

California High-Speed Train Project



Request for Proposal for Design-Build Services

**RFP No.: HSR 11-16
Scope of Work**

**ATTACHMENT 4
SCOPE ELEMENTS MATRIX**

NO.	WORK ELEMENTS			CP1	REFERENCE	INSTRUCTIONS / DIRECTIONS
	DISCIPLINE	CATEGORY	ITEM			
INFRASTRUCTURE						
1	SITE WORK	EARTHWORK	GRADING, SIDE SLOPES	YES		CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING OF THE PROJECT ELEMENTS WHICH INCLUDE THE WORK OF HST AND THIRD PARTIES (UPRR, BNSF, CALTRANS, CITY OF FRESNO). CONTRACTOR SHALL MONITOR SETTLEMENTS OF FILL AREAS IN ACCORDANCE WITH DESIGN CRITERIA. CONTRACTOR SHALL PROVIDE PERMANENT SLOPE PROTECTION.
2	SITE WORK	EARTHWORK	SUBGRADE	YES		CONTRACTOR SHALL DESIGN AND INSTALL STABILITY MEASURES TO MEET MAINTENANCE REQUIREMENTS.
3	SITE WORK	EARTHWORK	COMPACTED FILL	YES		
4	SITE WORK	EARTHWORK	SUBBALLAST	NO	YES	CONTRACTOR SHALL ONLY INSTALL PROTECTIVE LAYER FOR PROTECTION OF PREPARED SUBGRADE. REFER TO SCOPE OF WORK.
5	SITE WORK	EARTHWORK	ASPHALT UNDERLAYMENT	YES		CONTRACTOR MAY USE THE ASPHALT UNDERLAYMENT AS AN ALTERNATIVE TO THE SUBBALLAST LAYER IN POOR SOIL CONDITIONS.
6	SITE WORK	SPECIAL TRACKWORK	GRADING OF TRACKWAY IN AREAS OF SPECIAL TRACKWORK AND WAYSIDE EQUIPMENT	YES		CONTRACTOR SHALL INSTALL PROTECTIVE LAYER FOR PROTECTION OF PREPARED SUBGRADE IN AREAS/LIMITS OF SPECIAL TRACKWORK AND WAYSIDE EQUIPMENT THAT WILL BE INSTALLED LATER. REFER TO SCOPE OF WORK.
7	SITE WORK	EARTHWORK	ROCK CONTAINMENT/CATCHMENT	NO	YES	CONTRACTOR SHALL DESIGN AND CONSTRUCT ROCK CONTAINMENT/CATCHMENT (IF APPLICABLE) PER DESIGN CRITERIA.
8	GENERAL	GENERAL	DEMOLITION	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
9	SITE WORK	ACCESS CONTROL	FENCE	YES		CONTRACTOR SHALL FENCE AND FULLY SECURE THE AUTHORITY'S RIGHT-OF-WAY. CONTRACTOR SHALL CONSTRUCT PERMANENT/ULTIMATE FENCING. REFER TO DESIGN CRITERIA. THIRD PARTY FENCING SHALL BE DESIGNED PER THIRD PARTY REQUIREMENTS.
10	SITE WORK	ACCESS CONTROL	GATES (WALKING AND DRIVING)	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
11	SITE WORK	ACCESS ROAD	ACCESS ROADS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT ACCESS ROADS (TO THE TOP OF AGGREGATE BASE). REFER TO SCOPE OF WORK AND DIRECTIVE DRAWINGS.
12	SITE WORK	ACCESS ROAD	COMPACTED SUBGRADE	YES		CONTRACTOR SHALL CONSTRUCT ACCESS ROADS TO THE TOP OF AGGREGATE BASE
13	SITE WORK	ACCESS ROAD	AGGREGATE BASE	YES		CONTRACTOR SHALL CONSTRUCT ACCESS ROADS TO THE TOP OF AGGREGATE BASE
14	SITE WORK	ACCESS ROAD	AGGREGATE SUBBASE	YES		CONTRACTOR SHALL CONSTRUCT ACCESS ROADS TO THE TOP OF AGGREGATE BASE
15	SITE WORK	ACCESS ROAD	ASPHALT CONCRETE	NO		CONTRACTOR SHALL CONSTRUCT ACCESS ROADS TO THE TOP OF AGGREGATE BASE.
16	SITE WORK	INTRUSION PROTECTION AND SAFETY BARRIER	CONCRETE BARRIERS, CONCRETE WALLS, METAL BEAM GUARD RAILS, AND BERMS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT THE INTRUSION AND SAFETY BARRIERS PER CHSTP, CALTRANS, AND OTHER PARTY'S DESIGN REQUIREMENTS. FOR COLLISION LOADS, REFER TO DESIGN CRITERIA. CONTRACTOR SHALL DESIGN AND CONSTRUCT THE INTRUSION BARRIER INTEGRAL TO THE TRENCH WALL IF IT IS LOCATED ON TOP OF THE TRENCH WALL.
