATENARY SYSTEM
HEADSPAN REGISTRATION ASSEMBLIES
HR-3L, HR-3M, HR-3H & HR-3MW

DRAWING No.: STD-JOD423
FACILITY ID:
SHEET No.: REV: 1



SINGLE TRACK MEDIUM LOAD PULL-OFF POC-1M
NTS

DOUBLE TRACK MEDIUM LOAD PULL-OFF POC-2M
NTS



SINGLE TRACK HEAVY LOAD PULL-OFF POC-1H
NTS

DOUBLE TRACK HEAVY LOAD PULL-OFF POC-2H
NTS

GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF THE COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. CONTRACTOR SHALL FIELD VERIFY POLE SETOUT DIMENSION PRIOR TO FABRICATION OF ASSEMBLY.
3. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
4. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWGS JOD112 AND JOD114.
5. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
6. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DWGS JZN001 AND JZN002.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOAD TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
9. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
10. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
11. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.
12. FOR A DOUBLE TRACK PULL-OFF, IF PROPER CLEARANCE CANNOT BE MET FOR THE INSIDE STEADY ARM, THE ASSEMBLY SHALL SPLIT INTO TWO SEPERATE SINGLE TRACK PULL-OFFS. ANY EXTRA MATERIAL REQUIRED FOR THE CHANGE WILL BE CONTRACTORS EXPENSE.
13. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

MAXIMUM ASSEMBLY LOADING

	POC-2H	POC-1H	POC-2M	POC-1M
CONTACT WIRE RADIAL LOAD	1000 LBS	1000 LBS	500 LBS	500 LBS

BILL OF MATERIALS

QUANTITIES EA TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
POC-2H	POC-1H	POC-2M	POC-1M				
4	2	2	1	EA	CURVED STEADY ARM	1	
4	2	2	1	EA	CONTACT WIRE SWIVELCLAMP	2	INSULATED
4	2	2	1	EA	LOOP INSULATOR	3	
16	8	8	4	EA	THIMBLE	4	
16	8	8	4	EA	COMPRESSION CONNECTOR	5	
2	2	1	1	LF	STAINLESS STEEL WIRE	6	LENGTH AS REQ'D

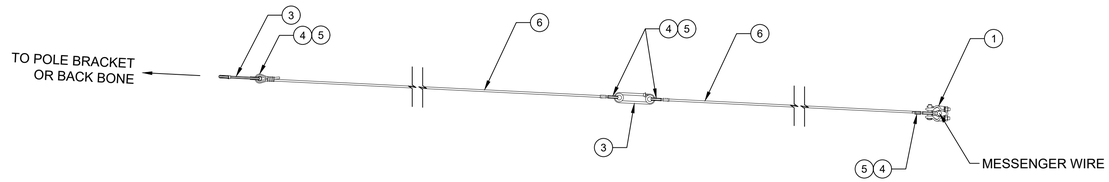
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SCALE: NTS
FILENAME: STD-JOD430
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

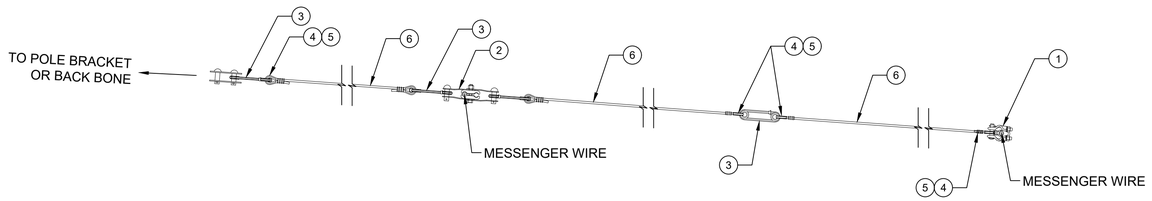
OVERHEAD CATENARY SYSTEM
CONTACT WIRE PULL-OFF ASSEMBLIES
POC-1M, POC-1H, POC-2M & POC-2H

DRAWING No.: **STD-JOD430**
FACILITY ID:
SHEET No.: REV: 1



SINGLE TRACK PULL-OFF POM-1M AND POM-1H

NTS



DOUBLE TRACK PULL-OFF POM-2M AND POM-2H

NTS

GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF THE COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. CONTRACTOR SHALL FIELD VERIFY POLE SETOUT DIMENSION PRIOR TO FABRICATION OF ASSEMBLY.
3. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
4. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWGS JOD112 AND JOD114.
5. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
6. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DWGS JZN001 AND JZN002.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOAD TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
9. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
10. CONTRACTOR TO ENSURE THAT THE STEADY ARM DESIGN ALLOWS FOR PANTOGRAPH CLEARANCE ENVELOPE.
11. THE CONTRACTOR SHALL ENSURE THAT TWIN STEADY ARMS EQUALLY SHARE THE CONTACT WIRE RADIAL LOAD.
12. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.

MAXIMUM ASSEMBLY LOADING

	POM-2H	POM-1H	POM-2M	POM-1M
MESSENGER WIRE RADIAL LOAD	1450 LBS	750 LBS	1450 LBS	750 LBS

BILL OF MATERIALS

QUANTITIES EA TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
POM-2H	POM-1H	POM-2M	POM-1M				
1	1	1	1	EA	MESSENGER WIRE SUSPENSION CLAMP	1	
1	-	1	-	EA	MESSENGER WIRE PULL-OFF CLAMP	2	
3	2	3	2	EA	LOOP INSULATOR	3	
6	4	6	4	EA	THIMBLE	4	
6	4	6	4	EA	COMPRESSION OVAL CONNECTOR	5	
1	1	1	1	LF	STAINLESS STEEL WIRE	6	LENGTH AS REQ'D

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

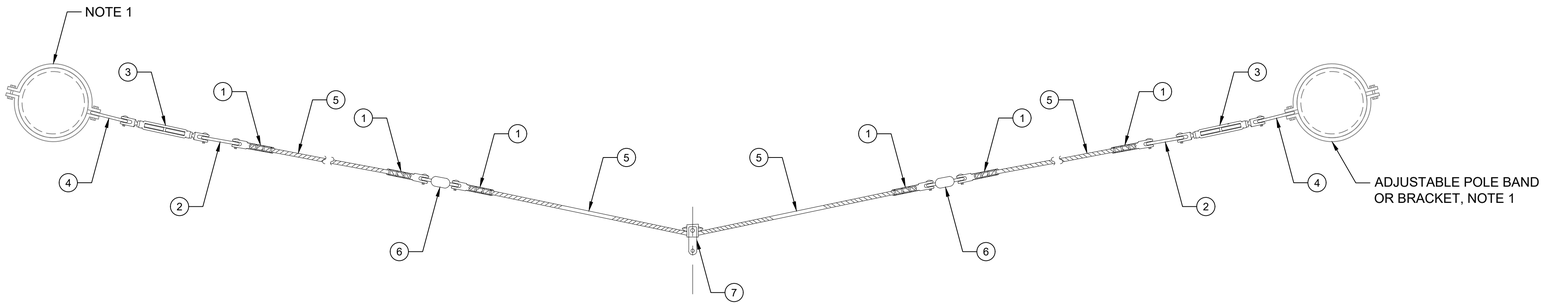
SCALE: NTS
FILENAME: STD-JOD431
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
MESSENGER WIRE PULL-OFF ASSEMBLIES FOR
POM-1M, POM-1H, POM-2M & POM 2H

DRAWING No.: **STD-JOD431**
FACILITY ID:
SHEET No.: 1
REV:

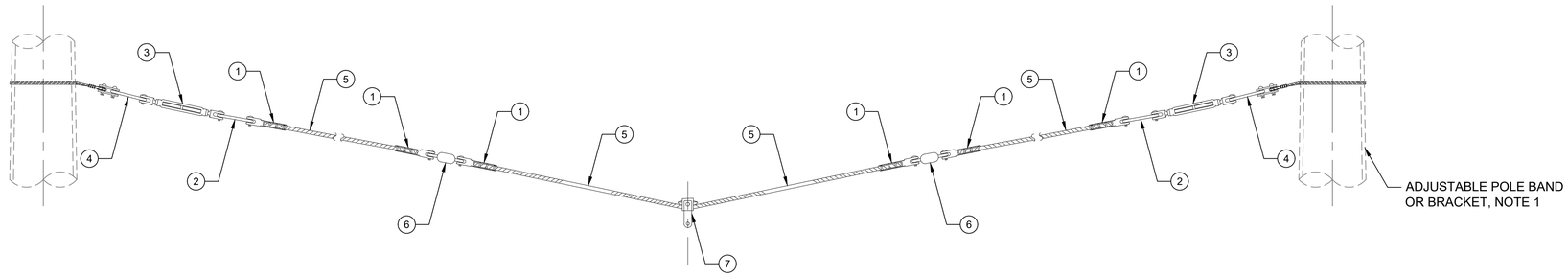
01/30/25 | 1:07 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD431.DWG



BDL-1 - ONE WIRE CLAMP FOR SINGLE PULL-OFF (AS SHOWN)
BDL-2 - TWO WIRE CLAMPS FOR TWO PULL-OFFS

BRIDLE WIRE ASSEMBLY BDL-1 OR BDL-2

NTS



FOR SUPPORTING SINGLE CONTACT SYSTEM SECTION INSULATOR, IN SPAN INSULATION, TO BE DETERMINED TO SUIT ADJACENT WIRING AND FITTINGS.

BRIDLE WIRE SUPPORT ASSEMBLY BDL-3

NTS

GENERAL NOTES:

1. POLE BANDS AND POLE BRACKETS SHALL BE CALLED OFF SEPARATELY.
2. CONTRACTOR SHALL PROVIDE WORKING LOAD CAPACITIES FOR THESE ASSEMBLIES.
3. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
4. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
6. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.

BILL OF MATERIALS

QUANTITIES EACH TYPE			UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
BDL-3	BDL-2	BDL-1				
6	6	6	EA	STRAIN CLAMP	1	
2	2	2	EA	LINK	2	
2	2	2	EA	TURNBUCKLE	3	
2	2	2	EA	LINK	4	
3	3	3	EA	STAINLESS STEEL WIRE	5	LENGTH AS REQ'D
2	2	2	EA	INSULATOR	6	
1	2	1	EA	WIRE CLAMP	7	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

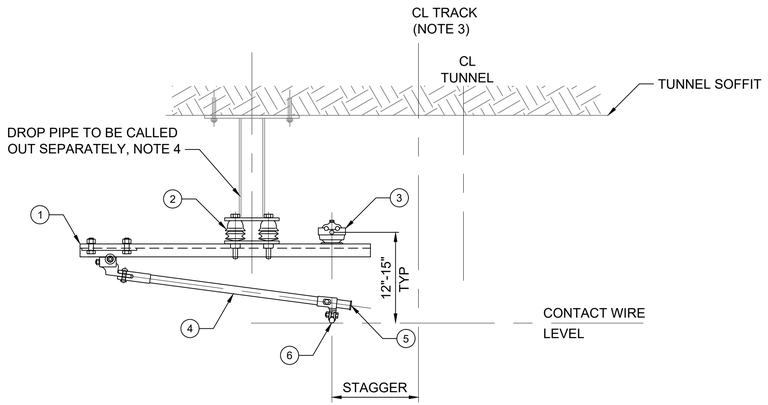
SCALE: NTS
FILENAME: STD-JOD432
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
BRIDLE WIRE ASSEMBLIES FOR SWFT
BDL-1, BDL-2 & BDL-3

DRAWING No.: **STD-JOD432**
FACILITY ID:
SHEET No.: REV: 1

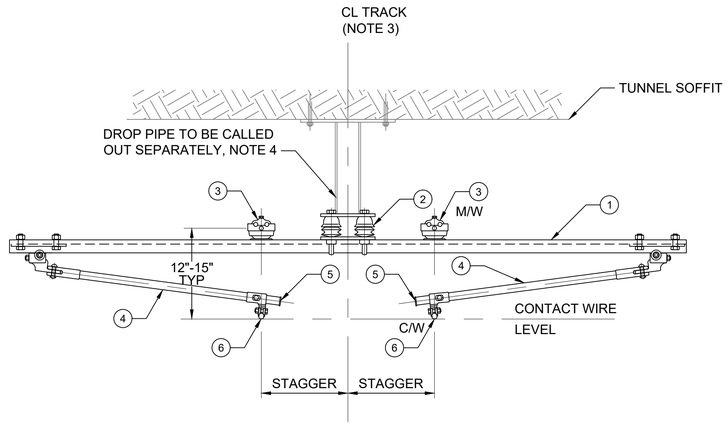
01/30/25 | 1:07 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD432.DWG



TUNNEL SUPPORT AND REGISTRATION ASSEMBLY TS-1

NTS

SEE NOTE 4



TUNNEL SUPPORT AND REGISTRATION FOR OVERLAP ASSEMBLY TS-3

NTS

SEE NOTE 4

GENERAL NOTES:

1. FOR SYMBOLS, LEGENDS AND ABBREVIATIONS SEE DWGS JZN001 AND JZN002.
2. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. CONTRACTOR TO COORDINATE THE LOCATION OF THE ASSEMBLIES WITH THE CATENARY STAGGERS AND TRACK CENTERLINE TO ENSURE THAT ELECTRICAL CLEARANCES ARE MAINTAINED.
4. CONTRACTOR TO MEASURE THE DISTANCE BETWEEN THE RAIL LEVEL AND THE SOFFIT AT EACH LOCATION AND MANUFACTURE THE DROP PIPE TO SUIT THE CATENARY HEIGHTS.
5. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWG JOD112 AND JOD114.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
9. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
10. THE MAXIMUM LOADS IN THE TABLE ARE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE
11. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.

MAXIMUM ASSEMBLY LOADING

	TS-3	TS-1
MESSENGER WIRE RADIAL LOAD	550 LBS	650 LBS
CONTACT WIRE RADIAL LOAD	350 LBS	450 LBS
VERTICAL LOAD	250 LBS	300 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
TS-3	TS-1				
1	1	EA	SUPPORT BRACKET	1	
4	4	EA	INSULATOR	2	
2	1	EA	M/W SUPPORT INSULATOR	3	
2	1	EA	STEADY ARM	4	INSULATED
2	1	EA	PIPE CAP	5	
2	1	EA	C/W SUPPORT CLAMP	6	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: DATE: REVIEWED BY: DATE:

LINE IS 1" AT FULL SCALE

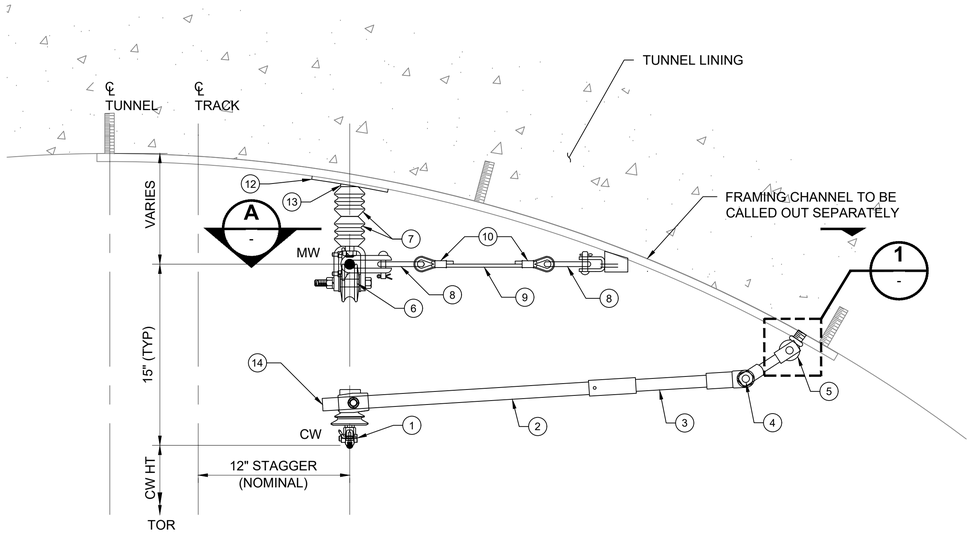
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD440
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TUNNEL SUPPORT ASSEMBLIES
SCFT TS-1 & TS-3

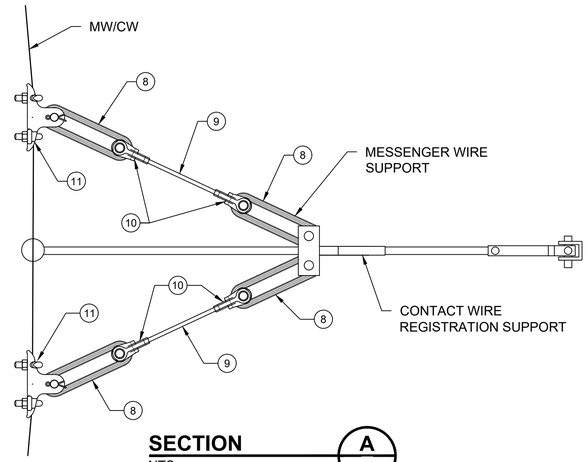
DRAWING No.: **STD-JOD440**
FACILITY ID:
SHEET No.: REV: 1



TUNNEL SUPPORT ASSEMBLY TS-6

NTS

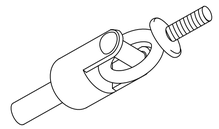
SEE NOTE 10



SECTION A -

NTS

SEE NOTE 3



DETAIL- CLEVIS TO EYE 1 -

NTS

GENERAL NOTES:

1. FOR ABBREVIATIONS, LEGENDS AND SYMBOLS, SEE DWGS JZN001 AND JZN002.
2. CATENARY DETAILS INCLUDING STAGGER, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWG JOD112 AND JOD114.
4. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
5. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS
6. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
7. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
8. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
9. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
10. CONTRACTOR TO MEASURE THE DISTANCE BETWEEN THE RAIL LEVEL AND THE SOFFIT AT EACH LOCATION AND MANUFACTURE THE DROP PIPE TO SUIT THE CATENARY HEIGHTS.

MAXIMUM ASSEMBLY LOADING

	TS-6
MESSENGER WIRE RADIAL LOAD	450 LBS
CONTACT WIRE RADIAL LOAD	300 LBS
VERTICAL LOAD	250 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE TS-6	UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
1	EA	CW SWIVEL CLAMP	1	INSULATED
1	LF	PIPE	2	LENGTH AS REQ'D
1	EA	INSULATOR, EPOXY FIBERGLASS ROD	3	LENGTH AS REQ'D
1	EA	ADJUSTABLE ARM	4	
1	EA	CLEVIS FITTING	5	
1	EA	MW ROLLER	6	
2	EA	SPOOL INSULATOR	7	
4	EA	LOOP INSULATOR	8	
2	LF	STAINLESS STEEL WIRE	9	LENGTH AS REQ'D
4	EA	WIRE THIMBLE AND CRIMP	10	
2	EA	MW CONDUCTOR CLAMP	11	
1	EA	GLASTIC WASHER	12	
AS REQ'D	EA	BEVELED WASHER	13	
1	EA	PIPE CAP	14	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD441
CONTRACT No.: RTA/LR
DATE: 2/2024

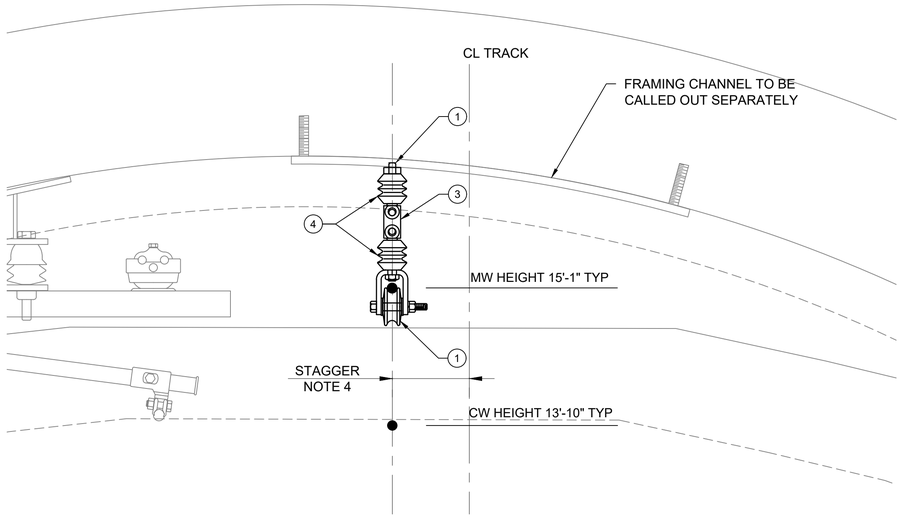
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TUNNEL SUPPORT ASSEMBLIES
SCFT TS-6

DRAWING No.: STD-JOD441
FACILITY ID:
SHEET No.: REV: 1

GENERAL NOTES:

1. FOR ABBREVIATIONS, LEGENDS AND SYMBOLS, SEE DWGS JZN001 AND JZN002.
2. CATENARY DETAILS INCLUDING STAGGER, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. MINIMUM ELECTRICAL CLEARANCE IS 6 INCHES FROM THE OCS WIRE.
4. INTERMEDIATE STAGGERS NOT GIVEN. INSTALL SUPPORT ASSEMBLIES DIRECTLY IN LINE FROM ADJACENT CW REGISTRATION POINTS. THERE ARE NO CONTACT WIRE RADIAL LOADS AT THESE LOCATIONS.
5. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWGS JOD112 AND JOD114.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
9. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
10. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
11. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
12. CONTRACTOR TO MEASURE THE DISTANCE BETWEEN THE RAIL LEVEL AND THE SOFFIT AT EACH LOCATION AND MANUFACTURE THE DROP PIPE TO SUIT THE CATENARY HEIGHTS.



TUNNEL SUPPORT FOR MESSENGER WIRE ASSEMBLY TS-9

NTS

SEE NOTE 12

MAXIMUM ASSEMBLY LOADING	
	TS-9
MESSENGER WIRE RADIAL LOAD	50 LBS
CONTACT WIRE RADIAL LOAD	-
VERTICAL LOAD	250 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE		DESCRIPTION	ITEM NO.	PART NO./ REMARKS
TS-9	UNITS			
1	EA	FRAMING CHANNEL HARDWARE	1	
1	EA	MW ROLLER	2	
1	EA	TWO PIN STRAP W/PINS	3	
2	EA	SPOOL INSULATOR	4	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

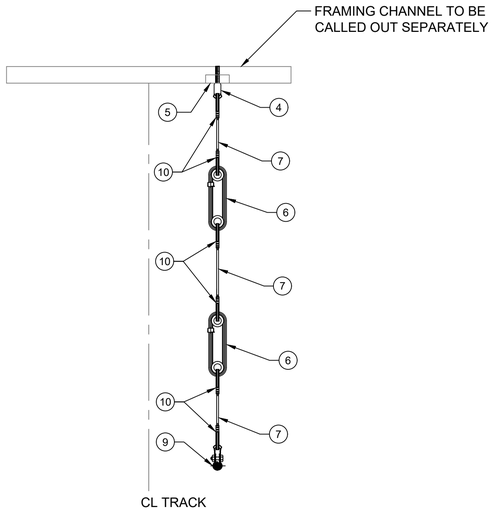
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD442
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TUNNEL SUPPORT ASSEMBLIES
SCFT TS-9

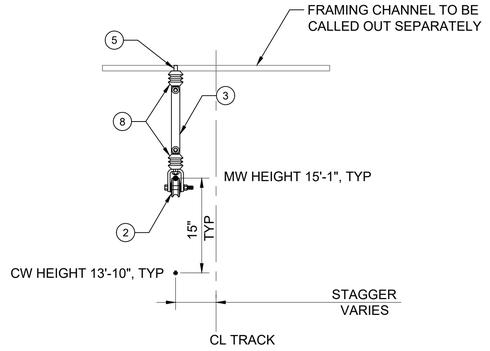
DRAWING No.: **STD-JOD442**
FACILITY ID:
SHEET No.: REV: 1



TUNNEL SUPPORT FOR MESSENGER WIRE ASSEMBLY TS-11

NTS

SEE NOTE 3



TUNNEL SUPPORT FOR MESSENGER WIRE ASSEMBLY TS-12

NTS

SEE NOTE 3

GENERAL NOTES:

1. FOR ABBREVIATIONS, LEGENDS AND SYMBOLS, SEE DWGS JZN001 AND JZN002.
2. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. INTERMEDIATE STAGGERS NOT GIVEN. INSTALL SUPPORT ASSEMBLIES DIRECTLY IN LINE FROM ADJACENT CW REGISTRATION POINTS. THERE ARE NO CONTACT WIRE RADIAL LOADS AT THESE LOCATIONS.
4. MINIMUM ELECTRICAL CLEARANCE IS 6 INCHES FROM THE OCS WIRE.
5. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
6. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
7. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
8. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
9. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
10. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
11. CONTRACTOR TO MEASURE THE DISTANCE BETWEEN THE RAIL LEVEL AND THE SOFFIT AT EACH LOCATION AND MANUFACTURE THE DROP PIPE TO SUIT THE CATENARY HEIGHTS.

