



Date: October 24, 2008

DOCUMENT 00 91 13

**ADDENDUM No. 4 TO THE CONTRACT DOCUMENTS**

Bid Opening Date – November 13, 2008

**INLAND EMPIRE TRANSPORTATION MANAGEMENT CENTER  
(IETMC)**

PROJECT NO. 118480

ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON BID FORM AND  
REVISE THE CONTRACT DOCUMENTS AS FOLLOWS:

PROJECT MANUAL

INTRODUCTORY INFORMATION

1. DOCUMENT 00 01 10 – TABLE OF CONTENTS
  - A. REPLACE Addendum 3 issued Document 00 01 10, Table of Contents, WITH the attached Document 00 01 10, Table of Contents.
1. DOCUMENT 00 01 16 – INDEX OF DRAWINGS – COMMUNICATION TOWER
  - A. ADD the attached Document 00 01 16, Index of Drawings – Communication Tower.
2. DOCUMENT 00 11 00 - INVITATION TO BID
  - A. BID OPENING DATE  
CHANGE bid opening date FROM November 20, 2008 TO November 13, 2008.

## BIDDING REQUIREMENTS

1. DOCUMENT 00 41 00 – BID FORM AND BID PACKAGE
  - A. REPLACE Addendum 3 issued Bid Form WITH the revised Bid Form attached to this addendum.

## SPECIFICATIONS

1. SECTION 27 05 45 – COMMUNICATION TOWER
  - A. ADD the attached Section 27 05 45, Communication Tower and associated Exhibit A.

## DRAWINGS

1. ADD the following sheets dated October 27, 2008:

SHEET	COMMUNICATION TOWER
G-000-III	Cover Sheet Volume III
T1	Title Sheet
G-100	Accessibility Site Plan
G1	General Notes Sheet
E1	Tower Elevation
A1.1	T-21B Tower Section
A1.2	T-21B Assembly
A2.1	T-18 Tower Section
A2.1	T-18 Assembly
A3.1	T-16 Tower Section
A3.2	T-16 Assembly
A3.3	Platform Assembly
A3.4	Platform Details
A4.1	T-13 Tower Section
A4.2	T-13 Assembly
A4.3	Platform Assembly
A4.4	Platform Details
A5.1	T-11 Tower Section
A5.2	T-11 Assembly
A6.1	T-9S Tower Section
A6.2	T-9S Assembly
A7	Dish Mount Assembly
A8	Face Dish Mount Assembly
A9	Ladder Assembly
F1	Foundation Plan

END OF ADDENDUM NO. 4

ATTACHMENTS:

Document 00 01 10, Table of Contents.

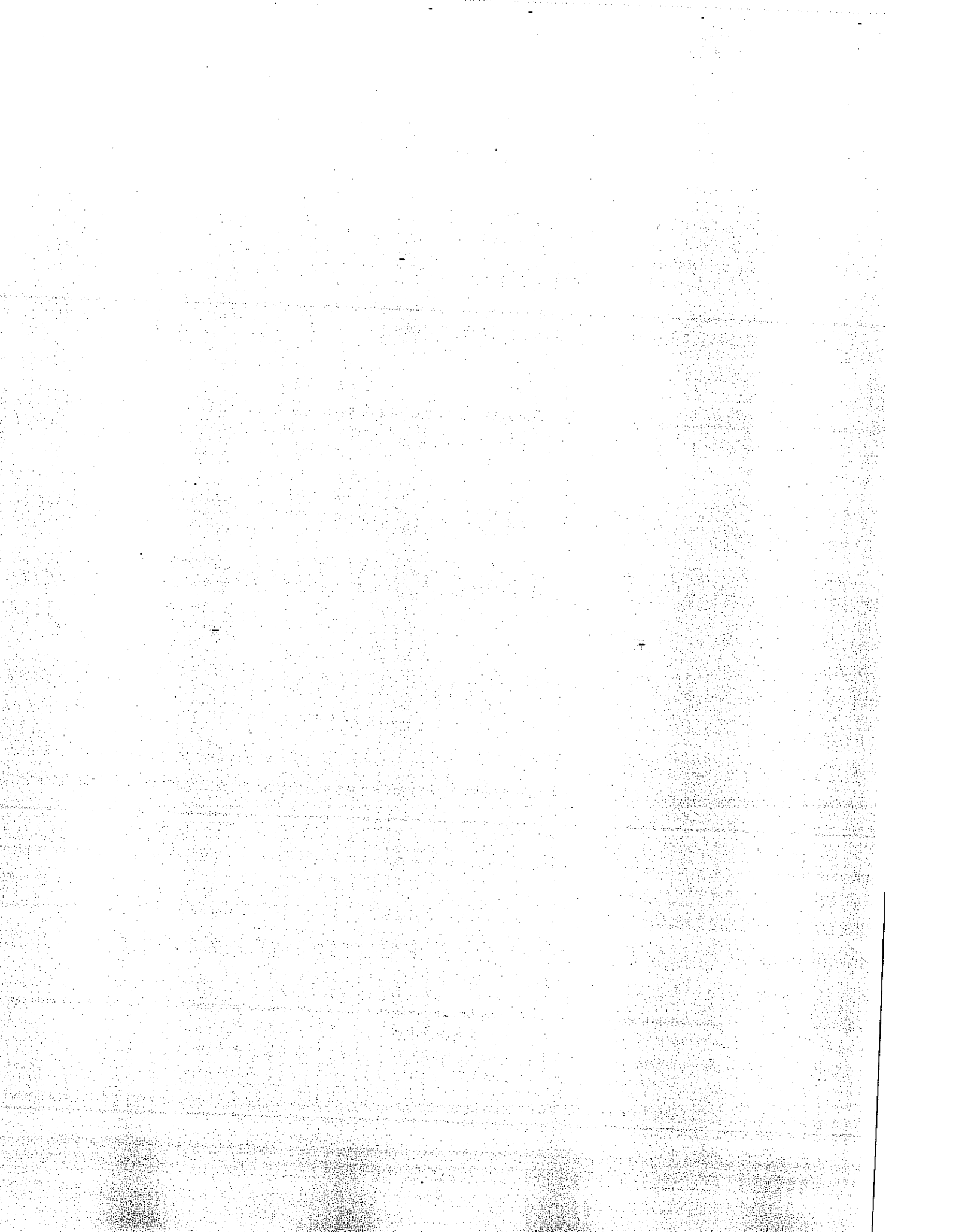
Document 00 01 16, Index of Drawings – Communication Tower

Document 00 41 00, Bid Form

Section 27 05 45, Communication Tower with Exhibit A

Communication Tower Drawings dated October 27, 2008:

Sheet G-000-III	Sheet A3.1	Sheet A5.1
Sheet T1	Sheet A3.2	Sheet A5.2
Sheet G-100	Sheet A3.3	Sheet A6.1
Sheet G1	Sheet A3.4	Sheet A6.2
Sheet E1	Sheet A4.1	Sheet A7
Sheet A1.1	Sheet A4.2	Sheet A8
Sheet A1.2	Sheet A4.3	Sheet A9
Sheet A2.1	Sheet A4.4	Sheet F1
Sheet A2.1		



DOCUMENT 00 01 10

TABLE OF CONTENTS

BOOK I

INTRODUCTORY INFORMATION

	Pages
Document 00 00 00 Notice to Contractors .....	1 only
00 01 01 Project Title Page.....	1 only
00 01 05 Certifications Page.....	1 through 2
00 01 10 Table of Contents.....	1 through 8
00 01 15 Index of Drawings .....	1 through 10
00 01 16 Index of Drawings – Communication Tower .....	1 through 2

BIDDING REQUIREMENTS

Document 00 11 00 Invitation to Bid .....	1 through 4
00 21 00 Instructions to Bidders.....	1 through 8
00 22 00 Supplementary Instructions to Bidders .....	1 only
00 22 05 Supplementary Instructions to Bidders Federal – Aid Construction Projects .....	1 through 36
00 22 10 DVBE Program Requirements .....	1 through 6
00 31 32 Geotechnical Data .....	1 only
00 31 33 Shop Drawings Data .....	1 through 2
00 41 00 Bid Form .....	1 through 6
00 43 13 Bidder's Bond Form .....	1 only
00 43 14 DVBE Participation Summary .....	1 through 4
00 43 15 Good Faith Effort Documentation Form .....	1 through 4
00 43 16 SMSB Subcontractor(s) Summary .....	1 through 2
00 45 46 Payee Data Record.....	1 through 2

CONTRACTING REQUIREMENTS

Document 00 52 00 Agreement .....	1 only
00 61 13 Performance Bond .....	1 only
00 61 14 Payment Bond .....	1 only
00 72 00 General Conditions of the Contract for Construction .....	1 through 30
00 73 00 Supplementary Conditions .....	1 through 7
00 73 10 Supplementary Conditions .....	1 through 13
Federal – Aid Construction Projects	

SPECIFICATIONS

DIVISION 01 - GENERAL REQUIREMENTS

Section 01 11 00 Summary .....	1 through 4
01 21 00 Allowances .....	1 through 2
01 31 00 Project Management and Coordination .....	1 through 2
01 31 10 Partnering .....	1 through 3
01 32 16 Progress Schedules and Reports .....	1 through 6
01 32 33 Construction Photographs.....	1 through 2
01 33 00 Submittal Procedures.....	1 through 6
01 35 57 Essential Services Project Procedures.....	1 only

01 41 00	Quality Requirements.....	1 through 2
01 45 29	Testing Laboratory Services .....	1 through 4
01 51 00	Temporary Facilities and Controls.....	1 through 11
01 57 13	Storm Water Pollution Prevention Plan .....	1 through 4
01 60 00	Product Requirements .....	1 through 2
01 64 00	Owner-furnished Equipment.....	1 through 2
01 73 29	Cutting and Patching.....	1 through 2
01 74 19	Construction Waste Management.....	1 through 3
	Appendix 01 74 19.1, Construction Waste Estimate .....	1 only
	Appendix 01 74 19.2, Waste Management Report.....	1 only
01 74 20	Recycled Content Certification.....	1 through 2
	Appendix 01 74 20.1, Ex. Recycled Content Certification Worksheet .....	1 through 3
	Appendix 01 74 20.1, Recycled Content Certification Worksheet.....	1 through 3
	Appendix 01 74 20.2, Example SABRC Procurement Summary .....	1 through 2
	Appendix 01 74 20.2, SABRC Procurement Summary.....	1 through 2
01 74 23	Cleaning.....	1 through 2
01 75 00	Starting and Adjusting.....	1 through 3
01 77 00	Closeout Procedures.....	1 through 4
01 79 00	Demonstration and Training .....	1 through 2
01 81 13	Sustainable Design Requirements .....	1 through 10
01 86 19	Testing, Adjusting and Balancing Procedures .....	1 through 2
01 91 00	General Commissioning Requirements.....	1 through 42