17	SITE WORK	INTRUSION PROTECTION	FENCING AND TRAFFIC BARRIER COMBINATION	YES		CONTRACTOR SHALL DESIGN AND INSTALL INSIDE THE AUTHORITY'S RIGHT-OF-WAY.
18	SITE WORK	INTRUSION PROTECTION	EARTH BERM OR DITCH	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT EARTH BERM OR DITCH.
19	SITE WORK	INTRUSION PROTECTION	HST PIER PROTECTION IN RAILROAD AND/OR HIGHWAY RIGHT-OF-WAY	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT THE INTRUSION BARRIER. FOR COLLISION LOADS, REFER TO DESIGN CRITERIA. CONTRACTOR SHALL PROVIDE PIER PROTECTION FOR HST PIERS AND THIRD PARTY PIERS PER DESIGN CRITERIA AND THIRD PARTY REQUIREMENTS.
20	SITE WORK	INTRUSION PROTECTION	PROTECTIVE SCREEN (SOLID PLATE) ON HST UNDERPASS STRUCTURES	NO	YES	PROTECTIVE SCREEN WITH SOLID PLATE WILL BE INSTALLED LATER.
21	SITE WORK	SIGNAGE	FENCE SIGNAGE	YES		CONTRACTOR SHALL DESIGN AND INSTALL ACCESS CONTROL SIGNAGE. SIGNS SHALL BE ACCEPTED BY THE AUTHORITY BEFORE FABRICATION.
22	SITE WORK	SIGNAGE	SIGN, POLE, AND FOUNDATION	NO		
23	SITE WORK	SIGNAGE	MILE POST	NO		
24	SITE WORK	SURVEY	SITE SURVEY AND FIELD ENGINEERING	YES		
25	SITE WORK	ROADWAY WORK	MAINTENANCE OF TRAFFIC	YES		CONTRACTOR SHALL DESIGN AND INSTALL TEMPORARY AND PERMANENT TRAFFIC CONTROL DEVICES FOR HIGHWAY AND RAILROADS TO MAINTAIN TRAFFIC FLOW PER DESIGN CRITERIA, CALTRANS, AND THIRD PARTY REQUIREMENTS.
26	SITE WORK	ROADWAY WORK / STRUCTURES	GRADE SEPARATIONS (HST OVERPASS AND UNDERPASS)	YES		ROADWAY WORK SHALL BE DESIGNED AND CONSTRUCTED PER DESIGN CRITERIA AND THIRD PARTY REQUIREMENTS.
27	SITE WORK	ROADWAY WORK	NEW OR MODIFICATIONS TO EXISTING ROADS	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
28	SITE WORK	STRUCTURES	PEDESTRIAN BRIDGES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PEDESTRIAN BRIDGES PER DESIGN CRITERIA AND THIRD PARTY REQUIREMENTS.
29	SITE WORK	PARKING	FACILITY PARKING DETAIL	NO		
30	SITE WORK	ENVIRONMENTAL	CULVERTS FOR WILDLIFE CROSSINGS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT WILDLIFE CROSSINGS AS INDICATED IN THE ENVIRONMENTAL DOCUMENTS.
31	SITE WORK	ENVIRONMENTAL	HAZARDOUS MATERIALS REMOVAL	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
32	SITE WORK	ENVIRONMENTAL	SOUND WALL AND FOUNDATION (AT-GRADE, CUT/FILL, RETAINED STRUCTURES)	NO	YES	CONTRACTOR SHOULD REFER TO ENVIRONMENTAL DOCUMENTS FOR THE LIMITS OF SOUND WALLS. CONTRACTOR SHALL DESIGN PARAPET FOR SLIPSTREAM LOADS PER DESIGN CRITERIA.
33	SITE WORK	TRACKWAY DRAINAGE	DRAIN AGGREGATE UNDER CABLE TROUGH	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE SYSTEM, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.
34	SITE WORK	TRACKWAY DRAINAGE	UNDERDRAIN SYSTEM	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE SYSTEM, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.
35	SITE WORK	TRACKWAY DRAINAGE	PERFORATED PIPE UNDERDRAIN (CLOSED DRAINAGE)	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE SYSTEM, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.
36	SITE WORK	TRACKWAY DRAINAGE	GEOTEXTILE FABRIC / GEOFABRIC	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE SYSTEM, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.

NO.	WORK ELEMENTS			CP1	REFERENCE	INSTRUCTIONS / DIRECTIONS
	DISCIPLINE	CATEGORY	ITEM			
37	SITE WORK	TRACKWAY DRAINAGE	TRACKSIDE DITCH (OPEN CHANNEL DRAINAGE)	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT OPEN/SURFACE DRAINAGE. REFER TO SCOPE OF WORK.