MAXIMUM ASSEMBLY LOADING

	TS-11	TS-12
MESSENGER WIRE RADIAL LOAD	50 LBS	50 LBS
CONTACT WIRE RADIAL LOAD	-	-
VERTICAL LOAD	175 LBS	175 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
TS-11	TS-12				
-	-	EA	NOT USED	1	
-	1	EA	MW ROLLER	2	
-	2	EA	TWO HOLE STRAP W / PINS	3	
1	-	EA	EYEBOLT	4	
1	1	EA	FRAMING CHANNEL HARDWARE	5	
2	-	EA	LOOP INSULATOR	6	
3	-	EA	STAINLESS STEEL WIRE	7	LENGTH AS REQ'D
-	2	EA	SPOOL INSULATOR	8	
1	-	EA	MW SUPPORT CLAMP	9	
6	2	EA	WIRE THIMBLE AND CRIMP	10	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: DATE:
REVIEWED BY: DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

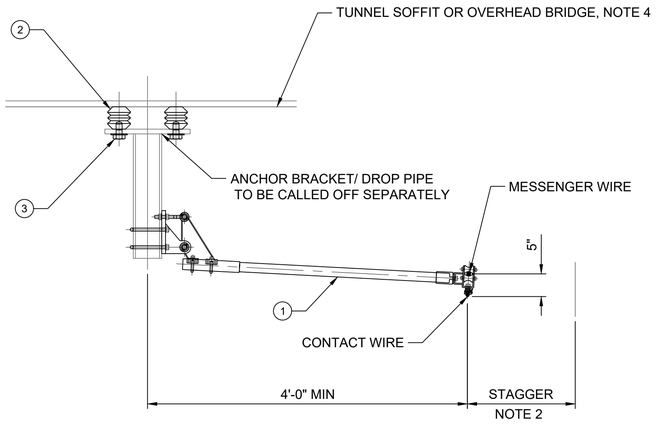
SCALE: NTS
FILENAME: STD-JOD443
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TUNNEL SUPPORT ASSEMBLIES
SCFT TS-11 & TS12

DRAWING No.: **STD-JOD443**
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:08 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD443.DWG



CONTACT WIRE ELASTIC ARM SUPPORT ASSEMBLY TYPE TS-16

NTS

GENERAL NOTES:

1. FOR ABBREVIATIONS, LEGENDS AND SYMBOLS, SEE DWGS JZN001 AND JZN002.
2. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. CONTRACTOR TO COORDINATE THE LOCATION OF THE ASSEMBLY WITH THE CATENARY STAGGERS AND TRACK CENTERLINE TO ENSURE THAT ELECTRICAL CLEARANCES ARE MAINTAINED.
4. CONTRACTOR TO DETERMINE DETAILS OF ANCHORING ASSEMBLY TO THE TUNNEL ROOF OR OVERHEAD BRIDGE. ADDITIONAL REQUIREMENTS WHEN ANCHORING TO WSDOT STRUCTURES TO BE INCLUDED IN SPECIFICATIONS.
5. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWG JOD112 AND JOD114.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
9. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
10. CONTRACTOR SHALL VERIFY STEEL REINFORCEMENT LOCATIONS IN CONCRETE STRUCTURES, PRIOR TO DRILLING AT OCS SUPPORT LOCATIONS. DETAILED REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.
11. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.
12. CONTRACTOR TO MEASURE THE DISTANCE BETWEEN THE RAIL LEVEL AND THE SOFFIT AT EACH LOCATION AND MANUFACTURE THE DROP PIPE TO SUIT THE CATENARY HEIGHTS.

MAXIMUM ASSEMBLY LOADING	
	TS-16
MESSENGER WIRE RADIAL LOAD	100 LBS
CONTACT WIRE RADIAL LOAD	50 LBS
VERTICAL LOAD	200 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE TS-16	UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
1	EA	ELASTIC SUPPORT W/ CW AND MW CLAMPS	1	INSULATED
4	EA	SPOOL INSULATORS	2	
4	EA	BOLT AND WASHER	3	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

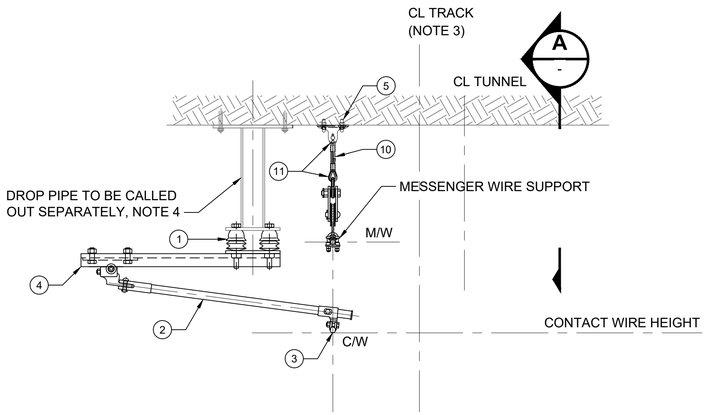
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD444
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

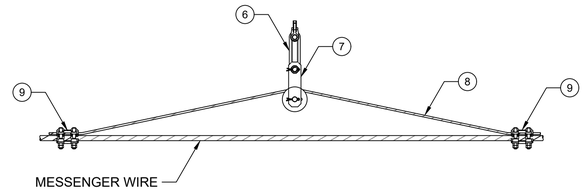
OVERHEAD CATENARY SYSTEM
TUNNEL SUPPORT ASSEMBLY
SCFT TS-16

DRAWING No.: **STD-JOD444**
FACILITY ID:
SHEET No.: REV: 1



TUNNEL SUPPORT AND REGISTRATION ASSEMBLY TS-17

NTS



SECTION A -

NTS

DROP PIPE AND SUPPORT
BRACKET OMITTED FOR CLARITY

GENERAL NOTES:

1. FOR ABBREVIATIONS, LEGENDS AND SYMBOLS, SEE DWGS JZN001 AND JZN002.
2. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. CONTRACTOR TO COORDINATE THE LOCATION OF THE ASSEMBLIES WITH THE CATENARY STAGGERS AND TRACK CENTERLINE TO ENSURE THAT ELECTRICAL CLEARANCES ARE MAINTAINED.
4. CONTRACTOR TO MEASURE THE DISTANCE BETWEEN THE RAIL LEVEL AND THE SOFFIT AT EACH LOCATION AND MANUFACTURE THE PIPE STANCHION TO SUIT THE CATENARY HEIGHTS.
5. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWGS JOD112 AND JOD114.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE. THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
9. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
10. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
11. STEADY ARM LENGTH AND HEELS SETTING TO BE DETERMINED BY THE CONTRACTOR.
12. SIZE AND EMBEDMENT DEPTH OF CONCRETE ANCHORS TO BE DETERMINED BY CONTRACTOR.
13. CONTRACTOR SHALL VERIFY STEEL REIFORCEMENT LOCATIONS IN CONCRETE STRUCTURES, PER SPECIFICATION SECTION 34 23 25 PRIOR TO DRILLING AT OCS SUPPORT LOCATIONS

MAXIMUM ASSEMBLY LOADING	
	TS-17
MESSENGER WIRE RADIAL LOAD	1200 LBS
CONTACT WIRE RADIAL LOAD	750 LBS
VERTICAL LOAD	300 LBS

QUANTITIES EACH TYPE TS-17	UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
4	EA	INSULATOR	1	
1	EA	STEADY ARM	2	INSULATED
1	EA	C/W SWIVEL CLAMP	3	
1	EA	SUPPORT BRACKET	4	
1	EA	BRACKET W/ CONCRETE ANCHORS	5	NOTE 12
1	EA	LOOP INSULATOR	6	
1	EA	BRIDLE PULLEY	7	
1	EA	INSULATED BRIDLE WIRE	8	LENGTH AS REQ'D
2	EA	MESSENGER CLAMP	9	
1	EA	STAINLESS STEEL WIRE	10	LENGTH AS REQ'D
2	EA	THIMBLE AND WIRE CLIPS	11	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

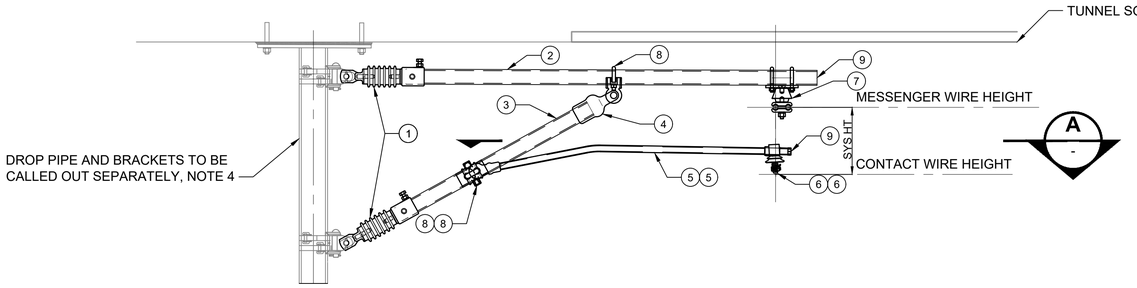
SCALE: NTS
FILENAME: STD-JOD445
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TUNNEL SUPPORT ASSEMBLIES
SCAT TS-17

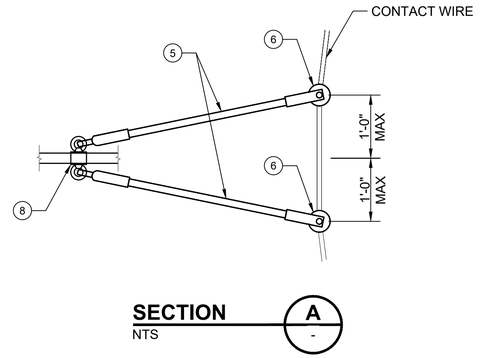
DRAWING No.: **STD-JOD445**
FACILITY ID:
SHEET No.: 1
REV:

01/30/25 | 1:09 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD445.DWG



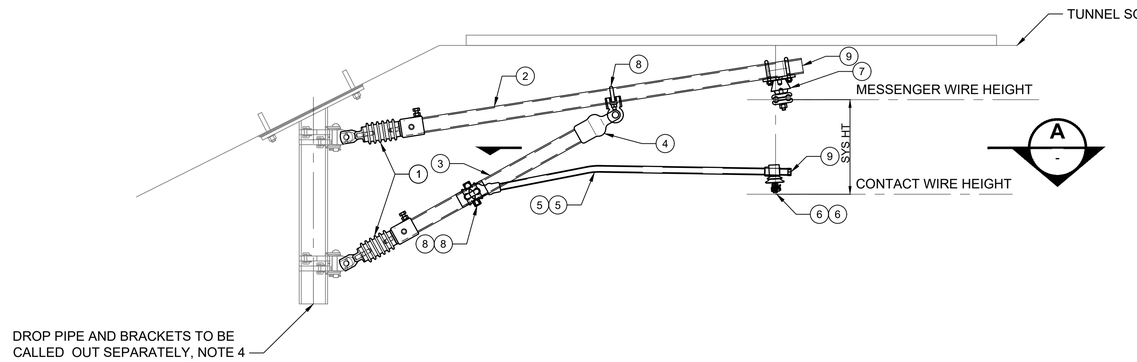
LOW PROFILE TUNNEL SUPPORT ASSEMBLY TS-20 HEAVY LOAD

NTS



SECTION A -

NTS



INCLINED LOW PROFILE TUNNEL SUPPORT ASSEMBLY TS-21 HEAVY LOAD

NTS

SEE NOTE 11

GENERAL NOTES:

1. FOR ABBREVIATIONS, LEGENDS AND SYMBOLS, SEE DWG JZN001 AND JZN002.
2. CATENARY DETAILS INCLUDING STAGGERS, POLE OFFSETS AND WIRE HEIGHTS AT EACH LOCATION TO BE SHOWN ON OCS LAYOUT PLANS AND SCHEDULES.
3. CONTRACTOR TO COORDINATE THE LOCATION OF THE ASSEMBLIES WITH THE CATENARY STAGGERS AND TRACK CENTERLINE TO ENSURE THAT ELECTRICAL CLEARANCES ARE MAINTAINED.
4. CONTRACTOR TO MEASURE THE DISTANCES BETWEEN THE RAIL LEVEL AND THE SOFFIT AT EACH LOCATION AND MANUFACTURE THE DROP PIPE TO SUIT THE CATENARY HEIGHTS.
5. FOR DETAILS OF PANTOGRAPH CLEARANCES, SEE DWG JOD112 AND JOD114.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
7. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
8. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED. WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE, THE CONTRACTOR SHALL UPDATE THE TABLE IN THEIR SUBMISSION OF ASSEMBLY.
9. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
10. THE MAXIMUM LOADS IN THE TABLE ARE THE WORST CASE LOADS THAT INCLUDE WIND AND ICE WHERE APPLICABLE.
11. UNDER HUNG MESSENGER CLAMP SHALL BE DESIGNED FOR UNDER HUNG OPERATIONS AT THE LOADING SPECIFIED. LOADING DIRECTION MAY BE UP TO 20 DEGREES OFF OF HORIZONTAL.
12. STEADY ARM LENGTH AND HEEL SETTING TO BE DETERMINED BY THE CONTRACTOR.

MAXIMUM ASSEMBLY LOADING

	TS-21	TS-20
MESSENGER WIRE RADIAL LOAD	1500 LBS	1500 LBS
CONTACT WIRE RADIAL LOAD	1000 LBS	1000 LBS
VERTICAL LOAD	300 LBS	300 LBS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
TS-21	TS-20				
2	2	EA	INSULATOR	1	
1	1	EA	TOP PIPE	2	LENGTH AS REQ'D
1	1	EA	STRUT PIPE	3	LENGTH AS REQ'D
1	1	EA	CLEVIS FITTING	4	
2	2	EA	STEADY ARM, CURVED	5	LENGTH AS REQ'D
2	2	EA	CONTACT WIRE SWIVEL CLAMP	6	
1	1	EA	UNDER HUNG INSULATED MESSENGER CLAMP	7	NOTE 11
3	3	EA	EYE CLAMP	8	
2	2	EA	PIPE CAP	9	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD446
CONTRACT No.: RTA/LR
DATE: 2/2024

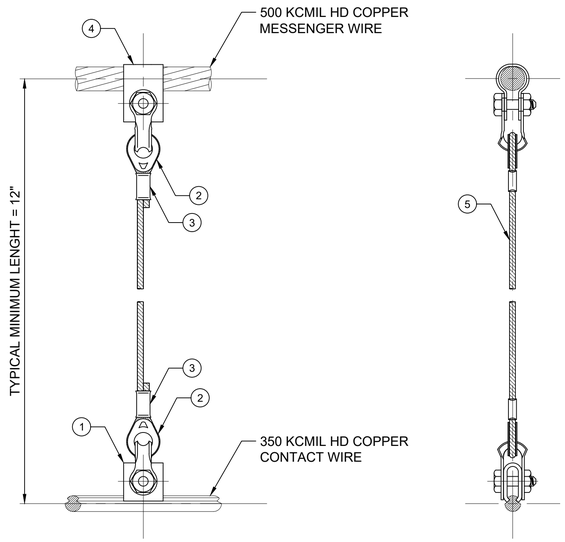
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
LOW PROFILE TUNNEL SUPPORT ASSEMBLIES
SCAT TS-20 & TS-21

DRAWING No.: **STD-JOD446**
FACILITY ID:
SHEET No.: REV: 1

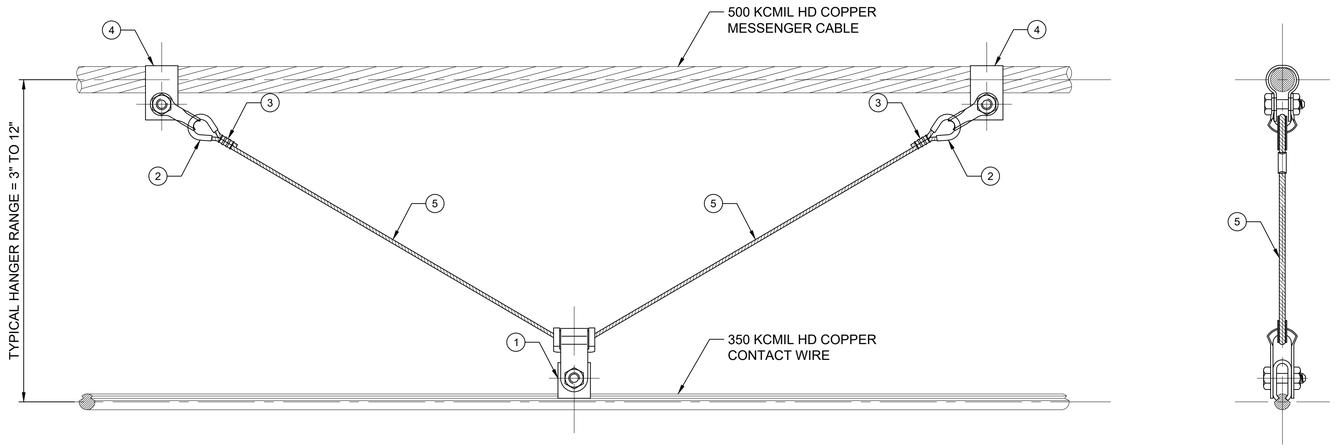
GENERAL NOTES:

1. HANGER LENGTHS TO BE DETERMINED BY CONTRACTOR.
2. HANGERS SHALL BE FLEXIBLE STAINLESS STEEL WIRE ROPE.
3. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
4. CONTRACTOR TO VERIFY ALL QUANTITIES AND SIZES ON THE BILL OF MATERIALS.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
6. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN.



ELEVATION **END VIEW**

HANGER ASSEMBLY HA-1
NTS



ELEVATION **END VIEW**

SHORT HANGER ASSEMBLY HA-2
NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
HA-2	HA-1				
1	1	EA	CONTACT WIRE CLIP	1	
2	2	EA	INSULATED THIMBLE	2	
2	2	EA	COMPRESSION SLEEVE	3	
2	1	EA	MESSENGER CLIP	4	
1	1	LF	FLEXIBLE S/STL HANGER WIRE	5	LENGTH AS REQ'D

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

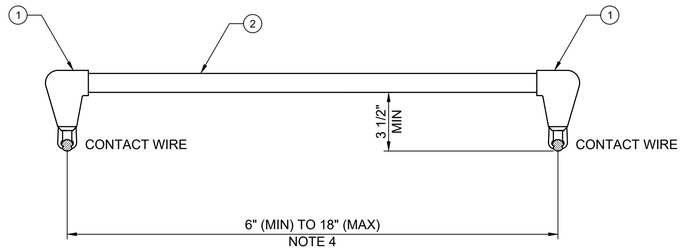
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD500
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

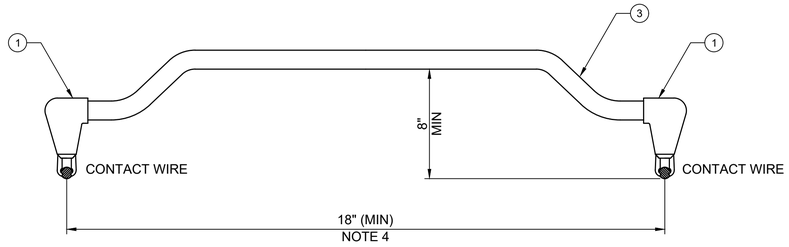
OVERHEAD CATENARY SYSTEM
HANGER ASSEMBLIES
HA-1 & HA-2

DRAWING No.: **STD-JOD500**
FACILITY ID:
SHEET No.: REV: 1



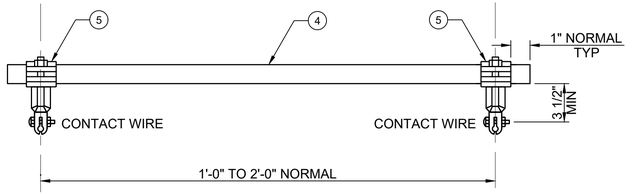
SHORT CONTACT WIRE KNUCKLE ASSEMBLY KN-1

NTS



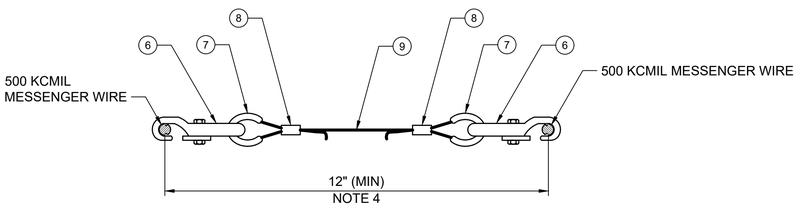
LONG CONTACT WIRE KNUCKLE ASSEMBLY KN-2

NTS



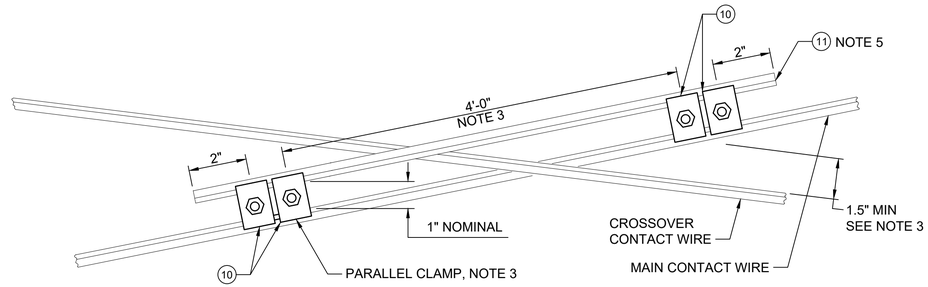
INSULATED KNUCKLE ASSEMBLY KN-3

NTS



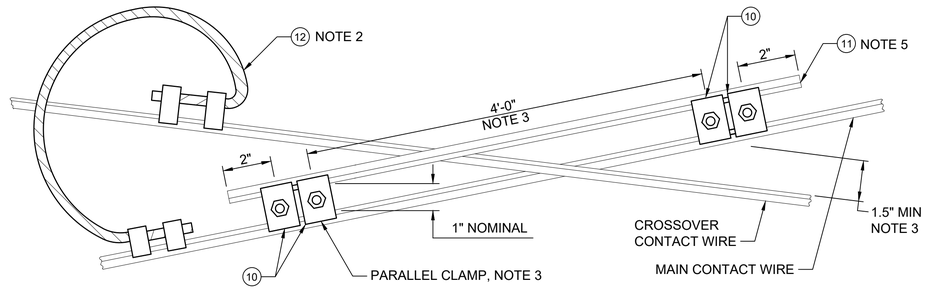
MESSENGER WIRE KNUCKLE ASSEMBLY KN-4

NTS



CROSS CONTACT FOR SIMPLE CATENARY ASSEMBLY CC-1

NTS



SINGLE CONTACT SYSTEM CROSS CONTACT AND JUMPER ASSEMBLY CC-2

NTS

GENERAL NOTES:

1. A FULL CURRENT JUMPER (TYPE JC-2) WILL TYPICALLY BE ALLOCATED IN ASSOCIATION WITH SIMPLE CATENARY CROSS CONTACT ASSEMBLIES AND KNUCKLE ASSEMBLIES ON OCS LAYOUT PLANS.
2. POSITION THE JUMPER BETWEEN THE SINGLE CONTACT WIRES SO IT WILL BE CLEAR OF THE PANTOGRAPH UNDER ALL CONDITIONS.
3. THE LENGTH OF THE BRIDGE ROD OR WIRE SHALL BE INCREASED AS NECESSARY WHEN THE CROSSING ANGLE PRODUCES LESS THAN 1.5" CLEARANCE AT EACH CLAMP.
4. KNUCKLE LENGTH:
   - 4.1. FOR FIXED TERMINATION CATENARY 6" MINIMUM MAY BE USED.
   - 4.2. FOR AUTO-TENSIONED CATENARY A 6" MINIMUM KNUCKLE CAN BE USED ONLY WHERE ALONG TRACK MOVEMENTS ARE IDENTICAL. WHERE THE ALONG TRACK MOVEMENTS OF THE KNUCKLED WIRES ARE NOT IDENTICAL, THE KNUCKLE SHALL BE OF SUFFICIENT LENGTH TO ACCOMMODATE THE DIFFERENTIAL MOVEMENT WITHOUT CAUSING EXCESSIVE LOADINGS ON THE COMPONENTS OR RESTRICTING MOVEMENT. KNUCKLES SHALL BE USED ONLY IN TENSION.
5. IF CONTACT WIRE IS USED FOR THE CROSS CONTACT BRIDGING ROD IT SHALL BE STRAIGHTENED IN THE SHOP. FIELD STRAIGHTENED WIRE SHALL NOT BE USED.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
7. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
8. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
10. THE BILL OF MATERIALS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.

