

**SERIAL 11096 C ITS DEVICES, COMMUNICATIONS AND EQUIPMENT**

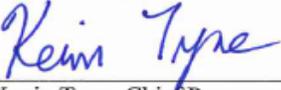
**DATE OF LAST REVISION: December 5, 2016 CONTRACT END DATE: January 31, 2018**

**CONTRACT PERIOD THROUGH JANUARY 31, ~~2015~~ 2018**

TO: All Departments  
FROM: Office of Procurement Services  
SUBJECT: Contract for **ITS DEVICES, COMMUNICATIONS AND EQUIPMENT**

Attached to this letter is published an effective purchasing contract for products and/or services to be supplied to Maricopa County activities as awarded by Maricopa County on **January 19, 2012**.

All purchases of products and/or services listed on the attached pages of this letter are to be obtained from the vendor holding the contract. Individuals are responsible to the vendor for purchases made outside of contracts. The contract period is indicated above.

  
Kevin Tyne, Chief Procurement Officer  
Office of Procurement Services

**NP/at**  
Attach

Copy to: Office of Procurement Services  
**Sami Birchard**, MCDOT

**AM SIGNAL, INC., 9935 TITAN PARK CIRCLE, LITTLETON, CO 80125**

COMPANY NAME:	<u>AM Signal, Inc</u>
DOING BUSINESS AS (DBA) NAME:	<u>AM Signal, Inc</u>
MAILING ADDRESS:	<u>9935 Titan Park Circle Littleton, CO 80125</u>
REMIT TO ADDRESS:	<u>9935 Titan Park Circle Littleton, CO 80125</u>
TELEPHONE NUMBER:	<u>720-348-6925</u>
FACSIMILE NUMBER:	<u>720-348-6950</u>
WEB SITE:	<u>amsignalinc.com</u>
REPRESENTATIVE NAME:	<u>Arnold Undzis</u>
REPRESENTATIVE TELEPHONE NUMBER:	<u>720-348-6925</u>
REPRESENTATIVE E-MAIL:	<u>arnold@amsignalinc.com</u>

	<u>YES</u>	<u>NO</u>	<u>REBATE</u>
WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

WILL ACCEPT PROCUREMENT CARD FOR PAYMENT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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FUEL COMPRISES (if section for fuel price adjustment is located in the solicitation document) % OF TOTAL BID AMOUNT

1% 10 DAYS NET 30 DAYS

<b>CAMERA ASSEMBLY</b>				
<b>Title</b>	<b>Unit Price</b>	<b>Qty</b>	<b>UofM</b>	<b>Bidder Notes</b>
Camera: Bosch VG4-524-ECS1M/5001	\$1,111.11	1	each	BOSCH CATALOG & CUTSHEET ATTACHED 10% OFF CATALOG PRICE
Camera: Bosch VG4-524-ECS1M/5001	\$3,377.30	1	each	SUBSTITUTE IS THE 600 SERIES BOSCH CATALOG & CUTSHEET ATTACHED 10% OFF CATALOG PRICE
Camera: Cohu -Helios 3960 HD	\$1,000.00	1	Each	CATALOG & CUTSHEETS ATTACHED OFFERING 10% OFF CATALOG PRICE
Camera: Cohu -Helios 3960 HD	\$2,944.44	1	each	CATALOG & CUTSHEETS ATTACHED OFFERING 10% OFF CATALOG PRICE

<b>PRODUCT TRAINING</b>			
<b>Title</b>	<b>Camera Assembly</b>	<b>Radio Communications Equipment</b>	<b>Bidder Notes</b>
4-Hour Training Course	\$800.00	\$800.00	EACH PRODUCT IS A SEPARATE \$800.00 FOR 4-HOUR TRAINING COURSE CAMERA ASSY - BOSCH - \$800.00 CAMERA ASSY - FLIR - \$800.00 CAMERA ASSY - TRAFICON - \$800.00 RADIO COMM - TROPOS - \$800.00

**AM SIGNAL, INC., 9935 TITAN PARK CIRCLE, LITTLETON, CO 80125**

8-Hour Training Course	\$1,500.00	\$1,500.00	EACH PRODUCT IS A SEPARATE \$1,500.00 FOR 8-HOUR TRAINING COURSE CAMERA ASSY - BOSCH - \$1,500.00 CAMERA ASSY - FLIR - \$1,500.00 CAMERA ASSY - TRAFICON - \$1,500.00 RADIO COMM - TROPOS - \$1,500.00
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PRICING SHEET: NIGP CODE , 83829