38	SITE WORK	TRACKWAY DRAINAGE	DRAIN INLET	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT THE FINAL DRAINAGE SYSTEM. DRAIN INLETS SHALL ACCOMMODATE TEMPORARY AND FINAL DRAINAGE SYSTEM. REFER TO SCOPE OF WORK.
39	SITE WORK	TRACKWAY DRAINAGE	CONNECTION TO STORM DRAIN	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT FOR THE FINAL DRAINAGE SYSTEM AND CONNECT TO LOCAL STORM DRAIN SYSTEMS.
40	SITE WORK	TRACKWAY DRAINAGE	DETENTION BASIN	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT DETENTION BASINS TO ACCOMMODATE THE FINAL DRAINAGE SYSTEM.
41	SITE WORK	TRACKWAY DRAINAGE	SIPHONS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT SIPHONS (IF REQUIRED).
42	SITE WORK	TRACKWAY DRAINAGE	ENERGY DISSIPATORS	NO	YES	
43	SITE WORK	DRAINAGE	CULVERTS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT CULVERTS (IF REQUIRED).
44	SITE WORK	DRAINAGE	PUMP STATIONS (THIRD PARTY)	YES		CONTRACTOR SHALL DESIGN AND INSTALL PUMP STATIONS (AS NEEDED) FOR THIRD PARTY ENTITIES PER THAT ENTITY'S REQUIREMENTS.
45	SITE WORK	DRAINAGE	ROADWAY DRAINAGE	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT ROADWAY DRAINAGE SYSTEM PER JURISDICTIONAL REQUIREMENTS
46	SITE WORK	UTILITIES	WATERPROOFING SYSTEM AT STRUCTURE/UTILITY INTERFACES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT STRUCTURE/UTILITY PENETRATIONS SO THAT IT DOES NOT COMPROMISE THE INTEGRITY OF WATERPROOFING OF THE STRUCTURE.
47	SITE WORK	UTILITIES	RELOCATION OF EXISTING UTILITIES	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
48	SITE WORK	UTILITIES	CORROSION CONTROL	YES		CONTRACTOR SHALL DESIGN AND INSTALL UTILITY CORROSION CONTROL, UNLESS PERFORMED BY THE UTILITY OWNER.
49	SITE WORK	UTILITIES	VENT PIPE RISER	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT VENT PIPE RISER, UNLESS PERFORMED BY THE UTILITY OWNER.
50	SITE WORK	UTILITIES	SHUTOFF VALVE	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT SHUTOFF VALVES PER THE REQUIREMENTS OF THE UTILITY OWNER (IF REQUIRED)
51	SITE WORK	LOW VOLTAGE UNDER TRACK CROSSING	UNDER TRACK CONDUITS IN DUCTBANKS AND MANHOLES (AT-GRADE, CUT/FILL, RETAINED STRUCTURES)	YES		CONTRACTOR SHALL LOCATE, DESIGN AND CONSTRUCT LOW VOLTAGE UNDER TRACK CONDUITS IN DUCTBANKS AND MANHOLES IN AT-GRADE, CUT/FILL, AND RETAINED TRACKWAY SECTIONS. REFER TO THE COMMUNICATIONS CHAPTER OF THE DESIGN CRITERIA. PRELIMINARY DESIGN HAS LOCATED LOW VOLTAGE UNDERTRACK CONDUITS AND MANHOLES AT THE FOLLOWING STATIONING, THE CONTRACTOR SHALL CONFIRM ALL LOCATIONS. REFER TO SCOPE OF WORK. OPTION 1: 2115+00, 2203+00, 2332+00, 2388+00, 2496+00, 2651+00 ALIGNMENT 1A: 10545+00, 10600+00, 10682+00, 10827+00, 10856+00, 10865+00, 10874+00 ALIGNMENT 1B: 10971+00, 10983+00, 10993+00, 11007+00, 11008+00, 11017+00, 11018+00, 11026+00 ALIGNMENT 1C: 11030+00, 11045+00, 11055+00, 11136+00, 11288+00, 11296+00
52	SITE WORK	LOW VOLTAGE UNDER GROUND CROSSING	UNDER GROUND CONDUITS IN DUCTBANKS AND MANHOLES (AT-GRADE, TRENCH, CUT/FILL, RETAINED STRUCTURES)	YES		CONTRACTOR SHALL LOCATE, DESIGN AND CONSTRUCT LOW VOLTAGE UNDER GROUND CONDUITS IN DUCTBANKS AND MANHOLES IN AT-GRADE, CUT/FILL, AND RETAINED TRACKWAY SECTIONS. REFER TO THE COMMUNICATIONS CHAPTER OF THE DESIGN CRITERIA. PRELIMINARY DESIGN HAS LOCATED LOW VOLTAGE UNDERGROUND CONDUITS AND MANHOLES AT THE FOLLOWING STATIONING, THE CONTRACTOR SHALL CONFIRM ALL LOCATIONS. REFER TO SCOPE OF WORK. ALIGNMENT 1A: 10545+00, 10600+00, 10682+00, 10827+00, 10856+00, 10865+00, 10874+00