DIVISION 02 – EXISTING CONDITIONS

Not Applicable

DIVISION 03 - CONCRETE

Section	03 01 33	Repair of Horizontal Concrete Surfaces .....	1 through 8
	03 10 00	Concrete Forming and Accessories.....	1 through 4
	03 30 00	Cast-In-Place Concrete .....	1 through 22
	03 39 00	Concrete Curing .....	1 through 4
	03 64 23	Crack Repair Epoxy Injection Grouting.....	1 through 8

DIVISION 04 - MASONRY

Section	04 20 00	Unit Masonry .....	1 through 14
---------	----------	--------------------	--------------

DIVISION 05 - METALS

Section	05 12 00	Structural Steel Framing.....	1 through 10
	05 21 00	Steel Joist Framing.....	1 through 6
	05 31 00	Steel Decking .....	1 through 6
	05 40 00	Cold-Formed Metal Framing.....	1 through 8
	05 50 00	Metal Fabrications .....	1 through 6
	05 51 00	Metal Stairs .....	1 through 8
	05 53 00	Metal Gratings.....	1 through 6
	05 73 00	Decorative Metal Railings.....	1 through 8
	05 75 00	Decorative Formed Metal .....	1 through 8

DIVISION 06 - WOOD, PLASTICS AND COMPOSITES

Section	06 10 53	Miscellaneous Rough Carpentry.....	1 through 4
	06 16 00	Sheathing .....	1 through 4
	06 40 23	Interior Architectural Woodwork .....	1 through 10

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section	07 14 16	Cold Fluid-Applied Waterproofing.....	1 through 6
	07 21 00	Thermal Insulation.....	1 through 6
	07 32 16	Concrete Roof Tiles.....	1 through 10
	07 42 15	Sheet Metal Wall and Soffit Panels .....	1 through 4
	07 54 19	Polyvinyl-Chloride (PVC) Roofing .....	1 through 12
	07 62 00	Sheet Metal Flashing and Trim.....	1 through 10
	07 72 00	Roof Accessories .....	1 through 6
	07 81 10	Applied Fireproofing .....	1 through 12
	07 84 13	Penetration Firestopping .....	1 through 10
	07 84 46	Fire-Resistive Joint Systems .....	1 through 6
	07 92 00	Joint Sealants.....	1 through 12

**BOOK II**

DIVISION 08 - OPENINGS

Section	08 11 13	Hollow Metal Doors and Frames.....	1 through 8
	08 31 13	Access Doors and Panels.....	1 through 4
	08 33 23	Overhead Coiling Doors .....	1 through 6
	08 41 13	Aluminum Framed Entrances and Storefronts.....	1 through 8
	08 44 13	Glazed Aluminum Curtain Walls.....	1 through 22
	08 44 29	Glass Canopies.....	1 through 10
	08 62 23	Tubular Daylighting Devices .....	1 through 8
	08 71 11	Door Hardware .....	1 through 44
	08 80 00	Glazing .....	1 through 14
	08 90 00	Louvers and Vents.....	1 through 8

DIVISION 09 - FINISHES

Section	09 21 17	Gypsum Board Shaft Wall Assemblies.....	1 through 6
	09 22 16	Non Structural Metal Framing.....	1 through 6
	09 24 00	Portland Cement Plastering.....	1 through 6
	09 29 00	Gypsum Board .....	1 through 6
	09 30 00	Tiling.....	1 through 6
	09 51 13	Acoustical Panel Ceilings .....	1 through 10
	09 65 13	Resilient Base and Accessories.....	1 through 6
	09 65 19	Resilient Tile Flooring .....	1 through 6
	09 65 36	Static-Control Resilient Flooring .....	1 through 6
	09 66 23	Resinous Matrix Terrazzo Flooring .....	1 through 8
	09 68 13	Tile Carpeting .....	1 through 8
	09 69 00	Access Flooring .....	1 through 12
	09 84 13	Fixed Sound-Absorptive Panels.....	1 through 4
	09 91 23	Interior Painting .....	1 through 8
	09 96 00	High-Performance Coatings .....	1 through 6

DIVISION 10 - SPECIALTIES

Section	10 11 00	Visual Display Surfaces .....	1 through 6
	10 14 00	Signage .....	1 through 6
	10 21 13	Toilet Compartments .....	1 through 6
	10 28 00	Toilet, Bath and Laundry Accessories .....	1 through 8
	10 44 13	Fire Extinguisher Cabinets .....	1 through 6
	10 44 16	Fire Extinguishers .....	1 through 4
	10 51 13	Metal Lockers .....	1 through 6
	10 71 13.43	Fixed Sun Screens .....	1 through 6

DIVISION 11 - EQUIPMENT

Section	11 24 19	Vacuum Cleaning Systems .....	1 through 6
	11 31 00	Residential Appliances .....	1 through 6
	11 52 13	Projection Screens .....	1 through 6

DIVISION 12 - FURNISHINGS

Section	12 21 13	Horizontal Louver Blinds .....	1 through 4
	12 24 13	Roller Window Shades .....	1 through 8
	12 48 16	Entrance Floor Grilles .....	1 through 4
	12 93 00	Site Furnishings .....	1 through 4

DIVISION 13 - SPECIAL CONSTRUCTION

Section	13 48 65	Seismic Isolation Bearings .....	1 through 14
		Appendix A - Individual Isolator Specified Design Properties .....	1 through 2
		Appendix B - Forms to Submit With Contract Bid .....	1 through 4
	13 48 67	Viscous Fluid Dampers .....	1 through 12

DIVISION 14 - CONVEYING SYSTEMS

Section	14 24 00	Hydraulic Elevators .....	1 through 10
---------	----------	---------------------------	--------------

**BOOK III**

DIVISION 21 - FIRE SUPPRESSION

Section	21 13 13	Fire Sprinkler Systems .....	1 through 24
	21 22 00	Clean Agent Fire Suppression Systems .....	1 through 18

DIVISION 22 - PLUMBING

Section	22 05 00	Common Work Results for Plumbing .....	1 through 14
		Appendix A - RS-1 through RS-9 .....	15 through 26
	22 05 13	Common Motor Requirements for Plumbing Equipment .....	1 through 4
	22 05 19	Meters and Gages for Plumbing Piping .....	1 through 10
	22 05 23	General-Duty Valves for Plumbing Piping .....	1 through 18
	22 05 29	Hangers and Supports for Plumbing Piping and Equipment .....	1 through 14



22 05 48	Vibration and Seismic Controls for Plumbing Piping and Equipment.....	1 through 12
22 05 53	Identification for Plumbing Piping and Equipment.....	1 through 6
22 07 00	Plumbing Insulation.....	1 through 34
22 11 16	Domestic Water Piping.....	1 through 22
22 11 19	Domestic Water Piping Specialties.....	1 through 12
22 11 23	Domestic Water Pumps.....	1 through 6
22 13 16	Sanitary Waste and Vent Piping.....	1 through 14
22 13 19	Sanitary Waste Piping Specialties.....	1 through 10
22 14 13	Facility Storm Drainage Piping.....	1 through 12
22 14 29	Sump Pumps.....	1 through 4
22 34 00	Fuel-Fired Domestic Water Heaters.....	1 through 8
22 40 00	Plumbing Fixtures.....	1 through 18
22 45 00	Emergency Plumbing Fixtures.....	1 through 6
22 47 00	Drinking Fountains and Water Coolers.....	1 through 4

### DIVISION 23 - HEATING, VENTILATING, AND AIRCONDITIONING (HVAC)

Section	23 05 00	Common Work Results for HVAC.....	1 through 12
	23 05 13	Common Motor Requirements for HVAC Equipment.....	1 through 4
	23 05 19	Meters and Gages for HVAC Piping.....	1 through 12
	23 05 23	General-Duty Valves for HVAC Piping.....	1 through 18
	23 05 29	Hangers and Supports for HVAC Piping and Equipment.....	1 through 12
	23 05 48	Vibration and Seismic Controls for HVAC Piping and Equipment..	1 through 16
	23 05 53	Identification for HVAC Piping and Equipment.....	1 through 8
	23 05 93	Testing, Adjusting, and Balancing for HVAC.....	1 through 20
	23 07 00	HVAC Insulation.....	1 through 40
	23 08 00	Commissioning of HVAC.....	1 through 14
	23 09 00	Instrumentation and Control for HVAC.....	1 through 38
	23 09 93	Sequence of Operations for HVAC Controls.....	1 through 40
	23 11 13	Facility Fuel-Oil Piping.....	1 through 18
	23 11 23	Facility Natural-Gas Piping.....	1 through 22
	23 21 13	Hydronic Piping.....	1 through 18
	23 21 23	Hydronic Pumps.....	1 through 8
	23 25 00	HVAC Water Treatment.....	1 through 8
	23 31 13	Metal Ducts.....	1 through 18
	23 33 00	Air Duct Accessories.....	1 through 14
	23 34 16	Centrifugal HVAC Fans.....	1 through 8
	23 34 23	HVAC Power Ventilators.....	1 through 6
	23 36 00	Air Terminal Units.....	1 through 8
	23 37 13	Diffusers, Registers, and Grilles.....	1 through 6
	23 37 23	HVAC Gravity Ventilators.....	1 through 6
	23 38 13	Commercial-Kitchen Hoods.....	1 through 8
	23 51 00	Breechings, Chimneys, and Stacks.....	1 through 4
	23 52 33	Water Tube Boilers.....	1 through 8
	23 64 26	Rotary-Screw Water Chillers.....	1 through 14
	23 73 13	Modular Indoor Central-Station Air-Handling Units.....	1 through 12
	23 74 13	Packaged, Outdoor, Central-Station Air-Handling Units.....	1 through 10
	23 81 23	Computer-Room Air Conditioners.....	1 through 8
	23 82 19	Fan Coil Units.....	1 through 8
	23 82 39	Unit Heaters.....	1 through 6
	23 84 13	Humidifiers.....	1 through 6

