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EL PASO STREETCAR PROJECT
MASTER TECHNICAL SPECIFICATIONS LIST

TXDOT SPECIFICATIONS, SPECIAL PROVISIONS APPLICABLE TO THIS PROJECT ARE LISTED AS FOLLOWS AND ARE LOCATED AT:

http://www.txdot.gov/business/resources/txdot-specifications.html

Item numbers in parentheses are TxDOT reference specifications that can also be retrieved at the above website.

TXDOT STANDARD SPECIFICATIONS AND STATEWIDE SPECIAL SPECIFICATIONS:	ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION NOVEMBER 1, 2014. STANDARD SPECIFICATIONS ARE INCORPORATED INTO THE CONTRACT BY REFERENCE.

ITEM NO.	DESCRIPTION
ITEM 100	PREPARING RIGHT OF WAY (103)
ITEM 104	REMOVING CONCRETE
ITEM 105	REMOVING TREATED AND UNTREATED BASE AND ASPHALT PAVEMENT
ITEM 110	EXCAVATION (132)
ITEM 170	IRRIGATION SYSTEM (402)(403)(618)(620)(622)(624)(628)
ITEM 192	LANDSCAPE PLANTING (161)(166)(168)
ITEM 216	PROOF ROLLING (210)
ITEM 247	FLEXIBLE BASE (105)(204)(210)(216)(247)(300)(310)(520)
ITEM 251	REWORKING BASE COURSES (204) (210)(216)(520)
ITEM 305	SALVAGING, HAULING, AND STOCKPILING RECLAIMABLE ASPHALT PAVEMENT
ITEM 315	FOG SEAL (204)(300)(316)
ITEM 340	DENSE-GRADED HOT-MIX ASPHALT (SMALL QUANTITY)(300)(301)(320)(520)(585)
ITEM 341	DENSE-GRADED HOT-MIX ASPHALT (300)(301)(320)(520)(585)
ITEM 360	CONCRETE PAVEMENT (421)(422)(438)(440)(529)(585)
ITEM 400	EXCAVATION AND BACKFILL FOR STRUCTURES (110)(132)(401)(402)(403)(416)(420)(421)(423)
ITEM 401	FLOWABLE BACKFILL (421)
ITEM 402	TRENCH EXCAVATION PROTECTION
ITEM 416	DRILLED SHAFT FOUNDATIONS (405)(420)(421)(423)(440)(448)
ITEM 420	CONCRETE SUBSTRUCTURES (400)(404)(421)(422)(426)(427)(440)(441)(448)
ITEM 439	BRIDGE DECK OVERLAYS
ITEM 442	METAL FOR STRUCTURES (441)(445)(446)(447)(448)
ITEM 450	RAILING (420)(421)(422)(424)(440)(441)(442)(445)(446)(448)(540)
ITEM 464	REINFORCED CONCRETE PIPE (400)(402)(403)(467)(476)
ITEM 465	JUNCTION BOXES, MANHOLES, AND INLETS (400)(420)(421)(424)(440)(471)
ITEM 476	JACKING, BORING, OR TUNNELING PIPE OR BOX (402)(403)(460)(462)(464)
ITEM 479	ADJUSTING MANHOLES AND INLETS (400)(421)(465)(471)
ITEM 481	PIPE FOR DRAINS (400)
ITEM 496	REMOVING STRUCTURES
ITEM 500	MOBILIZATION
ITEM 502	BARRICADES, SIGNS AND TRAFFIC HANDLING
ITEM 504*	FIELD OFFICE AND LABORATORY
ITEM 506	TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS
ITEM 529	CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER (360)(420)(421)(440)
ITEM 530	INTERSECTIONS, DRIVEWAYS AND TURNOUTS (247)(260)(263)(275)(276)(292)(316)(330)(334)(340)(360)(421)(440)
ITEM 531	SIDEWALKS (104)(360)(420)(421)(440)(530)
ITEM 550	CHAIN LINK FENCE (421)(445)
ITEM 618	CONDUIT (400)(476)
ITEM 620	ELECTRICAL CONDUCTORS (610)(628)
ITEM 624	GROUND BOXES (420)(421)(432)(440)(618)(620)
ITEM 636	SIGNS (643)
ITEM 644	SMALL ROADSIDE SIGN ASSEMBLIES (421)(440)(441)(442)(445)(634)(636)(643)(656)
ITEM 656	FOUNDATIONS FOR TRAFFIC CONTROL DEVICES (400)(416)(420)(421)(432)(440)(441)(442)(445)(447)(449)(618)
ITEM 666	RETROREFLECTORIZED PAVEMENT MARKINGS (316)(318)(502)(662)(677)(678)
ITEM 677	ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS (300)(302)(316)
ITEM 678	PAVEMENT SURFACE PREPARATION FOR MARKINGS (677)
ITEM 680	HIGHWAY TRAFFIC SIGNALS (610)(618)(624)(625)(627)(628)(636)(656)(682)(684)(686)(688)
ITEM 682	VEHICLE AND PEDESTRIAN SIGNAL HEADS

ITEM 684	TRAFFIC SIGNAL CABLES
ITEM 685	ROADSIDE FLASHING BEACON ASSEMBLIES (441)(442)(445)(449)(610)(620)(621)(624)(628)(656)(682)(684)(687)
ITEM 686	TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL) (416)(421)(441)(442)(445)(449)
ITEM 687	PEDESTAL POLE ASSEMBLIES (445)(449)(656)(682)
ITEM 688	PEDESTRIAN DETECTORS AND VEHICLE LOOP DETECTORS (618)(624)(682)(684)
ITEM 751	LANDSCAPE MAINTENANCE (193)(730)(734)(745)
~~ITEM 1003 (TxDOT 2004 SPEC)~~	~~LANDSCAPE BOULDERS~~ UTILIZE SPECIAL SPECIFICATION: EP-LAND
ITEM 1003	TRANSPLANT PLANT MATERIAL
ITEM 1004	TREE PROTECTION
ITEM 1005	LOOSE AGGREGATE FOR GROUNDCOVER
~~ITEM 5878 (TXDOT 2004 SPEC)~~ OMIT	~~WATER AND SANITARY SEWER SYSTEMS~~ OMIT
ITEM 6002	VIDEO IMAGING VEHICLE DETECTION SYSTEM
ITEM 6027	PREPARATION OF EXISTING CONDUITS, GROUND BOXES OR MANHOLES

TXDOT STANDARD PROVISIONS:	SPECIAL PROVISIONS WILL GOVERN AND TAKE PRECEDENCE OVER THE SPECIFICATIONS ENUMERATED HEREON WHEREVER IN CONFLICT THEREWITH.
SP 506-001	TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS
SP 506-002	TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

EL PASO STREETCAR PROJECT SPECIAL PROVISIONS AND SPECIAL SPECIFICATIONS ARE LISTED AS FOLLOWS AND ARE ATTACHED IN VOLUME 1.

ITEM NO.	DESCRIPTION
ITEM EP-000-SYS	IMPORTANT NOTICE TO CONTRACTORS - SYSTEM INTEGRATION
ITEM EP-000-UTL	IMPORTANT NOTICE TO CONTRACTORS - UTILITY ADJUSTMENTS
ITEM EP-000-ADD	IMPORTANT NOTICE TO CONTRACTORS - ADD ALTERNATE ITEMS
ITEM EP-UTL COORD RELO	UTILITY COORDINATION AND RELOCATION
ITEM EP-PUBLIC INFO	PUBLIC INFORMATION SPECIFICATION
ITEM EP-TRACK	TRACK AND SPECIAL TRACKWORK
ITEM EP-TWC*	TRAIN TO WAYSIDE COMMUNICATIONS SYSTEM
ITEM EP-SYSTEMS	SYSTEMS
ITEM EP-STOPS	STREETCAR STOP FURNISHINGS
ITEM EP-TRACK REMOVAL	REMOVAL OF EXISTING STREETCAR TRACK
ITEM EP-ARM	BANNER ARM ASSEMBLY
ITEM EP-IRON FENCE	INSTALLATION OF WROUGHT IRON FENCE AND GATES AT TPSS
ITEM EP-LUMINAIRE	SPECIAL ILLUMINATION
ITEM EP-FENCE GROUND	FENCE GROUNDING
ITEM EP-GROUT	PRESSURE GROUTING BENEATH CENTER BENT FOOTINGS OF STANTON STREET BRIDGE
ITEM EP-SWP	SPECIAL GRATE INLET PROTECTION
ITEM EP-LAND	MISCELLANEOUS LANDSCAPE ELEMENTS
ITEM EP-TSP	EMERGENCY PREEMPTION TRAFFIC SIGNAL PRIORITY CONTROL SYSTEM INSTALLATION
ITEM 680-XXXX	SPECIAL PROVISION TO TXDOT STANDARD SPECIFICATION 680
ITEM 6002-XXX	SPECIAL PROVISION TO TXDOT SPECIAL SPECIFICATION 6002
ITEM EP-WWWR	WATER AND WASTEWATER RELOCATION

EL PASO STREETCAR PROJECT SPECIAL SPECIFICATIONS (MAINTENANCE & STORAGE FACILITY) ARE LISTED AS FOLLOWS AND ARE ATTACHED IN VOLUME 2.