53	SITE WORK	25KV UNDER GROUND CROSSING	UNDER GROUND CONDUITS IN DUCTBANKS AND MANHOLES (AT-GRADE, TRENCH, CUT/FILL, RETAINED STRUCTURES)	YES		CONTRACTOR SHALL LOCATE, DESIGN, AND CONSTRUCT 25KV UNDER GROUND CONDUITS IN DUCTBANKS AND MANHOLES IN AT-GRADE, CUT/FILL, AND RETAINED TRACKWAY SECTIONS. REFER TO THE TRACTION POWER SUPPLY SYSTEM CHAPTER OF THE DESIGN CRITERIA. PRELIMINARY DESIGN HAS LOCATED LOW VOLTAGE UNDERGROUND CONDUITS AND MANHOLES AT THE APPROXIMATE FOLLOWING STATIONING, THE CONTRACTOR SHALL CONFIRM ALL LOCATIONS. REFER TO SCOPE OF WORK. ALIGNMENT 1A: 10546+00, 10601+00, 10828+00
54	SITE WORK	UNDER TRACK CROSSING	UNDER TRACK CONDUITS (AERIAL, TRENCH, C&C STRUCTURES)	NO	YES	CONTRACTOR SHOULD NOT CONSTRUCT UNDER TRACK CONDUITS FOR AERIAL, TRENCH, AND C&C STRUCTURES. REFER TO THE COMMUNICATIONS CHAPTER OF THE DESIGN CRITERIA.
55	STRUCTURES	CABLE TROUGH	CABLE TROUGH - AERIAL STRUCTURE	NO	YES	CONTRACTOR SHALL DESIGN AND CONSTRUCT THE CABLE TROUGH WALL FOR THE CONCRETE PARAPET CONNECTION. REMOVABLE PRECAST COVERS ARE NOT INCLUDED. REFER TO SCOPE OF WORK TYPICAL SECTION EXHIBIT.
56	STRUCTURES	CABLE TROUGH	CABLE TROUGH - TRENCH AND C&C STRUCTURES	NO	YES	
57	STRUCTURES	CABLE TROUGH	CABLE TROUGH - CUT/FILL, RETAINED STRUCTURES	NO	YES	CONTRACTOR SHALL USE THE SAME-GRADED MATERIAL AS THE EMBANKMENT FOR EASE OF FUTURE CABLE TROUGH INSTALLATION.
58	STRUCTURES	CABLE TROUGH	CABLE TROUGH TRANSITIONS	NO	YES	
59	STRUCTURES	RETAINING WALL	RETAINING WALL	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
60	STRUCTURES	RETAINING WALL	FALL PROTECTION	YES		CONTRACTOR SHALL ENSURE FALL PROTECTION DESIGN MEETS MINIMUM REQUIREMENTS PER DESIGN CRITERIA.
61	STRUCTURES	RETAINING WALL	FLOOD PROTECTION / INTRUSION PROTECTION	YES		WALL HEIGHTS MAY BE HIGHER AS REQUIRED FOR FLOOD ELEVATION AND INTRUSION PROTECTION REQUIREMENTS.
62	STRUCTURES	RETAINING WALL	RETAINING WALL DRAINAGE	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT/ULTIMATE DRAINAGE SYSTEM FOR THE RETAINING WALL.
63	STRUCTURES	RETAINING WALL	TOP OF RETAINING WALL GUTTER	YES		
64	STRUCTURES	RETAINING WALL	CONTINUOUS DRAINAGE BLANKET BEHIND EVERY WALL	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT/ULTIMATE DRAINAGE SYSTEM FOR THE RETAINING WALL.
65	STRUCTURES	RETAINING WALL	PERFORATED UNDERDRAIN AT THE BOTTOM OF WALL BEHIND THE FILL	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT/ULTIMATE DRAINAGE SYSTEM FOR THE RETAINING WALL.
66	STRUCTURES	RETAINING WALL	WEEP HOLES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT/ULTIMATE DRAINAGE SYSTEM FOR THE RETAINING WALL.
67	AERIAL STRUC.	GENERAL	EXIT STAIRWAYS	NO	YES	
68	AERIAL STRUC.	GENERAL	DERAILMENT PROTECTION WALL AND SLEEVES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT DERAILMENT PROTECTION WALLS PER LOAD REQUIREMENTS IN THE DESIGN CRITERIA AND AS SHOWN ON DIRECTIVE DRAWINGS. DERAILMENT PROTECTION WALLS SHALL INCLUDE THE CABLE TROUGH SIDE WALL ON AERIAL STRUCTURES. REFER TO SCOPE OF WORK TYPICAL SECTION EXHIBIT.