## BOOK IV

### DIVISION 26 - ELECTRICAL

Section	26 05 00	Common Work Results for Electrical.....	1 through 4
	26 05 19	Low-Voltage Electrical Power Conductors and Cables .....	1 through 8
	26 05 23	Control-Voltage Electrical Power Cables .....	1 through 12
	26 05 26	Grounding and Bonding for Electrical Systems.....	1 through 8
	26 05 29	Hangers and Supports for Electrical Systems.....	1 through 6
	26 05 33	Raceway and Boxes for Electrical Systems.....	1 through 14
	26 05 36	Cable Trays for Electrical Systems .....	1 through 6
		Appendix – TDM 8660.1.2 .....	1 through 30
	26 05 39	Underfloor Raceways for Electrical Systems .....	1 through 12
	26 05 43	Underground Ducts and Raceways for Electrical Systems .....	1 through 16
	26 05 48	Vibration and Seismic Controls for Electrical Systems.....	1 through 8
	26 05 53	Identification for Electrical Systems .....	1 through 12
	26 05 73	Overcurrent Protective Device Coordination Study.....	1 through 6
	26 08 00	Commissioning of Electrical Systems .....	1 through 6
	26 09 23	Lighting Control Devices.....	1 through 12
	26 09 43	Network Lighting Controls .....	1 through 10
	26 22 00	Low-Voltage Transformers .....	1 through 8
	26 23 00	Low-Voltage Switchgear.....	1 through 14
	26 24 13	Switchboards.....	1 through 16
	26 24 16	Panelboards .....	1 through 16
	26 26 00	Power Distribution Units .....	1 through 10
	26 27 26	Wiring Devices .....	1 through 12
	26 28 13	Fuses .....	1 through 4
	26 29 13	Enclosed Controllers .....	1 through 12
	26 29 23	Variable-Frequency Motor Controllers.....	1 through 12
	26 32 13	Engine Generators .....	1 through 16
	26 33 53	Static Uninterruptible Power Supply .....	1 through 16
	26 36 00	Transfer Switches.....	1 through 10
	26 41 13	Lightning Protection for Structures .....	1 through 4
	26 43 13	Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits .....	1 through 8
	26 51 00	Interior Lighting.....	1 through 10
	26 56 00	Exterior Lighting .....	1 through 10

### DIVISION 27 - COMMUNICATIONS

Section	27 00 00	Communications Overview.....	1 through 4
	27 05 00	Common Work Results for Communications.....	1 through 8
	27 05 26	Grounding and Bonding for Communication Systems .....	1 through 6
	27 05 28	Pathways for Communications Systems.....	1 through 6
	27 05 45	Communication Tower.....	1 through 2
		Exhibit A .....	1 through 36
	27 05 53	Identification for Communication Systems.....	1 through 6
		Appendix A.....	1 through 10
	27 11 01	Telecommunications Rooms and Spaces.....	1 through 14
	27 11 07	Telecommunications Room Finishes .....	1 through 4
	27 11 19	Communications Termination Blocks and Patch Panels.....	1 through 6
	27 13 23	Fiber Optic Communication System .....	1 through 2
		Exhibit A .....	3 through 24

27 14 13	Communications Copper Riser Cabling .....	1 through 14
27 14 23	Communications Optical Fiber Riser Cabling .....	1 through 8
27 15 13	Communications Horizontal Cabling .....	1 through 14
27 15 33	Communications Coaxial Horizontal Cabling .....	1 through 6
27 15 43	Faceplates and Connectors.....	1 through 6
27 51 23	Intercommunications and Program Systems .....	1 through 12

**DIVISION 28 - ELECTRONIC SAFETY AND SECURITY**

Section	28 13 00	Access Control .....	1 through 46
	28 23 00	Video Surveillance.....	1 through 14
	28 31 11	Addressable Fire-Alarm System .....	1 through 16

**DIVISION 31 - EARTHWORK**

Section	31 11 00	Clearing & Grubbing .....	1 through 2
	31 23 13	Subgrade Preparation .....	1 through 2
	31 23 16	Excavation.....	1 through 4
	31 23 23	Fill and Backfill .....	1 through 10
	31 23 23.15	Trench Backfill.....	1 through 10
	31 25 00	Temporary Erosion and Sediment Control.....	1 through 56

**DIVISION 32 - EXTERIOR IMPROVEMENTS**

Section	32 11 23	Aggregate Base Courses .....	1 through 6
	32 12 16	Asphalt Paving .....	1 through 4
	32 16 00	Curbs and Gutters .....	1 through 4
	32 17 13	Parking Bumpers.....	1 through 2
	32 17 15	Accessible Parking and Authorization Signs.....	1 through 2
	32 17 23	Pavement Markings.....	1 through 2
	32 17 24	Painted Stall Lines.....	1 through 2
	32 18 16	Resilient Surfacing .....	1 through 6
	32 31 13	Chain Link Fences and Gates .....	1 through 10
	32 31 19	Decorative Metal Fences and Gates.....	1 through 10
	32 84 00	Planting Irrigation .....	1 through 8
	32 93 00	Plants .....	1 through 16
	32 97 00	Maintenance.....	1 through 6

**DIVISION 33 - UTILITIES**

Section	33 05 01.05	Reinforced Concrete Cylinder Pipe and Fittings .....	1 through 4
	33 05 01.09	Polyvinyl Chloride (PVC) Pressure Pipe and Fittings.....	1 through 4
	33 05 01.12	Gravity Sewer Pipe and Fittings.....	1 through 14
	33 12 13	Water Service Connections.....	1 through 10
	33 13 00	Disinfecting of Water Utility Distribution.....	1 through 4
	33 44 13.13	Catch Basins .....	1 through 4

**DIVISION 40 - PROCESS INTEGRATION**

Section	40 80 01	Process Piping Leakage Testing .....	1 through 6
---------	----------	--------------------------------------	-------------

**END OF DOCUMENT**

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**INDEX OF DRAWINGS – COMMUNICATION TOWER**

<b>VOLUME III</b>	
<u>Sheet Number</u>	<u>Description</u>
<b>COMMUNICATION TOWER</b>	
G-000-III	Cover Sheet Volume III
T1	Title Sheet
G-100	Accessibility Site Plan
G1	General Notes Sheet
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A1.1	T-21B Tower Section
A1.2	T-21B Assembly
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A3.1	T-16 Tower Section
A3.2	T-16 Assembly
A3.3	Platform Assembly
A3.4	Platform Details
A4.1	T-13 Tower Section
A4.2	T-13 Assembly
A4.3	Platform Assembly
A4.4	Platform Details
A5.1	T-11 Tower Section
A5.2	T-11 Assembly
A6.1	T-9S Tower Section
A6.2	T-9S Assembly
A7	Dish Mount Assembly
A8	Face Dish Mount Assembly
A9	Ladder Assembly
F1	Foundation Plan

End of Section

RESPD/PMB  
W.O. NO. 118480

IETMC – COMMUNICATION TOWER  
60004333  
October 24, 2008

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**DOCUMENT 00 41 00  
 BID FORM**

THE STATE OF CALIFORNIA  
 DEPARTMENT OF GENERAL SERVICES  
 REAL ESTATE SERVICES DIVISION  
 PROJECT MANAGEMENT BRANCH

FROM: \_\_\_\_\_  
 (Name of Bidding Firm)

DELIVER TO: Project Management Branch  
 13025 Danielson Street, Suite 105  
 Poway, CA 92064

BEFORE 2:00 P.M., November 13, 2008

FOR: INLAND EMPIRE TRANSPORTATION MANAGEMENT CENTER (IETMC)  
 DEPARTMENT OF TRANSPORTATION  
 FONTANA, SAN BERNARDINO COUNTY, CALIFORNIA  
 118480

Plainly mark outside of envelope with "Bid For"; followed by the above Title and Project Number.

The undersigned hereby proposes and agrees to furnish all labor, materials, and equipment, and to perform all work required for the above-named Project in the manner and time prescribed in the Drawings and Project Manual, dated July 2008 and such addenda thereto as may be issued prior to bid opening date and in accordance with prevailing wage rates ascertained by the Department of Industrial Relations and set forth on the DIR web site ([http://www.dir.ca.gov/DLSR/statistics\\_research.html](http://www.dir.ca.gov/DLSR/statistics_research.html)) for General Prevailing Wage Rates as determined by the February 2008 DIR prevailing wage published rates or with Federal Davis Bacon Wage Act Provisions which ever is greater. The Bid Price, set forth below in clear legible figures, includes the cost of Bonds, Insurance, Sales Tax, and every other item of expense, direct or indirect, incidental to the Bid Price.

**SCHEDULE OF WORK AND PRICES**

WORK ITEM	DESCRIPTION	ITEM TOTAL IN FIGURES
1.	SITE for the sum of:	\$ _____
2.	COOMUNICATION TOWER for the sum of:	\$ _____
3.	BUILDING for the sum of:	\$ _____
4.	Allowance(s) as specified in Section 01 21 00, not included in Work Items 1 or 2 above for the sum of:	<b><u>\$315,000.00</u></b>
COMPLETE WORK: Total of Work Items 1,2 and 3 for the lump sum of:		\$ _____

**DETERMINATION OF BID:** Determination of amount of bid will be on the basis of total sum of Work Items as verified by the State.





**IMPORTANT - READ BEFORE SIGNING:** Bid Form must be executed in same name-style in which the bidder is licensed. Bidder bidding jointly or as a combination of several business organizations is specially cautioned that such bidder must be jointly licensed in the same form and style in which the bid is executed. If making a bid as a joint venture, each person submitting the bid shall provide the information required below with respect to his or her licensure. The undersigned Bidder certifies and agrees to provide the information and comply with the requirements contained in Articles 1 through 10 on the following pages of the Bid Form. By signing, Bidder swears under penalty of perjury that the conditions of Article 2, Article 4, Paragraph 4.2, and Article 7 are true.

Legal Name of Bidder: \_\_\_\_\_ Federal I.D. No.: \_\_\_\_\_

Contractor's License No.: \_\_\_\_\_ License Expiration Date \_\_\_\_\_ License Classification: \_\_\_\_\_

Business Address \_\_\_\_\_  
(Street and/or P.O. Box) (City) (State) (Zip)

E-Mail Address: \_\_\_\_\_

Business Telephone No.: \_\_\_\_\_ Facsimile No.: \_\_\_\_\_

**SIGN HERE** ----->

\_\_\_\_\_  
Signature of Bidder

\_\_\_\_\_  
Print Name and Title of Bidder

Executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ at \_\_\_\_\_, California.