Payment Term: 1% 10 DAYS NET 30 DAYS

Vendor Number: 2011001527 0

Certificates of Insurance Required

Contract Period: To cover the period ending **January 31, 2015-2018.**

**CLARK ELECTRIC SALES, 7825 E GELDING DR. SUITE 102, SCOTTSDALE AZ 85260**

COMPANY NAME:	<u>Clark Electric Sales, Inc.</u>
DOING BUSINESS AS (DBA) NAME:	
MAILING ADDRESS:	<u>7825 E. Gelding Dr. Scottsdale, AZ 85260</u>
REMIT TO ADDRESS:	<u>7825 E. Gelding Dr. Scottsdale, AZ 85260</u>
TELEPHONE NUMBER:	<u>480/347-9765</u>
FACSIMILE NUMBER:	<u>480/284-7628</u>
WEB SITE:	<u>clarkelectricsales.com</u>
REPRESENTATIVE NAME:	<u>Steve Clark</u>
REPRESENTATIVE TELEPHONE NUMBER:	<u>480/347-9765</u>
REPRESENTATIVE E-MAIL:	<u>steve.clark@clarkelectricsales.com</u>

	<u>YES</u>	<u>NO</u>	<u>REBATE</u>
WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

WILL ACCEPT PROCUREMENT CARD FOR PAYMENT:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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FUEL COMPRISES (if section for fuel price adjustment is located in the solicitation document) % OF TOTAL BID AMOUNT

NET 30 DAYS

RADIO COMMUNICATIONS EQUIPMENT MATERIALS				
Description	Unit Price	Qty	Uof M	Bidder Notes
Colubris / HP Procure	\$2,040.00	1	Ea.	This is an ENCOM radio equivalent to the Colubris MAP-330R. The EP-COMMPAK BB24/58 is a dual radio with both 2.4 and 5.8 GHz frequencies and includes 150' of Cat5e cable, PoE injector, surge protection and mounting bracket.
Hyper Technologies	\$126.00	1	Ea	This is an ENCOM equivalent to the Hypertechnologies HG5819P. The ENCOM AN-196 is a 4.9 - 5.8 GHz flat panel antenna, 23 dB gain.

**EFFECTIVE 12/16/15**				
Manufacturer	Part Number	Unit Price	UofM	Description
EWAN	EX71802-0VB	\$908.00	Ea.	HARDENED MANAGED ETHERNET SWITCH. 8 10/100BASE TX ETHERNET PORTS PLUS 2 GIGABIT 1000BASE-SFP PORTS, DIN RAIL, TERMINAL BLOCK (12-48VDC) OR DC JACK POWER CONNECTOR
EWAN	41-136046-1	\$68.00	Ea.	POWER SUPPLY, HARDENED EXTERNAL, 100-240VAC INPUT, TS2 RATED, 12VDC OUTPUT, TERMINAL BLOCK
EWAN	EX-1250TSP-MB4L-A	\$189.00	Ea.	HARDENED SFP MODULE. 1000BASE-LX WITH DUPLEX LC CONNECTORS. 10KM OPTICS
EWAN	EX-1250TSP-MB5L-A	\$357.00	Ea.	HARDENED SFP MODULE. 1000BASE-LX WITH DUPLEX LC CONNECTORS. 2 KM OPTICS.

**CLARK ELECTRIC SALES, 7825 E GELDING DR. SUITE 102, SCOTTSDALE AZ 85260**

EWAN	EX71802-0AB	\$1,210.00	Ea.	HARDENED MANAGED ETHERNET SWITCH. 8 10/100BASE TX ETHERNET PORTS PLUS 2 GIGABIT 1000BASE LX PORTS, 10KM FIBER PORTS WITH SC CONNECTORS, DIN RAIL, TERMINAL BLOCK (12-48VDC) OR DC JACK POWER CONNECTOR
EWAN	EX71802-0BB	\$1,378.00	Ea.	HARDENED MANAGED ETHERNET SWITCH. 8 10/100 BASE TX ETHERNET PORTS PLUS 2 GIGABIT 1000 BASE LX PORTS, 20KM FIBER PORTS WITH SC CONNECTORS, DIN RAIL, TERMINAL BLOCK (12-48VDC) OR DC JACK POWER CONNECTOR
EWAN	EX73402-0AB	\$1,424.00	Ea.	HARDENED MANAGED ETHERNET SWITCH, 16 PORT 10/100 TX + 2 GIGABIT PORT 1000LX 10KM SC. DIN RAIL. TERMINAL BLOCK (12-48VDC) OR DC JACK POWER CONNECTOR
EWAN	EX73402-0BB	\$1,589.00	Ea.	HARDENED MANAGED ETHERNET SWITCH, 16 PORT 10/100 TX + 2 GIGABIT PORT 1000LX 20KM SC. DIN RAIL. TERMINAL BLOCK (12-48VDC) OR DC JACK POWER CONNECTOR
EWAN	ED3575	\$1,341.00	Ea.	HARDENED MANAGED ETHERNET SWITCH