ITEM NO.	DESCRIPTION
ITEM EP-MSF	MAINTENANCE STORAGE FACILITY

GENERAL:	THE ABOVE-LISTED SPECIFICATION ITEMS ARE THOSE UNDER WHICH PAYMENT IS TO BE MADE (ITEMS INDICATED WITH (*) ARE CONSIDERED SUBSIDIARY TO THE PERTINENT BID ITEMS). THESE, TOGETHER WITH SUCH OTHER PERTINENT ITEMS, IF ANY, AS MAY BE REFERRED TO IN THE ABOVE-LISTED SPECIFICATION ITEMS, AND INCLUDING THE SPECIAL PROVISIONS AND SPECIAL SPECIFICATIONS LISTED ABOVE, AND OTHER PROJECT SPECIFICATIONS WITHIN THIS VOLUME CONSTITUTE THE COMPLETE SPECIFICATIONS FOR THIS PROJECT.

SPECIAL PROVISION

EP 000---ADD

ADD ALTERNATE ITEMS

The Contractor's attention is directed to the information presented below regarding additive alternate infrastructure items to be considered by the CRRMA for this Streetcar project. Add alternates are additional items of work that may be awarded as part of the contract if the bids come within the budget specified in the contract.

Additive Alternate items below are listed in no particular order. All items shall be furnished and installed as shown in construction plans and details or as designated by the project Owner (or Owner's representative)

1. Furnish and installing transit shelters at designated stop locations. The item will be measured and paid for as indicated elsewhere in the following project documents:
    - Shelters EP-STOPS
2. Furnish and installing waste receptacles at stop locations as designated by the Owner or Owner's Representative. The item will be measured and paid for as indicated elsewhere in the following project documents:
    - Waste Receptacles EP-STOPS
3. Furnish and installation of Sun Metro information holders at stop locations as shown in construction plans and details and details. The item will be measured and paid for as indicated elsewhere in the following project documents:
    - Transportation Information Holder EP-STOPS
4. Furnish and installation of the Blockout area and Sun Metro Logo Panel at stop locations as show in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:
    - Sun Metro Logo Panel EP-STOPS

5 – 7. Furnish and installation of irrigation systems at stop locations as shown in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Irrigation System (location A) TxDOT specification 170 6006
- Irrigation System (location B) TxDOT specification 170 6007
- Water Meter EP-LAND

8 – 9. Furnish and installation of tree grates at stop locations as shown in construction plans and details or as designated by the Owner. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Grates EP-LAND

10. Furnish and installation of trees at stop locations as shown in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Plant Material (30 gallon Tree) TxDOT specification 192 6024

11. Furnish and installation of vegetation barriers at stop locations as shown in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Vegetation Barrier TxDOT specification 192

12. Furnish and installation of aggregate for ground cover at stop locations as shown in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Loose Aggregate for Ground Cover TxDOT specification 1005 6001

13. Maintenance of trees and vegetation planted in accordance with this contract until final acceptance of the project. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Maintenance TxDOT specification 192

14. Performance of and oversight over public information duties connected with construction activities for the El Paso Streetcar Project. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Public Information EP-PUBLIC INFORMATION

15. Coordination with the project Owner, Owner's Representative, and utility Point of Contact (POC) regarding the adjustment and relocation work of any known and unknown utility infrastructure relocations required within the project limits of construction for subsurface and above ground utilities. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Utility Coordination EP-UTILITY COORDINATION

16. Furnish and installing of drill shafts in support of Additive Alternate Decorative Light Poles (Non-OCS) at locations indicated in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- DRILL SHAFT (RDWY ILL POLE) (30 IN) TxDOT Specification 416 6029

17 – 18. Furnish and installation of conduit in support of the placement of Additive Alternate Decorative Light Poles (Non-OCS) and Joint Use OCS Poles (Standard LED and Dark Sky Compliant) as shown

in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- CONDUIT (PVC)(SCHD 40)(2") TxDOT Specification 618 6023
- CONDUIT (PVC)(SCHD 40)(2") (BORE) TxDOT Specification 620 6024

19 – 20. Furnish and installation of electrical wiring in support of the placement of Additive Alternate Decorative Light Poles (Non-OCS) and Joint Use OCS Poles (Standard LED and Dark Sky Compliant) as shown in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- ELEC CONDR (NO.10) BARE TxDOT Specification 620 6005
- ELEC CONDR (NO.10) INSULATED TxDOT Specification 620 6006

21. Furnish and installation of junction boxes in support of the placement of Additive Alternate Decorative Light Poles (Non-OCS) and Joint Use OCS Poles (Standard LED and Dark Sky Compliant) as shown in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- JUNCTION BOX TxDOT Specification 624

22. Furnish and installation of LED illumination fixtures compliant with the City of El Paso's "Dark Sky" ordinance, on Joint-Use OCS poles at locations indicated in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Joint Use OCS Poles (Dark Sky Compliant) EP-LUMINAIRE

23. Furnish and installation of standard, LED illumination fixtures on Joint-Use OCS poles at locations indicated in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Joint Use OCS Poles (Standard LED) EP-LUMINAIRE

24. Furnish and installation of banner arm assemblies as shown in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Banner Arm Assembly EP-ARM

25. Furnish and installation of "City of El Paso Style Decorative Light Poles" at stop locations as shown in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- Decorative Light Poles (Non-OCS) EP-LUMINAIRE

26. Removal of existing concrete pavement along Santa Fe Street in support of full width, full depth concrete pavement, from station 18+40.84 to 36+12.82, as shown in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

- REMOVING CONC (PAV) TxDOT Specification 104

27. Removal of existing asphalt paving and/or stabilizing base material in support of full depth roadway reconstruction activities as indicated in construction plans and details. The items will be measured and paid for as indicated elsewhere in the following project documents:

    - REMOVE STAB BASE AND ASPH PAV (6"-20") TxDOT Specification 105 2039

28. Furnish and installation of asphaltic 2" pavement overlays at "Mill and Overlay" locations as indicated in construction plans and details. The items will be measured and paid for as indicated elsewhere in the following project documents:

    - D-GR HMA TY-C SAC-A PG70-23 TxDOT Specification 341 6026

29. Furnish and installation of full depth base material and asphaltic pavement as indicated in construction plans and details. The items will be measured and paid for as indicated elsewhere in the following project documents:

    - FL BS (CMP IN PLC)(TYA GR1-2) (FNAL POS) TxDOT Specification 247 6041
    - D-GR HMA TY-C SAC-A PG70-23 TxDOT Specification 341 6026

30. Removal of the existing asphaltic pavement to a depth of 2" as indicated at "Mill and Overlay" additive locations in construction plans and details. The items will be measured and paid for as indicated elsewhere in the following project documents:

    - SALV,HAUL& STKPL RCL APH PV (VAR DEPTH) TxDOT Specification 305 2014

31. Furnish and installation of pavement sealer as indicated in construction plans and details. The item will be measured and paid for as indicated elsewhere in the following project documents:

    - FOG SEAL (CSS-1H) TxDOT Specification 315 6004

The Proposer should note that Additive Alternate items of work may be awarded in lieu of base bid items, if the bids come within the budget specified in the contract. Unless otherwise indicated, the quantity of Incremental Additive Alternate items will be equal to the quantity of Base Bid item to be replaced. When completing the Unit Price Schedule for Additive Alternate items in Form G, the Proposer shall enter a unit cost for the Additive Alternate item equal to the unit price differential of the Additive Alternate item minus the Base Bid item(s) being replaced.