BILL OF MATERIALS

QUANTITIES EACH TYPE						UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
CC-2	CC-1	KN-4	KN-3	KN2	KN-1				
-	-	-	-	2	2	EA	CONTACT WIRE CLAMP	1	
-	-	-	-	-	1	EA	STRAIGHT PIPE	2	LENGTH AS REQ'D
-	-	-	-	1	-	EA	CURVED PIPE	3	LENGTH AS REQ'D
-	-	-	1	-	-	EA	INSULATED ROD	4	LENGTH AS REQ'D
-	-	-	2	-	-	EA	CONTACT WIRE CLAMP	5	
-	-	2	-	-	-	EA	MESSENGER CLAMP	6	
-	-	2	-	-	-	EA	THIMBLE	7	
-	-	2	-	-	-	EA	COMPRESSION SLEEVE	8	
-	-	1	-	-	-	EA	FLEXIBLE SS WIRE	9	LENGTH AS REQ'D
4	4	-	-	-	-	EA	PARALLEL GROOVE CLAMP	10	
1	1	-	-	-	-	EA	CONTACT WIRE, 350 KCMIL	11	LENGTH AS REQ'D
1	-	-	-	-	-	EA	FULL FEEDING JUMPER	12	ASSEMBLY TYPE JC-1

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

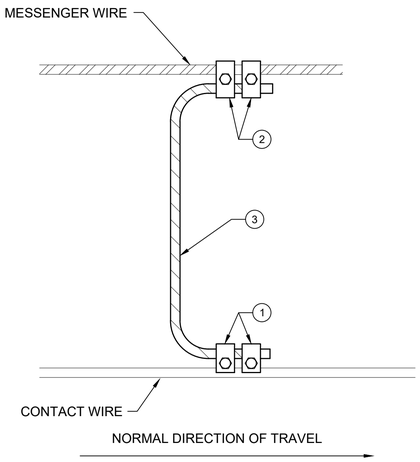
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD501
CONTRACT No.: RTA/LR
DATE: 2/2024

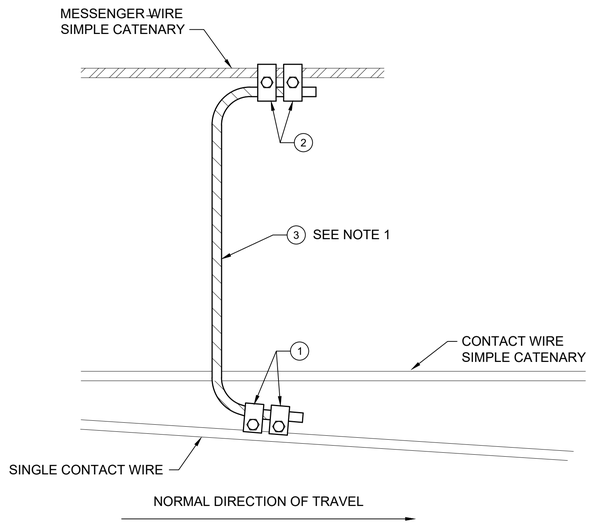
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
IN-SPAN ASSEMBLIES
CC-1, CC-2, KN-1, KN-2, KN-3 & KN-4

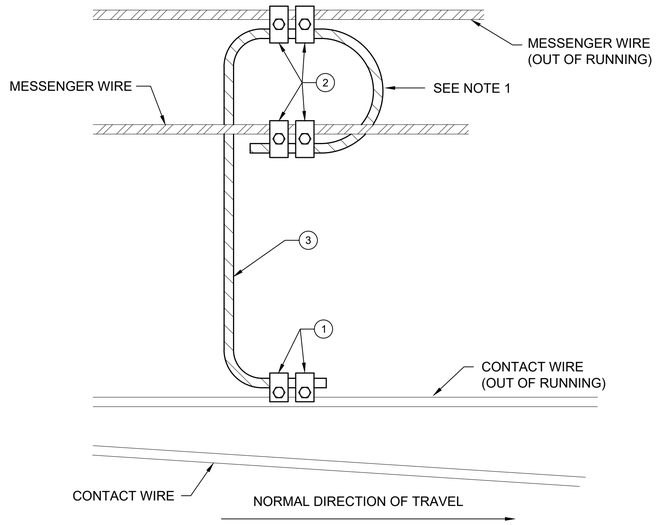
DRAWING No.: STD-JOD501
FACILITY ID:
SHEET No.: 1 REV:



FOR SIMPLE CATENARY
IN SPAN JUMPER JS-1
NTS



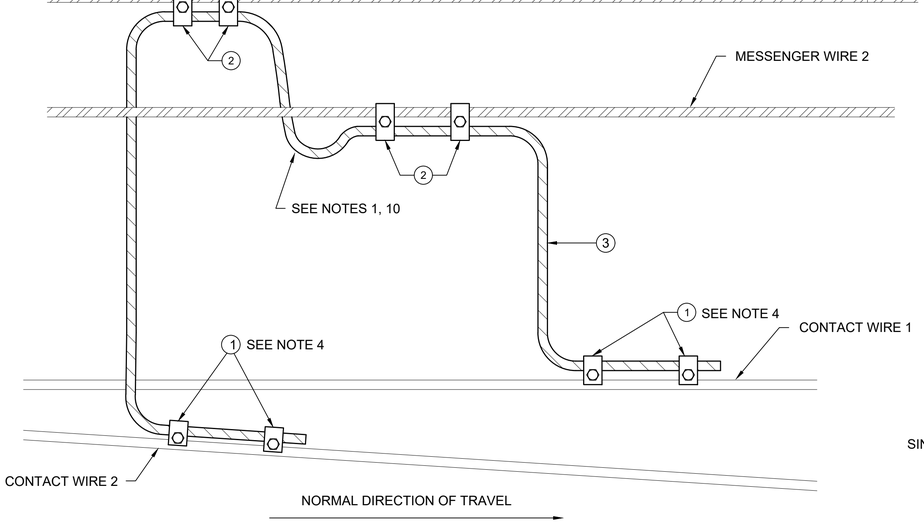
SIMPLE CATENARY TO SINGLE CONTACT SYSTEM
FULL CURRENT JUMPER JP-1
NTS



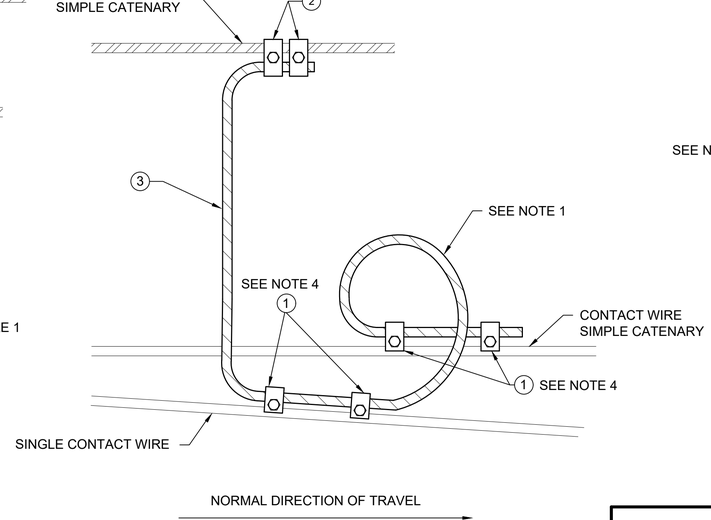
SIMPLE CATENARY TO SINGLE CONTACT SYSTEM
POTENTIAL EQUALIZING JUMPER JP-2
NTS

GENERAL NOTES:

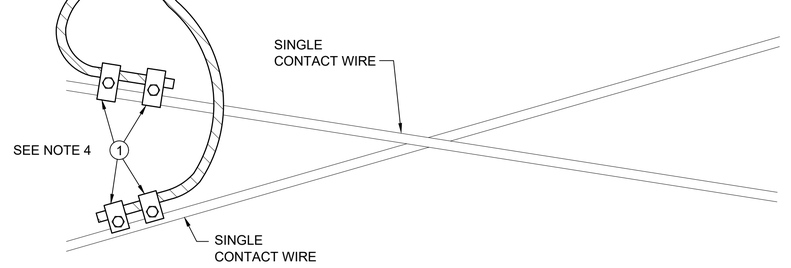
1. WHEN INSTALLING A JUMPER BETWEEN WIRES THE CONTRACTOR SHALL DRAPE THE JUMPER WIRE SUFFICIENTLY TO PROVIDE FOR DIFFERENTIAL ALONG TRACK MOVEMENT OF THE TENSION LENGTHS. ANY BENDS IN JUMPER WIRE SHALL BE NO LESS THAN 6" RADIUS.
2. MESSENGER WIRE IS 500 KCMIL HD COPPER 19 STRAND. CONTACT WIRE IS 350 KCMIL HD COPPER SOLID GROOVED.
3. CUT ENDS OF JUMPER WIRE TO PROTRUDE TYPICALLY 1" BEYOND ADJACENT CLAMP. ENDS TO BE BOUND TO PREVENT FRAYING.
4. THE CONTRACTOR MAY SUBSTITUTE ONE TWO-BOLT CONTACT/JUMPER CLAMP FOR EACH PAIR OF CLAMPS SHOWN.
5. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
6. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
7. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
8. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
9. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
10. INSTALL AS NOTED:
    MESSENGER WIRE 1 TO CONTACT WIRE 2.
    MESSENGER WIRE 2 TO CONTACT WIRE 1.



CATENARY SYSTEM TO CATENARY SYSYEM
FULL CURRENT JUMPER JC-2
NTS



SIMPLE CATENARY TO SINGLE CONTACT SYSTEM
FULL CURRENT JUMPER JC-3
NTS



SINGLE CONTACT SYSTEM FULL JUMPER JC-1
NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE						UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
JS-1	JP-1	JP-2	JC-1	JC-2	JC-3				
2	2	2	4	4	4	EA	CLAMP, CONTACT/JUMPER	1	NOTE 4
2	2	4	-	4	2	EA	CLAMP, MESSENGER/JUMPER	2	
1	1	1	1	1	1	EA	JUMPER WIRE, 350 KCMIL CLASS G OR H	3	LENGTH AS REQ'D

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

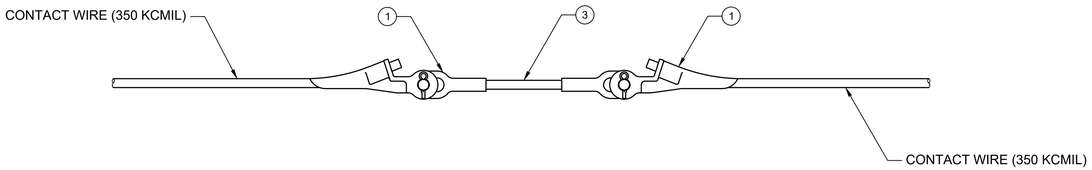
LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD502
CONTRACT No.: RTA/LR
DATE: 2/2024

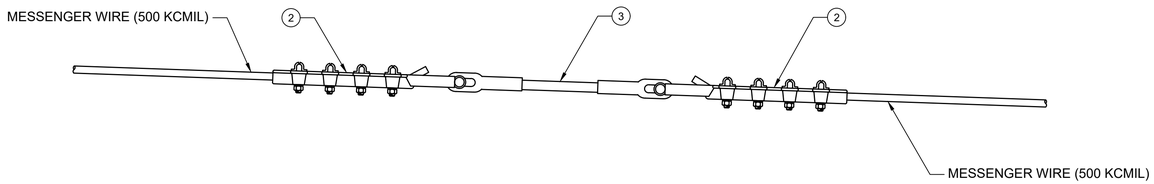
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
JUMPER ASSEMBLIES
JC-1, JC-2, JC-3, JP-1, JP-2 & JS-1

DRAWING No.: STD-JOD502
FACILITY ID:
SHEET No.: REV: 1



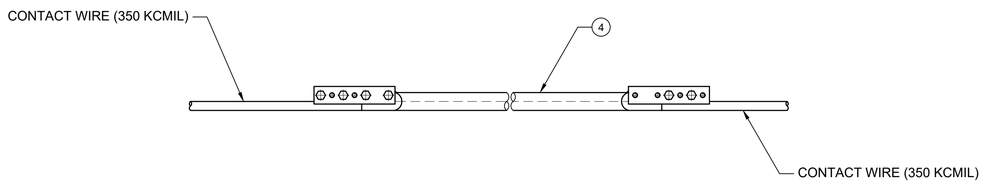
CONTACT WIRE IN-SPAN INSULATION ASSEMBLY IN-1

NTS



MESSENGER IN-SPAN INSULATION ASSEMBLY IN-2

NTS

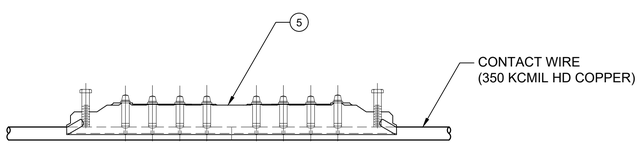


CONTACT WIRE OVERLAP IN-SPAN INSULATION ASSEMBLY IN-3

NTS

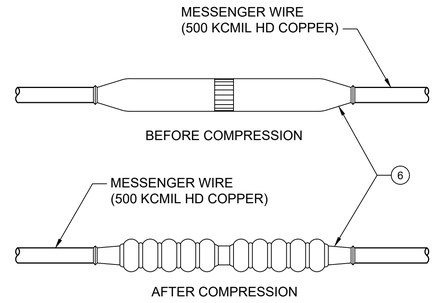
GENERAL NOTES:

1. ALL INSULATORS, END CLAMPS AND SPLICES SHALL BE DESIGNED TO ACCOMMODATE MESSENGER AND CONTACT WIRE MAXIMUM TENSIONS TOGETHER WITH MINIMUM SPECIFIED SAFETY FACTORS.
2. LOCATION OF IN-SPAN INSULATION TO BE SHOWN ON OCS LAYOUT PLANS.
3. FOR CONDUCTOR TENSIONS AND DETAILS SEE TECHNICAL DWGS JOD100, JOD101.
4. A SWIVEL LINK MAY BE ADDED BETWEEN THE CONTACT WIRE CLAMPS OR MESSENGER WIRE CLAMPS AND THE INSULATORS TO PREVENT THE OUT OF RUNNING CATENARY FROM TWISTING.
5. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
6. ASSEMBLY IN-1 SHALL NOT BE INSTALLED WHERE LESS THAN 6" VERTICAL CLEARANCE WILL OCCUR ABOVE A PANTOGRAPH. INSTEAD USE ASSEMBLY IN-3.
7. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
8. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
9. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.



CONTACT WIRE SPLICE ASSEMBLY SPL-1

NTS



MESSENGER WIRE SPLICE ASSEMBLY SPL-2

NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE					UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
SPL-2	SPL-1	IN-3	IN-2	IN-1				
-	-	-	-	2	EA	CONTACT WIRE DEAD END	1	
-	-	-	2	-	EA	MESSENGER DEAD END	2	
-	-	-	1	1	EA	STRAIN INSULATOR	3	
-	-	1	-	-	EA	CONTACT WIRE INSULATOR	4	
-	1	-	-	-	EA	CONTACT WIRE SPLICE	5	
1	-	-	-	-	EA	MESSENGER WIRE SPLICE	6	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

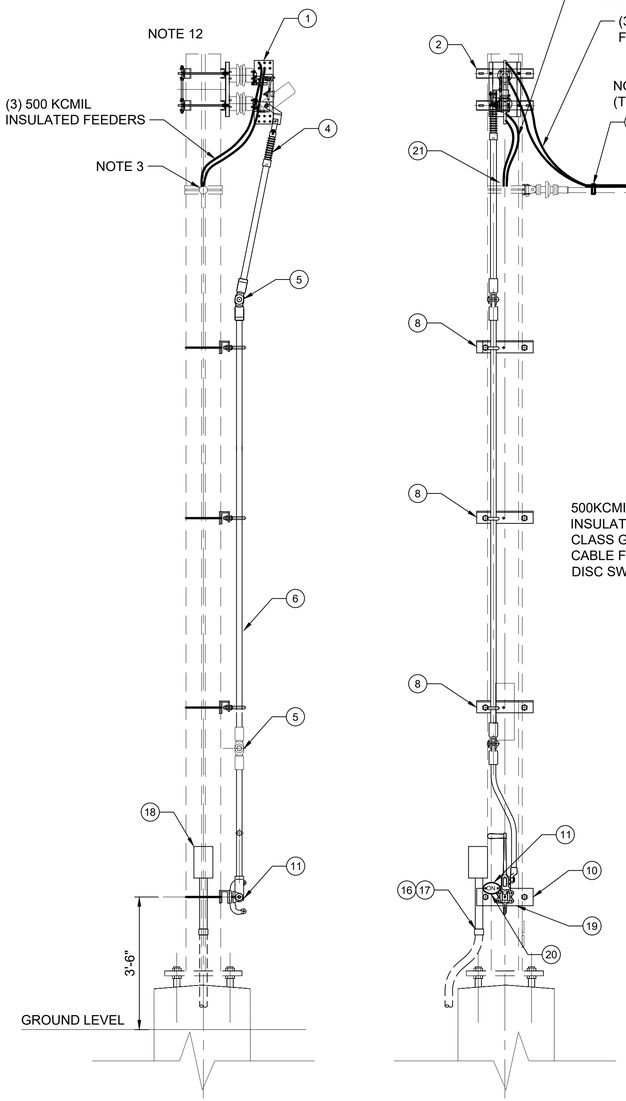
SOUNDTRANSIT

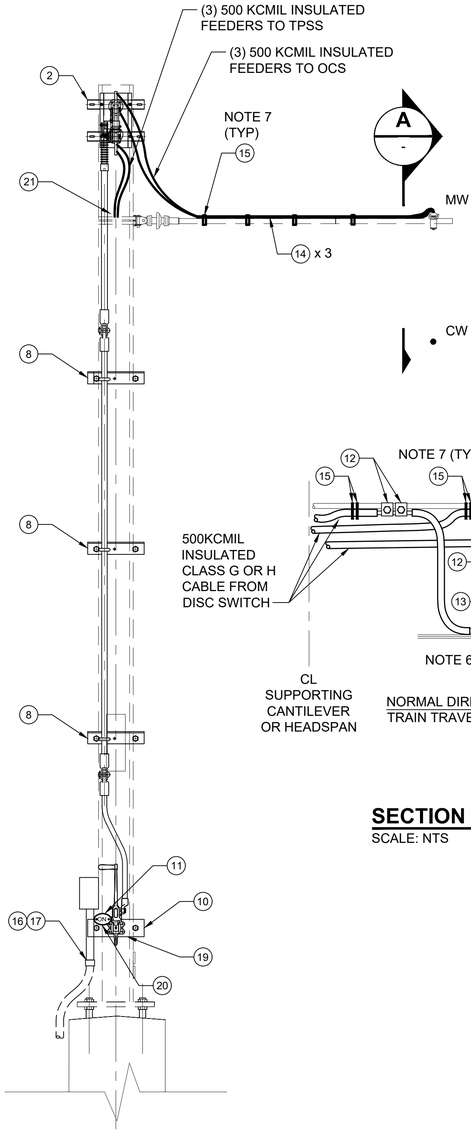
SCALE: NTS
FILENAME: STD-JOD503
CONTRACT No.: RTA/LR
DATE: 2/2024

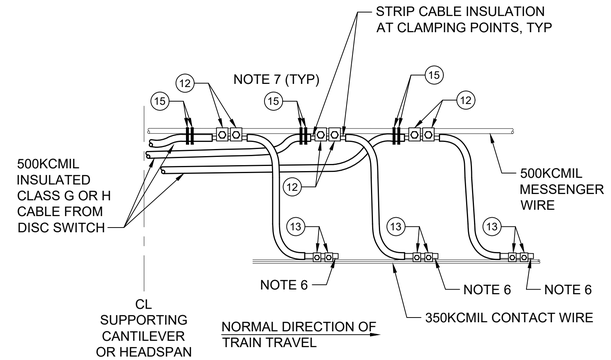
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
IN-SPAN INSULATORS AND SPLICE ASSEMBLIES
IN-1, IN-2, IN-3, SPL -1, & SPL-2

DRAWING No.: STD-JOD503
FACILITY ID:
SHEET No.: 1 REV:

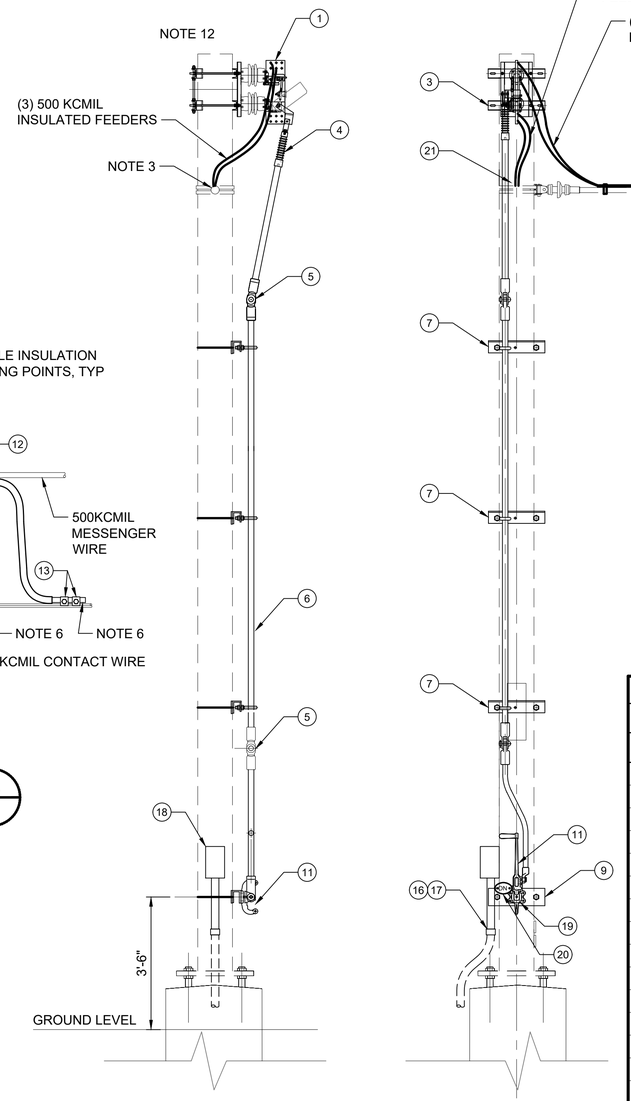


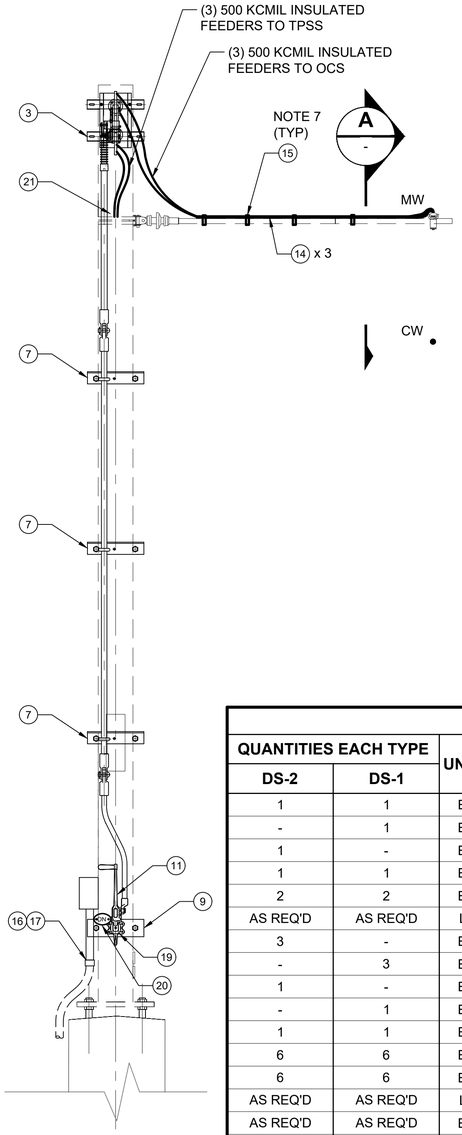




SECTION A
SCALE: NTS

FEEDER DISCONNECT FOR WIDE FLANGE POLE DS-1
NTS





FEEDER DISCONNECT SWITCH FOR TUBULAR POLE DS-2
NTS

GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. THE CONTRACTOR SHALL INCLUDE CABLE SUPPORTS WHERE CABLE WEIGHT MAY AFFECT SWITCH OPERATION.
3. 4" CONDUITS ARE PART OF WIDE FLANGE FEEDER POLE ASSEMBLIES. (FEEDER SPOUTS ARE PART OF TUBULAR FEEDER POLE ASSEMBLIES.)
4. TERMINATE HANDLE INDICATOR CABLE AT SCADA JUNCTION BOX.
5. BEFORE ASSEMBLY, CLAMPS ARE TO BE WIRE BRUSH CLEANED, THEN GREASED WITH CONDUCTIVE GREASE ACCORDING TO CLAMP MANUFACTURER.
6. WIRE ENDS TO BE TIED BEFORE CUTTING AND POSITIONED TO PROTRUDE BEYOND CLAMPS BY 1".
7. CABLES AND CLAMPS TO BE INSTALLED ALLOWING FOR ALONG TRACK WIRING MOVEMENT, AND SECURED AGAINST DROOPING BELOW THE LEVEL OF THE CONTACT WIRE WHEN UPLIFTED 3". (INSULATED CABLE SUPPORT REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.)
8. JUMPER WIRES CONNECTED TO THE CONTACT WIRE SHALL NOT BE BENT TO LESS THAN 6" RADIUS.
9. CABLE MUST NOT BE TIED TO ANY ADJACENT INSULATORS.
10. HANDLE SHALL BE IN THE DOWN POSITION WHEN THE SWITCH IS OPEN.
11. INSTALL PROVISIONS TO PAD LOCK SWITCH IN OPEN AND CLOSED POSITIONS.
12. POLE, CANTILEVER/SUPPORT ASSEMBLY AND SURGE ARRESTER TO BE CALLED OFF SEPARATELY.
13. CONTRACTOR TO COORDINATE CABLE ROUTING WITH THE OCS LAYOUT PLANS AND SECTIONALIZING DIAGRAM.