**\*\*EFFECTIVE 4/21/16\*\***

Description	Unit Price	Qty	UofM	Bidder Notes
GS-3-GS2	\$9,760.00	1	Ea.	DUAL CAMERA GS2 PROCESSOR,1U
GS-2-TS2-0PT	\$31.00	1	Ea	TS2 (SDLC) 10 CONTROLLER FOR GS2
GS-3-TS2	\$80.00	1	Ea	TS2 CABLES, Y CONNECTION TO SDLC, 6FT
GS-3-PFM	\$3,200.00	1	Ea	SOFTWARE, PERFORMANCE MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS
GS-3-PFM+	\$4,400.00	1	Ea	SOFTWARE, PERFORMANCE PLUS MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS,ADVANCED ALERTS
GS-3-PED	\$626.00	1	Ea	SOFTWARE, PEDESTRIAN
GS-3-CAM	\$2,670.00	1	Ea	GRIDSMART BELL CAMERA
GS-3-TCS	\$1,250.00	1	Ea	GRIDSMART TRADITIONAL CAMERA,STQPBAR, SPECIAL SCENARIO
GS-3-TCA	\$1,250.00	1	Ea	GRIDSMART TRADITIONAL CAMERA, ADVANCED DETECTION
GS-2-TS1-0PT	\$31.00	1	Ea	TS1 10 CONTROLLER FOR GS2 PROCESSOR
GS-3-TS1	\$180.00	1	Ea	TS1 CABLES, 12FT
GS-3-SMCH	\$310.00	1	Ea	SMART CONNECT, HYBRID BOX, QUICK CONNECTOR, TERMINAL STRIP FOR CAT 5E WITH SURGE, SWIVEL BRACKET
GS-3-SMC	\$220.00	1	Ea	JUNCTION BOX WITH CONNECTOR, SWIVEL BRACKET
GS-3-SMC2	\$250.00	1	Ea	SMART CONNECT, TERMINAL STRIP BOX, SWIVEL BRACKET, TERMINAL STRIP
GS-3-TEN	\$130.00	1	Ea	JUNCTION BOX WITH SURGE 1.9" TO 4.5" TENON BRACKET

**CLARK ELECTRIC SALES, 7825 E GELDING DR. SUITE 102, SCOTTSDALE AZ 85260**

<b>**EFFECTIVE 4/21/16**</b>				
GS-3-CBL	\$130.00	1	Ea	BRACI<ET,84" CABLE BRACKE
GS-3-BND	\$110.00	1	Ea	BRACKET,36" BANDED BRACKET
GS-3-A34	\$55.00	1	Ea	34" 90 DEGREE MOUNTING ARM
GS-3-A56	\$70.00	1	Ea	58" 90 DEGREE MOUNTING ARM
GS-3-A7	\$105.00	1	Ea	76" 90 DEGREE MOUNTING ARM
GS-3-CATS	\$450.00	1	Ea	CABLE, CAT 5E BURIAL, SHIELDED, GEL-FILLED, 1000FT
GS-3-RBA	\$365.00	1	Ea	ETHERNET REPEATER BOARD USED TO EXTEND CAT 5 CABLE BEYOND 100M
GS-3-EPM	\$75.00	1	Ea	ETHERNET PROTECTION MODULES

**EFFECTIVE 12/05/16**

<b>QTY</b>	<b>UofM</b>	<b>Mfg.</b>	<b>Part Number</b>	<b>Price</b>
1	EA	WTI	SW720-H.264-HD30 SIDEWINDER PTZ CAMERA, 85-265 VAC, BOTTOM EGRESS, HD 30X OPTICAL ZOOM, H.264	\$3,412.00
1	EA	WTI	SW720-H.264-HD30 POE SIDEWINDER POE PTZ CAMERA, 85-265 VAC, BOTTOM EGRESS, HD 30X OPTICAL ZOOM, H.264	\$3,677.00
1	EA	WTI	MS CONNECTOR 1 MS CONNECTOR FOR CUSTOMER SUPPLIED CABLE	\$30.00
1	EA	WTI	MS CONNECTOR WITH CABLE 1 MS CONNECTOR WITH 3FT PIGTAIL	\$43.00
1	EA	WTI	SW720-H.264-SD SIDEWINDER PTZ CAMERA, 120 VAC, BOTTOM EGRESS, SD, H.264	\$3,648.00
1	EA	WTI	SWPTM1-A SIDEWINDER PTZ, POST TOP MOUNT BRACKET FOR USE WITH LOWERING DEVICE	\$75.00
1	EA	WTI	SWWM1 W/VPA SIDEWINDER WALL MOUNT WITH VERTICAL POLE MOUNT ADAPTER	\$128.00
1	EA	WTI	15-4-913 SIDEWINDER MOUNTING BASE, ROUND, 6" RISER	\$183.00
1	EA	WTI	SWCH.264-MS PRICE PER FT, SIDEWINDER IP CABLE FOR H.264 - MS CONNECTOR TO RJ45 / POWER PLUG	\$5.00
1	EA	WTI	SWCH.264-AVS PRICE PER FT, SIDEWINDER ANALOG CABLE FOR H.264 - MS CONNECTOR TO RJ45 / POWER PLUG WITH ANALOG VIDEO COAX AND SERIAL DATA	\$6.00
1	EA	WTI	SW RJ45 BOX SIDEWINDER RJ45 SERIAL DATA BREAKOUT BOX	\$83.00