Construction items identified below may be installed in place of Base Bid I items if the construction bids come within the budget specified in the contract:

32 – 35. Furnishing and installation of Ornamental (Decorative) style Overhead Contact System (OCS) Poles in lieu of standard tapered style OCS poles as shown in construction plans and details. Four project segments have been identified for Additive installation of Ornamental OCS poles: 1) Kansas Street, from Paisano Drive to Father Rahm Avenue, 2) Father Rahm Avenue, from Kansas Street to Santa Fe Street, 3) Kansas Street, from Franklin Street to Paisano Drive, and 4) Oregon Street, from Glory Road to Franklin Street. The item will be paid for as indicated elsewhere in the following project specification documents:

    - Ornamental OCS Poles EP-SYSTEMS

36. Furnishing and installation of a wrought iron perimeter fence at Traction Power Substation (TPSS) locations as identified in construction the plans in lieu of Base Bid TxDOT Specification Item 550 – Chain Link Fence (Install) (6'). The item will be paid for as indicated elsewhere in the following project specification documents:

    - Wrought Iron Fence EP – IRON Fence

37. Furnishing and installation of full width, 8.5" reinforced concrete paving in lieu of partial width, full depth asphaltic pavement along Santa Fe Street, from station 18+40.84 to 36+12.82, as shown in construction plans and details. The item will be paid for as indicated elsewhere in the following project specification documents

    - CONC PVMT (CONT REINF-CRCP)(8.5") TxDOT specification 360 6011

SPECIAL SPECIFICATION

EP-SYSTEMS

Systems

1. **Description.** Construct the Overhead Contact System (OCS) and Traction Power Substations (TPSS) for the El Paso Streetcar Project in El Paso, Texas, as shown on the plans and the attached specifications. Perform Baseline and Revenue Stray Current Testing, as described in the attached specifications.

2. **Materials.** All materials furnished and all construction methods utilized will be in accordance with the plans, details, and attached specifications.

3. **Measurement.** The Overhead Contact System will be measured by the lump sum. The OCS spare parts as indicated in the attached specifications will be measured by the lump sum. The Traction Power Substations will be measured by each substation complete in place. The TPSS spare parts indicated in the attached specifications will be measured by the lump sum.

4. **Payment.**

   a. **Traction Power Substation.** The work performed and materials furnished in accordance with this item and measured as provided for under "Measurement" will be paid at the unit price bid for "TPSS" for the locations specified ("A1", "A2", "A3", "A4", "S1") and "TPSS – Spare Parts". This price will be full compensation for furnishing all materials, equipment, labor, and incidentals necessary to complete the work specified in the attached specifications (listed under Section 5 "Attached Specifications") and plans.

   The following items related to the civil work related to the traction power substations will be paid for separately as indicated elsewhere in the project documents and as follows:

Foundations:	TxDOT Item 420 "Concrete Structures"
Removals:	TxDOT Item 104 "Removing Concrete"
	TxDOT Item 105 "Removing Stabilized Base and Asphalt Pavement"
Sidewalk:	TxDOT Item 531 "Sidewalk"
Curb:	TxDOT Item 529 "Concrete Curb, Gutter, and Combined Curb and Gutter"
Boring of the feeder duct under Mesa Street:	
	TxDOT Item 476 "Jacking, Boring, or Tunneling Pipe or Box"
Perimeter Fence:	Item EP-IRON FENCE "Installation of Wrought Iron Fence and Gates at TPSS"

   b. **Overhead Contact System.** The work performed and materials furnished in accordance with the Overhead Contact System and measured as provided for under "Measurement" will be paid at the unit price bid for "OCS System – Complete in Place"

and "OCS System – Spare Parts". This price will be full compensation for furnishing all materials, equipment, labor, and incidentals necessary to complete the work specified in the attached specifications (listed under Section 5 "Attached Specifications") and plans.

The lump sum payment for "OCS System – Complete in Place" shall be based on the installation of plain OCS tubular steel poles in accordance with Section 34 23 37 "OCS Tubular Steel Poles". The lump sum payment for "OCS System – Complete in Place" shall not include Ornamental Poles as specified in the plans and in Section 34 23 37.11 "OCS Pole Ornamentation". The incremental cost for the Ornamental Poles as shown in the plans shall be paid for separately.

The following items associated with the OCS poles will be paid for separately as follows:

Foundations:	TxDOT Item 416 "Drilled Shaft Foundations" (Also refer to 34 23 71 OCS Pole Foundations for additional requirements)
Banner Arms:	Item EP-ARM "Banner Arm Assembly"
LED Lighting Fixtures:	Item EP-LUMINAIRE "Special Illumination"
Incremental Cost for the Ornamental Poles	

c. **Baseline and Revenue Stray Current Testing.** The work associated with the baseline and revenue stray current testing will not be paid for separately but considered subsidiary to the pertinent bid items.

5. Attached Specifications.

TRACTION ELECTRIFICATION SYSTEM

DIVISION 01 GENERAL REQUIREMENTS
01 11 00 Systems Summary of Work
01 31 19 Systems Project Meetings
~~01 32 13 Scheduling of Work~~
01 33 10 Systems Submittal Procedures
01 42 00 Systems References
~~01 43 00 Systems Quality Assurance~~
01 46 00 Systems System Assurance
01 78 23 Systems Operation and Maintenance Data
01 78 39 Systems Project Record Documents
01 79 00 Systems Demonstration and Training
DIVISION 05 METALS
05 05 00 Common Work Results for Metals
DIVISION 09 FINISHES
09 67 25 Dielectric Epoxy Flooring
DIVISION 22 PLUMBING
22 45 19 Self Contained Eyewash Equipment
DIVISION 26 ELECTRICAL
26 05 00 Common Work Results for Electrical
26 05 10 Common Work Results for Systems Conductors and Cable
26 05 19 Low-Voltage Conductors and Cable
26 05 26 Grounding and Bonding
26 05 29 Hangers and Supports for Electrical Systems
26 05 33 Raceway and Boxes

26 05 43 Underground Ducts and Raceways for Electrical Systems
26 12 16 Dry-Type Transformers
26 24 13 Switchboards
26 24 16 Low-Voltage Panelboards
26 50 00 Lighting

DIVISION 34 TRACTION POWER

34 11 05 Systems Rail Bonding
34 21 05 Common Work Results for Traction Electrification System (TES)
34 21 16 TPSS Enclosures
34 21 19 DC Switchgear
34 21 23 Transformer-Rectifier Unit
34 21 25 TPSS DC Control Power
34 21 31 Substation Automation System (SAS)
34 21 33 Rail-Voltage Monitoring and Grounding System
34 21 40 DC Disconnect Switches
34 21 46 Traction Power DC Contactor Panel
34 21 50 DC Surge Arresters
34 21 73 TE System Studies
34 21 80 TES Spare Parts and Special Tools
34 21 90 Traction Electrification System Testing

OVERHEAD CONTACT SYSTEM

DIVISION 34.23 OCS OVERHEAD TRACTION POWER

34 23 10 OCS Description and General Requirements
34 23 11.01 OCS Glossary of Standard Terms
34 23 35.99 OCS Pole Painting
34 23 37 OCS Tubular Steel Poles (See payment clause above)
34 23 37.11 OCS Pole Ornamentation (See payment clause above)
34 23 40 OCS Wire and Cable
34 23 50 OCS Assemblies, Components and Fittings
34 23 64 OCS Special Tools
34 23 66 OCS Spare Parts
34 23 70 OCS Installation
34 23 71 OCS Pole Foundations
34 23 72 OCS Tubular Pole Installation
34 23 77 OCS Surge Arrester Installation
34 23 78 OCS Disconnect Switch Installation
34 23 80 OCS Testing
34 23 90 OCS Installation Records
34 23 96 OCS Installation and Maintenance Manuals
34 23 97 OCS Maintenance Staff Training

BASELINE AND REVENUE STRAY CURRENT TESTING

26 24 90 Baseline and Revenue Stray Current Testing

El PASO STREETCAR TECHNICAL SPECIFICATIONS
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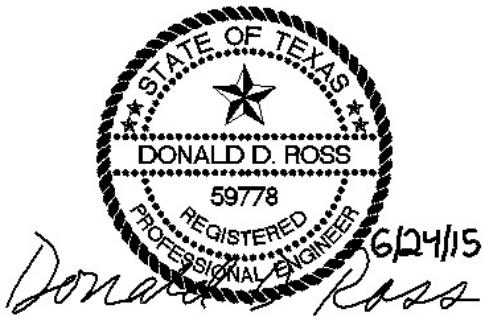


El PASO STREETCAR TECHNICAL SPECIFICATIONS
TABLE OF CONTENTS – OCS

SECTION 01 11 00
SYSTEMS SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work, which is found in Specification Sections in Divisions 5, 9, 22, 26, and 34.

A. Traction power substations general requirements.

B. Overhead contact system (OCS) general requirements.

1.2 PREPACKAGED 350KW TRACTION POWER SUBSTATIONS

A. Provide four prepackaged 350kW substations, set in place, ground, and connect to utility power.

B. Test and energize substations.

C. Test substations and OCS with each other and with streetcars.

1.3 BUILT-IN-PLACE MSF 150KW TRACTION POWER SUBSTATION

A. Provide 150kW substation equipment and all other materials and equipment required for a complete substation.

B. Connect MSF substation to Shop OCS.

C. Test and energize substation and OCS.

D. Provide and test interlocking.

1.4 OVERHEAD CONTACT SYSTEM

A. Perform design completion for a complete overhead contact system (OCS). See Section 34 23 10, OCS Description and General Requirements.