BILL OF MATERIALS

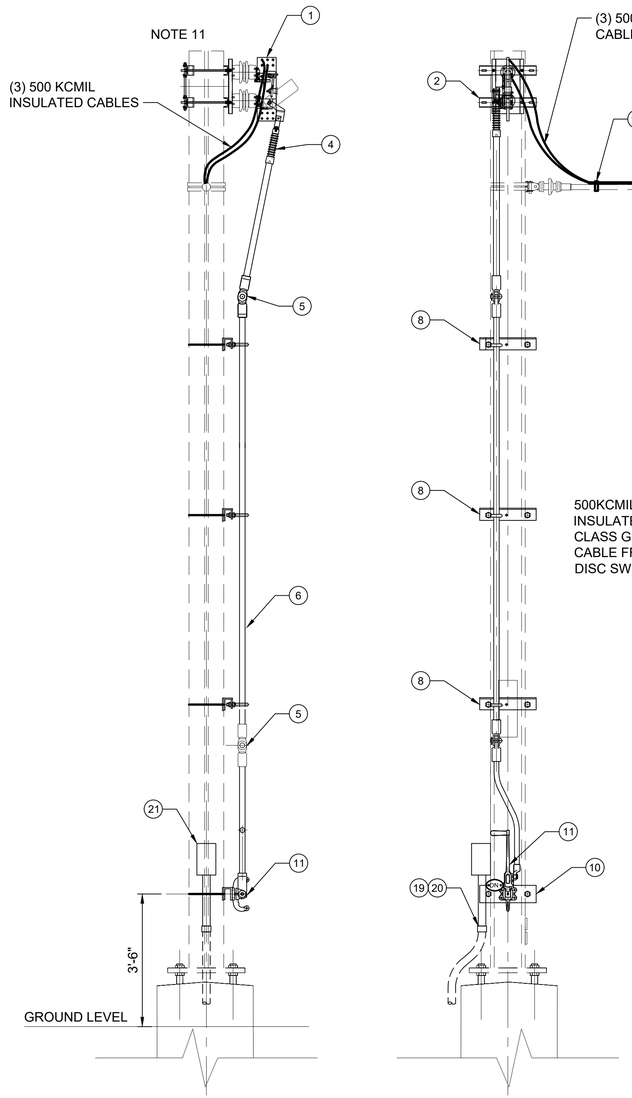
QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
DS-2	DS-1				
1	1	EA	SWITCH ASSY, 2000 AMP	1	
-	1	EA	SWITCH SUPPORT, WF POLE	2	
1	-	EA	SWITCH SUPPORT, TUBULAR POLE	3	
1	1	EA	INSULATED PIPE	4	
2	2	EA	PIPE LINKAGE	5	
AS REQ'D	AS REQ'D	LF	OPERATING PIPE	6	
3	-	EA	PIPE SUPPORT, TUBULAR POLE	7	
-	3	EA	PIPE SUPPORT, WF POLE	8	
1	-	EA	HANDLE SUPPORT, TUBULAR POLE	9	
-	1	EA	HANDLE SUPPORT, WF POLE	10	
1	1	EA	OPERATING HANDLE ASSY	11	
6	6	EA	CABLE FEEDER/MESSENGER CLAMP	12	
6	6	EA	FEEDER/CONTACT CLAMP	13	
AS REQ'D	AS REQ'D	LF	FEEDER CABLE, 500KCMIL	14	2400V INSULATED
AS REQ'D	AS REQ'D	EA	INSULATED CABLE SUPPORT	15	
AS REQ'D	AS REQ'D	LF	CONDUIT	16	
AS REQ'D	AS REQ'D	EA	PIPE STRAP FOR CONDUIT	17	
1	1	EA	SCADA JUNCTION BOX	18	NOTE 4
AS REQ'D	AS REQ'D	EA	INTERLOCK	19	
1	1	EA	HANDLE INDICATOR	20	
1	1	EA	STRAIN RELIEF BUSHING	21	WATERTIGHT

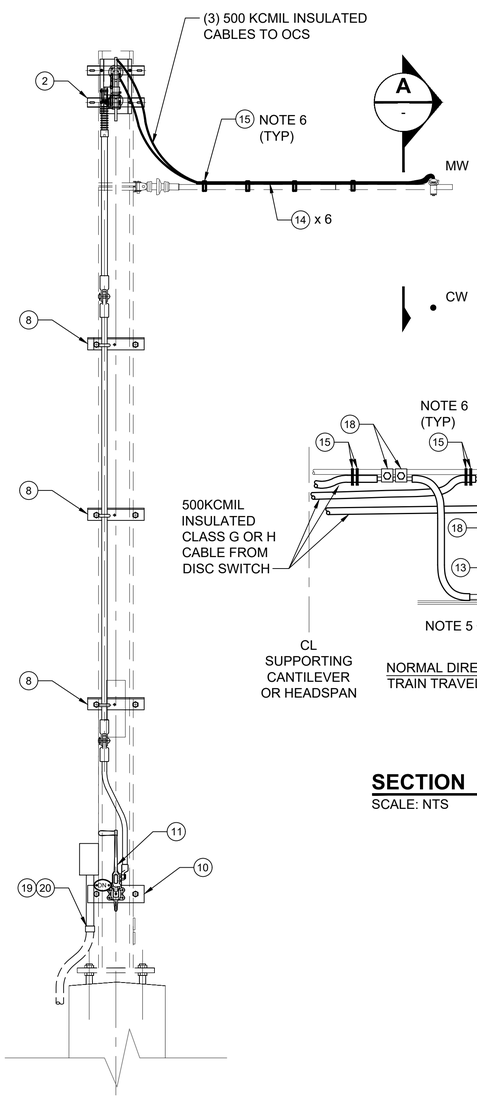
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

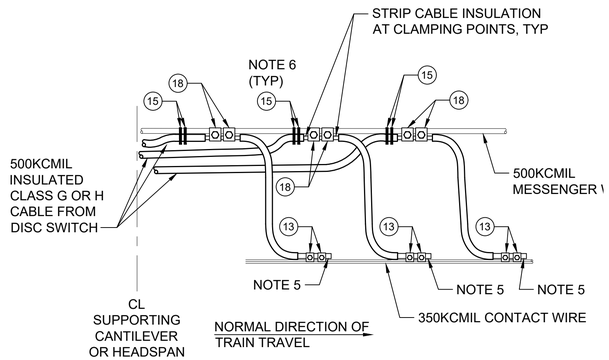
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD510
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
POLE MOUNTED FEEDER DISCONNECT ASSEMBLIES
DS-1 & DS-2

DRAWING No.: STD-JOD510
FACILITY ID:
SHEET No.: REV: 1

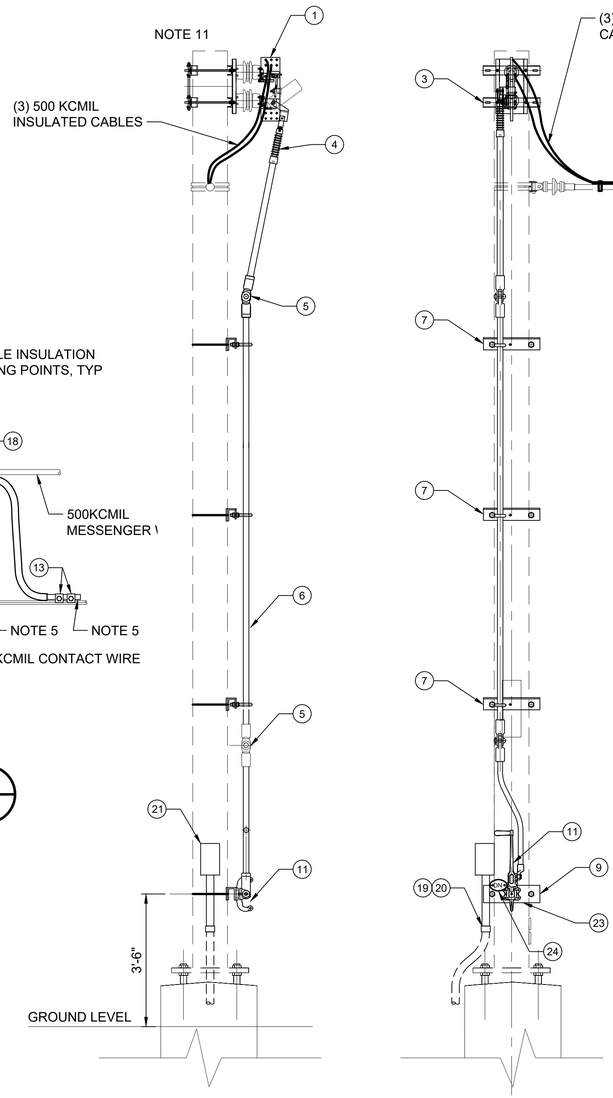


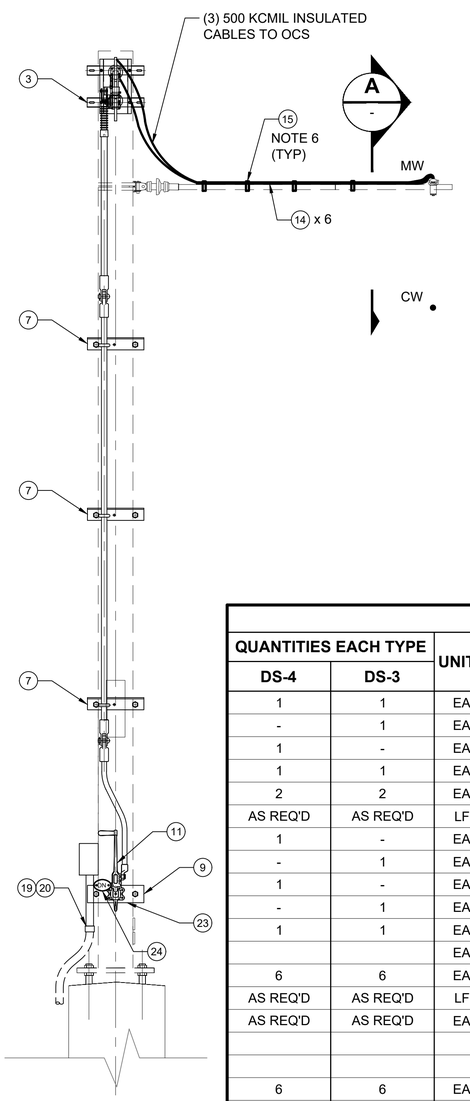




SECTION A
SCALE: NTS

BYPASS SWITCH FOR WIDE FLANGE POLE DS-3
NTS





BYPASS SWITCH FOR TUBULAR POLE DS-4
NTS

GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. THE CONTRACTOR SHALL INCLUDE CABLE SUPPORTS WHERE CABLE WEIGHT MAY AFFECT SWITCH OPERATION.
3. TERMINATE HANDLE INDICATOR CABLE AT SCADA JUNCTION BOX.
4. BEFORE ASSEMBLY, CLAMPS ARE TO BE WIRE BRUSH CLEANED, THEN GREASED WITH CONDUCTIVE GREASE ACCORDING TO CLAMP MANUFACTURER.
5. WIRE ENDS TO BE TIED BEFORE CUTTING AND POSITIONED TO PROTRUDE BEYOND CLAMPS BY 1".
6. CABLES AND CLAMPS TO BE INSTALLED ALLOWING FOR ALONG TRACK WIRING MOVEMENT, AND SECURED AGAINST DROOPING BELOW THE LEVEL OF THE CONTACT WIRE WHEN UPLIFTED 3". INSULATED CABLE SUPPORT REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.
7. JUMPER WIRES CONNECTED TO THE CONTACT WIRE SHALL NOT BE BENT TO LESS THAN 6" RADIUS.
8. CABLE MUST NOT BE TIED TO ANY ADJACENT INSULATORS.
9. HANDLE SHALL BE IN THE DOWN POSITION WHEN THE SWITCH IS OPEN.
10. INSTALL PROVISIONS TO PAD LOCK SWITCH IN OPEN AND CLOSED POSITIONS.
11. POLE CANTILEVER/SUPPORT ASSEMBLY AND SURGE ARRESTERS TO BE CALLED OFF SEPARATELY.
12. CONTRACTOR TO COORDINATE CABLE ROUTING WITH THE OCS LAYOUT PLANS AND SECTIONALIZING DIAGRAM.

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
DS-4	DS-3				
1	1	EA	SWITCH ASSY, 2000 AMP	1	
-	1	EA	SWITCH SUPPORT, WF POLE	2	
1	-	EA	SWITCH SUPPORT, TUBULAR POLE	3	
1	1	EA	INSULATED PIPE	4	
2	2	EA	PIPE LINKAGE	5	
AS REQ'D	AS REQ'D	LF	OPERATING PIPE	6	
1	-	EA	PIPE SUPPORT, TUBULAR POLE	7	
-	1	EA	PIPE SUPPORT, WF POLE	8	
1	-	EA	HANDLE SUPPORT, TUBULAR POLE	9	
-	1	EA	HANDLE SUPPORT, WF POLE	10	
1	1	EA	OPERATING HANDLE ASSY	11	
		EA	NOT USED	12	
6	6	EA	CLAMP CONTACT	13	
AS REQ'D	AS REQ'D	LF	FEEDER CABLE, 500KCMIL	14	2400V INSULATED
AS REQ'D	AS REQ'D	EA	INSULATED CABLE SUPPORT	15	
			NOT USED	16	
			NOT USED	17	
6	6	EA	CLAMP, FEEDER TO MESSENGER	18	
AS REQ'D	AS REQ'D	LF	CONDUIT	19	
AS REQ'D	AS REQ'D	EA	PIPE STRAP FOR CONDUIT	20	
1	1	EA	SCADA JUNCTION BOX	21	NOTE 3
AS REQ'D	AS REQ'D	EA	INTERLOCK	22	
1	1	EA	HANDLE INDICATOR	23	

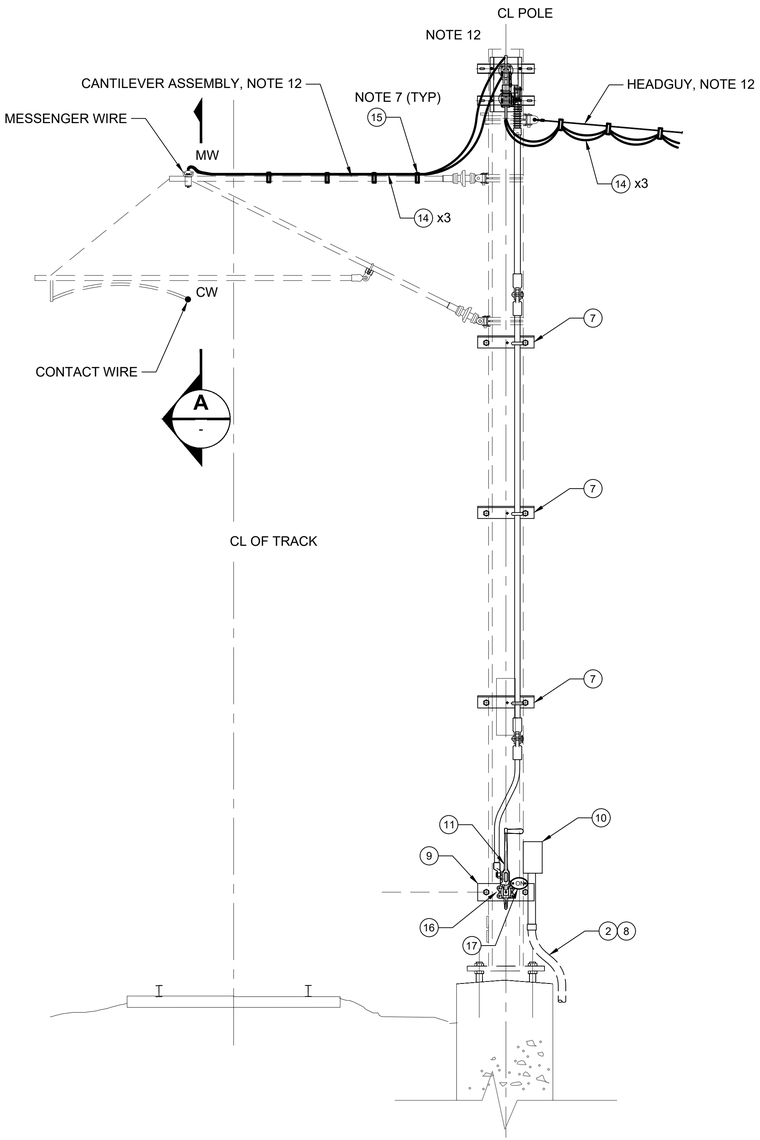
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

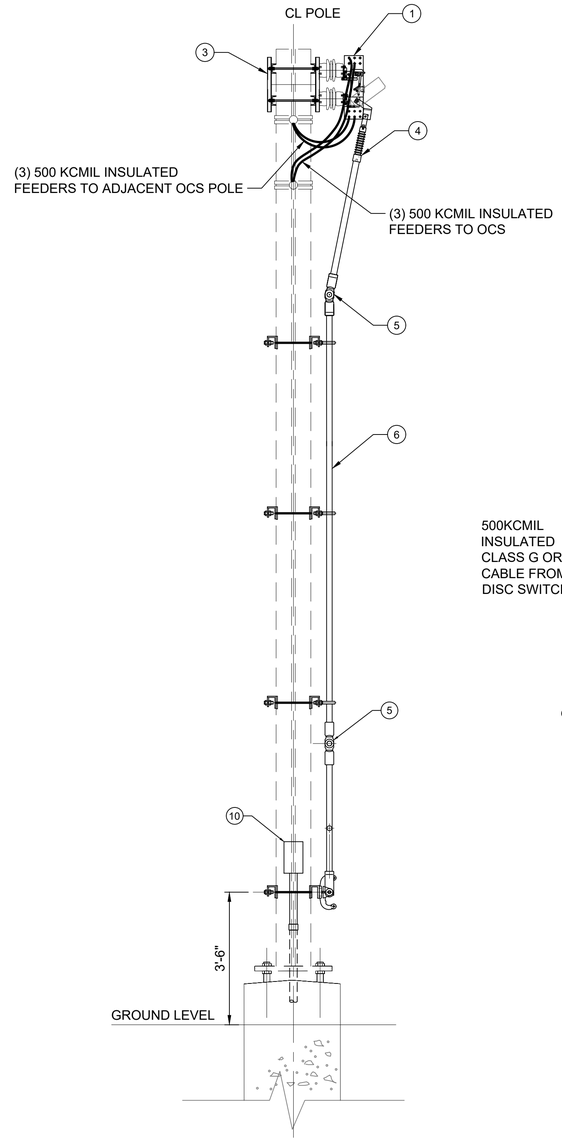
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD511
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
POLE MOUNTED BYPASS DISCONNECT ASSEMBLIES
DS-3 & DS-4

DRAWING No.: STD-JOD511
FACILITY ID:
SHEET No.: REV: 1

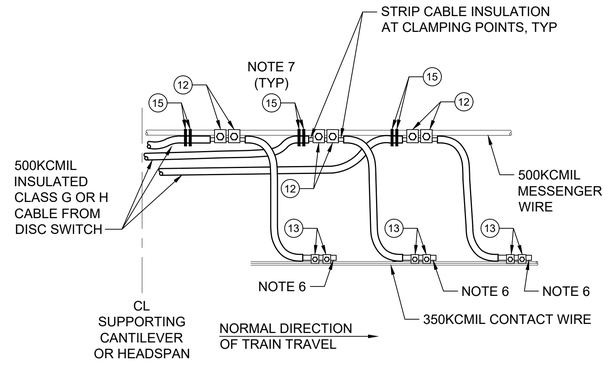
01/30/25 | 1:10 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD511.DWG





BYPASS SWITCH ASSEMBLY DS-5

NTS



SECTION A -

NTS

GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. THE CONTRACTOR SHALL INCLUDE CABLE SUPPORTS WHERE CABLE WEIGHT MAY AFFECT SWITCH OPERATION.
3. 4" CONDUITS ARE PART OF WIDE FLANGE POLE ASSEMBLIES.
4. TERMINATE HANDLE INDICATOR CABLE AT SCADA JUNCTION BOX.
5. BEFORE ASSEMBLY, CLAMPS ARE TO BE WIRE BRUSH CLEANED, THEN GREASED WITH CONDUCTIVE GREASE ACCORDING TO CLAMP MANUFACTURER.
6. WIRE ENDS TO BE TIED BEFORE CUTTING AND POSITIONED TO PROTRUDE BEYOND CLAMPS BY 1".
7. CABLES AND CLAMPS TO BE INSTALLED ALLOWING FOR A LONG TRACK WIRING MOVEMENT, AND SECURED AGAINST DROOPING BELOW THE LEVEL OF THE CONTACT WIRE WHEN UPLIFTED 3". (INSULATED CABLE SUPPORT REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.)
8. JUMPER WIRES CONNECTED TO THE CONTACT WIRE SHALL NOT BE BENT TO LESS THAN 6" RADIUS.
9. CABLE MUST NOT BE TIED TO ANY ADJACENT INSULATORS.
10. HANDLE SHALL BE IN THE DOWN POSITION WHEN THE SWITCH IS OPEN.
11. INSTALL PROVISIONS TO PAD LOCK SWITCH IN OPEN AND CLOSED POSITIONS.
12. POLE CANTILEVER/SUPPORT ASSEMBLY AND SURGE ARRESTERS TO BE CALLED OFF SEPARATELY.
13. CONTRACTOR TO COORDINATE CABLE ROUTING WITH THE OCS LAYOUT PLANS AND SECTIONALIZING DIAGRAM.