**ARTICLE 1 – BIDDER'S BUSINESS IDENTIFICATION**

**THIS BID IS SUBMITTED BY** (check one):

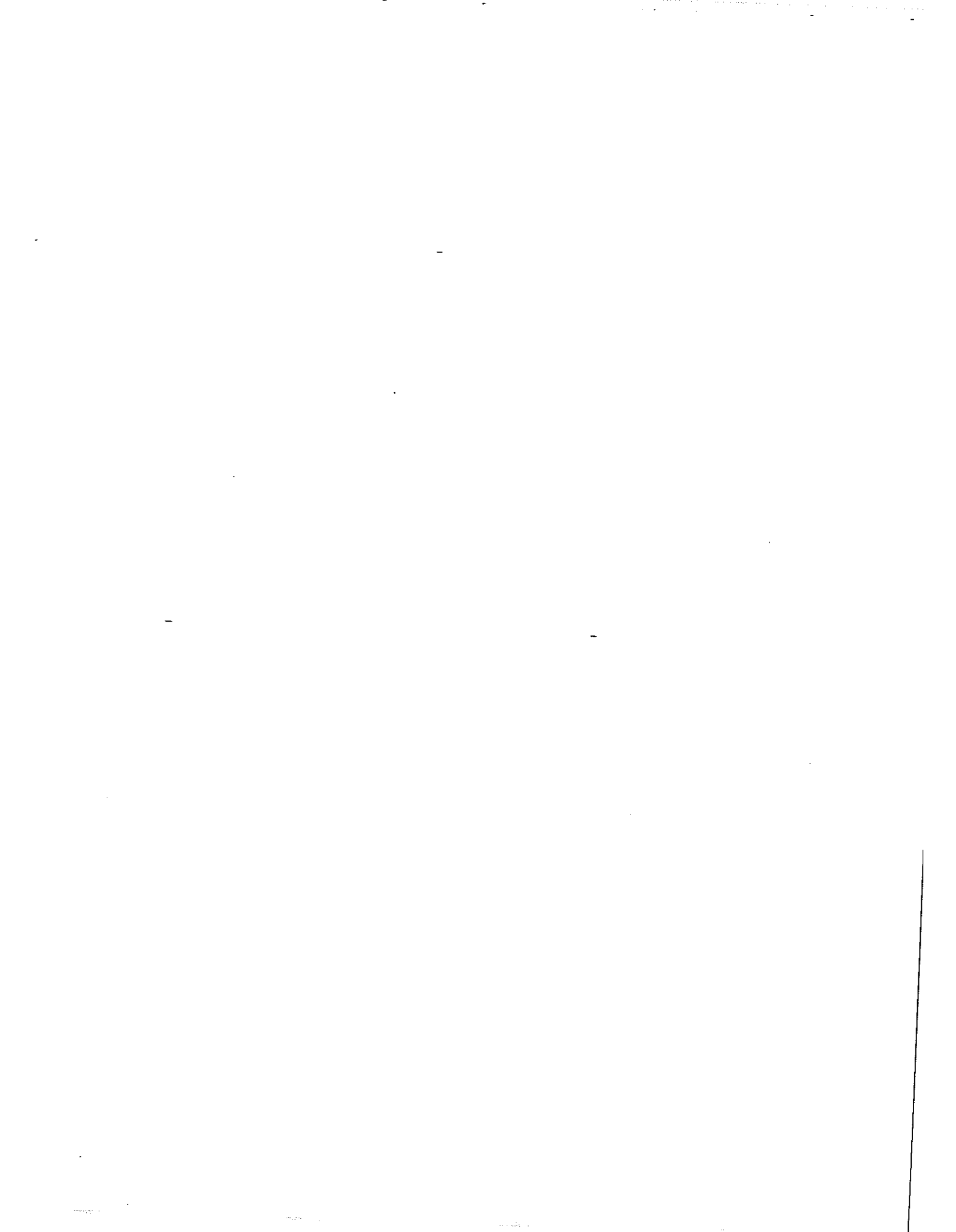
- Individual
- Partnership
- Joint Venture
- Corporation

\_\_\_\_\_  
State in which Incorporated

**NOTE:** If Bidder is a corporation, the State in which incorporated shall be inserted above and the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if Bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of a partner authorized to sign contract in behalf of the partnership; and if Bidder is an individual, that person's signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the Department prior to opening bids or submitted with the bid; otherwise, the bid will be regarded as irregular and unauthorized. If bid is submitted by partnership or joint venture, the members are:

**ARTICLE 2 – REQUEST FOR SMALL BUSINESS PREFERENCE AND CERTIFICATION AND NON-SMALL BUSINESS SUBCONTRACTOR PREFERENCE**

REQUEST FOR SMALL BUSINESS PREFERENCE IS NOT APPLICABLE FOR THIS PROJECT



**ARTICLE 3 – BONDING ASSISTANCE**

In the event Bidder has received assistance in obtaining bonding for this Project, Bidder shall set forth name and nature of firm providing such assistance. Should that firm be listed as subcontractor, Bidder shall set forth the percentage of contract to be performed by that subcontractor.

Firm Providing Assistance and Nature of Assistance

Subcontractor:       Yes                       No                      Percentage \_\_\_\_\_

**ARTICLE 4 – CERTIFICATIONS - BID DEPOSITORY AND FEDERAL COURT FINDINGS**

4.1 By signing this Bid Form, Bidder certifies that in preparation of this Bid Form, no bid was received by the bidder from a bid depository, which depository (as to any portion of the work) prohibits or imposes sanctions for the obtaining by bidder, or the submission to bidder by any subcontractor or vendor or supplier of goods and services, of a bid outside the bid depository. This certification shall constitute a warranty, the falsity of which shall entitle the State to pursue any remedy authorized by law, and shall include the right, at the option of the State, of declaring any contract made as a result thereof to be void.

4.2 By signing this Bid Form, Bidder swears under penalty of perjury that representations of the bid with respect to bidder's license are true and that no more than one final unappealable finding of contempt of court by a Federal Court has been issued against the Contractor within the immediately preceding two-year period because of the Contractor's failure to comply with an order of a Federal Court which orders the Contractor to comply with an order of the National Labor Relations Board.

**ARTICLE 5 – STATEMENT OF COMPLIANCE - NONDISCRIMINATION**

Bidder (hereinafter referred to as "prospective contractor" in this Statement), by signing this Bid Form, hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f), and CCR, Title 2, Division 4, Chapter 5, Section 8103, in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program; as set forth in the General Conditions of the Contract for Construction. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicants for employment because of sex, race, color, ancestry, religious creed, national origin, physical disability (including HIV and AIDS), medical disability (cancer), age (over 40), marital status, and denial of family care leave.

**ARTICLE 6 – QUESTIONNAIRE**

6.1 In accordance with Public Contract Code, Section 10162, the Bidder shall complete the following questionnaire:

6.1.1 Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a Federal, State or Local government project because of a violation of law or a safety regulation?

Yes                       No

6.1.2 Has the Bidder, any officer of the Bidder, or any employee of the Bidder who has a proprietary interest in the Bidder, ever received a safety violation or failed to file notifications to the Cal-OSHA, Federal OSHA, or EPA Agencies for employee records as required by CCR, Title 8, Section 5208 and CFR 40, Part 617?

Yes                       No

If the answer to either 6.1.1 or 6.1.2 above is "Yes", then give the date(s) of the citation(s) or failure to make notifications, and explain the circumstances by attachment to this Bid Form.



**ARTICLE 7 – NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID**

By signing this Bid Form, Bidder, being first duly sworn, deposes and says that he or she is the authorized representative of the Bidder, the party making the foregoing bid, that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and is not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the bid price, or that of any other Bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the Bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

**ARTICLE 8 – ADDENDA**

In submitting this bid, Bidder represents that Bidder has examined copies of all the Contract Documents and acknowledges receipt of the following addenda:

Addendum No.: _____	Date: _____	Addendum No.: _____	Date: _____
Addendum No.: _____	Date: _____	Addendum No.: _____	Date: _____
Addendum No.: _____	Date: _____	Addendum No.: _____	Date: _____

Failure to acknowledge on the Bid Form receipt of an addendum shall not in itself be cause for withdrawal or rejection of bids, if it can be shown that bidder did, in fact, receive such addendum prior to bid opening.

**ARTICLE 9 – COMPLIANCE WITH GOALS SET FORTH IN THE DISADVANTAGED BUSINESS ENTERPRISED (DBE) PROGRAM**

In accordance with part 26, Title 49, Code of Federal Regulations entitled, "Participation By Minority Business Enterprise In Department Of Transportation Programs", the Department of General Services has established criteria to implement the Disadvantaged Business Enterprise Program Goal as set forth in Document 00455 of the Project Manual.

THE ATTACHED DOCUMENT LLP 01-04 – PROVIDES INFORMATION OF REQUIREMENTS AND DOCUMENTATION THAT MUST BE COMPLETED BY THE PRIME CONTRACTOR AND RECEIVED BY THE PROJECT MANAGEMENT BRANCH IN ACCORDANCE WITH THE DATE SPECIFIED IN DOCUMENT 00 11 00 TO HAVE THE BID CONSIDERED. IF FULL DBE GOAL ATTAINMENT IS NOT ACHIEVED, BIDDER MUST COMPLETE DOCUMENTATION OF THEIR GOOD FAITH EFFORT AND SUBMIT IN ACCORDANCE WITH DOCUMENT 00 22 05. A FORM WILL BE HANDED OUT AT THE MANDATORY PRE-BID TOUR THAT SHALL BE USED FOR THE GOOD FAITH DOCUMENTATION.









SECTION 27 05 45 - COMMUNICATION TOWER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 ALTERNATE DESIGNS

- A. The design of the Communications Tower indicated on the Drawings and in Specifications meets Division of the State Architect (DSA) approval requirements. Alternate designs, which include but are not limited to, designs using differing structural shapes, materials strengths or dimensions, will be considered for approval, however, alternate designs or products are deferred approval items that require approval by the DSA prior to incorporation in the Work. Cost of design and submission to DSA is responsibility of Contractor. Contractor shall allow 11 weeks for the initial DSA review. Subsequent reviews may be required if initial review is not approved. Contractor shall schedule activities and approvals accordingly and no additional Contract Time will be given to Contractor as a result of such submittal and approval.