B. Provide complete single contact wire OCS, including procurement, delivery, installation, and testing of OCS from interface with traction power substation positive feeders to interface with rail vehicle pantograph.

C. Provide all OCS design, installation, and testing documentation as required in the OCS Specifications.

D. Provide special tools, training, instruction manuals, and maintenance manuals for OCS operation, as required in the OCS Specifications.

1.5 DC FEEDERS

A. Provide dc positive feeders and dc negative returns from traction power substations to OCS and to rail. See Sections 26 05 10, Common Work Results for Conductors and Cable and 26 05 19, Low-Voltage Conductors and Cable and Contract Drawings.

B. Provide crossbonds and rail bonds as a part of the dc negative return system. See Sections 26 05 10, Common Work Results for Conductors and Cable and 26 05 19, Low-Voltage Conductors and Cable and Contract Drawings.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

SECTION 01 31 19
SYSTEMS PROJECT MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work, which is found in Specification Sections in Divisions 5, 9, 26, and 34.

B. Requirements are in addition to those in Section 01310 Project Management and Coordination

C. Additions to meeting requirements found elsewhere in the Contract Documents:

1. Design conferences.

2. Systems weekly progress meetings.

3. Other special meetings.

1.2 DESIGN CONFERENCES

A. Dates for design conferences will be as mutually agreed by Owner, Engineer, and Contractor.

B. Traction power substation design conference will be held at the Project site, unless otherwise to by the Engineer within 45 days of NTP. Contractor and subcontractor design personnel are required to attend. The following will be discussed:

1. Basic TPSS layouts.

2. One-line diagram.

3. Proposed basic TPSS parts.

4. Proposed sequence of TPSS work.

5. Design, production and field testing procedures.

6. Submittal list.

C. Overhead contact system (OCS) design conference will be held in El Paso within 45 days of NTP. Contractor and subcontractor design personnel are required to attend. The following will be discussed:

1. Proposed assembly and arrangement drawings that demonstrate overall understanding of Project OCS design requirements.

2. Samples of OCS layouts.

3. Samples of design calculations.

4. Demonstration of how pantograph clearance has been considered in hardware and OCS arrangement design.

5. Proposed OCS hardware.

6. Proposed sequence of OCS Work.

7. Proposed schedule of work, including design completion, installation, and testing.

8. Safety, security, and theft prevention.
9. Quality assurance.
10. Mobilization and staging.
11. Coordination of work with Owner and interested parties.
12. Submittal list.

1.3 MONTHLY PROGRESS MEETINGS

A. See Section 01310 Project Management and Coordination for additional requirements

1.4 SPECIAL MEETINGS

A. Special meetings will be scheduled and conducted by the Engineer throughout the project as the Engineer deems necessary.

B. Meetings may be called by the Engineer or Contractor to discuss submittals.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

SECTION 01 32 13
SCHEDULING OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work, which is found in Specification Sections in Divisions 5, 9, 26, and 34.

B. Requirements for the preparation, revision, and submittal of Contract Critical Path Method (CPM) Schedule.

C. Requirements are in addition to those in General Conditions (GC) 2.7, Additional Instructions and Detail Drawings, GC 2.8, Shop or Setting Drawings, GC 3.3 Reports, Records and Data, 3.4, Cooperation with Utilities, and 6.3, Progress Schedule.

1.2 SUBMITTALS

A. Procedures: Section 01 33 00, Submittal Procedures.

B. Formats: Electronic file in its native form (.XER) and in PDF format.

C. Schedule submittals:

1. Baseline CPM Schedule: Submit within 60 days after Notice to Proceed.

2. CPM Schedule Update: Submit monthly.

1.3 GENERAL

A. Schedules shall represent a practical and logical plan to complete the work within the Contract time.

B. Schedule and execute submittals, manufacturing, delivery, commissioning, and testing in accordance with the Contract Documents.

C. The submittal of schedules shall be understood to be the Contractor's representation that the schedule meets the requirements of the Contract Documents and that the work will be executed in the sequence and duration indicated in the schedule.

D. Failure to include any element of work required for performance of the Contract or failure to properly sequence the work shall not excuse the Contractor from completing Work within the Contract Time.

E. Schedule submittals are subject to the Engineer's approval. The Owner retains the right to withhold appropriate monies (up to the full value of the progress payment) from progress payments until the Contractor submits a schedule in accordance with these provisions.

F. Use Microsoft Project, Primavera Project Planner, or approved equal software to prepare required schedules.

G. Develop schedules using industry standard "best practices" including, but not limited to:

1. No open-ended activities.

2. No use of constraints other than those defined in the Contract Documents without the prior approval of the Engineer.

3. No negative leads or lags.

4. No excess leads or lags without prior justification and approval from the Engineer.

5. Schedule shall demonstrate coordination with Owner and all other interested parties.

1.4 BASELINE CPM SCHEDULE

A. If in the opinion of the Engineer the schedule is determined to be impractical or not in compliance with the Contract Documents, the Contractor shall revise the schedule and resubmit within 14 Days.

1. Show clearly on the Contract Schedule the sequence and interdependence of activities.

2. Include dates for submittals for equipment on the critical path, with sufficient time for minimum of one resubmittal.

3. Indicate on the schedule diagram a clearly defined critical path.

4. Include with the schedule submittal a detailed written narrative describing the approach and methods for completion of the work. Include assumptions and specific schedule risks identified in development of the schedule.

1.5 MONTHLY CPM SCHEDULE UPDATE

A. Submit a Monthly CPM Schedule Update.

B. The Monthly CPM Schedule Update shall have a data date (statused) as of the last day of the corresponding month (for example; for schedules submitted at the beginning of February 2011 the data date shall be 31 January 2011).

C. The Monthly CPM Schedule Update shall incorporate all progress to-date.

D. Provide with the monthly CPM schedule update submittal a written narrative. Include the following:

1. Changes, additions or deletions that have been made to the schedule since the prior month and a reason for each of the changes.

2. Assumptions made in developing and updating the schedule.

3. Major risk items that could potentially have an adverse impact to the schedule and how these risks are being addressed.

E. If in the opinion of the Engineer the schedule is impractical or not in compliance with the Contract Documents, the Contractor shall revise the schedule and resubmit within 7 Days.

1.6 REQUESTS FOR TIME EXTENSIONS

A. Submit a written request for extension of Contract Time in accordance with Contract Terms and Conditions. Include the following:

1. Justification for the extension of time, supporting evidence, and specific references to the current approved schedule at the time the qualifying event occurred.

2. Analysis of a calendar time-scaled CPM network schedule (FRAGNET) and reports depicting the time impact basis of the request with the affected areas prominently highlighted. Use only the current and accepted schedule at the time the qualifying event occurred when determining time extension request.

B. If the Owner finds that the Contractor is entitled to an extension of time under the Terms and Conditions of the Contract, the Owner will decide the length of extension based upon analysis of the current schedule and data relevant to the extension.

C. Extensions of time for performance under the Terms and Conditions of the Contract will be granted only to the extent that equitable time adjustments for the affected activity exceed the total float along the relevant path of the accepted current schedule.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

SECTION 01 33 10
SYSTEMS SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work, which is found in Specification Sections in Divisions 5, 9, 26, and 34.

B. General requirements and procedures for preparing and submitting product data, shop drawings, samples, and other submittals for review and approval.

C. Requirements are in addition to those in Section 01330 Submittal Procedures.

1.2 DEFINITIONS

A. Product Data: Includes illustrations, standard schedules, diagrams, performance charts, instructions, and brochures that illustrate physical appearance, size, and other characteristics of materials and equipment for some portion of the work.

B. Shop Drawings: Drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

C. Samples: Physical examples of materials, equipment, or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standard by which the work will be judged.

D. Day: Calendar day.

1.3 SUBMITTALS

A. Schedule of Submittals: Within 45 Days after the effective date of Notice to Proceed, submit a completed submittal list.

1. Include for each planned submittal:

   a. Date on which each submittal will be submitted.

   b. Contract Specifications reference, by Section and Article.

   c. Intended submission/resubmission date(s).

   d. Lead time to delivery/anticipated delivery date(s).

2. Highlight submittals that are on the critical path and add each of these submittals as an activity on the CPM Schedule required by Section 01 32 13, Scheduling of Work.

3. Update and resubmit Schedule of Submittals on a monthly basis.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. Submit in a timely manner:

1. Submit product data and samples not less than 45 days before scheduled procurement. Contractor shall be responsible for scheduling submittals such that the project schedule is not delayed.

2. Submit shop drawings not less than 30 days before work involving such drawings is to be performed as indicated on the Contractor's CPM Schedule.

3. Contractor shall bear the risk when products, equipment, or materials are procured before approval of submittals or work is started before approval of shop drawings.