69	AERIAL STRUC.	GENERAL	CONCRETE PARAPET	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT CONCRETE PARAPET PER DESIGN CRITERIA AND DIRECTIVE DRAWINGS.

NO.	WORK ELEMENTS			CP1	REFERENCE	INSTRUCTIONS / DIRECTIONS
	DISCIPLINE	CATEGORY	ITEM			
70	AERIAL STRUC.	SOUND WALL	SOUND WALL	NO	YES	CONTRACTOR SHOULD REFER TO ENVIRONMENTAL DOCUMENTS FOR THE LIMITS OF SOUND WALLS. CONTRACTOR SHALL DESIGN PARAPET FOR SLIPSTREAM LOADS PER DESIGN CRITERIA. CONTRACTOR SHALL DESIGN PARAPET ON AERIAL STRUCTURES TO ACCOMMODATE FOR FUTURE INSTALLATION AND LOADING OF SOUND WALL PER DESIGN CRITERIA.
71	AERIAL STRUC.	GENERAL	EXPANSION JOINT	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PER DESIGN CRITERIA
72	AERIAL STRUC.	GENERAL	BEARINGS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PER DESIGN CRITERIA
73	AERIAL STRUC.	GENERAL	SHEAR KEY	YES		
74	AERIAL STRUC.	SUPERSTRUCTURE	BOX GIRDER	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PER DESIGN CRITERIA
75	AERIAL STRUC.	SPECIAL TRACKWORK	TURNOUTS AND CROSSOVERS	NO	YES	CONTRACTOR SHALL DESIGN THE AERIAL STRUCTURE TO CONSIDER THE EFFECTS OF TURNOUTS AND CROSSOVERS ON THE STRUCTURE JOINTS.
76	AERIAL STRUC.	OCS FOUNDATION	SLEEVES AT OVERHANG OF BOX GIRDERS	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT SLEEVES AT OVERHANG OF BOX GIRDERS SPACED AT 30 FEET MAXIMUM FOR FUTURE OVERHEAD CATENARY SYSTEM FOUNDATION AND CONDUITS FOR CABLE ROUTING
77	AERIAL STRUC.	SUBSTRUCTURE	PIER CAP, PIER, AND FOUNDATION	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PER DESIGN CRITERIA
78	AERIAL STRUC.	DRAINAGE	DRAINAGE INLET, WEIR, DOWNSPOUT, DRAINAGE CLEANOUT, CONNECTION TO EXISTING OR PROPOSED DRAINAGE SYSTEM	YES		CONTRACTOR SHALL DESIGN AERIAL STRUCTURE DRAINAGE SYSTEM PER DESIGN CRITERIA AND DIRECTIVE DRAWINGS. CONTRACTOR SHALL DESIGN AND INSTALL THE DRAIN PIPE (EMBEDDED IN PIER) AND SHALL NOT INTERRUPT THE SUBSTRUCTURE REINFORCEMENT, ESPECIALLY IN THE PLASTIC HINGE POINT. CONTRACTOR SHALL CONNECT THE DRAIN PIPE TO A DRAINAGE SYSTEM.
79	AERIAL STRUC.	FIXED EQUIPMENT	SURFACE MOUNTED PULL BOXES	NO		
80	AERIAL STRUC.	FIXED EQUIPMENT	EXPOSED CONDUITS, EXPANSION AND DEFLECTION FITTINGS, SUPPORTING STEEL AND HARDWARE, EXTERIOR AESTHETIC CLADDING SYSTEM	NO		
81	AERIAL STRUC.	FIXED EQUIPMENT	CONCRETE PROTECTION CURB TO PROTECT EXPOSED CONDUITS	NO		
82	TRENCH	GENERAL	FALL PROTECTION	YES		CONTRACTOR SHALL ENSURE DESIGN OF FALL PROTECTION MEETS THE MINIMUM REQUIREMENTS PER DESIGN CRITERIA.
83	TRENCH	GENERAL	FLOOD PROTECTION / INTRUSION PROTECTION	YES		WALL HEIGHTS MAY BE HIGHER AS REQUIRED FOR FLOOD ELEVATION AND INTRUSION PROTECTION REQUIREMENTS.
84	TRENCH	GENERAL	STRUT	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT PERMANENT STRUTS (IF REQUIRED).
85	TRENCH	STRUCTURES / UTILITY / CIVIL	INTERMITTENT ROOF SLAB FOR UTILITY AND ROADWAY CROSSING	YES		
86	TRENCH / C&C	GENERAL	NICHES	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT NICHES FOR THE PERMANENT/ULTIMATE CONDITION OF THE STAIRWAYS AND SUMP PUMPS THAT WILL BE INSTALLED LATER.