BILL OF MATERIALS

QUANTITIES EACH TYPE DS-5	UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
1	EA	SWITCH ASSY, 2000 AMP, 1500 VOC	1	
AS REQ'D	LF	CONDUIT	2	
1	EA	SWITCH SUPPORT	3	
1	EA	INSULATED PIPE	4	
2	EA	PIPE LINKAGE	5	
AS REQ'D	LF	OPERATING PIPE	6	
3	EA	PIPE SUPPORT	7	
AS REQ'D	EA	PIPE STRAP FOR CONDUIT	8	
1	EA	HANDLE SUPPORT	9	
1	EA	SCADA JUNCTION BOX	10	NOTE 4
1	EA	OPERATING HANDLE ASSY	11	
6	EA	MW CABLE CLAMPS	12	
6	EA	CLAMP, FEEDER TO CONTACT WIRE	13	
AS REQD	LF	FEEDER CABLE, 500KCMIL	14	2400V INSULATED
AS REQD	EA	INSULATED CABLE SUPPORT	15	
1	EA	INTERLOCK	16	
1	EA	HANDLE INDICATOR	17	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

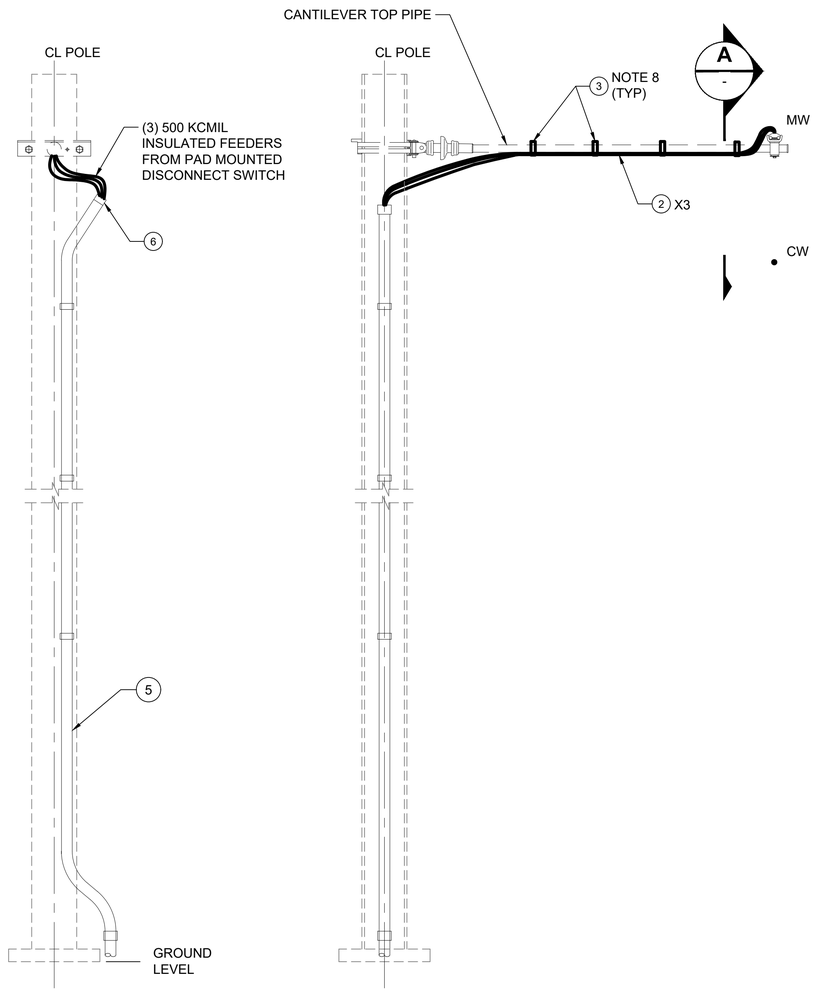
SCALE: NTS
FILENAME: STD-JOD512
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
POLE MOUNTED BYPASS DISCONNECT ASSEMBLY
DS-5

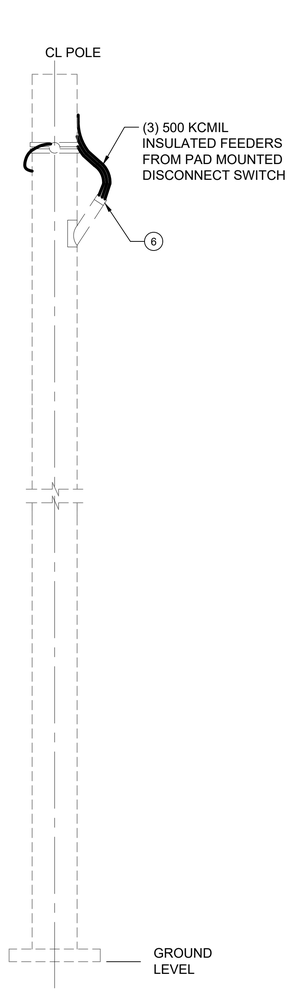
DRAWING No.: **STD-JOD512**
FACILITY ID:
SHEET No.: 1 REV:

01/30/25 | 1:10 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD512.DWG



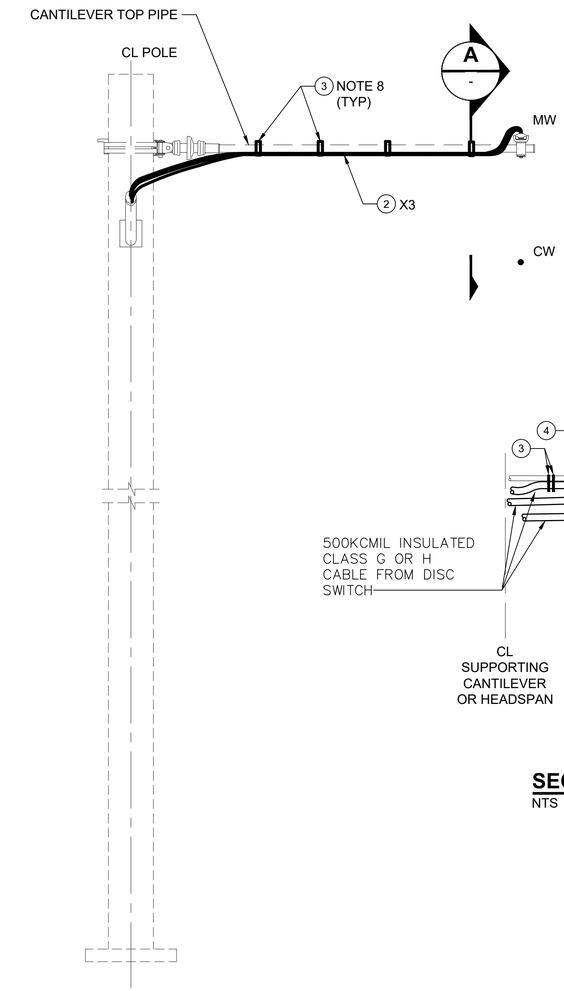
FEEDER CABLE ASSEMBLY FOR WIDE FLANGE POLE AND TUNNEL FC-1

NTS



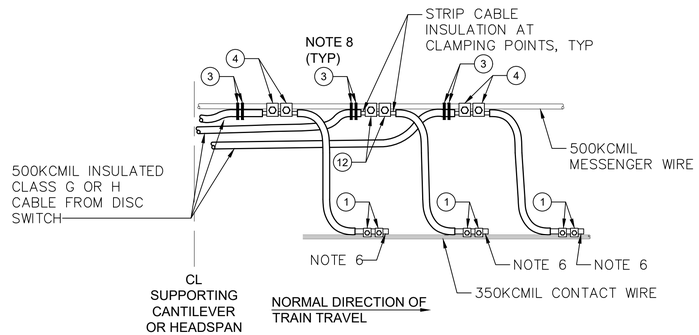
FEEDER CABLE ASSEMBLY FOR TUBULAR POLE FC-2

NTS



GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
3. FOR SYMBOLS LEGEND AND ABBREVIATIONS SEE DWGS JZN001 AND JZN002.
4. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
5. THE CONTRACTOR RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
6. SURGE ARRESTER TO BE CALLED OFF SEPARATELY.
7. WIRE ENDS TO BE TIED BEFORE CUTTING AND POSITIONED TO PROTRUDE BEYOND CLAMPS BY 1".
8. CABLES AND CLAMPS TO BE INSTALLED ALLOWING FOR A LONG TRACK MOVEMENT, AND SECURED AGAINST DROOPING BELOW THE LEVEL OF THE CONTACT WIRE WHEN UPLIFTED 3". INSULATED CABLE SUPPORT REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.



SECTION A
NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE FC-1	QUANTITIES EACH TYPE FC-2	UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
6	6	EA	CLAMP, CONTACT WIRE	1	
AS REQ'D	AS REQ'D	LF	FEEDER CABLE, 500KCMIL	2	2400V INSULATED
AS REQ'D	AS REQ'D	EA	INSULATED CABLE SUPPORT	3	
6	6	EA	CLAMP, FEEDER TO MESSENGER	4	
AS REQ'D	-	LF	4" GRS CONDUIT	5	
1	1	EA	4" STRAIN RELEASE BUSHING	6	WATERPROOF

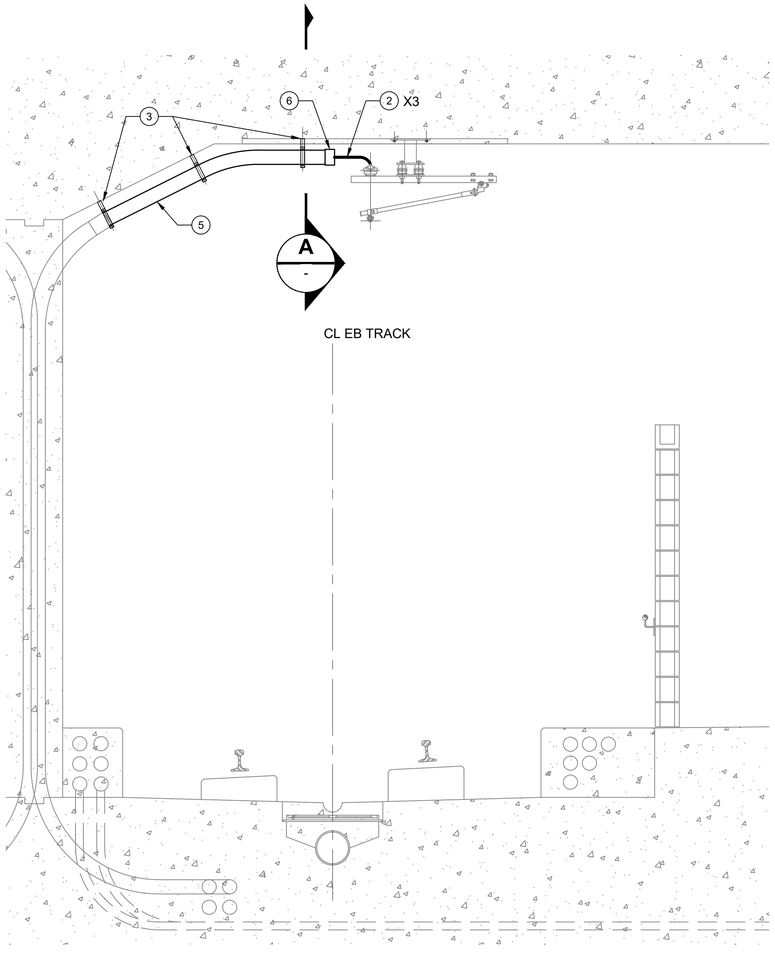
No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SCALE: NTS
FILENAME: STD-JOD513
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
FEEDER CABLE ASSEMBLIES
FC-1 & FC-2

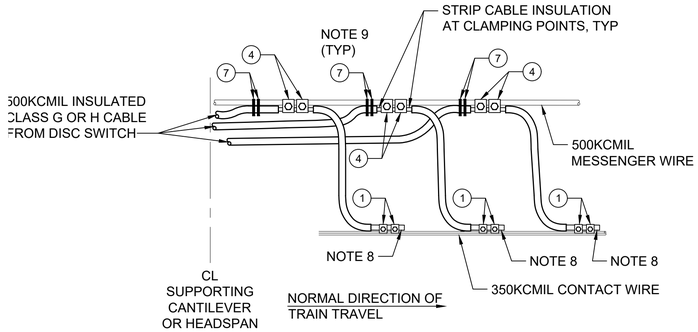
DRAWING No.: **STD-JOD513**
FACILITY ID:
SHEET No.: 1
REV:

01/30/25 | 1:10 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD513.DWG



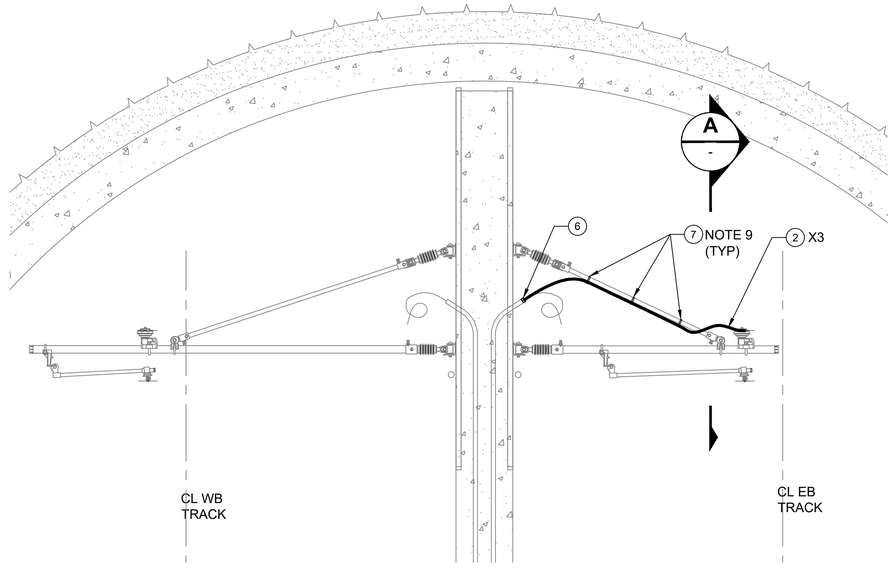
FEEDER CABLE ASSEMBLY FOR TUNNEL FC-3

NTS



SECTION A-

NTS



FEEDER CABLE ASSEMBLY FOR TUNNEL ON CENTER WALL FC-4

NTS

GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
3. FOR SYMBOLS LEGEND AND ABBREVIATIONS SEE DWGS JZN001 AND JZN002.
4. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
6. OCS SUPPORT TO BE CALLED OFF SEPARATELY.
7. CONTRACTOR SHALL VERIFY STEEL REINFORCEMENT LOCATIONS IN CONCRETE STRUCTURES PRIOR TO DRILLING AT OCS SUPPORT LOCATIONS. DETAILED REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.
8. WIRE ENDS TO BE TIED BEFORE CUTTING AND POSITIONED TO PROTRUDE BEYOND CLAMPS BY 1".
9. CABLES AND CLAMPS TO BE SECURED AGAINST DROOPING BELOW THE LEVEL OF THE CONTACT WIRE WHEN UPLIFTED 3". INSULTED CABLE SUPPORT REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./ REMARKS
FC-3	FC-4				
6	6	EA	CLAMP, CONTACT WIRE	1	
AS REQ'D	AS REQ'D	LF	FEEDER CABLE, 500KCMIL	2	2400V INSULATED
AS REQ'D	-	EA	CONDUIT BRACKET	3	W/ CONCRETE ANCHORS
6	6	EA	CLAMP, FEEDER TO MESSENGER	4	
AS REQ'D	-	LF	4" GRS CONDUIT	5	
1	1	EA	4" STRAIN RELIEF BUSHING	6	WATERPROOF
AS REQ'D	AS REQ'D	EA	INSULATED CABLE SUPPORT	7	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

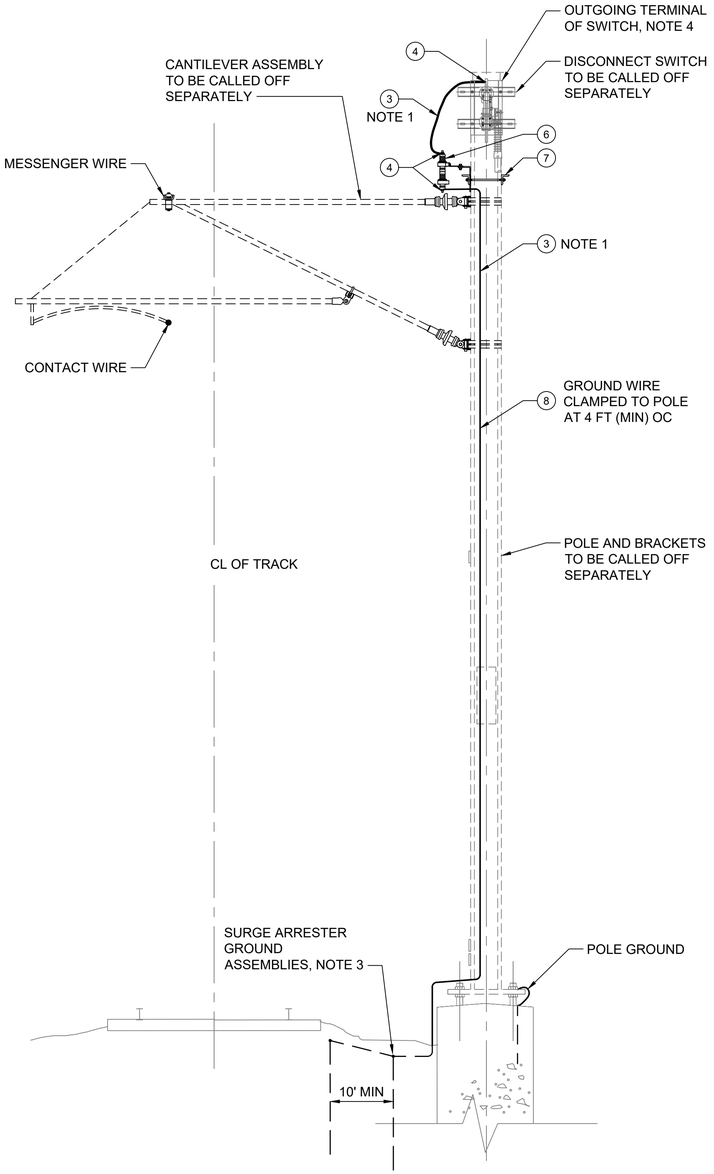
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD514
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
FEEDER CABLE ASSEMBLIES
FC-3 & FC-3

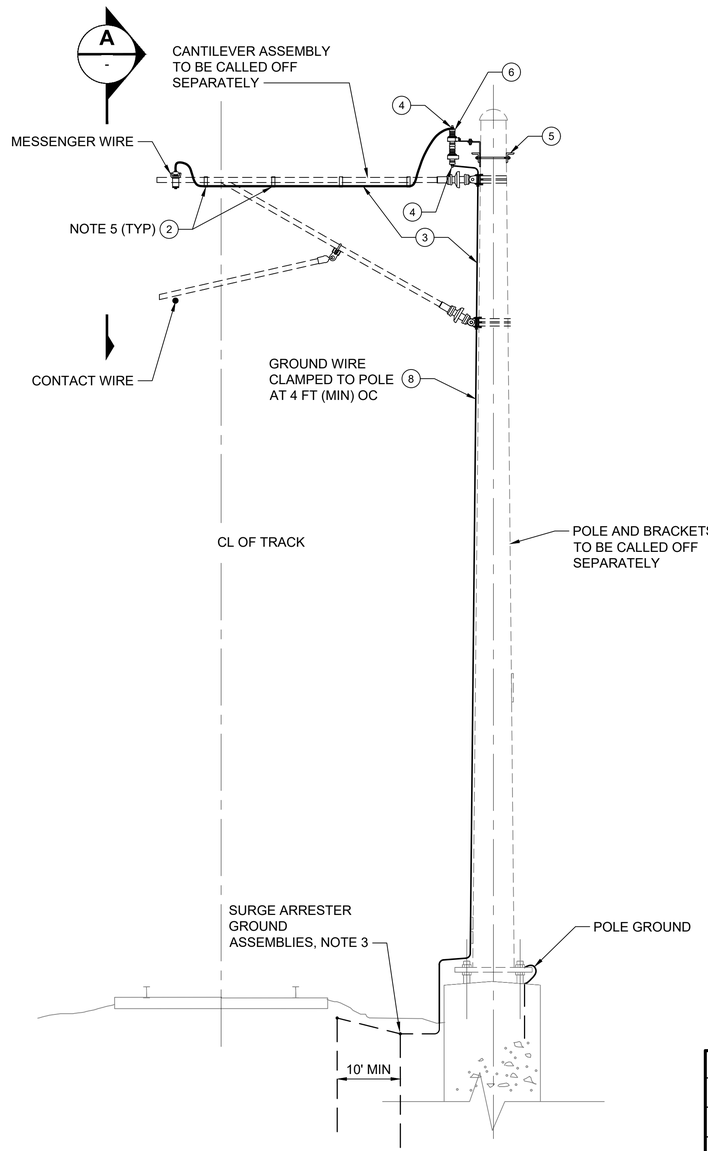
DRAWING No.: **STD-JOD514**
FACILITY ID:
SHEET No.: REV: 1



ASSEMBLY SA-1 FOR WIDE FLANGE POLE (AS SHOWN)
ASSEMBLY SA-2 FOR TUBULAR POLE (SIMILAR)

SURGE ARRESTER ASSEMBLIES FOR DISCONNECT SA-1 AND SA-2

NTS



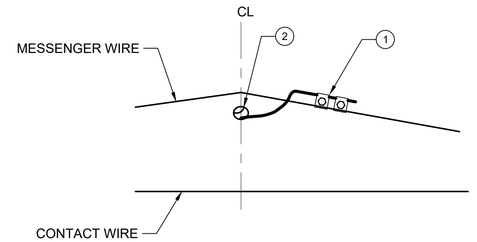
ASSEMBLY FOR SA-3 FOR WIDE FLANGE POLE (SIMILAR)
ASSEMBLY FOR SA-4 FOR TUBULAR POLE (AS SHOWN)

SURGE ARRESTER ASSEMBLIES FOR MESSENGER SA-3 AND SA-4

NTS

GENERAL NOTES:

1. THE SURGE ARRESTER SHALL BE MOUNTED TO PERMIT THE CABLES TO TAKE THE MOST DIRECT ROUTE TO GROUND ASSEMBLY. SURGE ARRESTOR CONNECTIONS TO OCS AND GROUND SHALL BE CONTINUOUS.
2. CABLE BENDS SHALL EXCEED 8" RADIUS.
3. ALL GROUND CONNECTIONS SHALL BE BY EXOTHERMIC WELD. FOR BORED FOUNDATIONS, SURGE ARRESTER GROUND CABLE IS TO BE CONNECTED TO A DEDICATED SURGE ARRESTOR GROUND ROD. FOR AERIAL STRUCTURE MOUNTED POLES, SURGE ARRESTOR GROUND IS TO BE CONNECTED TO A SEPARATE GROUND SYSTEM. MAXIMUM ALLOWABLE TESTED RESISTANCE TO GROUND TO BE INCLUDED IN SPECIFICATIONS.
4. THE POSITIVE CONNECTION CABLE SHALL BE CONNECTED TO THE SAME SWITCH TERMINAL AS THE OUTGOING FEEDER CABLES.
5. INSULATED CABLE SUPPORT REQUIREMENTS TO BE PROVIDED IN SPECIFICATIONS.
6. THE FEEDER POLE FOUNDATION, WITH INTEGRAL 1 1/2" CONDUIT RISER TO BE CALLED OFF SEPARATELY ON THE OCS FOUNDATION SCHEDULES.
7. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
8. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
9. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
10. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
12. DISCONNECT SWITCH ASSEMBLY SHADED FOR CLARITY.



SECTION A
NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
SA-4	SA-3	SA-2	SA-1				
2	2	-	-	EA	CLAMP, 4/0 TO MESSENGER	1	
4 TYP	4 TYP	-	-	EA	INSULATED CABLE SUPPORT	2	
AS REQ'D	AS REQ'D	AS REQ'D	AS REQ'D	LF	CABLE, 4/0 AWG	3	2400V INSULATED
2	2	3	3	EA	CABLE LUG, 4/0 AWG	4	
1	-	1	-	EA	SURGE ARRESTER BRACKET	5	FOR TUBULAR POLE
1	1	1	1	EA	SURGE ARRESTER	6	
-	1	-	1	EA	SURGE ARRESTER BRACKET	7	FOR WIDE FLANGE POLE
AS REQ'D	AS REQ'D	AS REQ'D	AS REQ'D	EA	CABLE STRAP	8	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2023 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

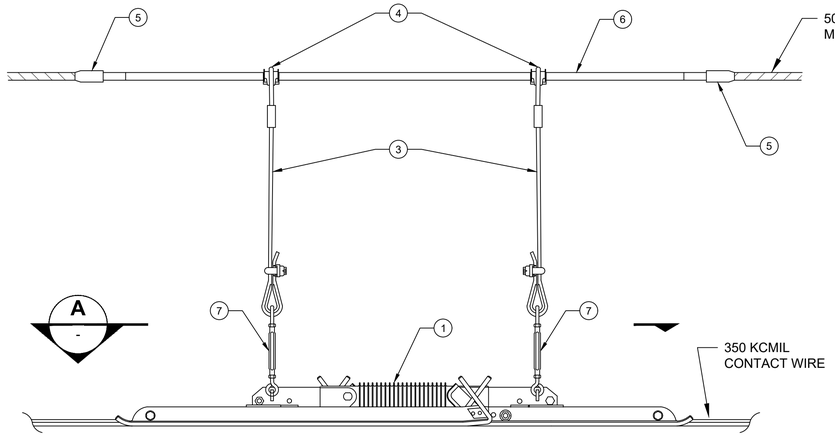
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD520
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

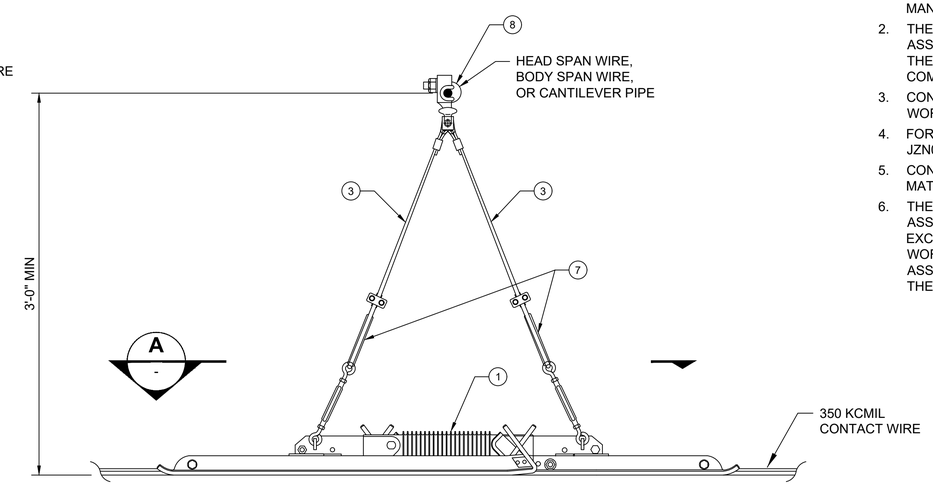
OVERHEAD CATENARY SYSTEM
SURGE ARRESTER ASSEMBLIES
SA-1, SA-2, SA-3 & SA-4

DRAWING No.: **STD-JOD520**
FACILITY ID:
SHEET No.: REV: 1



SECTION INSULATOR ASSEMBLY
FOR SIMPLE CATENARY AUTO-TENSIONED SYSTEM SI-1

NTS

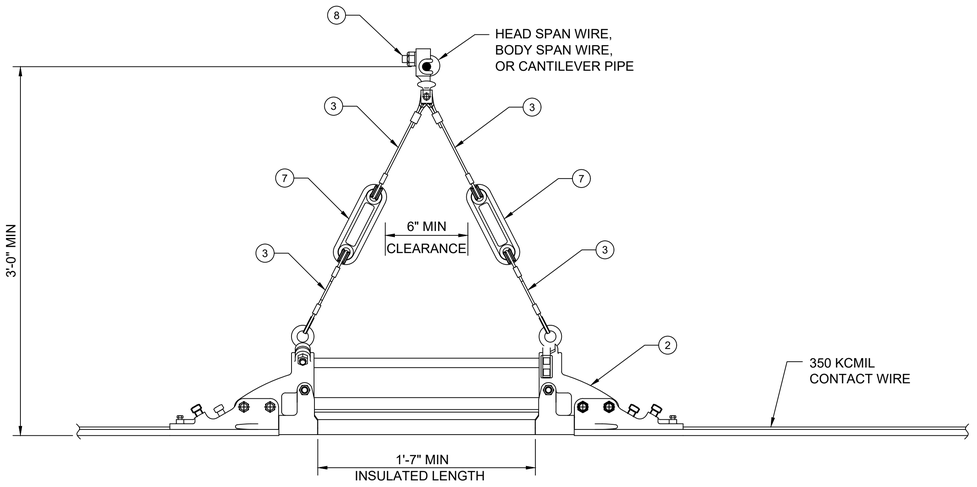


BRIDGING SECTION INSULATOR ASSEMBLY
FOR SINGLE CONTACT FIXED TERMINATION WIRING SI-2

NTS

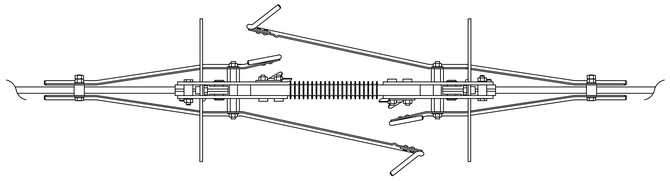
GENERAL NOTES:

1. SECTION INSULATORS SHALL BE INSTALLED AS PER MANUFACTURERS INSTRUCTIONS.
2. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
3. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
4. FOR SYMBOLS AND LEGEND AND ABBREVIATIONS SEE DWGS JZN001 AND JZN002.
5. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
6. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE AND EACH COMPONENT MEETING OR EXCEEDING THE LOADING TABLES WHERE PROVIDED WHERE THE WORKING LOAD CAPABILITIES OF THE CONTRACTOR'S ASSEMBLIES EXCEED THOSE SHOWN IN THE LOADING TABLE IN THEIR SUBMISSION OF ASSEMBLY.