B. Review Submittals Before Transmitting to Engineer:

1. Stamp and sign submittals as reviewed and approved by the Contractor before submission, including subcontractor submittals.

2. Coordinate each submittal with the requirements of the Work, placing particular emphasis upon ensuring that each submittal of one trade is compatible with other submittals of that trade and with the submittals of other trades.

3. Submit complete with all relevant data required for review.

4. Contractor shall be responsible for the correctness of the drawings, for shop fits and field connections, and for the results obtained by the use of such drawings.

C. Attend meetings as requested by the Engineer to address issues related to the review of submittals.

1.5 THE ENGINEER'S REVIEW

A. See Section 01330

B. The Contractor shall not be relieved from liability for form, fit, and function of any item, regardless of the Engineer's approval.

1.6 SUBMITTAL PROCEDURES

A. Provide each submittal listed in the Submittal Article of each Specification Section.

B. Identify submittals with the Contract Specification number (34 21 19), followed by the Specification Article number (1.03), paragraph number (B) and subparagraph numbers (2 a), followed by the review cycle number of the submittal (.001).

1. Example: 34 21 19-1.03 B 2 a.001

2. For subsequent resubmittals, the name and number must be identical to that of the original submittal, except that the review cycle number is incremented by 1:

a. First submittal: Ends in ".001"

b. Second submittal: Ends in ".002"

c. Third submittal: Ends in ".003"

C. Submittal Medium: Provide electronic copy in pdf format with bookmarks to separate sections.

D. Include the following information in each submittal:

1. Contract title and number.
2. Applicable standards, such as ASTM or IEEE.
3. Identification of deviations from the Contract Drawings and Contract Specifications.
4. Contractor's stamp, initialed or signed, certifying:
    a. Dimensional compatibility of the product with the space in which it is intended to be used.
    b. Review of submittals for compliance with the specified requirements.
    c. Compatibility of the product with other products with which it is to perform or with which it will be contiguous.
5. Professional Engineer’s stamp, where required in Specifications.

E. Attach a transmittal form to each submittal.

1.7 CHANGES

A. Changes in Reviewed Submittals: Changes in reviewed submittals will not be permitted unless those approved submittals with changes have been resubmitted and reviewed, in the same manner as the original submittal.

B. Changes in products for which shop drawings, product data, or samples have been submitted will not be permitted unless those changes have been accepted and approved, in writing, by the Engineer. Updated shop drawings, product data, and/or samples shall be provided to the Engineer for review and approval prior to procurement.

C. Supplemental Submittals: Initiated by the Contractor for consideration of corrective procedures.

1. Shall contain sufficient data for review.

2. Make supplemental submittals in the same manner as initial submittals.

1.8 PRODUCT DATA

A. Clearly indicate on product selection tables which product and which options are being provided.

B. Line through or delete information that is not applicable to the Contract.

1.9 SHOP DRAWINGS

A. Drawings shall be fully legible. Text on 22 x 34 drawings shall not be smaller than 1/8 inch and on 11 x 17 drawings shall not be smaller than 1/16 inch.

B. Include a title block in the lower right hand corner that identifies the Contractor, Subcontractor, Contract by number and title, subject matter of the drawing, sheet number, date of the original issue of the drawing, and the serial number and date of each revision. Where required by Specification, provide an area in the title block or nearby for Professional Engineer's stamp.

C. Provide sufficient dimensions on drawings so that size and location may be determined without calculation.

D. Sample Drawings: The first drawings submitted by Contractor will be reviewed for conformance. Once approval is given, use this approved drawing format as the standard and prepare subsequent drawings to a quality equal to the approved standard.

1.10 SAMPLES

A. Furnish to the Engineer samples indicated in the Contract Documents or these Specifications. Submit samples without charge, with shipping charges prepaid. Materials for which samples are required shall not be used in the Work until samples are reviewed.

B. Label each sample with the following data:

1. Name, number, and location of project.

2. Name of Contractor.

3. Material or equipment represented, and location in the project.

4. Name of producer, brand, trade name if applicable, and place of origin.

5. Date of submittal.

C. Approval of a sample will be only for characteristics and use named in submittal and approval, and shall not be construed to change or modify any Contract requirement.

D. Test samples as required by Contract Specifications.

E. Samples of material from local sources shall be taken by or in the presence of the Engineer; otherwise, samples will not be considered for testing.

F. Failure of any material to pass specified tests will be sufficient cause for refusal to consider, under this Contract, any further samples of the same brand, make, or source of that material. The Engineer reserves the right to disapprove any material that has previously proven unsatisfactory in service.

G. Samples of material delivered on site or in place may be taken by the Engineer for Quality Assurance testing and will not be returned to the Contractor. Failure of samples to meet Contract requirements will annul previous approvals of item tested.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

SECTION 01 42 00
SYSTEMS REFERENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work, which is found in Specification Sections in Divisions 5, 9, 26, and 34.

B. Definitions of Specification terms.

C. Explanation of Specifications style.

D. Referenced Standard Drawings and Specifications.

E. Reference Standards.

1.2 DEFINITION OF SYSTEMS SPECIFICATIONS TERMS

A. Engineer: The City Engineer or Owner's Designated Representative, as defined in General Provisions 3.1, City Engineer's Authority/Owner's Designated Representative.

B. Furnish, Install, and Provide:

1. Furnish: To supply and deliver to project site, ready for installation.

2. Install: To place in position for service or use.

3. Provide: To furnish and install, complete and ready for intended use.

C. Owner: The City of El Paso.

1.3 SPECIFICATION STYLE

A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" or "shall comply with", as appropriate, are included by inference where a colon (:) is used within sentences or phrases.

B. Examples:

1. "Prepare meeting minutes within 3 days following the meeting," means that the Contractor shall prepare the meeting minutes.

2. "Adhesive: Spread with a notched trowel" means "adhesive shall be spread with a notched trowel" and the Contractor is responsible for this work.

1.4 REFERENCE STANDARDS

A. Reference standards are referenced in other sections of the Specifications to establish requirements for the Work. These references are identified in each section by document number and title.

B. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the Engineer for a decision before proceeding.

D. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

E. Copies of Standards: Each entity engaged in Work on this Contract should be familiar with industry standards applicable to its construction activity.

1. Copies of applicable standards are not bound with the Contract Documents.

2. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

SECTION 01 43 00
SYSTEMS QUALITY ASSURANCE

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work, which is found in Specification Sections in Divisions 5, 9, 26, and 34.

B. Requirements for Contractor to establish, implement and maintain an effective Quality Program to manage, control, document and assure work complies with requirements specified in the Contract Documents.

1.2 REFERENCE STANDARDS

A. This Section incorporates by reference the latest revisions of the following documents:

1. Federal Transit Administration (FTA)

a. FTA Quality Guidelines.

2. International Organization of Standards

a. Quality Management Systems – Fundamentals and Vocabulary - ISO 9000 -2008

b. Quality Management Systems – Requirements - ISO 9001 -2008

1.3 SUBMITTALS

A. Procedures: Section 01 33 00, Submittal Procedures.

B. Qualifications:

1. Quality Assurance Manager, within 30 days after Notice to Proceed (NTP).

2. Independent Testing Laboratories, minimum of 30 days before scheduled use.

3. Quality Control Inspectors.

C. Quality Program Plan, within 60 Days after NTP.

D. Testing Laboratory Inspection and Test Reports, within 30 days after completion of the inspection or test.

E. List of Subcontractors and subconsultants within 45 Days after NTP. Provide updates at least 30 days prior to each new subcontractor or subconsultant beginning work on Contract.

F. Document Control Procedure, within 15 Days after effective date of Notice to Proceed.

1.4 CONTRACTOR QUALITY ASSURANCE REQUIREMENTS

A. Quality Assurance (QA) Manager: Assign a QA Manager responsible for managing and acting on all quality matters and who has authority to act on all quality matters as a representative of Contractor.

1. Quality Assurance Manager cannot have responsibilities for this Contract that conflict or appear to conflict with his or her responsibility for quality matters.

2. Qualification of Contractor QA Manager:

   a. Minimum 5 years overall quality experience.

   b. Minimum 2 years prior experience as a QA Manager, on transit project(s) of comparable complexity to this Contract.

   c. Minimum 2 years as a Quality Control (QC) Manager or Supervisor, Quality Engineer, Quality Auditor or QC Inspector.

3. QA Manager must be approved by the Engineer. At the sole discretion of the Engineer, Contractor may be required to replace QA Manager.

4. QA Manager's responsibilities include development and implementation of Quality Program Plan.

B. Quality Program Plan (QPP):

1. Develop a plan that addresses the 15 quality elements identified in FTA Quality Guidelines.

2. Provide descriptions of, and references to Quality procedures and work instructions, including specified requirements unique to this Contract, that relate to quality system elements defined in Quality Management Systems – Fundamentals and Vocabulary ISO 9000 and Quality Management Systems – Requirements ISO 9001.