87	TRENCH / C&C	GENERAL	BASE SLAB	YES		
88	TRENCH / C&C	GENERAL	WALKWAY AND INVERT SLAB	NO		
89	TRENCH / C&C	GENERAL	INTEGRAL CONCRETE WALL	YES		
90	TRENCH / C&C	GENERAL	COMPACTED BACKFILL / STRUCTURAL FILL	YES		
91	TRENCH / C&C	GENERAL	CONSTRUCTION JOINT WITH WATERSTOP	YES		
92	TRENCH / C&C	GENERAL	FULL PERIMETER WATERPROOFING	YES		CONTRACTOR SHALL DESIGN AND INSTALL WATERPROOFING FOR TRENCHES AND CUT-AND-COVER STRUCTURES.
93	TRENCH / C&C	GENERAL	DEWATERING	YES		CONTRACTOR SHALL DESIGN AND INSTALL DEWATERING FOR CONSTRUCTION OF TRENCHES AND CUT-AND-COVER STRUCTURES (CRUSHED STONE IS PART OF AN ACCEPTABLE METHOD FOR DEWATERING.)
94	TRENCH / C&C	FIXED EQUIPMENT	LIGHT FIXTURES	NO		CONTRACTOR SHALL DESIGN AND CONSTRUCT THE TRENCH WALL TO ENSURE THAT CONTINUOUS AND INTERMITTENT FIXED EQUIPMENT CAN BE INSTALLED LATER WITHOUT INTERFERING WITH THE STRUCTURAL REINFORCEMENT OF THE WALL.
95	TRENCH / C&C	FIXED EQUIPMENT	WALKWAY HANDRAILS	NO	YES	CONTRACTOR SHALL DESIGN AND CONSTRUCT THE TRENCH WALL TO ENSURE THAT CONTINUOUS AND INTERMITTENT HANDRAIL CAN BE INSTALLED LATER WITHOUT INTERFERING WITH THE STRUCTURAL REINFORCEMENT OF THE WALL.
96	TRENCH / C&C	FIXED EQUIPMENT	EMBEDDED CONDUITS IN WALKWAY AND INVERT SLAB FOR CABLE ROUTING	NO		
97	TRENCH / C&C	DRAINAGE	DRAIN AND INLET	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE CONDITION, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.
98	TRENCH / C&C	DRAINAGE	INVERT FOR TRACKBED	NO	YES	CONTRACTOR SHALL DESIGN INVERT SLAB THICKNESS TO ACCOMMODATE THE TRACK DRAINAGE SYSTEM.
99	TRENCH / C&C	DRAINAGE	SUMP PUMP	NO	YES	CONTRACTOR SHALL DESIGN FOR THE FINAL DRAINAGE CONDITION, BUT CONSTRUCT WHAT IS NEEDED TO ACCOMMODATE TEMPORARY DRAINAGE CONDITIONS. REFER TO SCOPE OF WORK.
100	C&C	GENERAL	VENTILATION STRUCTURE	NO	YES	CONTRACTOR SHALL KEEP THE LENGTH OF THE C&C SECTION SO THAT NO VENTILATION IS REQUIRED.
101	C&C	GENERAL	PORTAL FACILITY	NO	YES	
102	STATIONS	STRUCTURE	PASSENGER STATION BUILDING	NO		
103	STATIONS	GENERAL	STATION FURNITURES, FIXTURES, AND EQUIPMENT	NO		
104	STATIONS	WALL	SCREEN WALL	NO		
105	STATIONS	TRACKWAY DRAINAGE	DRAINAGE INLET	YES		CONTRACTOR SHALL DESIGN AND CONSTRUCT THE PERMANENT DRAINAGE SYSTEM INCLUDING THE INLETS UP TO SUBGRADE LEVEL AND INSTALL TEMPORARY CAP OVER THE INLET.
106	STATIONS	PLATFORM	STATION PLATFORM	NO	YES	
107	TRACK	GENERAL	RAIL AND FASTENERS	NO		
108	TRACK	NON-BALLASTED	NON-BALLASTED TRACK	NO	YES	
109	TRACK	NON-BALLASTED	AC LAYER	NO		
110	TRACK	NON-BALLASTED	SLEEVES FOR CABLE ROUTING	NO		
111	TRACK	BALLASTED	BALLAST (INCLUDING BALLAST BELOW TIE)	NO	YES	
112	TRACK	BALLASTED	CONCRETE TIES	NO		

THE WORK SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING WORK ELEMENTS

Attachment 4 - Scope Elements Matrix

NO.	WORK ELEMENTS			CP1	REFERENCE	INSTRUCTIONS / DIRECTIONS
	DISCIPLINE	CATEGORY	ITEM			
113	TRACK	BALLASTED	WOOD TIES	NO		
114	TRACK	BALLASTED	EMBEDDED CONDUITS WITHIN BALLAST TRACKWORK	NO		
115	TRACK	TRACKWORK	BUMPING POSTS	NO		
116	TRACK	TRACKWORK	DERAILS	NO		
117	TRACK	TRACKWORK	STRETCHER BARS	NO		
118	TRACK	TRACKWORK	ATC CROSSING BONDING	NO		
119	TRACK	SPECIAL TRACKWORK	SWITCH RAILS	NO		
120	TRACK	SPECIAL TRACKWORK	TURNOUTS AND CROSSOVERS	NO	YES	CONTRACTOR SHALL DESIGN FOR THE LOCATION AND SPACE REQUIREMENTS OF OPERATING MECHANISMS, SIGNAL EQUIPMENT, AND OTHER WAYSIDE FACILITIES. CONTRACTOR SHALL DESIGN THE FUTURE LOCATION FOR EASE OF ACCESS TO THE WAYSIDE FACILITIES.