NON-BRIDGING SECTION INSULATOR ASSEMBLY
FOR SINGLE CONTACT FIXED TERMINATION WIRING SI-3

NTS



SECTION A -
NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE			UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
SI-3	SI-2	SI-1				
-	1	1	EA	SECTION INSULATOR	1	WITH TURNBUCKLES
1	-	-	EA	SECTION INSULATOR	2	NON BRIDGING
2	4	4	EA	HANGER ASSEMBLY	3	FIELD ADJUSTABLE
-	-	2	EA	SLIDING HANGER CLIP	4	
-	-	2	EA	TERMINATION CLAMP	5	FOR 500 KCMIL MESSENGER
-	-	1	EA	STRAIN INSULATOR	6	LONG ROD TYPE
2	4	4	EA	HANGER INSULATOR	7	
1	2	-	EA	CLEVIS WIRE CLAMP	8	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

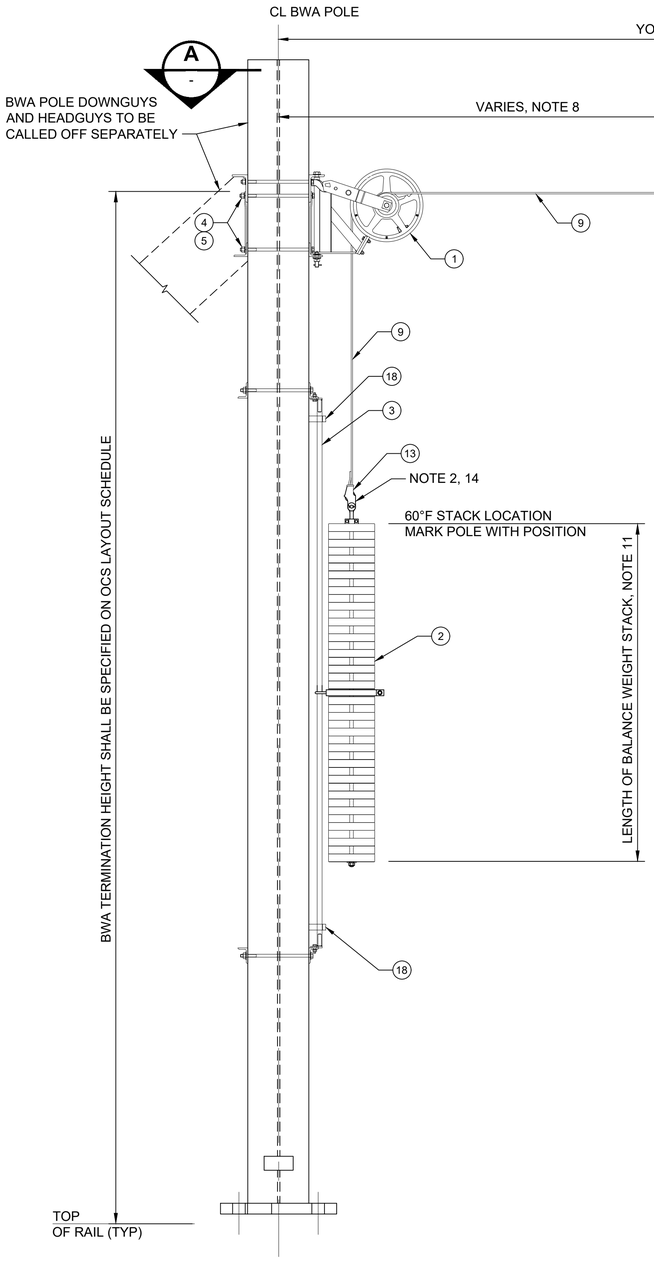
SCALE: NTS
FILENAME: STD-JOD530
CONTRACT No.: RTA/LR
DATE: 2/2024

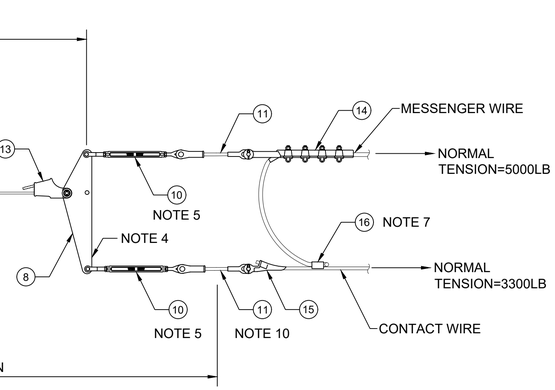
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

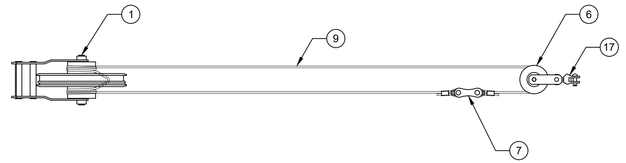
OVERHEAD CATENARY SYSTEM
SECTION INSULATOR ASSEMBLIES
SI-1, SI-2 & SI-3

DRAWING No.: STD-JOD530
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:11 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD530.DWG







SECTION A
NTS

BALANCE WEIGHT ANCHOR ASSEMBLY ON WIDE FLANGE POLE BW-1
BALANCE WEIGHT ANCHOR ASSEMBLY ON TUBULAR POLE BW-3
NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
BW-3	BW-1				
1	1	EA	TENSIONING WHEEL ASSEMBLY	1	
1	1	EA	BALANCE WEIGHT STACK	2	NOTE 11
1	1	EA	BALANCE WEIGHT GUIDE ASSEMBLY W/ BRACKETS	3	NOTE 18
-	2	EA	MOUNTING BRACKETS WIDE FLANGE POLE	4	NOTE 6, 17
2	-	EA	MOUNTING BRACKETS TUBULAR POLE	5	NOTE 6, 17
1	1	EA	SMALL PULLEY	6	
1	1	EA	LINK PLATE DOUBLE-ENDED CLEVIS	7	
1	1	EA	YOKE PLATE	8	
AS REQ'D	AS REQ'D	AS REQ'D	STAINLESS STEEL ROTATION RESISTANT WIRE ROPE	9	
2	2	EA	TURNBUCKLE	10	
3	3	EA	STRAIN INSULATOR	11	
AS REQ'D	AS REQ'D	AS REQ'D	STAINLESS STEEL WIRE ROPE	12	
3	3	EA	WIRE END FITTING	13	
1	1	EA	MESSENGER WIRE DEAD END CLAMP	14	
1	1	EA	CONTACT WIRE DEAD END CLAMP	15	
1	1	EA	MESSENGER/CONTACT CLAMP	16	NOTE 7
1	1	EA	SHACKLE OR SWIVEL	17	
2	2	EA	BALANCE WEIGHT STOP CLAMPS	18	

GENERAL NOTES:

1. THE ASSEMBLY SHALL APPLY A COMBINED TENSION TO THE MESSENGER AND CONTACT WIRES.
2. PROVIDE SUFFICIENT TAIL WIRE FOR FIELD ADJUSTMENT. THE EXCESS TAIL WIRE SHALL BE CUT OFF ONLY AFTER FINAL ADJUSTMENT.
3. TENSION ASSEMBLY SHALL HAVE A RATIO OF 1:3. TENSION ASSEMBLY SHALL BE DESIGNED SO THAT IT WILL BECOME LOCKED IN CASE OF A TENSION RELIEF FROM THE CATENARY.
4. THE YOKE PLATE SHALL BE DIMENSIONED TO PRODUCE THE NORMAL TENSION VALUE SHOWN. YOKE PLATE SHALL HAVE AN ADDITIONAL HOLE TO FACILITATE ATTACHMENT OF TENSIONING RIGS.
5. M/W & C/W TURNBUCKLES SHALL BE FURNISHED TO PERMIT PLUMBING OF YOKE PLATE. AFTER FINAL ADJUSTMENT, TURNBUCKLES SHALL BE EXTENDED 6" MIN FROM MIN LENGTH.
6. MOUNTING BRACKET SHALL BE FURNISHED TO PERMIT ALONG TRACK AND ACROSS TRACK ADJUSTMENTS FOR PLUMBING OF BALANCE WEIGHT.
7. A JUMPER/ANTI-TORSION ARRANGEMENT IS TO BE FORMED USING APPROXIMATELY 2.5' (FT) OF MESSENGER WIRE EXTENDING FROM THE REAR OF THE DEAD END ASSEMBLY.
8. CONTRACTOR SHALL FURNISH THIS DIMENSION, BASED ON PHYSICAL AND MECHANICAL PROPERTIES OF THE BALANCE WEIGHT ASSEMBLY AND THE ALONG TRACK MOVEMENT OF THE CATENARY.
9. CONTRACTOR SHALL USE MOUNTING BRACKET AND GUIDE ASSEMBLY ADJUSTABILITY TO KEEP THE WEIGHT STACK CLEAR OF THE DYNAMIC CLEARANCE ENVELOPE.
10. THE C/W TAIL WIRE INSULATOR IS TO BE NO CLOSER THAN 4'-0" TO SUPERELEVATED TRACK CENTERLINE. TYPICAL YOKE PLATE SET OUT DIMENSION IS TO BE SPAN LENGTH TIMES 0.3.
11. THE DESIGN IS BASED ON AN 18" EYE-TO-EYE YOKE PLATE AND 14" CIRCULAR BALANCE WEIGHT MOUNTED AT A 2" OFFSET FROM THE FACE OF THE POLE. THE CONTRACTOR SHALL DETERMINE THE LENGTH OF THE BALANCE WEIGHT STACK, TRAVEL, POSITION OF TEMPERATURE STOPS AND TERMINATION ATTACHMENT HEIGHT BASED ON THE REQUIRED TENSION, ACTUAL SUPPLIED HARDWARE AND SITE SPECIFIC CONDITIONS.
12. THE BALANCE WEIGHT SHALL MOVE FREELY WITHIN THE TEMPERATURE RANGE OF 5° F TO 130° F, AND WITHIN THE SPACE GIVEN BETWEEN BWA TERMINATION AND TOP OF BASEPLATE. TEMPERATURE STOP CLAMPS SHALL BE INSTALLED TO PREVENT BALANCE WEIGHT MOVEMENT BEYOND THE SET TEMPERATURE RANGE.
13. THE MOUNTING ARRANGEMENT OF BALANCE WEIGHT ASSEMBLY AS SHOWN IS TYPICAL. THE CONTRACTOR SHALL DEVELOP THE DESIGN BASED ON THE EQUIPMENT ACTUALLY USED AND THE MANUFACTURER'S RECOMMENDATIONS.
14. THE CONTRACTOR SHALL ENSURE THAT NO INTERFERENCE OCCURS BETWEEN ALL POLE CLAMPS & BRACKETS AND THE BWA-WIRE ROPE TERMINATIONS FOR THEIR TOTAL VERTICAL TRAVEL. PROVIDE A MINIMUM OF 2" OF FREE SPACE TO ALL MOVING WIRE COMPONENTS.
15. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
16. SEE DWG JOD602 FOR BALANCE WEIGHT MOVEMENT CHART.
17. BRACKETS SHALL BE DESIGNED AND FABRICATED FOR USE WITH THE DOWN GUY ASSEMBLIES.
18. GUIDE ASSEMBLY SHALL RESTRAIN SIDE TO SIDE MOVEMENT UNDER ALL ENVIRONMENTAL CONDITIONS.
19. CONSTANT TENSION SPRING TERMINATIONS ARE PREFERRED OVER BALANCE WEIGHT ASSEMBLIES.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

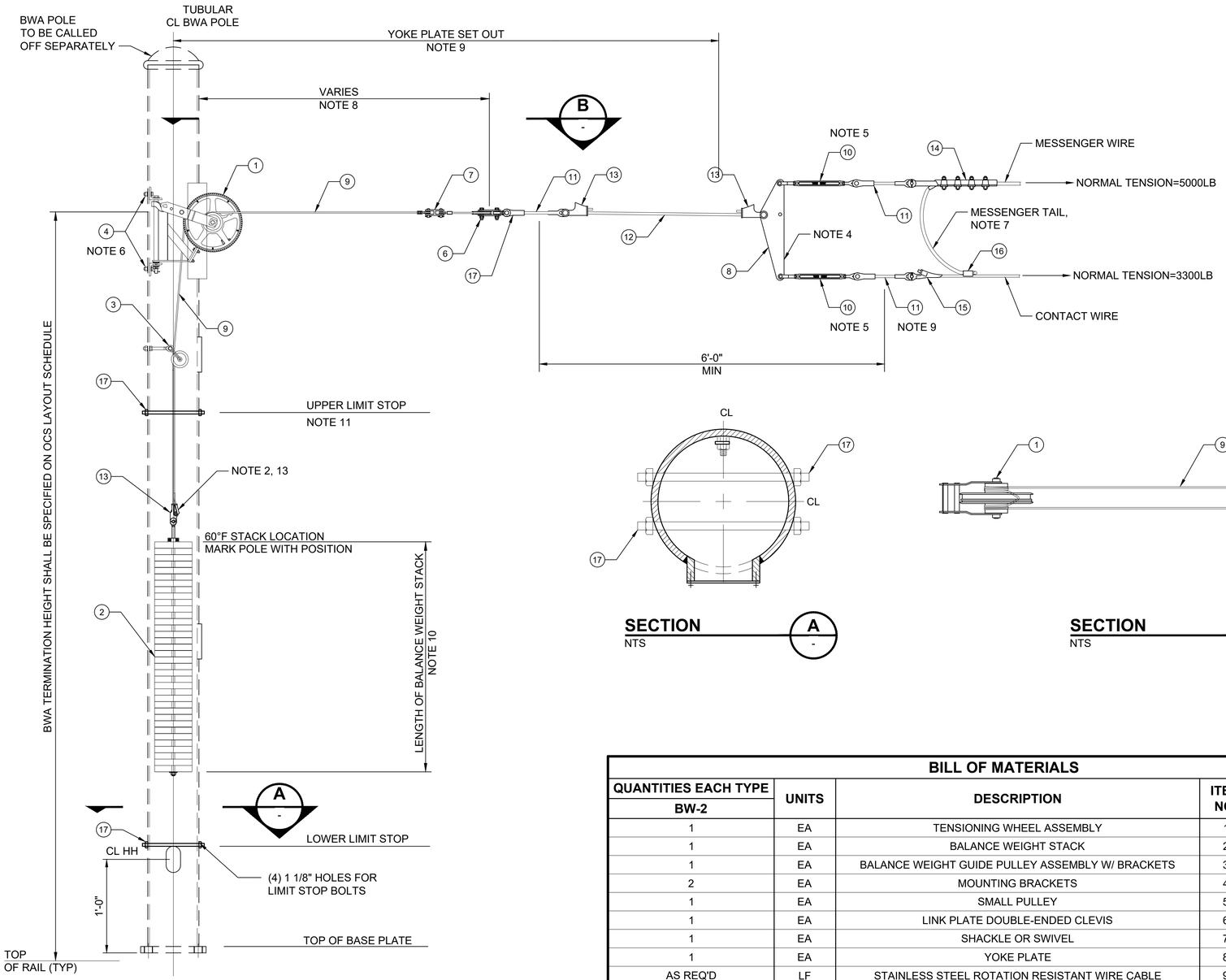
SCALE: NTS
FILENAME: STD-JOD600
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
BALANCE WEIGHT ANCHOR ASSEMBLY
BW-1 & BW-3

DRAWING No.: **STD-JOD600**
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:11 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\ST DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD600.DWG



BALANCE WEIGHT ANCHOR ASSEMBLY INSIDE TUBULAR POLE BW-2

SCALE: NTS

SECTION A - NTS

SECTION B - NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE BW-2	UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
1	EA	TENSIONING WHEEL ASSEMBLY	1	
1	EA	BALANCE WEIGHT STACK	2	
1	EA	BALANCE WEIGHT GUIDE PULLEY ASSEMBLY W/ BRACKETS	3	
2	EA	MOUNTING BRACKETS	4	NOTE 6, 17
1	EA	SMALL PULLEY	5	
1	EA	LINK PLATE DOUBLE-ENDED CLEVIS	6	
1	EA	SHACKLE OR SWIVEL	7	
1	EA	YOKE PLATE	8	
AS REQ'D	LF	STAINLESS STEEL ROTATION RESISTANT WIRE CABLE	9	
1	EA	TURNBUCKLE	10	
3	EA	STRAIN INSULATOR	11	
AS REQ'D	LF	STAINLESS STEEL WIRE ROPE	12	
3	EA	WIRE END FITTING	13	
1	EA	MESSENGER WIRE DEAD END CLAMP	14	
1	EA	CONTACT WIRE DEAD END CLAMP	15	
1	EA	MESSENGER/CONTACT CLAMP	16	NOTE 7
4	EA	1" DIAMETER STOP BOLTS & NUTS	17	

GENERAL NOTES:

1. THE ASSEMBLY SHALL APPLY A COMBINED TENSION TO THE MESSENGER AND CONTACT WIRES.
2. PROVIDE SUFFICIENT TAIL WIRE FOR FIELD ADJUSTMENT. THE EXCESS TAIL WIRE SHALL BE CUT OFF ONLY AFTER FINAL ADJUSTMENT.
3. TENSION ASSEMBLY SHALL HAVE A RATIO OF 1:3. TENSION ASSEMBLY SHALL BE DESIGNED SO THAT IT WILL BECOME LOCKED IN CASE OF A TENSION RELIEF FROM THE CATENARY.
4. THE YOKE PLATE SHALL BE DIMENSIONED TO PRODUCE THE NORMAL TENSION VALUE SHOWN. YOKE PLATE SHALL HAVE AN ADDITIONAL HOLE TO FACILITATE ATTACHMENT OF TENSION RIGS.
5. M/W & C/W TURNBUCKLES SHALL BE FURNISHED TO PERMIT PLUMBING OF YOKE PLATE. AFTER FINAL ADJUSTMENT, TURNBUCKLES SHALL BE EXTENDED 6" MIN FROM MIN LENGTH.
6. MOUNTING BRACKET SHALL BE FURNISHED TO PERMIT ALONG TRACK AND ACROSS TRACK ADJUSTMENTS FOR PLUMBING OF BALANCE WEIGHT.
7. A JUMPER/ANTI-TORSION ARRANGEMENT IS TO BE FORMED USING APPROXIMATELY 2.5 (FT) OF MESSENGER WIRE EXTENDING FROM THE REAR OF THE DEAD END ASSEMBLY.
8. CONTRACTOR SHALL FURNISH THIS DIMENSION, BASED ON PHYSICAL AND MECHANICAL PROPERTIES OF THE BALANCE WEIGHT ASSEMBLY AND THE ALONG TRACK MOVEMENT OF THE CATENARY.
9. THE C/W TAIL WIRE INSULATOR IS TO BE NO CLOSER THAN 4'-0" TO SUPER ELEVATED TRACK CENTERLINE. TYPICAL YOKE PLATE SET OUT DIMENSION IS TO BE SPAN LENGTH TIMES 0.3.
10. THE DESIGN IS BASED ON AN 18" EYE-TO-EYE YOKE PLATE AND 14" CIRCULAR BALANCE WEIGHT. THE CONTRACTOR SHALL DETERMINE THE LENGTH OF THE BALANCE WEIGHT STACK, TRAVEL, POSITION OF LOW TEMPERATURE STOP AND TERMINATION ATTACHMENT HEIGHT BASED ON THE REQUIRED TENSION, ACTUAL SUPPLIED HARDWARE AND SITE SPECIFIC CONDITIONS. MAXIMUM WIDTH OF THE WEIGHT SHALL FIT INSIDE 18" STD TUBULAR POLE.
11. THE BALANCE WEIGHT SHALL MOVE FREELY WITHIN THE TEMPERATURE RANGE OF 5° F TO 130° F, AND WITHIN THE SPACE BETWEEN TEMPERATURE STOPS. TEMPERATURE STOP BOLTS SHALL BE INSTALLED TO PREVENT BALANCE WEIGHT MOVEMENT BEYOND THE SET TEMPERATURE RANGE. TEMPERATURE STOP BOLTS TO BE PLACED ABOVE THE POLE GROUNDING STUD AND SHALL NOT IMPEDE HANDHOLE ACCESS TO THE POLE GROUNDING TERMINATIONS.
12. THE MOUNTING ARRANGEMENT OF BALANCE WEIGHT ASSEMBLY AS SHOWN IS TYPICAL. THE CONTRACTOR SHALL DEVELOP THE DESIGN BASED ON THE EQUIPMENT ACTUALLY USED AND THE MANUFACTURER'S RECOMMENDATIONS AS APPROVED BY THE RESIDENT ENGINEER.
13. THE CONTRACTOR SHALL ENSURE THAT NO INTERFERENCE OCCURS BETWEEN ALL POLE CLAMPS AND BRACKETS AND THE BWA-WIRE ROPE TERMINATIONS FOR THEIR TOTAL VERTICAL TRAVEL. PROVIDE A MINIMUM OF2" OF FREE SPACE TO ALL MOVING WIRE COMPONENTS.
14. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
15. CONTRACTOR TO ROTATE POLE TO ALIGN SHEAVE ASSEMBLY & TERM SPAN PERPENDICULAR TO UPPER POLE FLANGE. SEE DWG JOD304.
16. SEE DWG JOD602 FOR BALANCE WEIGHT MOVEMENT CHART.
17. BRACKETS SHALL BE DESIGNED AND FABRICATED FOR USE WITH THE DOWN GUY ASSEMBLIES.
18. TUBULAR POLES WITH INTERNAL BALANCE WEIGHTS ARE NON-PREFERRED COMPARED TO EXTERNAL BALANCE WEIGHTS. USE OF BW-2 INTERNAL BALANCE WEIGHT ASSEMBLIES MUST BE APPROVED BY SOUND TRANSIT ON A SITE SPECIFIC BASIS.
19. CONSTANT TENSION SPRING TERMINATIONS ARE PREFERRED OVER BALANCE WEIGHT ASSEMBLIES. ST APPROVAL IS REQUIRED IN ORDER TO USE BALANCE WEIGHTS.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD601
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
BALANCE WEIGHT ANCHOR ASSEMBLY
BW-2

DRAWING No.: **STD-JOD601**
FACILITY ID:
SHEET No.: 1
REV:

01/30/25 | 1:11 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD601.DWG

GENERAL NOTE:

1. THE INFORMATION FURNISHED IN TABLE 1 IS BASED ON A 1:3 RATIO PULLEY SYSTEM AND IS PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL DETERMINE THE ACTUAL BALANCE WEIGHT MOVEMENT, BASED ON ACTUAL PULLEY AND BALANCE WEIGHT ASSEMBLIES PROVIDED.