**CLARK ELECTRIC SALES, 7825 E GELDING DR. SUITE 102, SCOTTSDALE AZ 85260**

QTY	UofM	Mfg.	Part Number	Price
1	EA	WTI	SWCH.264-MS-POE PRICE PER FT, SIDEWINDER CABLE FOR H.264 POE - MS CONNECTOR TO CAT 5E	\$4.00
1	EA	McCain	EX2 ATC NEMA CONTROLLER TS2-1 ATC NEMA EX2 TS2-1 CONTROLLER, LOCAL SOFTWARE, POWER CABLE	\$2,777.00
1	EA	McCain	EX2 ATC NEMA CONTROLLER TS2-2 ATC NEMA CONTROLLER, TS2, TYPE 2, D CONNECTOR, LOCAL SOFTWARE, POWER CABLE	\$3,125.00
1	EA	McCain	350I ATC CABINET 350I ATC ALUMINUM CABINET, 67" H X 45" W X 26" D, FOUNDATION MOUNTED, ANCHOR BOLTS, 4 DOORS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-HV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) CMU, FITA, FOTA, SERVICE ASSEMBLY, (1) SHELF	\$16,640.00
1	EA	McCain	350I ATC CABINET DC 350I ATC ALUMINUM CABINET, 67" H X 45" W X 26" D, FOUNDATION MOUNTED, 4 DOORS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202- LV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) LV CMU, SHELF, FITA, FOTA, SERVICE ASSEMBLY, (3) SHELF	\$20,922.00
1	EA	McCain	352I ATC CABINET 352I ATC ALUMINUM CABINET, 67" H X 24" W X 30" D, FOUNDATION MOUNTED, ANCHOR BOLTS, 2 DOORS, UP TO 24 INPUTS AND 16 OUTPUTS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-HV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) CMU, FOTA, FITA, SERVICE ASSEMBLY, (1) SHELF	\$14,102.00
1	EA	McCain	352I ATC CABINET DC 352I ATC ALUMINUM CABINET, 67" H X 24" W X 30" D, FOUNDATION MOUNTED, 2 DOORS, UP TO 24 INPUTS AND 16 OUTPUTS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202- LV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) LV CMU, FOTA, FITA, SERVICE ASSEMBLY (2) SHELF	\$18,168.00
1	EA	McCain	357I ATC CABINET 357I ATC ALUMINUM CABINET, 36" X 21" W X 18"D, ANCHOR BOLTS, COMBINED INPUT/OUTPUT ASSEMBLY 8 SLOTS (4 IN, 4 OUT), NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (1) CMU, (5) 2202-HV HDSP/ FLASHER, (4) OUTPUT SURGE, (2) SIU, FITA, FOTA, SERVICE ASSEMBLY	\$10,865.00

**CLARK ELECTRIC SALES, 7825 E GELDING DR. SUITE 102, SCOTTSDALE AZ 85260**

QTY	UofM	Mfg.	Part Number	Price
1	EA	McCain	BACKPACK ATC CABINET 25" X 16" X 15" ALUMINUM CABINET, SINGLE DOOR, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (5) 2202-HV HDSP/FLASHER, (1) SIU, (1) CMU W/ETHERNET, FITA, FOTA, SERVICE ASSEMBLY	\$9,668.00
1	EA	McCain	CMU DATAKEY PROGRAMMER	\$518.00
1	EA	McCain	GPS CLOCK NEMA STAND ALONE GPS TIME CLOCK MODULE WITH M59205 NEMA/POWER CABLE	\$584.00
1	EA	McCain	CABINET DISPLAY 120VAC CABINET DISPLAY, ATC	\$609.00
1	EA	McCain	DC BATTERY 79AH MK 8A24HEI	\$216.00
1	EA	Southern	1RU8126MS-001 ITS COMMANDER	\$995.00
1	EA	Southern	CP621DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 21" X 72" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	\$2,234.00
1	EA	Southern	CP820DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 20" X 96" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	\$2,623.00
1	EA	Southern	CP920DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 20" X 108" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	\$2,828.00
1	EA	Southern	CP830DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 30" X 96" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	\$3,519.00
1	EA	Southern	CP1030DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 30" X 120" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	\$4,259.00
1	EA	SWFAB	IISNS BRACKET HORIZONTAL POLE BRACKET	\$500.00

PRICING SHEET: NIGP CODE , 83829

Payment Term: NET 30 DAYS

Vendor Number: 2011001484-0 VC0000006609

Certificates of Insurance Required

Contract Period: To cover the period ending **January 31, 2015-2018.**

**CONTRACTORS WEST INC, 1830 W. BROADWAY RD, MESA, AZ 85202**

COMPANY NAME:	<u>Contractors West Inc.</u>
DOING BUSINESS AS (DBA) NAME:	<u></u>
MAILING ADDRESS:	<u>1830 W. Broadway Rd Mesa, AZ 85202</u>
REMIT TO ADDRESS:	<u>1830 W. Broadway Rd Mesa, AZ 85202</u>
TELEPHONE NUMBER:	<u>(480) 969-6300</u>
FACSIMILE NUMBER:	<u>(480) 969-7300</u>
WEB SITE:	<u>www.contractorswest.com</u>
REPRESENTATIVE NAME:	<u>Bruce Farmer</u>
REPRESENTATIVE TELEPHONE NUMBER:	<u>(480) 969-6300</u>
REPRESENTATIVE E-MAIL:	<u><a href="mailto:brucefarmer@contractorswest.com">brucefarmer@contractorswest.com</a></u>