121	TRACK	SPECIAL TRACKWORK	TURNOUT GUARD RAILS (OR CHECK RAILS)	NO		
122	TRACK	SPECIAL TRACKWORK	SWITCH MACHINES	NO	YES	CONTRACTOR SHALL DESIGN THE FUTURE LOCATION OF SWITCH MACHINES FOR EASE OF ACCESS TO THE WAYSIDE FACILITIES.
123	TRACK	SPECIAL TRACKWORK	SWITCH HEATERS	NO		
SYSTEMS						
124	OCS	ASSEMBLY	OCS POLE AND FOUNDATION	NO	YES	
125	OCS	ASSEMBLY	OCS ASSEMBLY	NO		
126	OCS	ASSEMBLY	OCS POLE NUMBER PLATE	NO		
127	OCS	ASSEMBLY	OCS CONTACT WIRE	NO		
128	OCS	ASSEMBLY	MESSENGER WIRE	NO		
129	OCS	ASSEMBLY	NEGATIVE FEEDER WIRE	NO		
130	OCS	ASSEMBLY	STATIC WIRE	NO		
131	OCS	ASSEMBLY	PORTAL STRUCTURE OPENING	NO		
132	OCS	BALANCE WEIGHT	POLE BRACKET	NO		
133	OCS	BALANCE WEIGHT	CABLE TERMINATION CLAMP	NO		
134	OCS	BALANCE WEIGHT	OCS BALANCE WEIGHT POLE	NO		
135	OCS	BALANCE WEIGHT	TURNBUCKLE	NO		
136	OCS	BALANCE WEIGHT	ANCHOR U-BOLT	NO		
137	OCS	BALANCE WEIGHT	CATENARY INSULATED TERMINATION	NO		
138	OCS	BALANCE WEIGHT	POLE DOWN GUY BRACKET	NO		
139	OCS	BALANCE WEIGHT	BALANCE WEIGHT ANCHOR ASSEMBLY	NO		
140	OCS	L.V. DISTRIBUTION	25KV/480V TRANSFORMER	NO		
141	OCS	L.V. DISTRIBUTION	WEATHER HEAD	NO		
142	OCS	L.V. DISTRIBUTION	L.V. DISCONNECT SWITCH AND MOUNTING HARDWARE	NO		
143	OCS	L.V. DISTRIBUTION	CONDUCTORS AND MOUNTING HARDWARE	NO		
144	OCS	L.V. DISTRIBUTION	EXPOSED CONDUIT EXTENSIONS	NO		
145	OCS	GROUNDING & BONDING	GROUNDING AND BONDING ARRANGEMENT FOR OVERHEAD BRIDGES	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
146	OCS	GROUNDING & BONDING	GROUNDING AND BONDING ARRANGEMENT FOR HST STRUCTURES (I.E., AERIAL STRUCTURE, TRENCH, FENCE, ETC.)	YES		CONTRACTOR SHALL REFER TO SCOPE OF WORK.