TABLE 1 - BALANCE WEIGHT MOVEMENT

TEMP °F	DISTANCE FROM MID-POINT ANCHOR (FT)														
	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
5	-3.7	-7.4	-11.2	-14.9	-18.6	-22.3	-26.1	-29.8	-33.5	-37.2	-40.9	-44.7	-48.4	-52.1	-55.8
10	-3.4	-6.8	-10.2	-13.5	-16.9	-20.3	-23.7	-27.1	-30.5	-33.8	-37.2	-40.6	-44.0	-47.4	-50.8
20	-2.7	-5.4	-8.1	-10.8	-13.5	-16.2	-19.0	-21.7	-24.4	-27.1	-29.8	-32.5	-35.2	-37.9	-40.6
30	-2.0	-4.1	-6.1	-8.1	-10.2	-12.2	-14.2	-16.2	-18.3	-20.3	-22.3	-24.4	-26.4	-28.4	-30.5
40	-1.4	-2.7	-4.1	-5.4	-6.8	-8.1	-9.5	-10.8	-12.2	-13.5	-14.9	-16.2	-17.6	-19.0	-20.3
50	-0.7	-1.4	-2.0	-2.7	-3.4	-4.1	-4.7	-5.4	-6.1	-6.8	-7.4	-8.1	-8.8	-9.5	-10.2
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.7	1.4	2.0	2.7	3.4	4.1	4.7	5.4	6.1	6.8	7.4	8.1	8.8	9.5	10.2
80	1.4	2.7	4.1	5.4	6.8	8.1	9.5	10.8	12.2	13.5	14.9	16.2	17.6	19.0	20.3
90	2.0	4.1	6.1	8.1	10.2	12.2	14.2	16.2	18.3	20.3	22.3	24.4	26.4	28.4	30.5
100	2.7	5.4	8.1	10.8	13.5	16.2	19.0	21.7	24.4	27.1	29.8	32.5	35.2	37.9	40.6
110	3.4	6.8	10.2	13.5	16.9	20.3	23.7	27.1	30.5	33.8	37.2	40.6	44.0	47.4	50.8
120	4.1	8.1	12.2	16.2	20.3	24.4	28.4	32.5	36.5	40.6	44.7	48.7	52.8	56.9	60.9
130	4.7	9.5	14.2	19.0	23.7	28.4	33.2	37.9	42.6	47.4	52.1	56.9	61.6	66.3	71.1

DIMENSION GIVEN IN INCHES (SEE NOTE 1)
BALANCE WEIGHT MOVEMENT "-" MOVES UPWARD "+" MOVES DOWNWARD

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

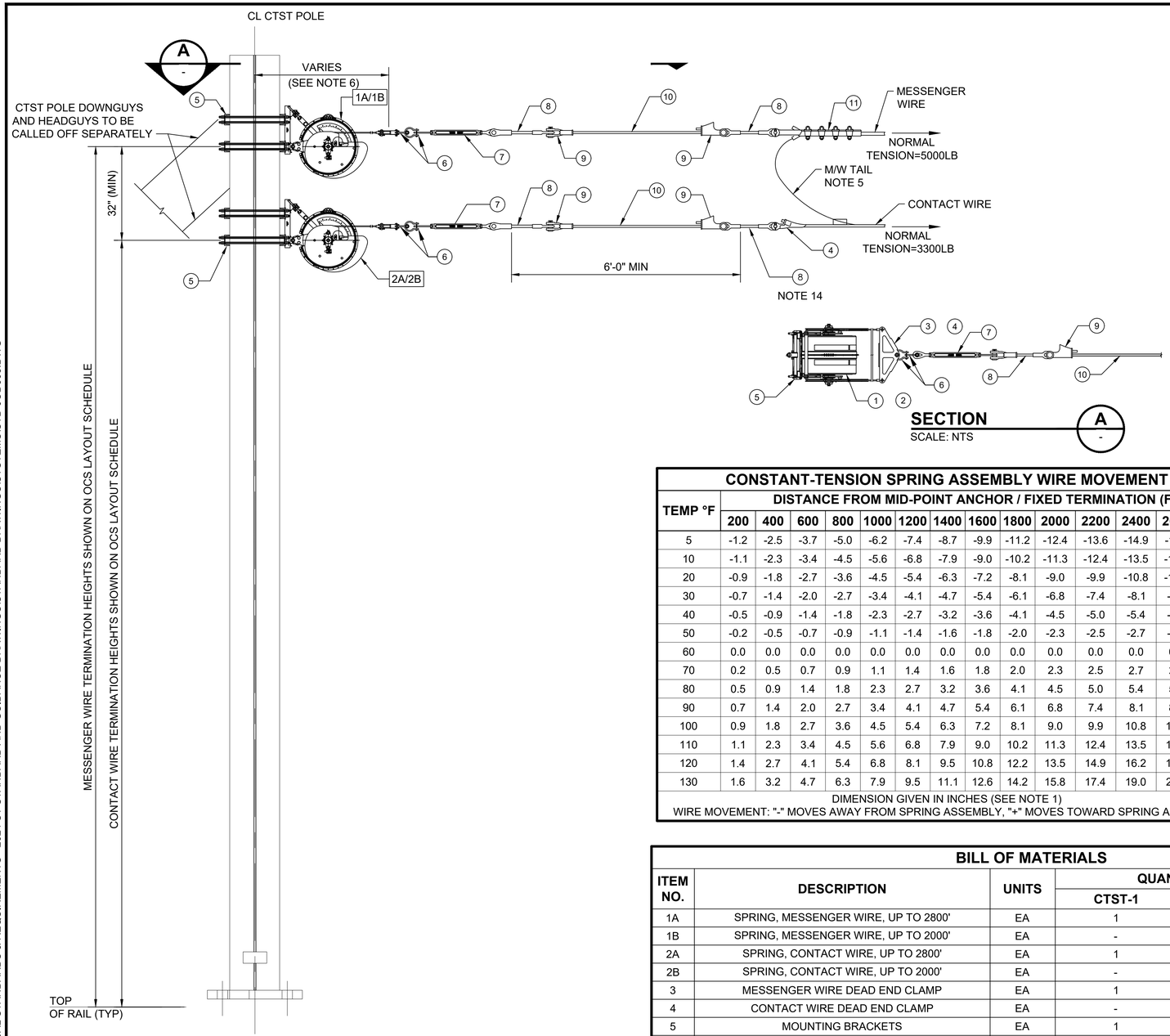
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD602
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
BALANCE WEIGHT ANCHOR ASSEMBLY
BW-1, BW-2, BW-3, BW-4, BW-5 & BW-6

DRAWING No.: **STD-JOD602**
FACILITY ID:
SHEET No.: REV: 1



CONSTANT-TENSION SPRING TERMINATION CTST-1 AND CTST-2

SCALE: NTS

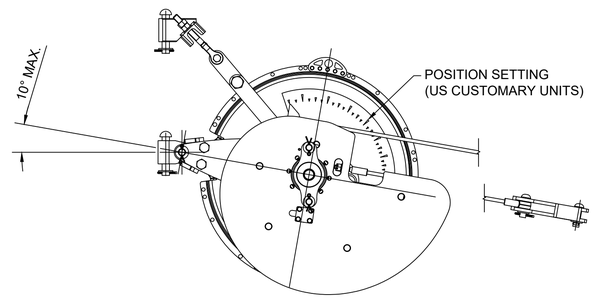
CONSTANT-TENSION SPRING ASSEMBLY WIRE MOVEMENT

TEMP °F	DISTANCE FROM MID-POINT ANCHOR / FIXED TERMINATION (FT)													
	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800
5	-1.2	-2.5	-3.7	-5.0	-6.2	-7.4	-8.7	-9.9	-11.2	-12.4	-13.6	-14.9	-16.1	-17.4
10	-1.1	-2.3	-3.4	-4.5	-5.6	-6.8	-7.9	-9.0	-10.2	-11.3	-12.4	-13.5	-14.7	-15.8
20	-0.9	-1.8	-2.7	-3.6	-4.5	-5.4	-6.3	-7.2	-8.1	-9.0	-9.9	-10.8	-11.7	-12.6
30	-0.7	-1.4	-2.0	-2.7	-3.4	-4.1	-4.7	-5.4	-6.1	-6.8	-7.4	-8.1	-8.8	-9.5
40	-0.5	-0.9	-1.4	-1.8	-2.3	-2.7	-3.2	-3.6	-4.1	-4.5	-5.0	-5.4	-5.9	-6.3
50	-0.2	-0.5	-0.7	-0.9	-1.1	-1.4	-1.6	-1.8	-2.0	-2.3	-2.5	-2.7	-2.9	-3.2
60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70	0.2	0.5	0.7	0.9	1.1	1.4	1.6	1.8	2.0	2.3	2.5	2.7	2.9	3.2
80	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.4	5.9	6.3
90	0.7	1.4	2.0	2.7	3.4	4.1	4.7	5.4	6.1	6.8	7.4	8.1	8.8	9.5
100	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6
110	1.1	2.3	3.4	4.5	5.6	6.8	7.9	9.0	10.2	11.3	12.4	13.5	14.7	15.8
120	1.4	2.7	4.1	5.4	6.8	8.1	9.5	10.8	12.2	13.5	14.9	16.2	17.6	19.0
130	1.6	3.2	4.7	6.3	7.9	9.5	11.1	12.6	14.2	15.8	17.4	19.0	20.5	22.1

DIMENSION GIVEN IN INCHES (SEE NOTE 1)
WIRE MOVEMENT: "-" MOVES AWAY FROM SPRING ASSEMBLY, "+" MOVES TOWARD SPRING ASSEMBLY

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	UNITS	QUANTITIES		PART NO./REMARKS
			CTST-1	CTST-2	
1A	SPRING, MESSENGER WIRE, UP TO 2800'	EA	1	-	000701359-1T2015
1B	SPRING, MESSENGER WIRE, UP TO 2000'	EA	-	1	000701358-1T2015
2A	SPRING, CONTACT WIRE, UP TO 2800'	EA	1	-	000700483-1T2015
2B	SPRING, CONTACT WIRE, UP TO 2000'	EA	-	1	000700433-1T2015
3	MESSENGER WIRE DEAD END CLAMP	EA	1	-	
4	CONTACT WIRE DEAD END CLAMP	EA	-	1	
5	MOUNTING BRACKETS	EA	1	1	NOTE 4, 11
6	SHACKLE	EA	2	2	
7	TURNBUCKLE	EA	1	1	NOTE 3
8	STRAIN INSULATOR	EA	2	2	
9	WIRE END FITTING	EA	2	2	
10	STAINLESS STEEL WIRE ROPE	LF	AS REQ'D	AS REQ'D	



MAX ANGLE OF INSTALLATION

SCALE: NTS

GENERAL NOTES:

1. THE WIRE MOVEMENT VALUES SHOWN IN THE TABLE PROVIDED ARE BASED ON A 1:1 RATIO OF SPRING SYSTEM TO WIRE MOVEMENT. CONTRACTOR SHALL SUBMIT POSITION SETTING TABLES BASED ON WIRE MOVEMENT FOR EACH CONSTANT-TENSION SPRING TERMINATION ASSEMBLY.
2. OCS WIRES SHALL MOVE FREELY WITHIN THE TEMPERATURE RANGE OF 5°F TO 130°F.
3. AFTER FINAL ADJUSTMENT OF WIRING, TURNBUCKLES SHALL BE EXTENDED 6" MINIMUM FROM MINIMUM LENGTH.
4. MOUNTING BRACKET SHALL BE FURNISHED TO PERMIT ALONG TRACK AND ACROSS TRACK ADJUSTMENTS OF SPRING TENSIONING ASSEMBLY.
5. A JUMPER/ANTI-TORSION ARRANGEMENT IS TO BE FORMED USING APPROXIMATELY 2.5' (FT) OF MESSENGER WIRE EXTENDING FROM THE REAR OF THE DEAD END ASSEMBLY.
6. CONTRACTOR SHALL FURNISH THIS DIMENSION, BASED ON PHYSICAL AND MECHANICAL PROPERTIES OF THE AUTOMATIC-TENSIONING ASSEMBLY AND THE ALONG TRACK MOVEMENT OF THE CATENARY.
7. THE MOUNTING ARRANGEMENT OF THE SPRING TENSIONING ASSEMBLY AS SHOWN IS TYPICAL. THE CONTRACTOR SHALL DEVELOP THE ACTUAL CONFIGURATION BASED ON THE EQUIPMENT USED AND THE MANUFACTURER'S RECOMMENDATIONS.
8. THE CONTRACTOR SHALL ENSURE THAT NO INTERFERENCE OCCURS BETWEEN ALL POLE CLAMPS, BRACKETS, AND OTHER MOUNTED EQUIPMENT IN THE VICINITY AND THE WIRE MOVEMENT OF THE SPRING TENSIONING ASSEMBLY.
9. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
10. PROVIDE SUFFICIENT TAIL WIRE FOR FIELD ADJUSTMENT. THE EXCESS TAIL WIRE SHALL BE CUT OFF ONLY AFTER FINAL ADJUSTMENT.
11. BRACKETS SHALL BE DESIGNED AND FABRICATED FOR USE WITH THE DOWN GUY ASSEMBLIES.
12. CTST UNITS SHALL INCLUDE WEEP HOLES TO ENSURE PROPER DRAINAGE BASED ON MOUNTING ORIENTATION.
13. THE CONSTANT TENSION SPRINGS SHALL BE SUBMITTED BY CONTRACTOR IN SHOP DRAWINGS, INCLUDING DATA DEMONSTRATING THE MAINTAIN A MECHANICAL PULL FORCE EFFICIENCY WITHIN +/- 3% OF THE REQUIRED TENSIONS OVER THE AUTO-TENSIONED TEMPERATURE RANGE.
14. THE CONTACT WIRE TAIL WIRE INSULATOR IS TO BE NO CLOSER THAN 4'-0" TO SUPERELEVATED TRACK CENTERLINE.
15. A SET OF BLOCKING PINS SHALL BE PROVIDED TO SOUND TRANSIT AS PART OF THE REQUIRED SPARE PARTS DELIVERY FOR THIS ITEM.

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
0	2/2024	----	----	----	2024 NEW STANDARD DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

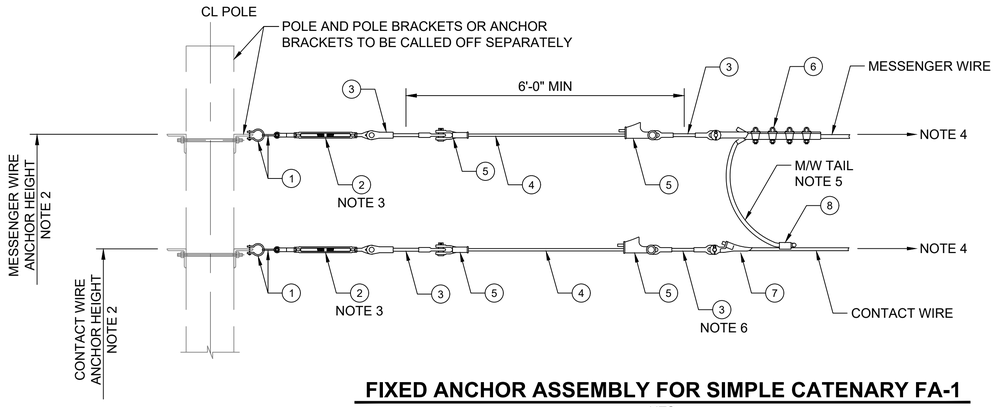
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD603
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CONTACT SYSTEMS
CONSTANT TENSION SPRING TERMINATION
CTST-1,CTST-2

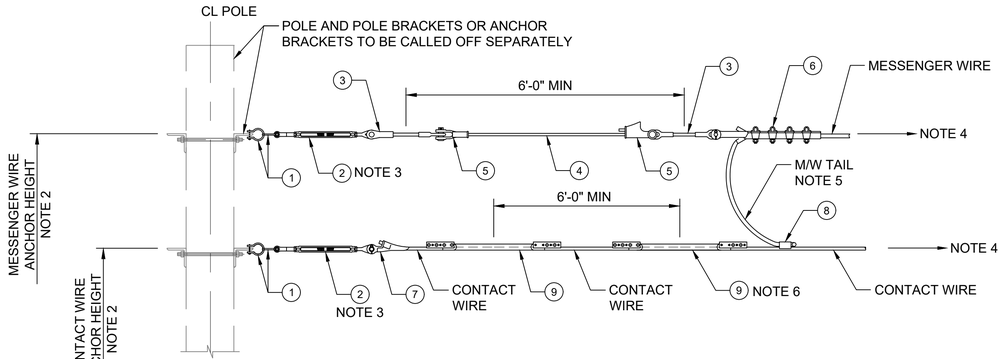
DRAWING No.: STD-JOD603
FACILITY ID:
SHEET No.: REV: 0

01/30/25 | 1:12 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD603.DWG



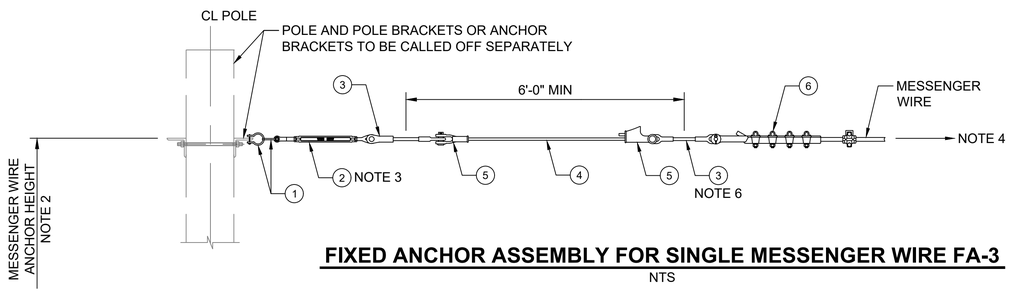
FIXED ANCHOR ASSEMBLY FOR SIMPLE CATENARY FA-1

NTS



FIXED ANCHOR ASSEMBLY FOR SIMPLE CATENARY IN TUNNEL FA-1T

NTS

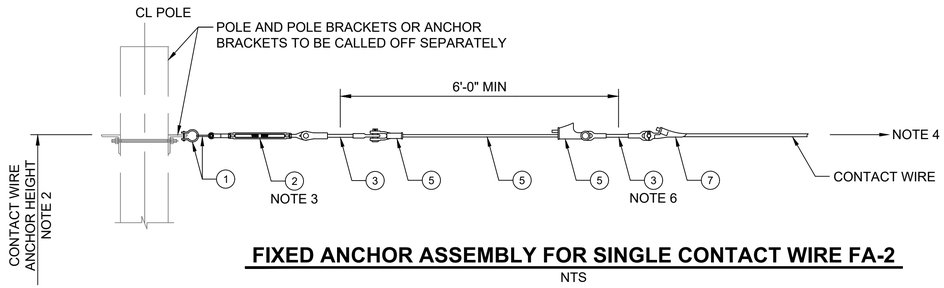


FIXED ANCHOR ASSEMBLY FOR SINGLE MESSENGER WIRE FA-3

NTS

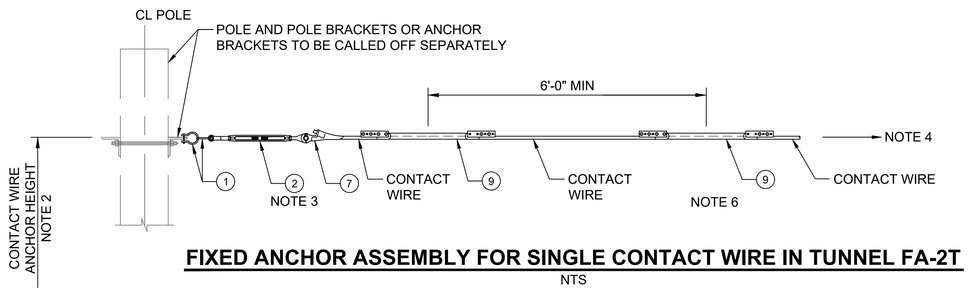
GENERAL NOTES:

1. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
2. ANCHOR HEIGHTS TO BE SHOWN ON OCS LAYOUT PLANS.
3. AFTER ADJUSTMENT OF WIRING, TURNBUCKLES SHALL BE EXTENDED 6" MINIMUM FROM MINIMUM LENGTH.
4. FOR CONDUCTOR TENSIONS AND DETAILS, SEE TECHNICAL DWGS JOD100, JOD101.
5. A JUMPER/ANTI-TORSION ARRANGEMENT IS TO BE FORMED USING APPROXIMATELY 2.5' (FT) OF MESSENGER WIRE EXTENDING FROM THE REAR OF THE DEAD END ASSEMBLY.
6. THE M/W AND C/W TAIL WIRE INSULATORS ARE TO BE NO CLOSER THAN 4'-0" TO SUPER-ELEVATED TRACK CENTERLINE.
7. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
8. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
9. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
10. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY.



FIXED ANCHOR ASSEMBLY FOR SINGLE CONTACT WIRE FA-2

NTS



FIXED ANCHOR ASSEMBLY FOR SINGLE CONTACT WIRE IN TUNNEL FA-2T

NTS

BILL OF MATERIALS

QUANTITIES EACH TYPE					UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
FA-3	FA-2T	FA-2	FA-1T	FA-1				
2	2	2	4	4	EA	SHACKLE	1	
1	1	1	2	2	EA	TURNBUCKLE	2	NOTE 3
2	-	2	2	4	EA	STRAIN INSULATOR	3	
1	-	1	1	2	EA	STAINLESS STEEL WIRE ROPE	4	LENGTH AS REQ'D
2	-	2	2	4	EA	WIRE END FITTING	5	
1	-	-	1	1	EA	MESSENGER DEADEND	6	
-	1	1	1	1	EA	CONTACT WIRE DEADEND	7	
-	-	-	1	1	EA	CLAMP, MESSENGER/CONTACT	8	NOTE 5
-	2	-	2	-	EA	RUNNABLE INSULATOR	9	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

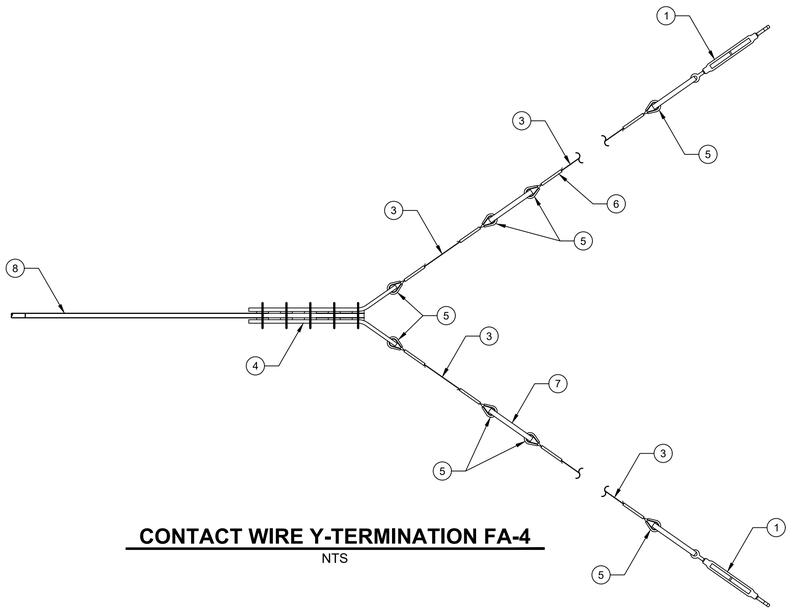
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD610
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

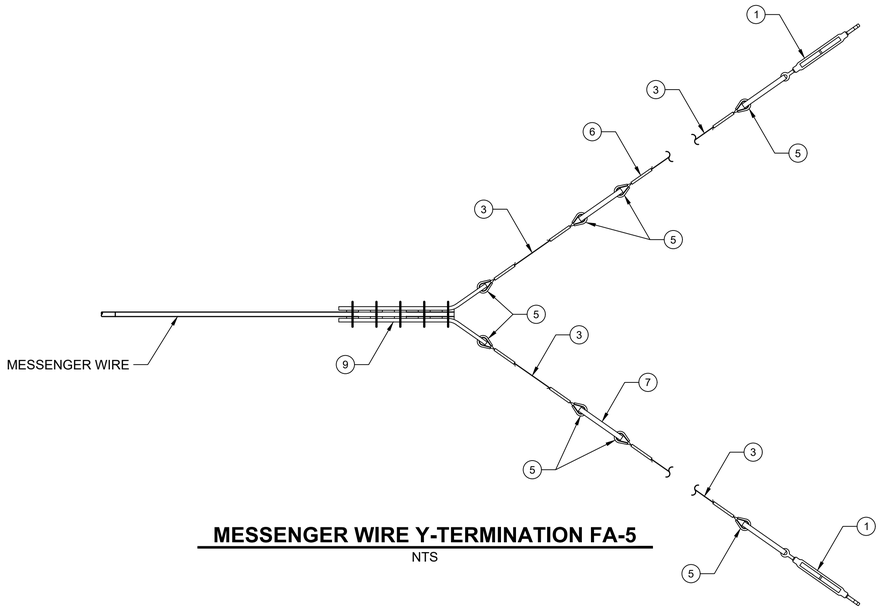
OVERHEAD CATENARY SYSTEM
FIXED ANCHOR ASSEMBLIES
FA-1, FA-1T, FA-2, FA-2T & FA-3

DRAWING No.: **STD-JOD610**
FACILITY ID:
SHEET No.: REV: 1



CONTACT WIRE Y-TERMINATION FA-4

NTS



MESSENGER WIRE Y-TERMINATION FA-5

NTS

GENERAL NOTES:

1. FOR CONDUCTOR TENSIONS AND DETAILS SEE TECHNICAL SHEETS JOD100, JOD101.
2. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
3. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
4. CONTRACTOR TO VERIFY ALL QUANTITIES ON THE BILL OF MATERIALS.
5. CONTRACTOR TO DETERMINE POLE BRACKET ATTACHMENT HEIGHTS.
6. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
7. ANCHOR HEIGHT TO BE SHOWN ON OCS LAYOUT PLANS.