1.3 SUMMARY

- A. This Section includes the following:
  - 1. Self supporting or free standing communication towers as specified in attached Exhibit A.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 27 05 45

EXHIBIT A FOLLOWS

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**SECTION 270545 – EXHIBIT A**

**STATE OF CALIFORNIA  
DEPARTMENT OF GENERAL SERVICES  
TELECOMMUNICATIONS DIVISION**

**MICROWAVE ANTENNA TELECOMMUNICATIONS TOWER  
SPECIFICATIONS AND OPERATIONAL REQUIREMENTS**

**Final**

**VHF / UHF antenna input required**

**FOR**

**120 FOOT TOWER**

**AT**

**INLAND EMPIRE TMC**

**SAN BERNARDINO COUNTY, CALIFORNIA**

**March 10, 2008**

## TABLE OF CONTENTS

<b>SECTION 1 GENERAL</b> .....	<b>4</b>
1.1 General .....	4
1.2 Certifications .....	5
<b>SECTION 2 LOCATION</b> .....	<b>5</b>
2.1 Site Location .....	5
2.2 Tower Orientation .....	5
2.3 Tower Location .....	5
<b>SECTION 3 SPECIFICATIONS</b> .....	<b>6</b>
3.1 Electronics Industries Associations (EIA) .....	6
3.2 California Code of Regulations (CCR) Title 24, Part 2, California Code .....	6
3.3 National Electric Code – National Fire Protection Association (NFPA-70) .....	6
3.4 California Code of Regulations (CCR) Title 8. Industrial Relations .....	6
3.5 National Electric Code – National Fire Protection Association (NFPA-780). .....	7
3.6 Greenbook Standard Specification for Public Works Construction .....	7
3.7 Tower Type .....	7
3.8 Dimensions of Telecommunications Tower .....	7
3.9 Tower Loading .....	7
3.10 Tower Protective Coatings .....	8
<b>SECTION 4 OPERATIONAL REQUIREMENTS</b> .....	<b>8</b>
4.1 General .....	8
4.2 Microwave Antennas .....	8
4.3 UHF and VHF Antennas .....	16
4.4 Basic Design Wind Speed .....	21
4.5 Tower Twist .....	22
4.6 Tower Sway .....	22
4.7 Tower Deflection .....	22

4.8	Microwave Antenna Mounting Structure .....	22
4.9	VHF/UHF Antenna Mounting Structure .....	23
4.10	Microwave Antenna Waveguide and VHF Antenna Coaxial Cable Circuit Run(s) .....	24
4.11	Vertical Waveguide and Coaxial Cable Rigid Support System .....	25
4.12	Horizontal Waveguide and Coaxial Cable Bridge Support System .....	26
4.13	Fixed Ladder (s) .....	26
4.14	Cable Bridge for Waveguides and Coaxle Cables .....	28
4.15	Work Platform(s) .....	28
4.16	Electrical Requirements .....	28
<b>SECTION 5</b>	<b>FABRICATION .....</b>	<b>29</b>
5.1	Field Fabrication .....	29
5.2	Tower Erection .....	30
5.3	Vendor Supervision .....	31
5.4	Connections and Locking Devices .....	31
<b>SECTION 6</b>	<b>QUALITY CONTROL .....</b>	<b>32</b>
6.1	General .....	32
6.2	Right to Inspections .....	32
6.3	Contractor Certifications .....	32
6.4	Other Quality Details .....	33
<b>SECTION 7</b>	<b>SUBMITTALS .....</b>	<b>34</b>
7.1	Shop Drawings .....	34
7.2	Welding Certificates .....	34
7.3	Qualifications Data .....	34
7.4	Mill Test Reports .....	34
7.5	Foundation Plans .....	34
<b>SECTION 8</b>	<b>APPLICABLE DOCUMENTS .....</b>	<b>34</b>
8.1	General .....	34

## SECTION 1 GENERAL

### 1.1 General

- 1.1.1 The telecommunications tower described in this document shall be used primarily for supporting telecommunications antennas and their associated hardware. These antennas shall include those that operate in the VHF, UHF and microwave range of radio frequencies. Associated hardware includes but is not limited to: microwave waveguides, coaxial cables, waveguide and coaxial cable support system(s), ladder(s), work platform(s), tower grounding system and antenna mounts.
- 1.1.2 This specification provides the technical, performance and equipment parameters required of a four-legged telecommunications tower.
- 1.1.3 The scope of the work encompassed by this specification includes the furnishing of all materials, materials testing, labor, transportation and engineering to completely design, fabricate and erect a self-supporting telecommunications tower, including all appurtenances and foundations. This specification includes microwave antenna mounts and VHF/UHF antenna outriggers.
- 1.1.4 The microwave antennas, microwave antenna second struts and VHF/UHF antennas and all antenna waveguides and antenna coaxial cables will be furnished and installed by the others.
- 1.1.5 The telecommunications tower and all its appurtenances that are fabricated or constructed at the jobsite shall be fabricated or constructed by California licensed contractors. The prime contractor shall be licensed as a California General Engineering Contractor, specifically experienced in the construction of microwave towers.
- 1.1.6 Where the requirements of an industrial or government standard, which is outlined below, are in conflict with another industrial standard which is also outlined below, the more demanding requirement shall apply.
- 1.1.7 Where the requirements of an industrial standard or government standard, which is outlined below, are in conflict with this specification, this specification shall apply.
- 1.1.8 The telecommunications tower and all its appurtenances shall meet or exceed the requirements of this document including, but not limited to: tower foundation(s), tower concrete base section, antenna mounts, earthwork

retaining system(s), vertical waveguide and conduit support system, climbing ladder(s) and grounding system.

## **1.2 Certifications and Permits**

1.2.1 All design and analysis computations and installation drawings developed and used in this project shall be certified and stamped by a California licensed Civil or Structural Engineer.

1.2.2 All necessary local construction permits will be obtained by the Contractor before any construction begins.

## **SECTION 2 LOCATION**

### **2.1 Site Location**

2.1.1 The telecommunications tower shall be located at the Inland Empire TMC, Fontana, San Bernardino, California site,

Located at:

34° 07' 45.0" North latitude by

117° 30' 09.2" West longitude,.

per NAD 83 and 1,340 feet above mean sea level.

### **2.2 Tower Orientation**

2.2.1 The tower shall be orientated with the Southerly outside face aligned 43° / 223° degrees clockwise from true North.

### **2.3 Tower Location**

2.3.1 The exact location of the telecommunications tower shall be staked-out by the State of California, DGS, Telecommunications Division, Microwave Engineering Unit, prior to beginning site construction.

## **SECTION 3 SPECIFICATIONS**

### **3.1 Electronics Industries Associations (EIA)**

- 3.1.1 The telecommunications tower and all tower mounted appurtenances installed by this specification shall meet or exceed the specifications found in ANSI/TIA/EIA standard ANSI/TIA/EIA-222-G-2006, (EIA-222-G) entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", dated January 1, 2006, including all TIA/EIA-222-G Annexes.

### **3.2 California Code of Regulations (CCR) Title 24, Part 2, California Building Code**

- 3.2.1 The telecommunications tower and all its appurtenances shall be classified to be in Exposure C per CCR Title 24, Part 2, California Building Code.
- 3.2.2 The telecommunications tower and all its appurtenances shall be classified as being in Seismic Zone 4 per CCR Title 24, Part 2, California Building Code.
- 3.2.3 The telecommunications tower and all its appurtenances shall be classified as being in Exposure C per CCR Title 24, Part 2, California Building Code.

### **3.3 National Electric Code – National Fire Protection Association (NFPA-70).**

- 3.3.1 The telecommunications tower and all its appurtenances shall meet or exceed the requirements of the National Electrical Code, NFPA-70.

### **3.4 California Code of Regulations (CCR) Title 8, Industrial Relations.**

- 3.4.1 The telecommunications tower and all its appurtenances shall meet or exceed the requirements of CCR Title 8, Division 1, Department of Industrial Relations, Chapter 4, Division of Industrial safety, Subchapter 7, General Industry Safety Orders.

### **3.5 National Electric Code – National Fire Protection Association (NFPA-780).**

- 3.5.1 The telecommunications tower and all its appurtenances shall meet or exceed the requirements of the National Electrical Code, NFPA-780.



### **3.6 "Greenbook" Standard Specification for Public Works Construction**

3.6.1 The telecommunications tower foundation concrete and reinforcement shall conform to Section 201 of the "Greenbook" Standard Specification for Public Works Construction.

### **3.7 Tower Type**

3.7.1 The telecommunications tower shall be a freestanding, four legged steel, open lattice structure with pipe legs.

### **3.8 Dimensions of Telecommunications Tower**

3.8.1 The telecommunications tower shall extend to a height of 120 feet above ground level ( $\pm 1'$ ).

3.8.2 The tower face width at its upper most height shall be 9' 0" ( $\pm 1'$ ).

3.8.3 The tower face width at ground level shall be 21' 0" ( $\pm 2'$ ).

### **3.9 Tower Loading**

3.9.1 The allowable unit stresses and the actual member stresses resulting from the specified design loads shall not exceed those given in the American Institute of Steel Construction, AISC Allowable Stress Design specifications and EIA-222-G.

3.9.2 All members of the structure shall be considered primary members for the purpose of establishing allowable compressive stresses per AISC, except those members whose sole function is to reduce the effective slenderness ratio ( $kl/r$ ) of primary members.

3.9.3 The telecommunications tower shall have a safety factor for uplift as described in EIA-222-G.

3.9.4 Foundations shall be designed with sufficient reserve capacity to match the tower leg reserve capacity.

3.9.5 Combined telecommunications tower wind loads and antenna loads shall be applied in combination such that the maximum axial forces are produced in girders, diagonals and legs. Multiple analyses shall be necessary to ensure that worst-case design conditions have been investigated per EIA-222-G.

### **3.10 Tower Protective Coatings**

3.10.1 The telecommunications tower and all above ground appurtenances installed by this specification shall contain a protective coating, as reference in EIA-222-G, which shall consist of the following:

3.10.1.1 Under no circumstances shall any coating on any metal member or fastener be cathodic relative to the base material.

3.10.1.2 "Devcon" or equivalent zinc rich paint or approved equal, shall be used to touch up damaged galvanizing. Touch up may be done by either a spray or brush application.

3.10.2 When required, the telecommunication tower structure shall be painted per Federal Aviation Administration, Specification AC70/7460.

3.10.3. All painting shall be performed in the shop using an acrylic latex paint specifically formulated for application to galvanized material.