147	OCS / TPS	OCS FEEDER	MAIN GANTRY AND FOUNDATION	NO		
148	OCS / TPS	OCS FEEDER	STRAIN GANTRY AND FOUNDATION	NO		
149	OCS / TPS	OCS FEEDER	ACROSS TRACK OCS CATENARY/FEEDER WIRE TO STRAIN GANTRY	NO		
150	OCS / TPS	OCS FEEDER	STANDOFF INSULATOR	NO		
151	OCS / TPS	OCS FEEDER	SURGE ARRESTER	NO		
152	OCS / TPS	OCS FEEDER	POTENTIAL TRANSFORMER	NO		
153	OCS / TPS	OCS FEEDER	ALUMINUM BUSBAR	NO		
154	OCS / TPS	OCS FEEDER	MOTOR OPERATED DISCONNECT SWITCH ASSEMBLY	NO		
155	TPS	FACILITIES	SUBSTATION	NO	YES	
156	TPS	FACILITIES	SWITCHING STATION	NO	YES	
157	TPS	FACILITIES	PARALLELING STATION	NO	YES	
158	TPS	FACILITIES	WAYSIDE POWER CONTROL CUBICLE	NO		
159	MOD	GROUND SWITCH	DISCONNECT SWITCH, ROD AND MOUNTING HARDWARE	NO		
160	MOD	GROUND SWITCH	2X25KV DISCONNECT SWITCH	NO		
161	MOD	GROUND SWITCH	SWITCH SUPPORT	NO		
162	MOD	GROUND SWITCH	ADJUSTABLE BRACE	NO		
163	MOD	GROUND SWITCH	DRIVE PIPE	NO		
164	MOD	GROUND SWITCH	GROUND WORKING PLATFORM AND GROUND CONNECTION	NO		

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NO.	WORK ELEMENTS			CP1	REFERENCE	INSTRUCTIONS / DIRECTIONS
	DISCIPLINE	CATEGORY	ITEM			
165	ATC	WAYSIDE	TRAIN CONTROL HOUSES	NO	YES	
166	ATC	WAYSIDE	DWARF SIGNALS	NO		
167	ATC	TRACKWORK	IMPEDANCE BOND	NO		
168	ATC	TRACK CIRCUIT	1-2" CONDUIT TO POWER COMPARTMENT	NO		
169	ATC	TRACK CIRCUIT	2" CONDUIT TO ATC/COMMS COMPARTMENT	NO		
170	ATC	TRACK CIRCUIT	CONDUIT EXTENSION	NO		
171	ATC	TRACK CIRCUIT	WORKING PLATFORM	NO		
172	ATC	TRACK CIRCUIT	GROUND ROD, CONDUCTOR, AND TERMINATION HARDWARE	NO		
173	ATC	TRACK CIRCUIT	POWER COMPARTMENT	NO		
174	ATC	TRACK CIRCUIT	EQUIPMENT CASE FOUNDATION	NO		
175	ATC	TRANSPONDER	ATC TRANSPONDERS AND MOUNTING HARDWARE	NO		
176	ATC	SPECIAL TRACKWORK	SWITCH MACHINE AND RODS	NO		
177	ATC	SPECIAL TRACKWORK	ATC SIGNAL	NO		
178	ATC / COMM	TRACK CIRCUIT	ATC EQUIPMENT CASE	NO		
179	COMM	COMM	STAND-ALONE RADIO SITES	NO	YES	
180	COMM	COMM	COMMUNICATION SHELTERS	NO	YES	
181	COMM	TRENCH	RADIO (LATERAL) COMMUNICATION CABLES TO RADIO EQUIPMENT	NO		
182	COMM	TRENCH	TRACKSIDE RADIO (LONGITUDINAL) CABLES	NO		
183	COMM	SCS	SCS EQUIPMENT CASE AND FOUNDATION	NO		
184	COMM	SCS	1-2" CONDUIT TO POWER COMPARTMENT	NO		
185	COMM	SCS	2" CONDUIT TO ATC/COMMS COMPARTMENT	NO		
186	COMM	SCS	SCADA INTERFACE CABINET	NO		
OPERATIONS & MAINTENANCE						
187	O&M	O&M	LIGHTING REQUIREMENTS AND PUMPS	YES		CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN AND CONSTRUCTION OF TEMPORARY FACILITIES THAT NEED TO BE LEFT IN PLACE AFTER THE COMPLETION OF THE CONTRACT. REFER TO SCOPE OF WORK.
188	O&M	INTRUSION	INTRUSION DETECTION	NO		
189	O&M	DERAILMENT	POWER OPERATED DERAIL DEVICES	NO		
190	O&M	FACILITIES	OPERATIONS CONTROL CENTER	NO		
191	O&M	FACILITIES	REGIONAL CONTROL CENTER	NO		
192	O&M	FACILITIES	YARD CONTROL CENTER	NO		
193	O&M	FACILITIES	YARD CONTROL TOWER EQUIPMENT ROOM	NO		
194	O&M	FACILITIES	TERMINAL CONTROL CENTER	NO		
195	O&M	FACILITIES	STATION CONTROL ROOM	NO		
196	O&M	FACILITIES	INCIDENT COMMAND POST	NO		
197	O&M	FACILITIES	HEAVY MAINTENANCE FACILITY	NO		
198	O&M	FACILITIES	OVERNIGHT LAYUP FACILITY	NO		
199	O&M	FACILITIES	PERIODIC INSPECTION FACILITY	NO		
200	O&M	FACILITIES	ROLLING STOCK MAINTENANCE	NO		
201	O&M	FACILITIES	MAINTENANCE OF INFRASTRUCTURE YARD	NO		
202	O&M	FACILITIES	MAINTENANCE OF INFRASTRUCTURE SIDING	NO		