3. Include the following elements in Contractor QPP:

   a. QA/QC Organization and staff, including job description and an organizational chart showing relationship between Contractor's General Manager, Project Manager, Quality Manager, Subcontractors, and consultants.

   b. Documented Quality System.

   c. Design Control.

   d. Document Control and Submittal Management.

   e. Subcontractor, Consultant and Supplier Control.

   f. Identification, Traceability and Receiving, Handling, Storage and Control of Products, Materials and Equipment.

   g. Process Control and control of special fabrication processes, i.e. welding, plating, and soldering.

   h. Inspection and Testing.

   i. Control of measuring and test equipment.

   j. Inspection and Test Reporting.

   k. Identification, Control and Correction of Non-conforming Conditions.

   l. Corrective Actions.

   m. Quality Records.

   n. Training.

   o. Configuration control for software.

   p. Change control for factory drawings, fabrications, assembly, wiring, testing, and as-built drawings.

C. Independent Testing Laboratories:

1. Employ services of Independent Testing Laboratories if required by Contract Documents, to confirm acceptable quality of materials, parts, and equipment not currently certified by test laboratories.

2. Employ only Independent Testing Laboratories that are currently certified by a nationally or state recognized regulatory agency or an industrial sponsored organization.

3. Obtain approval to use Independent Testing Laboratories from the Engineer before commencing any Work for which testing is required by Contract Documents. Independent Testing Laboratories must have special inspection capability and certification.

D. Quality Control Inspectors:

1. Employ qualified or certified quality control inspectors and test technicians with a minimum of 2 years quality control experience or testing experience for Work they are responsible for inspecting and testing.

2. Upon request from the Engineer, provide qualifications and certifications of the quality control inspectors.

3. Quality control inspectors must report directly to the Contractor's QA Manager and cannot have responsibilities for this Contract that conflict or appear to conflict with his primary responsibility for quality matters.

4. Mobilize the number of experienced quality control inspectors necessary to perform the Quality Control requirements commensurate with the ratio of work crew size to inspectors and the type of work requiring specific types of inspectors.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 QUALITY PROGRAM PLAN

A. Submit ISO 9001 certification or submit a Quality Program Plan, as described.

B. Documented Quality System:

1. Describe plans, procedures, and organization necessary to design, procure, install, inspect, and test to achieve compliance with the requirements of Contract Documents.

2. Include operations, both on-site and off-site including fabrication, manufacturing and suppliers.

3.2 SYSTEMIC FAILURES

A. Monitor component failures during the commissioning, testing, and warranty phase.

B. Systemic Failure: Failure of 10 percent or more of the same components used for the same function during this time period.

C. Within 30 days of receiving notification of systemic failure, begin a program to repair or replace all components of the type involved in the systemic failure.

D. Develop the repair or replacement for the components to remedy the nature and probable cause of the component failure.

E. The proposed repair or replacement shall be submitted to the Engineer for approval.

F. Components shall be replaced at no cost to the Owner.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

Technical Specification

SECTION 01 46 00
SYSTEMS SYSTEM ASSURANCE

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work, which is found in Specification Sections in Divisions 5, 9, 26, and 34.

B. Support for the Owner's Safety Certification Program.

1.2 REFERENCE STANDARDS

A. This Section incorporates by reference the latest revisions of the following documents:

B. U.S. Department of Transportation, Federal Transit Administration

1. DOT-FTA-MA-90-5006-02-01, Handbook for Transit Safety and Security Certification http://transit-safety.volpe.dot.gov/publications/safety/SafetyCertification/pdf/SSC.pdf

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 SAFETY CERTIFICATION PROGRAM

A. The Owner may comply with FTA guidelines to implement a Safety Certification Program (reference DOT-FTA-MA-90-5006-02-01).

B. Support the Owner's implementation of the program as directed by Engineer.

C. Participation includes activities such as assisting the Owner with development of checklists and documentation, identifying submittals that satisfy requirements of the Certifiable Item List, providing standards to which components are designed and tested, and identifying safety-related instructions in training and maintenance documents.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

SECTION 01 78 23
SYSTEMS OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work found in Specification Sections in Divisions 5, 9, 26, and 34. See Section 34 23 96, OCS Installation and Maintenance Manuals, for additional OCS operation and maintenance data requirements.

B. Operation and Maintenance (O&M) Manuals for Systems Work, including traction power/electrical.

C. Renewal Parts Catalogs. See Section 34 23 66, OCS Mandatory Spare Parts and Section 34 23 64, OCS Special Tools for OCS requirements.

D. See Section 01330 for overall project submittal procedures

1.2 SUBMITTALS

A. O&M Manuals:

1. Submit one for each type of Systems Work:

   a. Traction power/Electrical: Submit minimum of 90 days before scheduled energization of first substation.

   b. OCS: Submit Installation and Maintenance Manuals minimum of 90 days before scheduled energization of first substation,

2. For initial review, prepare one complete hard copy set and one electronic version for each manual.

3. After final approval of submitted O&M manual submit 10 hard copy sets and 5 electronic copies of each manual.

B. Renewal Parts Catalogs for each type of Systems Work: Submit at the same time as O&M manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE MANUALS

A. Format:

1. Include the following in each volume, specific to that volume of the manual:

   a. Frontispiece: Preceding and facing the title page, showing a recognizable illustration of the equipment described.

   b. Title Page: Include the name and function of the equipment, manufacturer's identification number(s), and the Contract Specifications number(s) and title(s).

   c. Table of Contents: List the sections and subsection titles with the page on which each starts and a list of included drawings for each section or subsection.

2. Format of content:

   a. Information shall cover the exact equipment provided and shall not consist of marked up general catalog data.

   b. Delete information on material or equipment not used.

   c. Include drawings and diagrams for major assemblies and subassemblies.

   d. Include descriptive brochures providing physical and functional description of the equipment.

      1) Brochures shall be original, printed materials or high quality color prints from electronic media.

      2) Brochures shall not be photocopies.

3. Dividers: Insert dividers with identifying tabs to separate sections of the manual.

4. Pages: 8-1/2 inches by 11 inches in size or folded to that size.

5. Binders: Heavy duty, D-ring, locking, three-ring binders not filled to more than 2/3 of their capacity. Binders shall be a maximum of 3" wide.

6. Paper: 47 pound bond.

B. Appendices:

1. Include the following in each systems O&M manual.

2. Glossary

3. Bill of Materials:

   a. Provide complete with all necessary information, including part numbers and catalog item numbers if applicable, for identifying parts.

   b. Identify parts or assemblies obtained from another manufacturer by the name of that manufacturer and its identifying part number.

   c. Supply the size, capacity, or other characteristics of the part if required for identification.

4. Torque table for all types of bolts used in bolted connections.

5. Spare Parts and Special Tools:

   a. Provide a list of contractual and recommended spare parts

   b. Provide a list of special tools required for maintenance.

6. Safety: Safety precautions.

7. Testing: Copies of Field Acceptance Testing procedures and test reports.

8. Warranty information.

9. Others appendices as needed.

C. Traction Power/Electrical:

1. Provide maintenance and operating instructions for all equipment and systems installed, including the following:

2. Installation:
    a. Pre-installation inspection.
    b. Installation verification checklist.
    c. Torque: Include manufacturer's recommended torque information for each type of bolted connection used.
    d. Calibration.
    e. Preparation for operation for initial installation.
3. Operation:
    a. Performance specifications.
    b. Operating limitations.
    c. Include step-by-step procedures for
        1) Starting: Provide start-up checklist.
        2) Restarting.
        3) Operating.
        4) Shutdown.
        5) Emergency requirements.
4. Preventative Maintenance:
    a. Include step-by-step procedures for
        1) Inspection.
        2) Operation checks.
        3) Cleaning.
        4) Lubrication.
        5) Adjustments.
5. Corrective Maintenance:
    a. Include step-by-step procedures for
        1) Repair.
        2) Disassembly.
        3) Reassembly of the equipment for proper operation.
6. Overhaul:
    a. Parameters that indicate an overhaul is required.
    b. Disassembly.
    c. Parts to replace.

d. Adjustment, cleaning, etc. for parts not replaced.

e. Reassembly of the equipment for proper operation.

f. Preparation for operation after overhaul.

D. OCS: Refer to Section 34 23 96, OCS Installation and Maintenance Manuals for requirements.

2.2 RENEWAL PARTS CATALOG

A. Enumerate and describe every component with its related parts, including supplier's number, Contractor's number, Drawings Apparatus Reference number, and provision for entry of the Owner's part number.

B. Use cut-away and exploded drawings to aid identification of parts not readily identified by description.

C. Parts common to different components, such as bolts and nuts, shall bear the same Contractor's number with a reference to other components in which they are found.