	<u>YES</u>	<u>NO</u>	<u>REBATE</u>
WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	no

WILL ACCEPT PROCUREMENT CARD FOR PAYMENT:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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NET 30 DAYS

**PRICING**

LOT NAME	TITLE	PRICE	UNIT
Blanket Labor Rates	ITS Technician	\$65.00	hour
Blanket Labor Rates	Operations Engineer	\$0.00	hour
Blanket Labor Rates	Principal	\$125.00	hour
Blanket Labor Rates	Secretary/Clerical	\$35.00	hour
Blanket Labor Rates	Senior Systems Engineer	\$0.00	hour
Blanket Labor Rates	Technician IMSA I	\$50.00	hour
Blanket Labor Rates	Technician IMSA II	\$65.00	hour
CAMERA ASSEMBLY	Camera: Bosch VG4-524-ECS1M/5001	\$5,192.90	each
CAMERA ASSEMBLY	Camera: Cohu -Helios 3960 HD	\$8,133.36	each
CAMERA ASSEMBLY	Camera: Cohu i-dome -3925-3100	\$4,774.37	each
CAMERA ASSEMBLY	Camera: Pelco Spectra 4 PTZ CCTV	\$4,634.86	each
CAMERA ASSEMBLY	Camera: Pelco - Spectra IV	\$3,934.92	each
CAMERA ASSEMBLY	Camera: Pelco ES30PC/ES31PC	\$4,756.48	each
CAMERA ASSEMBLY	Installation Labor Cost	\$702.43	each
CAMERA ASSEMBLY	Mobilization, General Conditions and Incidentals Cost	\$234.14	each
CCTV CABINET	CCTV CABINET	\$5,962.00	each
ELECTRICAL CONDUCTORS MATERIALS	Belden	\$1.49	linear foot
ELECTRICAL CONDUCTORS MATERIALS	Belden	\$0.47	linear feet
ELECTRICAL CONDUCTORS MATERIALS	Belden	\$0.89	linear foot
ELECTRICAL CONDUCTORS MATERIALS	Installation Labor Cost	\$0.71	linear foot

**CONTRACTORS WEST INC, 1830 W. BROADWAY RD, MESA, AZ 85202**

ELECTRICAL CONDUCTORS MATERIALS	Mobilization, General Conditions and Incidentals Cost	\$468.29	each
ELECTRICAL CONDUCTORS MATERIALS	West Penn	\$0.29	linear foot
ELECTRICAL CONDUCTORS MATERIALS	West Penn	\$0.94	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$208.24	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$283.79	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$66.77	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$0.70	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$1.96	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$19.08	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$345.80	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$12.64	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$172.90	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Installation Labor Cost	\$0.71	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (1-250ft)	\$468.29	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (2,501-5,000ft)	\$468.29	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (5,001-7,500ft)	\$585.36	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (7,501-10,000ft)	\$585.36	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (greater than 10,001ft)	\$702.43	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	NeatPatch	\$71.54	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	NeatPatch	\$95.39	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$12.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$5.33	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$36.42	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$12.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Tyco	\$19.08	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Tyco	\$268.29	each

**CONTRACTORS WEST INC, 1830 W. BROADWAY RD, MESA, AZ 85202**

ITS NETWORK EQUIPMENT MATERIALS - Server	Digi 76000752	\$89.43	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Ditek DTK-Z8-LVLP	\$93.01	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Installation Labor Cost	\$234.14	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Mobilization, General Conditions and Incidentals Cost	\$58.54	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Server	\$697.55	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EtherWan	\$9.54	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EtherWan	\$71.54	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Installation Labor Cost	\$234.14	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Jumper Cable	\$8.33	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Mobilization, General Conditions and Incidentals Cost	\$58.54	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$1,252.02	each
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Belden 7838A	\$0.47	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Installation Labor Cost	\$234.14	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Jumper Cable	\$8.33	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Mobilization, General Conditions and Incidentals Cost	\$58.54	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Router	\$4,465.54	each
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Belden 7838A	\$0.47	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Installation Labor Cost	\$234.14	each
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Jumper Cable	\$8.33	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Mobilization, General Conditions and Incidentals Cost	\$58.54	each
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Router	\$4,261.04	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	Installation Labor Cost	\$234.14	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	Jumper Cable	\$8.33	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	Mobilization, General Conditions and Incidentals Cost	\$58.14	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	RuggedCom	\$13.12	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	Switch	\$1,666.68	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (second lot)	Installation Labor Cost	\$234.14	each