3.10.4 Field painting shall be limited to touch-up of paint damaged during transportation and erection. Paint shall be the same as was used in the shop to touch-up damaged paint and provide the same protection as original shop painting.

## **SECTION 4 OPERATIONAL REQUIREMENTS**

### **4.1 General**

4.1.1 The telecommunications tower shall support the following listed antennas.

### **4.2 Microwave Antennas**

4.2.1 These microwave antennas shall be connected to their respective microwave waveguide circuit run(s).

## ANTENNA 1

Antenna size ..... 10'  
Center line height of antenna ..... 69'  
Azimuth from true North, clockwise ..... 01°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... San Sevaine

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... North corner leg

## ANTENNA 2

Antenna size ..... 10'  
Center line height of antenna ..... 110'  
Azimuth from true North, clockwise ..... 70°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Heaps Peak

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... center of Northeast face

### ANTENNA 3

Antenna size ..... 10'  
Center line height of antenna ..... 75'  
Azimuth from true North, clockwise ..... 70°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Heaps Peak

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... center of Northeast face

### ANTENNA 4

Antenna size ..... 10'  
Center line height of antenna ..... 100'  
Azimuth from true North, clockwise ..... 133°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Box Springs

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... South leg

### ANTENNA 5

Antenna size ..... 10'  
Center line height of antenna ..... 60'  
Azimuth from true North, clockwise ..... 133°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Box Springs

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... South leg

### ANTENNA 6

Antenna size ..... 10'  
Center line height of antenna ..... 110'  
Azimuth from true North, clockwise ..... 184°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Future

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... center of Southwest face

## ANTENNA 7

Antenna size ..... 10'  
Center line height of antenna ..... 75'  
Azimuth from true North, clockwise ..... 184°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Future

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... center of Southwest face

## ANTENNA 8

Antenna size ..... 10'  
Center line height of antenna ..... 100'  
Azimuth from true North, clockwise ..... 247°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... La Habra

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... West corner leg

### ANTENNA 9

Antenna size ..... 10'  
Center line height of antenna ..... 65'  
Azimuth from true North, clockwise ..... 247°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... La Habra

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... West corner leg

### ANTENNA 10

Antenna size ..... 10'  
Center line height of antenna ..... 90'  
Azimuth from true North, clockwise ..... 0°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Future

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... center of Northwest face

### ANTENNA 11

Antenna size ..... 10'  
Center line height of antenna ..... 90'  
Azimuth from true North, clockwise ..... 90°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Future

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... center of Northeast face

### ANTENNA 12

Antenna size ..... 10'  
Center line height of antenna ..... 75'  
Azimuth from true North, clockwise ..... 180°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Future

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... South corner leg



### ANTENNA 13

Antenna size ..... 10'  
Center line height of antenna ..... 100'  
Azimuth from true North, clockwise ..... 90°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Future

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... East corner leg

### ANTENNA 14

Antenna size ..... 10'  
Center line height of antenna ..... 65'  
Azimuth from true North, clockwise ..... 90°  
Operating frequency ..... 6 GHz  
Location of distant end of MW path ..... Future

Antenna type ..... Parabolic  
Antenna manufacturer ..... Andrew Corp.  
Antenna manufacturer model ..... HP10-65E  
Radome manufacturer ..... Andrew Corp.  
Radome requirements ..... Yes

Second antenna strut required ..... Yes  
Antenna mount type ..... Pipe 4 1/2" O.D.  
Antenna mount style ..... 8' minimum x 4 1/2" dia.  
Antenna mount location ..... East corner leg

**4.3 UHF and VHF Antennas**

4.3.1 The telecommunications tower shall be required to support the following: UHF and VHF antenna(s) and UHF and VHF antenna mounting(s) at the heights and location(s) indicated.

4.3.2 These shall be connected to their respective UHF and VHF coaxial circuit run(s).

**ANTENNA 15**

Antenna mounting height..... 120'  
Antenna length above mounting position..... 18'  
Antenna length below mounting position ..... 8'  
Antenna mount location ..... Top of tower, Center of Tower,  
  
Antenna mount type... 3" O.D. 26' long Pipe U Bolts and Thrust  
Bearing with M2's OR2800P-DC Rotator  
Antenna type ..... Yagi  
Antenna manufacturer ..... M2  
Antenna manufacturer model ..... 7-10-30LP8

**ANTENNA 16**

Antenna mounting height ..... 120'  
Antenna length above mounting position ..... 5'  
Antenna length below mounting position ..... 1'  
Antenna mount location ..... Top of tower, 43°  
Clockwise from true North, North corner leg  
  
Antenna mount type ..... Pipe 8" O.D  
Standoff Wireless Mount  
Antenna type ..... Offset Fed Parabola  
Antenna manufacturer ..... Microwave Radio Communications  
Antenna manufacturer model ..... Ultra Scan DR II

### ANTENNA 17

Antenna mounting height..... 20'  
Antenna length above mounting position ..... 15'  
Antenna length below mounting position ..... 2'  
Antenna mount location ..... Top of tower,  
133° Clockwise from true North, East corner leg  
Antenna mount type.....Valmont-Microflex  
.....V- Mount  
Antenna type ..... Omni  
Antenna manufacturer..... Kreco  
Antenna manufacturer model ..... CO-41A

### ANTENNA 18

Antenna mounting height ..... 120'  
Antenna length above mounting position ..... 15'  
Antenna length below mounting position ..... 2'  
Antenna mount location.....  
Top of tower, 223° Clockwise from true North,  
South corner leg  
Antenna mount type..... Valmont-Microflex  
.....V- Mount  
Antenna type ..... Omni  
Antenna manufacturer..... Kreco  
Antenna manufacturer model..... CO-41A

### ANTENNA 19

Antenna mounting height ..... 120'  
Antenna length above mounting position ..... 15'  
Antenna length below mounting position ..... 2'  
Antenna mount location.....  
Top of tower, 313° Clockwise from true North,  
West corner leg  
Antenna mount type ..... Valmont-Microflex  
.....V- Mount  
Antenna type ..... Omni  
Antenna manufacturer ..... Kreco  
Antenna manufacturer model ..... CO-41A

**ANTENNA 20**

Antenna mounting height ..... 120'  
Antenna length above mounting position ..... 15'  
Antenna length below mounting position ..... 2'  
Antenna mount location .....  
Top of tower, 43° Clockwise from true North,  
North corner leg  
Antenna mount type ..... Valmont-Microflex  
V- Mount  
Antenna type ..... Omni  
Antenna manufacturer ..... Kreco  
Antenna manufacturer model ..... CO-41A

**ANTENNA 21**

Antenna mounting height ..... 120'  
Antenna length above mounting position ..... 15'  
Antenna length below mounting position ..... 2'  
Antenna mount location .....  
Top of tower, 43° Clockwise from true North,  
East corner leg  
Antenna mount type ..... Valmont-Microflex  
V- Mount  
Antenna type ..... Omni  
Antenna manufacturer ..... Kreco  
Antenna manufacturer model ..... CO-41A

**ANTENNA 22**

Antenna mounting height ..... 120'  
Antenna length above mounting position ..... 15'  
Antenna length below mounting position ..... 2'  
Antenna mount location .....  
133° Clockwise from true North  
South corner leg  
Antenna mount type ..... Valmont-Microflex  
V- Mount  
Antenna type ..... Omni  
Antenna manufacturer ..... Kreco  
Antenna manufacturer model ..... CO-41A

**ANTENNA 23**







4.5.2 The twist requirement shall be maintained through wind speeds up to 70 mph. The telecommunications tower twist at all antenna mounting elevations shall be determined by analytical methods and shall be noted on the formal type-written detailed stress analysis.

#### **4.6 Tower Sway**

4.6.1 The maximum limit of the complete telecommunications tower sway at the antenna attachment point shall not exceed:

0.7° at an elevation of 120' and lower levels per EIA-222-G.

4.6.2 The sway requirement shall be maintained through wind speeds up to 70 mph. The telecommunications tower sway at all antenna mounting elevations shall be determined by analytical methods and shall be noted on the formal type-written detailed stress analysis.

#### **4.7 Tower Deflection**

4.7.1 The telecommunications tower deflection limits are to be held both vertically and horizontally. Deflection must be determined at each specific point on the tower where an antenna is attached.

#### **4.8 Microwave Antenna Mounting Structure**

4.8.1 A microwave antenna mounting structure shall be furnished and installed at each microwave centerline height for each antenna at its respective azimuth, as identified in the Microwave Antenna section above.

4.8.2 The microwave antenna mounting structure shall consist of a vertically positioned galvanized steel pipe of 4" inside diameter per ASTM A53. The angle of this steel pipe shall be true vertical ( $\pm 2^\circ$ ) in all planes.

4.8.3 The microwave antenna mounting structure shall be secured to the tower leg with a minimum of two u-bolts at both its upper end and at its lower end or a minimum four bolt assemblies at both its upper end and at its lower end.

4.8.4 The microwave antenna mounting structure shall consist of a vertical pipe measuring a minimum of 6' and a maximum of 8' in length.

4.8.5 Pipe mounts shall be positioned to prevent the antenna feed horn assembly from being directly opposite a tower member. Pipe mount positioning shall not prevent direct waveguide installation to any antenna.



- 4.8.6 Each microwave antenna mounting structure shall include two associated microwave antenna stiff arm supports locations within 8 feet of the respective microwave antenna horizontal center line. The stiff-arm locations shall be within 25 degrees of the antenna's horizontal centerline. The stiff-arm support locations shall meet the support requirements, as listed by the microwave antenna manufacture in their latest microwave antenna installation bulletin. The stiff-arm support location shall be adequate to maintain the respective microwave antenna within 3 DB of the antenna beam width through winds up to 70 miles per hour and survive winds up to 125 miles per hour without damage.
- 4.8.7 Mounts and stiff-arm support locations shall meet or exceed the standards specified by the antenna manufacturer in their latest installation bulletin.
- 4.8.8 Antenna mounts shall be positioned to allow the indicated antenna to be adjusted in horizontal azimuth continuously from + 18 degrees through - 18 degrees of the indicated antenna azimuth.
- 4.8.9 Antenna mounts shall be positioned to allow the indicated antenna to be adjusted in vertical altitude angle continuously from + 3 degrees through - 9 degrees of zero horizontal angle.