D. For each part or component, list all the assemblies of which it is a component.

E. Standard parts:

1. Identify commercially available items such as common standard fastenings, fuses, lamps, galvanized pipe, nuts and bolts, etc., by standard hardware nomenclature besides Contractor's number.

2. Furnish a separate list of these items in the catalog with adequate information to order these items through commercial channels.

F. Furnish a complete itemization of servicing materials (oils, paints, special compounds, greases, etc.) required and component requiring its use.

G. Furnish ordering and procurement information required for components and subassemblies to the lowest level replaceable component. Ensure that the Owner will not need to request information from Contractor at a future date.

H. Submit lists in the form of reproducible Bills of Materials suitable for loose-leaf binding adequately cross-referenced to related drawings and Bills of Material.

I. Refer to Section 34 23 66, OCS Mandatory Spare Parts for OCS spare parts requirements.

PART 3 - EXECUTION

3.1 REVISIONS

A. If subsequent modifications to the equipment require revised operation and maintenance procedures:

1. Revise the O&M Manuals to show the equipment as installed.

2. Revise by issue of replacement pages to the final O&M Manuals, or by reissue of the O&M Manuals, at the Engineer's option.

3. Submit the revisions to the O&M Manuals not later than 30 Days following revision of the equipment.

3.2 SPECIAL SUBMITTAL PROCEDURES

A. Work with Engineer to review O&M Manuals together in a meeting environment, if requested

B. Revise manuals in accordance with directions and comments from both meeting inputs and formal mark-ups (by reviewers)

C. Resubmit as required in accordance with Section 01 33 00, Submittal Procedures.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

SECTION 01 78 39
SYSTEMS PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work found in Specification Sections in Divisions 5, 9, 26, and 34. See Section 34 23 90, OCS Installation Records, for additional OCS project record document requirements.

B. Requirements are in addition to those in Section 01781 Project Record Document

1.2 SEE SECTION 01330 FOR OVERALL PROJECT SUBMITTAL PROCEDURES SUBMITTALS

A. Incremental Submission of Record Drawings

1. Upon request from the Engineer, make available copies of selected Record Drawings in color.

2. Incremental Record Drawings requested by the Engineer shall be stamped “Record Drawing”, signed, and dated by Contractor.

B. Final Submission of Record Drawings:

1. At completion of Work, and before requesting Final Acceptance of Work, deliver Final Record Drawings to the CRRMA.

2. Stamp drawings “Record Drawing.”

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 MAINTENANCE OF AS-BUILT DRAWINGS

A. During factory wiring and testing of a TPSS, or other equipment, immediately update drawings or documents affected by a change in the circuits or equipment.

B. During on-site installation and testing, maintain in each TPSS plan books of approved shop drawings, and immediately update drawings affected by a change in the circuits or equipment.

C. Protect drawings from damage.

D. Update Record documents continuously during the course of construction.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

Technical Specification

SECTION 01 79 00
SYSTEMS DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section applies to Systems Work found in Specification Sections in Divisions 5, 9, 26, and 34. See Section 34 23 97, OCS Maintenance Staff Training, for additional OCS demonstration and training requirements.

A. Requirements for instruction and training of Operations and Maintenance personnel in the management, operation, and maintenance of provided equipment and systems.

B. See Section 01330 for overall project Submittal Procedures

1.2 SUBMITTALS

A. Submit drafts of the Training Materials and Instructor Guides 3 months before the start of training.

B. Submit resumes of proposed instructors.

C. Submit final versions 1 month prior to the start of training. Training shall not commence until the Training Program Plan and Instructor Guides are approved by the Engineer.

D. Include videos if videos are used in training. Submit on DVD in MPEG-4 format.

E. Submit Training Reports not later than 1 week after completion of course.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Instructors shall be fluent in English and experienced in the system for which they are conducting training.

PART 2 - PRODUCTS

2.1 TRAINING PROGRAM

A. Design program to train the Owner's maintenance and operations personnel in details of furnished equipment and systems and enable them to operate, service, and maintain systems such that systems will perform and continue to perform in accordance with requirements of this Contract.

B. Provide a logically related sequence of separate courses covering System Operation, Overall System Maintenance, and Equipment Operation and Maintenance.

C. Ensure operations and maintenance personnel are fully trained prior to start of passenger service.

D. Operations and Maintenance Personnel Qualifications:

1. Assume personnel to be trained have only basic skills pertinent to their craft.

2. Assume Operations and Maintenance personnel to be trained have no knowledge of features of specific equipment or systems to be taught.

2.2 TRAINING COURSES

A. Course requirements:

1. Include classroom, hands-on, and/or field instruction, as appropriate, and models, mockups, documentation, and aids to carry out the program.

2. Class Sizes: Unless otherwise specified elsewhere in these Specifications, the Owner will be able to send up to 10 participants to each of the training courses specified.

3. Duration: Maximum 8 hours per day.

4. Training Location and Classrooms: Conduct training courses in facilities provided by the Owner. The facilities will be equipped with tables and chairs.

5. Provide video players and projectors as required.

6. Provide instructors who are fluent in English.

7. Provide literature and equipment necessary to train personnel.

8. Training on actual system equipment and spare equipment will be permitted; however, such use shall not interfere with pre-revenue tests and system demonstrations.

B. Equipment Operations and Maintenance Training:

1. Provide training in the operation and maintenance of equipment systems provided.

2. Provide hardware training including, but not limited to:

   a. Equipment operation.

   b. Troubleshooting procedures, including field diagnostics and test equipment.

   c. Interface with other equipment.

   d. Preventative maintenance procedures.

3. Provide Operations and Maintenance personnel with a thorough knowledge of the equipment and its operation, its interface with other equipment, and the capabilities and use of test equipment.

4. Provide participants with theoretical background and hands-on experience in troubleshooting, repair procedures, and preventive maintenance procedures.

5. Enable Operations and Maintenance personnel to develop a self sufficient hardware maintenance team for the equipment.

6. Include a page by page review and explanation of approved O&M Manuals.

C. Supplemental Training:

1. Provide extended, duplicate, or additional training for the systems provided, as deemed necessary by the Engineer, due to modification of systems and equipment configuration made after completion of the scheduled training courses.

2.3 TRAINING MATERIALS

A. Provide Owner-specific materials prepared specifically for use as training aids.

B. Use reference manuals, operating and maintenance manuals, and user's manuals as supplementary training materials.

C. Tailor principal documents used for training to reflect the Owner's equipment and specific user requirements.

D. Provide each course participant copies of training manuals and other pertinent material prior to commencement of courses.

E. The Owner will retain the master and two additional copies of training manuals and materials as reference documentation.

F. Upon completion of each course, instructor's manuals, training manuals, and training aids become the property of the Owner unless such items are specifically exempted by the Engineer.

G. The Owner reserves the right to copy training materials and aids for use in Owner-conducted training courses.

H. Provide special tools, equipment, training aids, and other materials required to train course participants. Provide sufficient quantity of special tools and other training equipment for the number of participants attending the course.

I. Use actual hardware and photographs taken during the manufacturing process wherever possible. Actual hardware used for training must pass re-inspection and acceptance testing prior to being placed in service.

J. Videos:

1. Use prerecorded lectures as supplementary training material.

2. Do not use videos as a replacement for a classroom instructor, or as the primary training vehicle.

3. The Owner shall have the right to videotape training courses presented by the Contractor. The Owner shall also have the right to use these videotapes to train personnel in the future.

2.4 INSTRUCTOR GUIDES

A. Detail instructor actions during program presentation, one Instructor Guide for each training session.

B. Supply the following materials with each Instructor Guide:

1. Microsoft PowerPoint presentation file on disk.

2. Slides, pictures, charts used in support of the lesson.

3. One complete student handout package.

4. One copy of material referenced in the lesson.

C. Each Instructor Guide shall be arranged in sections:

1. Section 1, Title: short and descriptive, must contain lesson name and target audience.

2. Section 2, Time to Teach: Designate estimated time to teach for each Instructor Guide, an approximate period that may vary due to student number and knowledge level.

3. Section 3, Objective: One or more performance-based objectives each of which specifies:

a. End-of-course performance expected of the student.

b. Conditions under which behavior will occur.

c. Measurable minimum level of performance considered acceptable.

4. Section 4, References: List sources of material presented, include maintenance manuals, test equipment manuals, and other documents developed for this Contract.

5. Section 5, Materials List: List materials needed to teach content, include training aids (such as overhead transparencies, charts, projectors, and size and type of facility), student handouts (such as books, drawings, and schematics), equipment (such as tools parts for disassembly).

6. Section 6, Introduction: Cover at least the following areas:

   a. Introduction of subject covered by the lesson.

   b. Lesson objectives.

   c. An outline of the lesson.

   d. A schedule of the lesson's activities.