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ITS NETWORK EQUIPMENT MATERIALS-Switch (second lot)	Jumper Cable	\$8.33	Each
ITS NETWORK EQUIPMENT MATERIALS-Switch (second lot)	Mobilization, General Conditions and Incidentals Cost	\$58.54	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Server	\$697.55	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EtherWan	\$9.54	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EtherWan	\$71.54	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Installation Labor Cost	\$234.14	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Jumper Cable	\$8.33	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Mobilization, General Conditions and Incidentals Cost	\$58.54	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$1,252.02	each
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Belden 7838A	\$0.47	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Installation Labor Cost	\$234.14	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Jumper Cable	\$8.33	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Mobilization, General Conditions and Incidentals Cost	\$58.54	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (first lot)	Router	\$4,465.54	each
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Belden 7838A	\$0.47	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Installation Labor Cost	\$234.14	each
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Jumper Cable	\$8.33	linear foot
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Mobilization, General Conditions and Incidentals Cost	\$58.54	each
ITS NETWORK EQUIPMENT MATERIALS-Router (second lot)	Router	\$4,261.04	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	Installation Labor Cost	\$234.14	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	Jumper Cable	\$8.33	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	Mobilization, General Conditions and Incidentals Cost	\$58.14	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	RuggedCom	\$13.12	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (fourth lot)	Switch	\$1,666.68	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (second lot)	Installation Labor Cost	\$234.14	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (second lot)	Jumper Cable	\$8.33	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (second lot)	Mobilization, General Conditions and Incidentals Cost	\$58.54	each

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ITS NETWORK EQUIPMENT MATERIALS-Switch (second lot)	Switch	\$3,843.11	Each
ITS NETWORK EQUIPMENT MATERIALS-Switch (second lot)	Traco	\$184.82	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (second lot)	Transition	\$868.07	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (third lot)	Installation Labor Cost	\$234.14	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (third lot)	Jumper Cable	\$8.33	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (third lot)	Mobilization, General Conditions and Incidentals Cost	\$58.54	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (third lot)	RuggedCom 25-10-0100	\$268.29	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (third lot)	RuggedCom 25-10-0101	\$491.27	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (third lot)	RuggedCom P	\$13.12	each
ITS NETWORK EQUIPMENT MATERIALS-Switch (third lot)	Switch	\$1,207.60	each
LIGHTNING PROTECTION	Ground Rod	\$23.85	each
LIGHTNING PROTECTION	Grounding Conductor	\$0.54	linear foot
LIGHTNING PROTECTION	Installation Labor Cost	\$468.29	each
LIGHTNING PROTECTION	Mobilization, General Conditions and Incidentals Cost	\$117.07	each
Miscellaneous	SFP Connector	\$1,788.60	each
PRODUCT TRAINING	4-Hour Training Course - CAMERA ASSEMBLY	\$947.42	each
PRODUCT TRAINING	4-Hour Training Course - ELECTRICAL CONDUCTORS	\$947.42	each
PRODUCT TRAINING	4-Hour Training Course - FIBER OPTIC CABLE AND EQUIPMENT	\$947.42	each
PRODUCT TRAINING	4-Hour Training Course - ITS NETWORK EQUIPMENT	\$947.42	each
PRODUCT TRAINING	4-Hour Training Course - RADIO COMMUNICATIONS EQUIPMENT	\$947.42	each
PRODUCT TRAINING	8-Hour Training Course - CAMERA ASSEMBLY	\$1,777.76	each
PRODUCT TRAINING	8-Hour Training Course - ELECTRICAL CONDUCTORS	\$1,777.76	each
PRODUCT TRAINING	8-Hour Training Course - FIBER OPTIC CABLE AND EQUIPMENT	\$1,777.76	each
PRODUCT TRAINING	8-Hour Training Course - ITS NETWORK EQUIPMENT	\$1,777.76	each
PRODUCT TRAINING	8-Hour Training Course - RADIO COMMUNICATIONS EQUIPMENT	\$1,777.76	each
PRODUCT TRAINING	Additional Student - CAMERA ASSEMBLY	\$177.78	each
PRODUCT TRAINING	Additional Student - ELECTRICAL CONDUCTORS	\$177.78	each
PRODUCT TRAINING	Additional Student - FIBER OPTIC CABLE AND EQUIPMENT	\$177.78	each

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PRODUCT TRAINING	Additional Student - ITS NETWORK EQUIPMENT	\$177.78	Each
PRODUCT TRAINING	Additional Student - RADIO COMMUNICATIONS EQUIPMENT	\$177.78	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7838A	\$0.47	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7838A	\$0.47	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7840A	\$1.49	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7921A	\$0.89	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Colubris / HP Procurve	\$953.92	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	HyperTechnologies	\$65.58	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	HyperTechnologies	\$11.05	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Installation Labor Cost	\$702.43	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	L-COM	\$71.54	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost	\$234.14	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	West Penn AQ296	\$0.94	linear foot
VIDEO CODEC - Decorder	CCTV Surge Protector	\$41.73	each
VIDEO CODEC - Decorder	Chassis/Power Supply	\$170.51	each
VIDEO CODEC - Decorder	Encoder	\$925.30	each
VIDEO CODEC - Decorder	Installation Labor Cost	\$468.29	each
VIDEO CODEC - Decorder	Jumper Cable	\$8.33	linear foot
VIDEO CODEC - Decorder	Mobilization, General Conditions and Incidentals Cost	\$117.07	each
VIDEO CODEC - Decorder	Surge Protector	\$41.73	each
VIDEO CODEC - Encoder	CCTV Surge Protector	\$41.73	each
VIDEO CODEC - Encoder	Chassis/Power Supply	\$176.48	each
VIDEO CODEC - Encoder	Encoder	\$1,621.66	each
VIDEO CODEC - Encoder	Installation Labor Cost	\$702.43	each
VIDEO CODEC - Encoder	Jumper Cable	\$8.33	linear foot
VIDEO CODEC - Encoder	Mobilization, General Conditions and Incidentals Cost	\$117.07	each
VIDEO CODEC - Encoder	Surge Protector	\$41.73	each