**4.9 VHF / UHF Antenna Mounting Structure**

- 4.9.1 The VHF and UHF antenna mounting structures shall be "Valmont-Microflex V-Mounts" ( Microflex VHF Mount ) for a pipe leg tower. The Microflex VHF V-Mounts used shall depend upon the tower leg diameter at the mounting elevation.
- 4.9.2 The Valmont-Microflex V-Mount, required vertical 2 3/8" OD pipes will be supplied by others.
- 4.9.3 For calculating the tower loading, for all of the VHF / UHF antennas assemblies, the following listed dead load and wind load area shall be used.

Dead Load	Wind Load Area
300 lbs	10 square feet

The VHF / UHF antenna assembly shall include the antenna, and mounting assemblies. The mounting assembly includes the Valmont – Microflex V-Mount standoffs (outrigger) and required vertical 2 3/8 " OD pipe, and any required Valmont – Microflex side strut bracket.

**4.10 Microwave Antenna Waveguide and VHF Antenna Coaxial Cable Circuit Run(s)**

- 4.10.1 The telecommunications tower shall also be required to support the following listed Individual microwave antenna waveguide and VHF / UHF coaxial cable circuit run(s) and their respective support system(s).
- 4.10.2 For parabolic type microwave antennas the waveguide circuit run(s) and their respective support system(s) shall extend from ground level to the heights indicated and terminate 8" ( $\pm$  8") below the antenna horizontal center line position of the respective antennas and terminate 8" ( $\pm$  8") vertically from the rear of the respective antenna mounting position.
- 4.10.2.1 For microwave antennas, the horizontal waveguide support system(s) shall terminate approximately 8" above the microwave antenna port for each respective antenna.
- 4.10.2.2 For microwave antennas, the horizontal waveguide support system(s) shall terminate within 8" horizontal of the microwave antenna port for each respective antenna.
- 4.10.2.3 The microwave antenna horizontal support system shall contain provisions for fastening and supporting the respective antenna waveguide at intervals not greater than 36" along the entire horizontal run.
- 4.10.3 Microwave waveguides and VHF coaxial cables listed below are manufactured by Andrew Corp.

Antenna Number	Height Above Ground level	Waveguide Outside Diameter	Waveguide Model Number
1	69'	2.01" x 1.16"	EW63
2	110'	2.01" x 1.16"	EW63
3	75'	2.01" x 1.16"	EW63
4	100'	2.01" x 1.16"	EW63
5	60'	2.01" x 1.16"	EW63
6	110'	2.01" x 1.16"	EW63
7	75'	2.01" x 1.16"	EW63
8	100'	2.01" x 1.16"	EW63
9	65'	2.01" x 1.16"	EW63
10	90'	2.01" x 1.16"	EW63
11	90'	2.01" x 1.16"	EW63
12	85'	2.01" x 1.16"	EW63
13	100'	2.01" x 1.16"	EW63
14	65'	2.01" x 1.16"	EW63
15	120'	1.1"	LDF5-50A
16	120'	1.1"	LDF5-50A

17	120'	1.1"	LDF5-50A
18	120'	1.1"	LDF5-50A
19	120'	1.1"	LDF5-50A
20	120'	1.1"	LDF5-50A
21	120'	1.1"	LDF5-50A
22	120'	1.1"	LDF5-50A
23	120'	1.1"	LDF5-50A
24	120'	1.1"	LDF5-50A
25	100'	1.1"	LDF5-50A
26	100'	1.1"	LDF5-50A
27	85'	1.1"	LDF5-50A
28	85'	1.1"	LDF5-50A
29	80'	1.1"	LDF5-50A
30	80'	1.1"	LDF5-50A

#### **4.11 Vertical Waveguide and Coaxial Cable Rigid Support System**

- 4.11.1 The telecommunications tower shall contain a vertical waveguide and coaxial cable rigid support system.
- 4.11.2 The vertical waveguide and coaxial cable rigid support system shall be easily accessed from the tower-climbing ladder.
- 4.11.3 The vertical waveguide and coax support system shall be of the type that will allow use of Microflect cushion hangers with Microflect # B174 spring nuts. The cushion hangers and spring nuts will be provided by others.
- 4.11.4 The vertical waveguide and coaxial cable rigid support system shall be located within 20 inches of the tower-climbing ladder.
- 4.11.5 The vertical waveguide and coaxial cable rigid support system shall support all listed waveguides and coaxial cables.
- 4.11.6 The vertical waveguide and coaxial cable rigid support system, vertical run support bars shall be positioned a maximum of each 30 inches of run for the waveguide and coaxial cable supports.
- 4.11.7 The vertical waveguide and coaxial cable rigid support system horizontal run support bars shall be positioned a maximum of each 30 inches of run.
- 4.11.8 The vertical waveguide and coaxial cable rigid support system vertical run supports to the tower shall be positioned a maximum of each 10 feet of vertical run.

- 4.11.9 The vertical waveguide and coaxial cable rigid support system supports shall be made to attach waveguide clamp heads equal to or better than the Microflex Company, Inc. waveguide support system.
- 4.11.10 The vertical waveguide and coaxial cable rigid support system supports shall be equal to or better than the Microflex Company, Inc. waveguide support system.
- 4.11.11 The vertical waveguide and coaxial cable rigid support system shall terminate at ground level at the tower position closest to the equipment building.

#### **4.12 Horizontal Waveguide and Coaxial Cable Bridge Support System**

- 4.12.1 The telecommunications tower shall include a horizontal waveguide and coaxial bridge support system. The system shall include horizontal rigid waveguide and coaxial bridge channels for all antennas located ten feet or below any work platform.
- 4.12.2 Each horizontal rigid waveguide and coaxial bridge channel shall be inverted.
- 4.12.3 The horizontal rigid waveguide and coaxial bridge channels shall be able to support the listed waveguide and coax cables in the span from their respective antenna to the location of the vertical waveguide /coaxial cable ladder.
- 4.12.4 All waveguide and coax cables shall lie on the inside surface of the bridge channel. No donut type supports are required within the inverted bridge channel.

#### **4.13 Fixed Ladder(s)**

- 4.13.1 The telecommunications tower shall contain one fixed ladder per the following specifications, (per paragraph 4.13.2 through 4.13.10 inclusive). The telecommunications tower shall also contain two step-bolt ladders per the following specifications (per paragraph 4.13.11).
- 4.13.2 The telecommunications tower shall contain a fixed ladder.
- 4.13.3 The telecommunications tower fixed ladder shall be located on the Southwest tower face.
- 4.13.4 The fixed ladder shall conform to CCR Title 8, Chapter 4, Subchapter 7, Group1, Article 4, Section 3277 - Fixed ladders, inclusive.

- 4.13.4 The fixed ladder's clear climbing space shall conform to CCR Title 8, Chapter 4, Subchapter 7, Group 1, Article 4, Section 3277, Fixed ladders, inclusive.
- 4.13.5 The fixed ladder shall be fabricated of steel. Step bolts shall not be used for this ladder. The maximum allowable spacing of the horizontal step rungs will be 12". The minimum diameter of the step rungs will be 3/4" diameter. The minimum allowable spacing of the side rails shall be 16".
- 4.13.6 The fixed ladder shall support a concentrated load of 300 lbs minimum.
- 4.13.7 A clear climbing space shall be maintained on the climbing side of the ladder and extending a minimum of 30 inches from the center of the ladder climbing rungs (at a right angle to the climbing rungs).
- 4.13.8 A clear climbing space shall be maintained on the climbing side of the ladder and extending a minimum of 15 inches from the center line of the ladder climbing rungs (parallel to the climbing rungs).
- 4.13.9 The fixed ladder system shall be fabricated from and supported by rigid steel members. Cables are not acceptable.
- 4.13.10 The fixed ladder system shall contain a Microflect Safety-Climb Cable System or equivalent.
- 4.13.10.1 The Microflect Safety-Climb Cable System consists of a 3/8" diameter, 7 x 19 strand aircraft cable with intermediate cable guides provided every 25 feet. The 3/8" steel cable extends from the ground level to the top of the tower, fastened at the ends.
- 4.13.10.2 The safety cable system must meet or exceed OSHA and ANSI requirements for tower climbing ladder safety.
- 4.13.11 The bottom 10 feet of the climbing ladder shall have an anti-climbing shield.
- 4.13.12 The telecommunications tower legs shall contain step bolts on each of the tower legs above the elevation of 20 feet.

#### **4.14 Cable Bridge for Waveguides and Coaxial Cables**

- 4.14.1 The telecommunications tower shall contain a waveguide bridge extending from the tower to the proposed equipment building per the contract drawings.

#### **4.15 Work Platform(s)**

4.15.1 The telecommunications tower shall contain a work platform(s) located at the 60' (+/- 2'), 80'(+/- 2') and 115' (+/- 2') elevation.

4.15.2 The work platform shall consist of a level platform of steel grating.

4.15.3 The platform shall be a full coverage platform and shall provide reasonable access to work areas.

4.15.4 The minimum coverage of the platform shall be 70 square feet, or equal to the area enclosed by the tower ( at that elevation ), which ever is greater.

4.15.5 Safety handrails shall be provided around the perimeter of the platform with the upper railing at 42" above the deck and the intermediate rail at 18" above the deck.

4.15.6 Safety toe-rails shall be provided around the perimeter of the platform.

4.15.7 The telecommunications diagonals may be used to support platform handrails.

4.15.8 Work platform shall be designed to support two concentrated live loads of 300 lbs each. Live loads imposed by persons on the platform shall be considered to concentrate at such points that will cause maximum stress in the structural members being considered.

#### **4.16 Electrical Requirements**

4.16.1 The telecommunications tower shall contain one duplex outlet on each work platform.

4.16.2 The duplex convenience outlets shall be provided with weatherproof, GFI protected, 120 volt, 20 ampere, NEMA 5-20R receptacles.

4.16.3 The duplex convenience outlet(s) shall be installed as a home-run, individual circuit.

4.16.4 The duplex outlet circuit shall be a circuit-breaker protected circuit, rated at 20 amperes, with ground fault protection.

4.16.5 The duplex outlet circuit-breaker shall be located in the telecommunications equipment building.

- 4.16.6 The duplex convenience outlet circuit shall be installed in a rigid galvanized metallic conduit, on the tower and buried underground between the telecommunications tower and the telecommunications equipment building.
- 4.16.7 The duplex convenience outlet circuit shall be installed using a minimum of 10 gauge copper wire, with THWN insulation.
- 4.16.8 The duplex convenience outlet(s) shall be wired with a 10 gauge copper green insulated wire installed from a ground point on the duplex outlet metallic frame to the radio vault ground bus bar in the electrical distribution panel.
- 4.16.9 The duplex outlets shall be mounted 1 foot above their respective work platform deck.