7. Section 7, Presentation: Presentation should be in outline form, narrative is acceptable but not necessary.

   a. Suggested numbering system:

A.
B.
1.
2.
a.
b.
(1)
(2)
(a)
(b)

D. Presentation portion of the Instructor Guide should be detailed enough to:

1. Serve as a written record of the specific facts and information.

2. Allow another instructor with knowledge of the area to teach the class.

3. Ensure that the subject delivery is consistent each time the lesson is given.

4. Allow replication of all evaluations, tests, and quizzes given in conjunction with this lesson.

PART 3 - EXECUTION

3.1 TRAINING REPORTS

A. Grading system: Establish to report progress of each trainee during a course and identify requirements for further training for each participant.

B. Training Reports:

1. Include graded tests (without names) with raw scores.

2. Include a summary of the results of monitoring and evaluating.

3. Include records of student attendance and performance.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

END OF SECTION

2.15 SOURCE QUALITY CONTROL

A. Factory Design Tests:

1. Perform with all accessories attached in accordance with design tests in IEEE C37.90.

2. Demonstrate electrical operation and accuracy of all components.

3. Test from alarm panel to initiating devices for proper operation.

B. Factory Production Tests:

1. Test all components for proper operation and function.

2. Test control wiring continuity by actual electrical operation of control devices.

3. Test inputs and outputs for proper operation and short circuits.

4. Communications: Verify communications and SCADA information is retrievable.

5. HMI: Verify that display, screens, and user interface operate in accordance with Specifications.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install SAS in MSF substation as required in Part 2, above, in the article titled “Factory Assembly.”

~~3.2 INTEGRATION WITH SCADA NETWORK~~

~~A. Program and configure SAS switches and SAS components to establish communication between substations and to a host SCADA workstation over the SCADA network.~~

~~B. Configure dc multifunction IEDs and SAS components to communicate transfer trip signals over the communications network using VLAN.~~

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Not Used

4.2 PAYMENT

Not Used

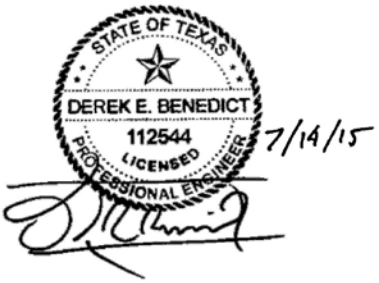
END OF SECTION

URS Corporation
TBPE Firm Registration No. F-3162

SPECIAL SPECIFICATION

EP-STOPS

Streetcar Stop Furnishings



1. **Description.** This work consists of supplying and installation of streetcar stop furnishings as indicated within this specification and the plans.

2. **Materials and Measurement.**

   A. **Shelters.** Furnish and install shelters at stop locations as field located by the Owner or Owner's Representative. Shelters shall be structurally supported cantilevered roof canopy sections of approximately 100" height to apex of roof of canopy, 180.5" length, 65" width and shall conform to the performance and specification requirements of http://www.brasco.com/ (Model # EC512-CA-AR-AL-125, Type Eclipse – cantilever or equal as approved by Sun Metro). Shelters will be measured by each shelter complete in place and will include all necessary materials, foundations, equipment and labor to complete per Manufacturer instructions.

   B. **Benches.** Furnish and Install benches as shown on the plans. Submit bench product data for approval. Benches will be measured by each bench complete in place and will include all necessary materials, foundations, equipment and labor to complete per plans.

   C. **Leaning Rail.** Furnish and install Leaning Rail as shown on the plans. Submit shop drawings and product data for approval. Leaning Rail will be measured by the linear foot and include all necessary materials, foundations, equipment and labor to complete per plans.

   D. **Barrier Rail/Handrail.** Furnish and install ADA compliant pedestrian handrail in accordance with TxDOT Standard Detail PRD-13. The handrail will meet the requirements of Texas Department of Transportation Specification Item 450 "Railing". Handrail will be measured by the linear foot and will include all necessary materials, foundations, equipment and labor to complete per plans.

   E. **Detectable Warning**. Construct Detectable Warning (Cast-in-Place) as indicated on the plans and details. Materials and construction will conform to Texas Department of Transportation (TxDOT) Specification 5003. Furnish materials in accordance with approved TxDOT Material Producer List). This item will be measured by the square foot of surface area and include all necessary materials, equipment and labor to complete per plans.

   F. **Transportation Information Holder.** Furnish and install transportation information holders as shown on the plans and details. This Item will include all materials necessary to construct an information display board as shown on the plans, including, but not limited to, one (1) aluminum transportation information holder with tamper resistant stainless steel attachment hardware (one-sided) with powder coated finish (display size 11" x 22", overall size 12" x 23") and one (1) impact resistant polycarbonate lens. Information holder will conform to Bunting

Tabloid Series (BGH_11-22) or equivalent. All construction methods will be consistent with the installation instructions specified by the manufacturer and details provided in the plans.

Holders will be measured by each display board complete in place and will include all necessary attachment hardware to install the holder onto the stop light pole.

G. Blade Sign. Blade signs will be measured for separately per the requirements of TxDOT Specification Item 636 "Aluminum Signs" and will include all necessary attachment hardware to install the sign onto the stop light pole.

H. Sun Metro Logo Panel. Furnish and Install the Blockout and Sun Metro Logo Panel located at the stop locations as shown in construction plans and details. Logo Blockout shall be stabilized screening material level and compact material to 85% as per ASTM D1557. The Sun Metro Standard Logo Panel shall be Bomanite Artistic Concrete or equal and shall be approved by the Owner or Owner's Representative. Install Logo panel per manufacturer's recommendation and shall be ADA/TAS compliant. Panels shall be measured by each panel complete in place.

I. Waste Receptacles. Furnish and Install 32 gallon flare door waste receptacles at stop locations as field located by the Owner or Owner's Representative. Waste receptacles shall be grey in color and shall conform to the performance and specification requirements of (http://www.wabashvalley.com/) Model # FR500P, #FR500R, or approved equal. This item will be measured by each waste receptacle assembly complete in place. All construction methods will be consistent with the installation instructions specified by the manufacturer.

3. Equipment and Construction. All equipment and construction activities required to perform the work described in this section and shown on the drawings will be executed in accordance with the requirements of the Texas Department of Transportation Standard Specifications for Highways, Streets, and Bridges or in accordance with City of El Paso requirements.

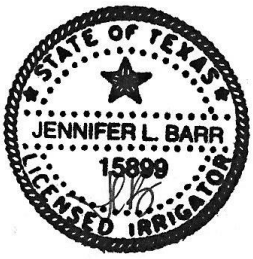
4. Payment. The work and materials furnished in accordance with this Item will be measured as specified under "Materials and Measurement" and will be paid for at the unit price bid for the items noted below:

a. Shelters – (EA)
b. Benches – (EA)
c. Leaning Rail – (LF)
d. Barrier Rail/ Handrail will be paid for under TxDOT Item 450 – Rail (Handrail) (TY A) (LF). See TxDOT Item 450 "Railing" for further specification information.
e. Detectable Warning Surface (Cast-in-Place) – (SF)
f. Furnish and Install Transportation Information Holder – (EA)
g. Blade Signs will be paid for under TxDOT Item 636 – Aluminum Signs (TY A) – (SF). See TxDOT Item 636 "Aluminum Signs" for further specification information.
h. Sun Metro Logo Panel – (EA)
i. Waste Receptacles – (EA)

SPECIAL SPECIFICATION

EP-LAND

Miscellaneous Landscape Elements



1. **Description.** This Item shall govern for supplying and installation of Tree Grates and Meter Assemblies, as shown on the plans and this specification.

2. **Materials and Construction.**

   (1) Grates - Furnish and Install Tree Grates as shown on the landscaping plans. Utilize Tree Grate models indicated in plans or approved equivalent.

   (2) Water Meter Assemblies - Furnish and Install Water Meter Assemblies as shown on the landscaping plans and in standard details of water replacement plans. Apply for new meter permit, and provide all fees and associated filing materials.

   (3) Relocate Boulders – Remove existing boulders during the demolition at the proposed Maintenance and Storage Facility site in accordance with Drawing No. LM102. Transfer removed boulders to owner approved location and reuse during new site construction.

3. **Measurement.** Measure Tree grates as each model, complete in place as shown on the plans. Measure Water Meter Assemblies as each, complete in place as shown on the plans. Measure Relocated Boulders by the 'each', complete in place as shown on the plans.

4. **Payment.** The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid at the unit price bid for "Furnish and Install Tree Grate", and "Furnish and Install Water Meter Assembly", and "Relocate Boulders". This price is full compensation for furnishing, preparing, hauling, and installing materials; for excavation and backfill; and for labor, tools, equipment, and incidentals necessary to complete the work.