**CONTRACTORS WEST INC, 1830 W. BROADWAY RD, MESA, AZ 85202**

Item #	Item Description	Unit	Quantity	Unit Price	Extension
02-24	Fiber Optic Cable & Equipment Materials - Fiber Connections - G620J012FRB-X-0 (12 Strand SC Gator Patch, No cable included, see item 2-26)	Each	1	\$457.70	\$457.70
02-25	Fiber Optic Cable & Equipment Materials - Fiber Connections - G620G012FRB-X-0 (12 Strand ST Gator Patch, No cable included, see item 2-26)	Each	1	\$496.80	\$496.80
02-26	Fiber Optic Cable & Equipment Materials - Fiber Connections - 12 Strand Gator Patch Cable (Riser Rated)	L.Ft	1	\$0.53	\$0.53
03-09	Camera Assembly - AXIS Q6042-E (includes T91A67 pole mount)	Each	1	\$3,029.27	\$3,029.27
03-10	Camera Assembly - AXIS Q6044-E (includes T91A67 pole mount)	Each	1	\$3,420.27	\$3,420.27
03-11	Camera Assembly - AXIS Q6045-E (includes T91A67 pole mount)	Each	1	\$3,615.77	\$3,615.77
03-12	Camera Assembly - AXIS P5534-E (includes T91A67 pole mount)	Each	1	\$2,931.52	\$2,931.52
03-13	Camera Assembly - AXIS 5700-371 - Replacement IP66 RJ45 Connector	Each	1	\$47.90	\$47.90
12-08	ITS Network Equipment - Switch (Third Lot) - RS900G-HI-N-2LC25-XX or RS900G-HI-N-2SC25-XX	Each	1	\$1,955.29	\$1,955.29
12-09	ITS Network Equipment - Switch (Third Lot) - RS900G-HI-N-2LC10-XX or RS900G-HI-N-2SC10-XX	Each	1	\$1,688.78	\$1,688.78
12-10	ITS Network Equipment - Switch (Third Lot) - RS900G-HI-N-2SFP-XX	Each	1	\$1,289.44	\$1,289.44
12-11	ITS Network Equipment - Switch (Third Lot) - RS900-HI-D-C2-C2-XX-XX	Each	1	\$1,245.45	\$1,245.45
12-12	ITS Network Equipment - Switch (Third Lot) - RS900-HI-N-L5-L5-XX-XX	Each	1	\$1,662.04	\$1,662.04
12-13	ITS Network Equipment - Switch (Third Lot) - RS900-HI-D-XX-XX-XX-XX	Each	1	\$889.24	\$889.24
12-14	ITS Network Equipment - Switch (Third Lot) - RS900-HI-D-C2-C2-C2-XX	Each	1	\$1,217.85	\$1,217.85
12-15	ITS Network Equipment - Switch (Third Lot) - Din Rail Mount for RS900 & RS900G	Each	1	\$18.98	\$18.98
12-16	ITS Network Equipment - Switch (Third Lot) - Panel Mount for RS900 & RS900G	Each	1	\$18.98	\$18.98
12-17	ITS Network Equipment - Switch (Third Lot) - RSG2100-F-RM-HI-XX-XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XX (up to 3 Gigabit Ports & Up to 16 FastEthernet Ports)	Each	1	\$1,743.98	\$1,743.98
12-18	ITS Network Equipment - Switch (Third Lot) - RSG2100 Modules (Must be purchased with an RSG2100) TX01 (2 10/100TX Ports)	Each	1	\$66.70	\$66.70
12-19	ITS Network Equipment - Switch (Third Lot) - RSG2100 Modules (Must be purchased with an RSG2100) FX04 (2 100FX Single Mode Ports, ST, 20km)	Each	1	\$688.85	\$688.85
12-20	ITS Network Equipment - Switch (Third Lot) - RSG2100 Modules (Must be purchased with an RSG2100) - TX01 (2 100FX Single Mode Ports, SC, 20km)	Each	1	\$688.85	\$688.85
12-20	ITS Network Equipment - Switch (Third Lot) - RSG2100 Modules (Must be purchased with an RSG2100) - TX01 (2 100FX Single Mode Ports, LC, 20km)	Each	1	\$688.85	\$688.85