## **SECTION 5 FABRICATION**

### **5.1 Field Fabrication**

- 5.1.1 All fabrication, erection and identification of structural steel shall conform to AISC specifications, Code of Standard Practice for Steel Buildings and Bridges, dated September 1, 1986.
- 5.1.2 Under no circumstances shall "dissimilar metals" be used in contact with one another.
- 5.1.3 Inside and outside surfaces of all hot-dipped-galvanized steel shall be as specified in standards and methods listed elsewhere in this specification.
- 5.1.4 All welding processes and welding operators shall be qualified in accordance with AWS "Standard Qualification Procedure."
- 5.1.5 All materials shall be properly marked and match-marked for field assembly.
- 5.1.6 All materials shall be fabricated for a delivery sequence, which will expedite erection and minimize field handling of materials.

### **5.2 Tower Erection**

- 5.2.1 The contractor shall furnish all necessary personnel, supervision, tools, equipment, and transportation required to complete the installation and erection of all items specified herein
- 5.2.2 Field modifications including welding or burning of holes in members is not acceptable.

- 5.2.3 Set structural members accurately to lines and elevations indicated on the erection drawings. Align and adjust the various members forming each telecommunications tower bay before permanently fastening.
- 5.2.4 The contractor shall maintain a check of tower plumbness during all phases of the erection work.
  - 5.2.4.1 Plumbness shall be measured by means of a transit placed so that the sight elevation angles are less than 45°.
  - 5.2.4.2 At least two sights shall be made for each check, oriented at right angles to each other and taken within the shortest practical time interval.
  - 5.2.4.3 At all times the telecommunications tower shall be plumb within the tolerance specified in drawings.
  - 5.2.4.4 After completion of tower construction, with all joints tight, and all appurtenances installed, the contractor shall make a final check of telecommunications tower plumbness in the manner prescribed above.
- 5.2.5 The contractor shall furnish all necessary personnel, supervision, tools, equipment, and transportation required to complete the installation and erection of all items specified herein.
- 5.2.6 After materials have been unloaded, the contractor shall inventory all parts per the bill of material and report immediately to the State that: materials received agree with bill of materials; or there are shortages or damaged materials, in which case those items shall be listed.
- 5.2.7 Any members who sustain damage after delivery shall be reported the State.
- 5.2.8 The contractor without approval of the State shall not do correction of damage.
- 5.2.9 Field modifications including welding or burning of holes in members is not acceptable.
- 5.2.10 Set structural members accurately to lines and elevations indicated on the erection drawings. Align and adjust the various members forming each telecommunications tower bay before permanently fastening.

### **5.3 Vendor Supervision**

- 5.3.1 Vendors will provide a dedicated, full-time field supervisor. This vendor-employee will be assigned and available through all phases of construction.



- 5.3.2 Responsibilities will include, but not be limited to:  
 Verification of telecommunications tower location(s);  
 Verification of quality of finished grade and construction of foundations;  
 Delivery and erection of telecommunications tower;  
 Joint inspection of construction.

**5.4 Connections and Locking Devices**

- 5.4.1 No field welding shall be permitted unless specifically approved in writing.
- 5.4.2 All members shall be connected with galvanized structural bolts unless otherwise approved.
- 5.4.3 The vendor shall provide bolts, nuts and lock washers in a quantity in excess of the actual bolt count and per the table below, for each size required for each telecommunications tower site.
- 5.4.4 The telecommunications tower will be provided with the correct size and length of anchor bolts necessary to carry the anticipated telecommunications tower loads.
- 5.4.5 If the telecommunications tower loads require more than one bolt per leg, they shall be shop welded into a cluster with weldable rebar ties to eliminate the need for a template during field installation.
- 5.4.6 All threaded fasteners shall extend not less than 1 1/2 threads beyond nuts and locking devices.

Bolt Count	Excess	Minimum Excess
0 – 200	5%	1
200-500	4%	10
500-1,000	3%	20
1,000 and over	2%	30

**SECTION 6 QUALITY CONTROL**

**6.1 General**

- 6.1.1 To insure the quality of the furnished items and the installation of those items in an acceptable manner, the following shall be part of a quality control and assurance program used for implementation of the specifications and requirements contained in this document.

**6.2 Right to Inspections**

6.2.1 The State of California, Department of General Services, Telecommunications Division reserves the right to inspect all jobsite work without notice to the prime contractor or any subcontractors.

### **6.3 Contractor Certifications**

6.3.1 The Contractor shall Certify that the Contractor has had successful experience for a minimum of 10 years in the immediate past in Telecommunications Tower Work.

6.3.2 The Contractor shall submit a Successful Projects List for a minimum of 10 years in the immediate past in Telecommunications Work for the Contractor within the State of California; the List shall at a minimum include:

names  
titles  
addresses  
telephone numbers

of project references and contacts, project address, dates, significance of contribution, and other relevant project experience; and other items of information the State may elect to require.

6.3.4 The Contractor shall submit a copy of the Successful Projects List to:

State of California  
Department of General Services  
Telecommunications Division  
Microwave Engineering Unit MS-21  
Attention: Thomas Halfman  
601 Sequoia Pacific Blvd.  
Sacramento, CA 95811

Telephone 916 / 657 - 9141  
E-mail thalfman@dgs.ca.gov.

### **6.4 Other Quality Details**

6.4.1 Tower Manufacturer Technician: The Contractor shall cause the Tower Manufacturer to provide a qualified field technician representing the Tower Manufacturer, to monitor, observe, inspect, to submit Tower Manufacturer's Reports, and ensure that the entire Tower system is installed in accordance to the Tower Manufacturer requirements.

- 6.4.2 Tower Manufacturer Reports: Shall include, but not be limited to, date, time, weather conditions, attendees, conditions observed, solutions to problems, and the like.
- 6.4.3 Tower Installer: The Contractor shall cause the Tower Manufacturer to install each Tower under the Tower Manufacturer's direct supervision.
- 6.4.4 Regulations and Standards: The Communications Tower; antennas and antennas mounts; ladders; foundations; and the like; and its appurtenant design and construction, shall be in compliance with Codes, Regulations, standards, and the like, as may be required by the design, and as specified herein.
- 6.4.5 Document Certification: Contractor shall cause design, Drawings, specifications, and calculations, and other pertinent documents, to be prepared by currently California-licensed Engineers as specified herein.
- 6.4.6 When galvanized steel pipe(s) are used for tower legs, certification from the steel manufacture is required to certify the minimum standard for galvanization has been done for both inside and outside the pipe.
- 6.4.7 The Tower manufacturer shall indicate in the drawings how drainage of moisture from the steel pipes has been accomplished.
- 6.4.8 A copy of the construction inspection logs, manufacturer's steel pipe certification(s), manufacturer's galvanization certification(s), and concrete samples are to be submitted to:

State of California  
Department of General Services  
Telecommunications Division  
Microwave Engineering Unit MS-21  
Attention: Thomas Halfman  
601 Sequoia Pacific Blvd.  
Sacramento, CA 95811

Telephone 916 / 657 - 9141  
e-mail thalfman@dgs.ca.gov.

## **SECTION 7: SUBMITTALS**

### **7.1 Shop Drawings – Show fabrication of structural steel components.**

7.1.1 Include details of cuts, connections, splices, holes and other pertinent data.

7.1.2 Indicate welds by standard AWS symbols, distinguishing between shop and

field welds, and show size, length, and type of each weld.

7.1.3 Include detailed piece and erection drawings.

7.2 Welding Certificates

7.3 Qualifications Data: For Installer and fabricator

7.4 Mill Test Reports

7.5 Foundation Plans

## SECTION 8 APPLICABLE DOCUMENTS

### 8.1 General

8.1.1 The following documents of the issue stated form a part of this specification and operational requirements document to the extent specified elsewhere in this document. In the event of conflict between the documents referenced below and the contents of this document, the most stringent requirement shall govern.

American Institute of Steel Construction (AISC)  
Manual of Steel Construction  
Specification for Structural Joints using ASTM A325 or A490 Bolts

America Society for Testing and Materials (ASTM)  
1916 Race Street  
Philadelphia, PA 19103

A36	Structural Steel
A50	Structural Steel
A53	Welded and Seamless Steel Pipe
A185	Wire fabric XXXXXXX
A123	Zinc (hot-dipped galvanized coatings on products fabricated from rolled, pressed, and forged steel shapes, plates, bars, and strips)
A325	High Strength Steel Bolts
A441	Structural Steel
A572	Structural Steel
A615 / A615M	Reinforcing Bars
A-706	Reinforcing Bars
C-9	Ready-mixed Concrete

State of California  
California Code of Regulations (CCR)  
Title 24: Building Standards  
Part 2 California Building Code , 2001  
Part 3 California Electrical Code, 2001  
Title 8: Industrial Relations  
Chapter 4 Division of Industrial Safety (Industrial Safety Orders)  
Subchapter 7 General Safety Orders

Concrete Reinforcing Steel Institute (CRSI)  
Manual of Standard Practice

Code of Federal Regulations (CFR)  
Superintendent of Documents  
Government Printing Office  
Washington, DC  
CFR Title 47, Telecommunications, Part 17  
CFR Title 14, Aeronautics and Space, Part 77

Electronics Industries Association (EIA)  
2001 Eye Street N.W.  
Washington, DC 20006  
TIA/EIA/222/G, 2006 Standard, entitled "Structural Standards for  
Steel Antenna Towers and Antenna Supporting Structures," dated  
March 1996.

National Fire Protection Association Inc. (NFPA)  
Batterymarch Park  
Quincy, MA 02269  
NFPA / 70 Standard 70, entitled "National Electrical Code  
2002"  
NFPA / 780 Standard 780 entitled "Standard for Installation of  
Lightning Protection Systems 2002"

"Greenbook " Standard Specification for Public Works Construction.  
2000 Edition.  
Written by Public Works Standards, Inc,  
Published by BNI Building News  
1612 South Clementine Street  
Anaheim, CA 92802  
Telephone 714 / 517-0970

International Conference of Building Officials  
5360 South Workman Mill Road  
Whittier, CA 90601  
UBC / 1994 Edition Standard entitled "Uniform Building Code"

End of Section 270545 Exhibit A