BILL OF MATERIALS

QUANTITIES EACH TYPE		UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
FA-5	FA-4				
2	2	EA	TURNBUCKLE	1	
-	5	EA	PARALLEL GROOVE CLAMP	2	
AS REQ'D	AS REQ'D	AS REQ'D	STAINLESS STEEL WIRE	3	
-	1	EA	CONTACT WIRE Y-TERMINATION	4	
8	8	EA	THIMBLE/CLAMP	5	
-	-	EA	NOT USED	6	
4	4	EA	INSULATOR	7	
-	1	EA	CONTACT WIRE 10FT LONG	8	
1	-	EA	MESSENGER WIRE Y-TERMINATION	9	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY: | DATE: | REVIEWED BY: | DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD611
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

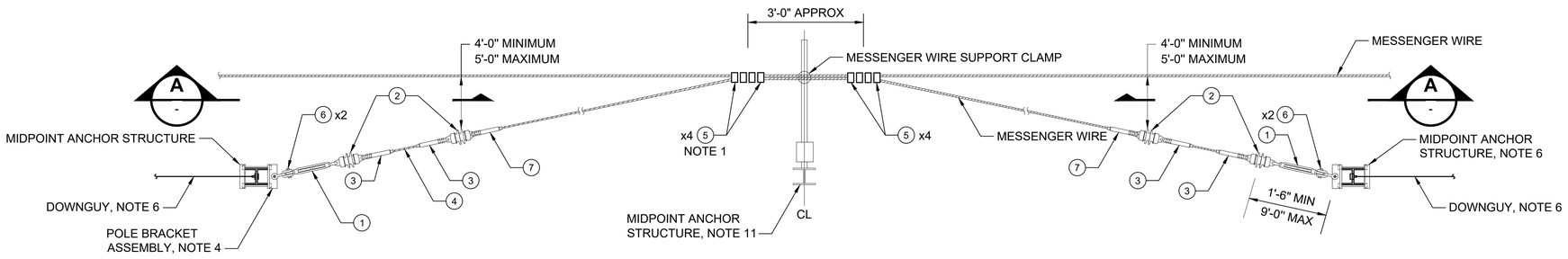
OVERHEAD CATENARY SYSTEM
FIXED ANCHOR Y-TERMINATIONS
FA-4 & FA-5

DRAWING No.: **STD-JOD611**
FACILITY ID:
SHEET No.: REV: 1

01/30/25 | 1:12 PM | HARRISBK
C:\USERS\HARRISBK\SOUND TRANSIT\PSO - TECHNICAL STANDARDS & REQUIREMENTS - 2024 ST STANDARD AND GUIDANCE DRAWINGS\STANDARD DRAWINGS\SYSTEMS\STD-JOD611.DWG

GENERAL NOTES:

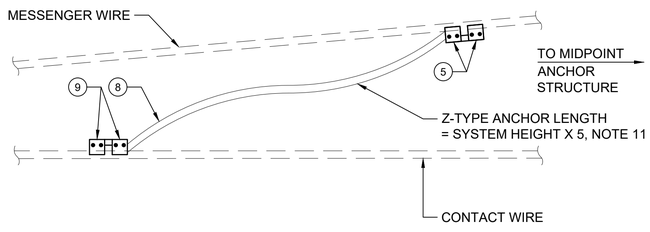
1. THE CLAMPS OR CLIPS SHALL HAVE SUFFICIENT STRENGTH TO RESTRAIN MESSENGER WIRE AND CONTACT WIRE ON ONE SIDE UNDER BROKEN MESSENGER OR CONTACT WIRE CONDITIONS.
2. SPAN GUY MATERIAL TO HAVE HIGHER MINIMUM FAILURE LOAD THAN MESSENGER WIRE.
3. NORMAL GUY WIRE TERMINATION HEIGHT IS 1'-6" BELOW THE MESSENGER WIRE HEIGHT.
4. POLE BRACKETS SHALL BE CALLED OFF SEPARATELY.
5. THE BILL OF MATERIALS DETAILS ARE TYPICAL FOR THE ASSEMBLY STYLES SHOWN. THE CONTRACTOR SHALL ITEMIZE THE TABLE WITH DESCRIPTIONS AND PART NUMBERS OF COMPONENTS REQUIRED TO COMPLETE EACH ASSEMBLY.
6. DOWN GUYS TO BE CALLED OFF SEPARATELY.
7. CONTRACTOR TO DETERMINE COMPONENT DETAIL AND SAFE WORKING LOADS.
8. FOR SYMBOLS, LEGEND AND ABBREVIATIONS SEE DRAWINGS JZN001 AND JZN002.
9. CONTRACTOR TO VERIFY ALL QUANTITIES AND SIZES ON THE BILL OF MATERIALS.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF EACH ASSEMBLY AS A WHOLE.
11. CANTILEVER TO BE CALLED OFF SEPARATELY.



PLAN

MID-POINT SPAN GUY MP-1

NTS



CONTACT WIRE RESTRAINT TIE-WIRE

NTS

A
-

QUANTITIES EACH TYPE MP-01	UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
2	EA	TURNBUCKLE	1	
4	EA	STRAIN INSULATOR	2	
6	EA	WIRE DEADEND	3	
AS REQ'D	LF	STAINLESS STEEL WIRE	4	NOTE 2
12	EA	PARALLEL GROOVE CLAMPS	5	NOTE 1
4	EA	SHACKLE	6	
2	EA	MESSENGER DEADEND	7	
AS REQ'D	LF	STRANDED TIE WIRE, HD COPPER	8	
4	EA	TROLLY WIRE CLAMP	9	NOTE 1

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

SOUNDTRANSIT

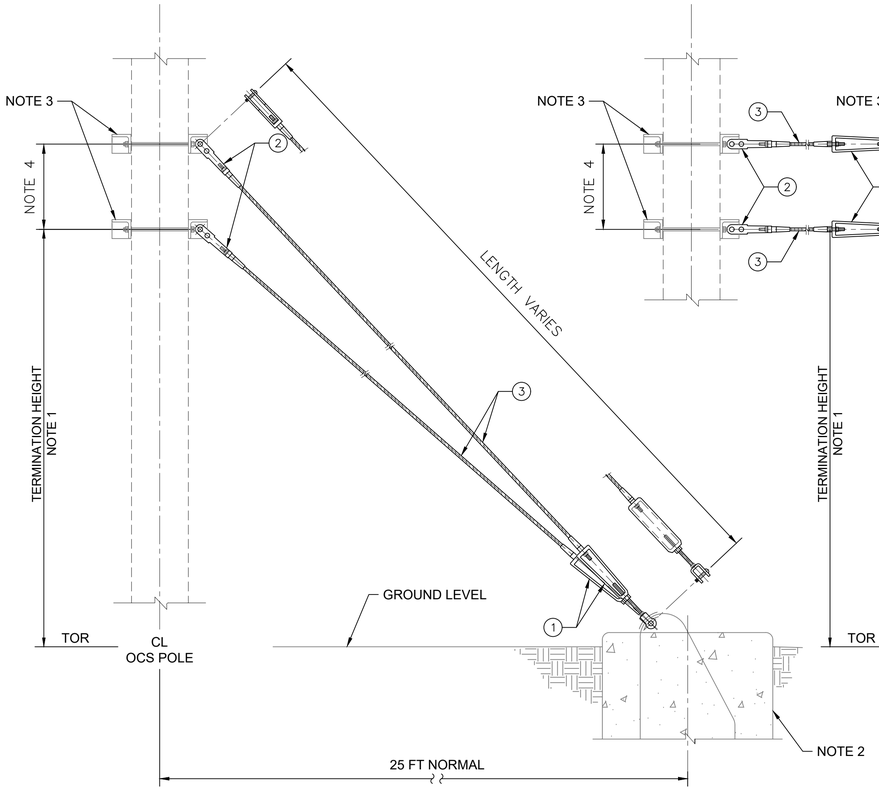
SCALE: NTS
FILENAME: STD-JOD615
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS
OVERHEAD CATENARY SYSTEM
MID-POINT SPAN GUY ASSEMBLY
MP-1

DRAWING No.: **STD-JOD615**
FACILITY ID:
SHEET No.: 1
REV:

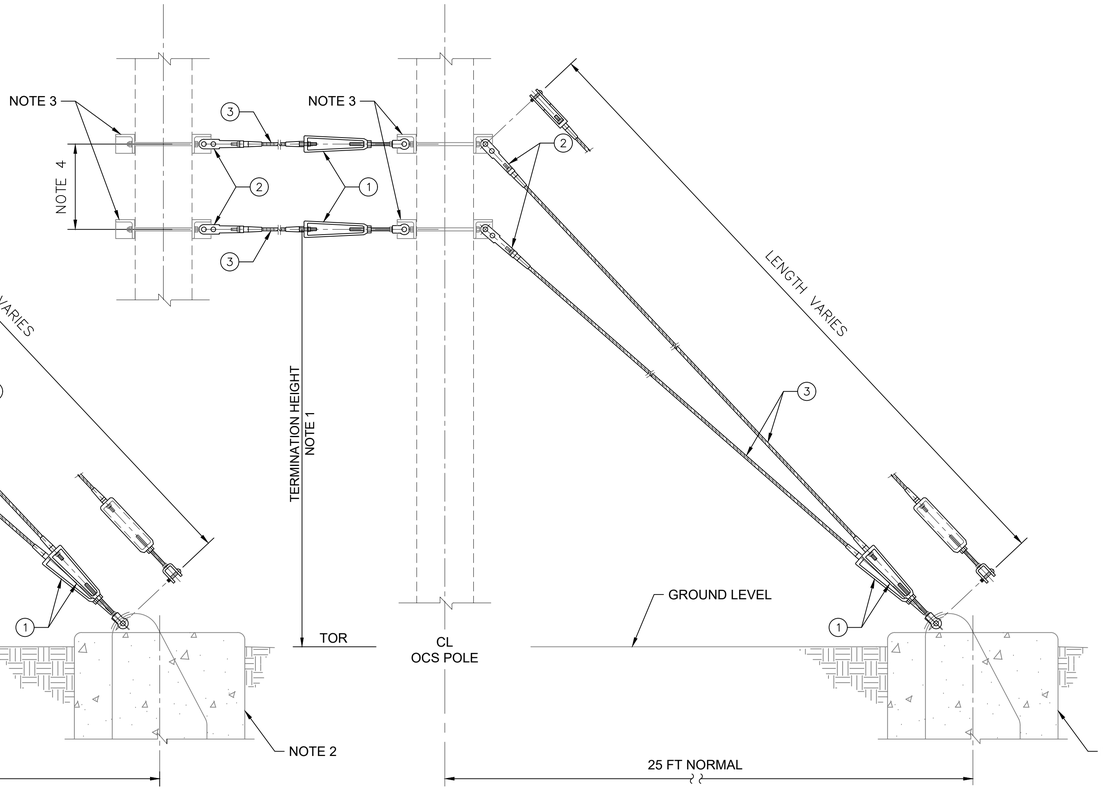
GENERAL NOTES:

1. TERMINATION HEIGHTS TO BE LISTED ON OCS LAYOUT PLANS AND SCHEDULES ON A SITE SPECIFIC BASIS.
2. GUY FOUNDATION TO BE CALLED OFF SEPARATELY.
3. POLE BRACKET TO BE CALLED OUT SEPARATELY.
4. ATTACHMENT HEIGHT AND SEPARATION OF ANCHOR PLATES VARIES WITH SPECIFIED TYPE (CTST, BWA, OR FA). CONTRACTOR TO DESIGN AND SUBMIT ALL ANCHOR CONFIGURATIONS FOR APPROVAL.
5. HEIGHT OF HEAD GUY NEAR TOP OF POLE SHALL BE DETERMINED BY THE CONTRACTOR.



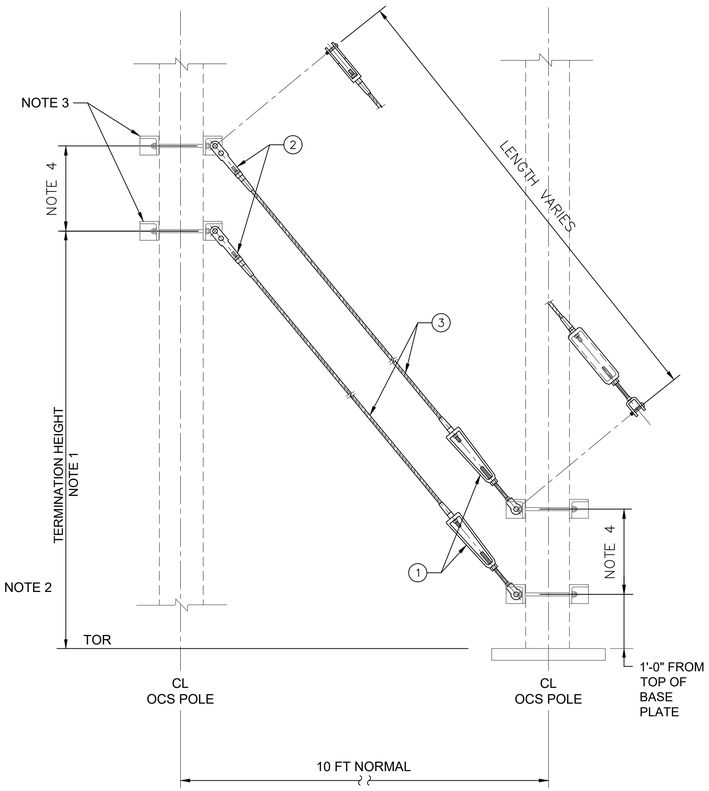
DOWN GUY ASSEMBLY DG-1

NTS



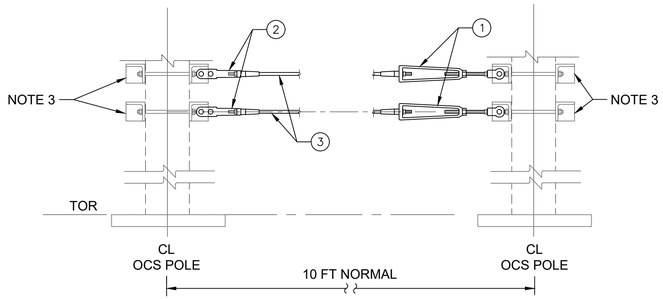
HEAD GUY AND DOWN GUY ASSEMBLY DG-2

NTS



DOWN GUY ASSEMBLY DG-3

NTS



HEAD GUY ASSEMBLY HG-1

NTS

SEE NOTE 5

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
HG-1	DG-3	DG-2	DG-1				
2	2	4	2	EA	END FITTING WITH TURNBUCKLE AND PIN	1	
2	2	4	2	EA	END FITTING WITH CLEVIS AND PIN	2	
AS REQ'D	AS REQ'D	AS REQ'D	AS REQ'D	LF	STAINLESS STEEL WIRE	3	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:

LINE IS 1" AT FULL SCALE

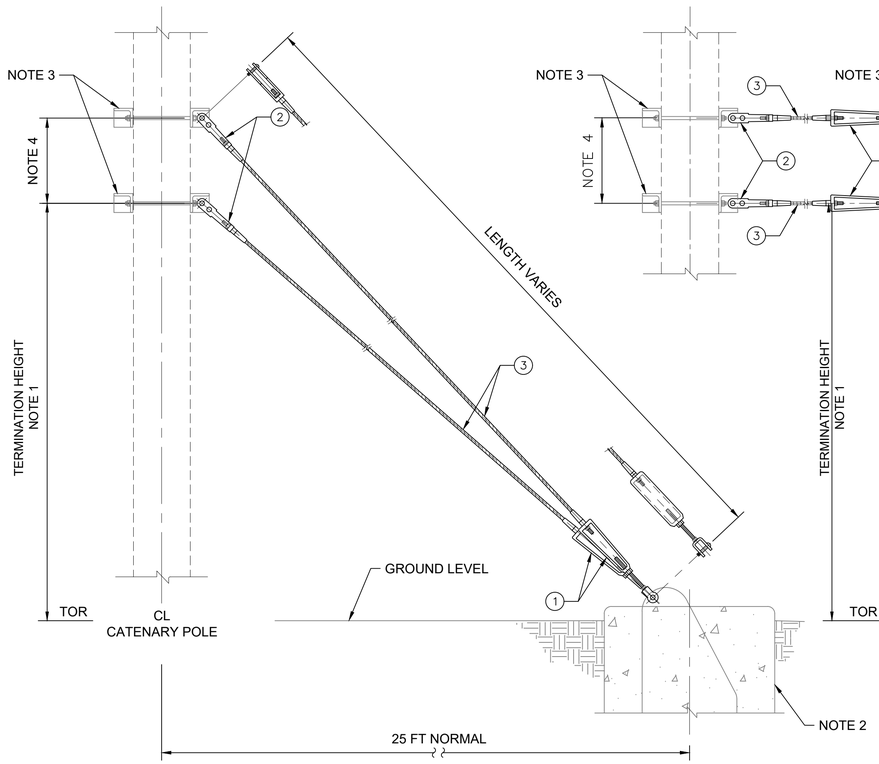
SOUNDTRANSIT

SCALE: NTS
FILENAME: STD-JOD620
CONTRACT No.: RTA/LR
DATE: 2/2024

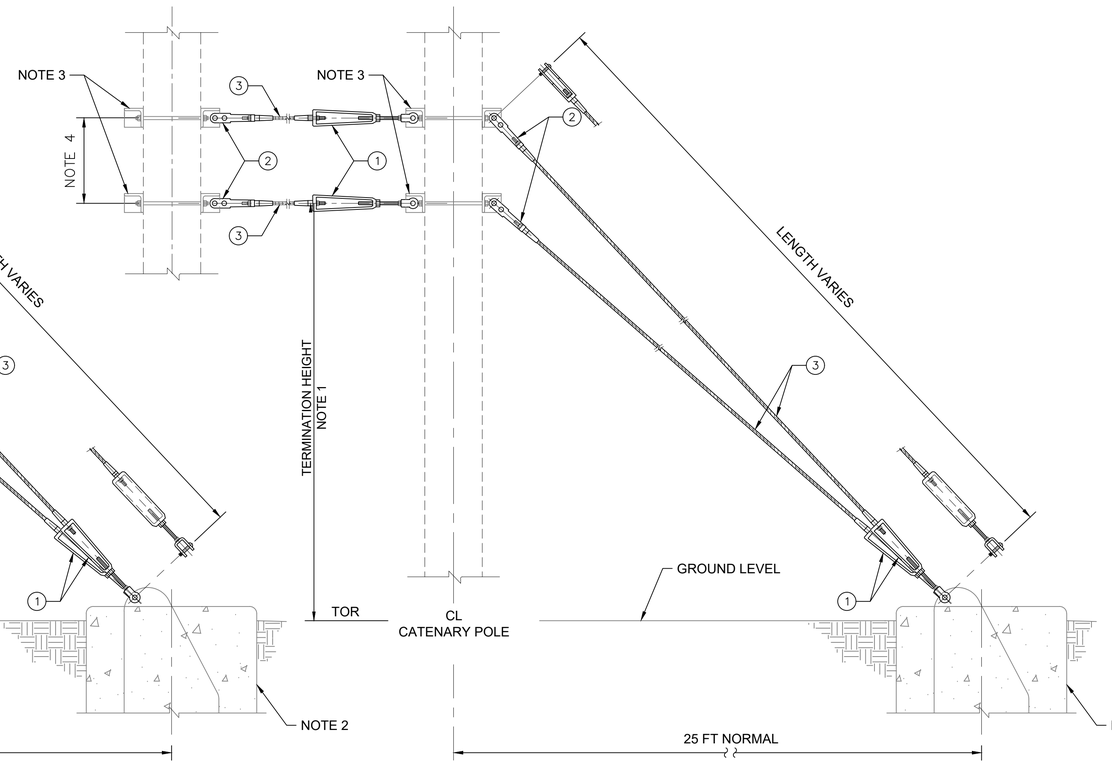
SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
WIDE FLANGE POLE DOWN/HEAD GUY ASSEMBLIES
DG-1, DG-2, DG-3 & HG1

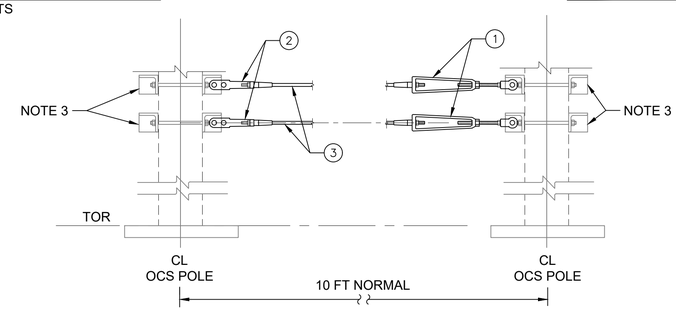
DRAWING No.: **STD-JOD620**
FACILITY ID:
SHEET No.: 1
REV:



DOWN GUY ASSEMBLY DG-4
NTS

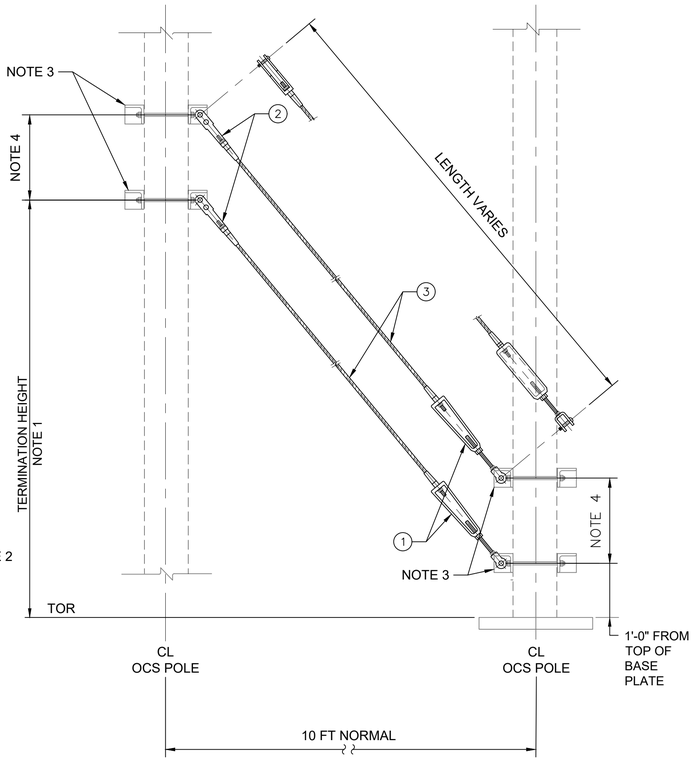


HEAD GUY AND DOWN ASSEMBLY DG-5
NTS



HEAD GUY ASSEMBLY HG-2
NTS

SEE NOTE 5



DOWN GUY ASSEMBLY DG-6
NTS

GENERAL NOTES:

1. TERMINATION HEIGHTS TO BE LISTED ON OCS LAYOUT PLANS AND SCHEDULES ON A SITE SPECIFIC BASIS.
2. GUY FOUNDATION TO BE CALLED OFF SEPARATELY.
3. POLE BRACKET TO BE CALLED OUT SEPARATELY.
4. ATTACHMENT HEIGHT AND SEPARATION OF ANCHOR PLATES VARIES WITH SPECIFIED TYPE (CTST, BWA, OR FA). CONTRACTOR TO DESIGN AND SUBMIT ALL ANCHOR CONFIGURATIONS FOR APPROVAL.
5. HEIGHT OF HEAD GUY NEAR TOP OF POLE SHALL BE DETERMINED BY THE CONTRACTOR.

BILL OF MATERIALS

QUANTITIES EACH TYPE				UNITS	DESCRIPTION	ITEM NO.	PART NO./REMARKS
HG-2	DG-6	DG-5	DG-4				
2	2	4	2	EA	END FITTING WITH TURNBUCKLE AND PIN	1	
2	2	4	2	EA	END FITTING WITH CLEVIS AND PIN	2	
AS REQD	AS REQD	AS REQD	AS REQD	LF	STAINLESS STEEL WIRE	3	

No.	DATE	DSN	CHK	APP	REVISION
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
----	----	----	----	----	----
1	2/2024	----	----	----	2024 REVISED STANDARD DRAWINGS
0	8/2019	----	----	----	REVISED SYSTEMS DIRECTIVE DRAWINGS

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SUBMITTED BY:
DATE:
REVIEWED BY:
DATE:
LINE IS 1" AT FULL SCALE
SOUNDTRANSIT
SCALE: NTS
FILENAME: STD-JOD621
CONTRACT No.: RTA/LR
DATE: 2/2024

SOUND TRANSIT
STANDARD DRAWINGS
SYSTEMS

OVERHEAD CATENARY SYSTEM
TAPERED TUBULAR POLE DOWN/HEAD GUY ASSEMBLIES
DG-4, DG-5, DG-6 & HG-2

DRAWING No.: STD-JOD621
FACILITY ID:
SHEET No.: REV: 1