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12-21	ITS Network Equipment - Switch (Third Lot) - RSG2200-F-RM-HI-XX-XXXX-XXXX-XXXX-XXXX-XX (Up to 9 Gigabit ports Copper or Fiber)	Each	1	\$2,565.08	\$2,565.08
12-22	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) Secondary Power Supply Module (HI or 24 or 48)	Each	1	\$333.50	\$333.50
12-23	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) CG01 (2 10/100/1000TX Copper Ports)	Each	1	\$221.95	\$221.95
12-24	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) 1CG01 (1 10/100/1000TX Copper Port)	Each	1	\$221.95	\$221.95
12-25	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) FG02 (2 1000LX Single Mode Ports, SC, 10km)	Each	1	\$755.55	\$755.55
12-26	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) FG03 (2 1000LX Single Mode Ports, LC, 10km)	Each	1	\$755.55	\$755.55
12-27	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) FG04 (2 1000LX Single Mode Ports, SC, 25km)	Each	1	\$1,066.05	\$1,066.05
12-28	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) FG05 (2 1000LX Single Mode Ports, LC, 25km)	Each	1	\$1,066.05	\$1,066.05
12-29	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) 1FG02 (1 1000LX Single Mode Port, SC, 10km)	Each	1	\$443.90	\$443.90
12-30	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) 1FG03 (1 1000LX Single Mode Port, LC, 10km)	Each	1	\$443.90	\$443.90
12-31	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) 1FG04 (1 1000LX Single Mode Port, SC, 25km)	Each	1	\$622.15	\$622.15
12-32	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) 1FG05 (1 1000LX Single Mode Port, LC, 25km)	Each	1	\$622.15	\$622.15
12-33	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) FG50 (2 1000LX SFP Ports, Blank, No Transceivers)	Each	1	\$266.80	\$266.80
12-34	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) FG70 (2 1000LX GBIC Ports, Blank, No Transceivers)	Each	1	\$266.80	\$266.80
12-35	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) 1FG50 (1 1000LX SFP Port, Blank, No Transceiver)	Each	1	\$221.95	\$221.95
12-36	ITS Network Equipment - Switch (Third Lot) - Dual Use Modules (Must be purchased with an RSG2100 or RSG2200) 1FG70 (1 1000LX GBIC Port, Blank, No Transceiver)	Each	1	\$221.95	\$221.95
16-02	Miscellaneous - LCOM POE Surge Suppressor	Each	1	\$69.00	\$69.00
16-03	Miscellaneous - ST-ST Duplex Single Mode Jumper, 2m (7')	Each	1	\$13.80	\$13.80
16-04	Miscellaneous - ST-SC Duplex Single Mode Jumper, 2m (7')	Each	1	\$16.10	\$16.10
16-05	Miscellaneous - ST-LC Duplex Single Mode Jumper, 2m (7')	Each	1	\$18.40	\$18.40
16-06	Miscellaneous - SC-SC Duplex Single Mode Jumper, 2m (7')	Each	1	\$16.10	\$16.10
16-07	Miscellaneous - SC-LC Duplex Single Mode Jumper, 2m (7')	Each	1	\$18.40	\$18.40
16-08	Miscellaneous - LC-LC Duplex Single Mode Jumper, 2m (7')	Each	1	\$20.70	\$20.70

EFFECTIVE 12/16/15

Description	Product Code	Price	Unit
ITS Network Equipment - Switch - Etherwan - EX71802-0VB (Hardened Managed Ethernet Switch - 8, 10/100 Ethernet Ports + 2 1000Base-SFP Ports, Din Rail Mount, Terminal Block or DC Jack Power, Connector)	EX71802-0VB	\$993.60	Ea.
ITS Network Equipment - Switch - Etherwan - 41-136046-1 (Power Supply, Hardened External, 100-240VAC Input, TS2 Rated, 12VDC Output, Terminal Block Connection)	41-136046-1	\$73.60	Ea.
ITS Network Equipment - Switch - Etherwan - EX-1250TSP-MB4L-A (Hardened SFP Module, 1000Base-LX with Duplex LC Connectors, 10KM Optics)	EX-1250TSP-MB4L-A	\$207.00	Ea.

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ITS Network Equipment - Switch - Etherwan - EX-1250TSP-MB5L-A (Hardened SFP Module, 1000Base-LX with Duplex LC Connectors, 20KM Optics)	EX-1250TSP-MB5L-A	\$391.00	Ea.
ITS Network Equipment - Switch - Etherwan - EX71802-0AB (Hardened Managed Ethernet Switch - 8-10/100 Ethernet Ports + 2 1000Base LX Ports, 10KM Optics w/ Duplex SC Connectors, Din Rail Mount, Terminal Block or DC Jack Power Connector)	EX71802-0AB	\$1,324.80	Ea.
ITS Network Equipment - Switch - Etherwan - EX71802-0BB (Hardened Managed Ethernet Switch - 8-10/100 Ethernet Ports + 2 1000Base LX Ports, 20KM Optics w/ Duplex SC Connectors, Din Rail Mount, Terminal Block or DC Jack Power Connector)	EX71802-0BB	\$1,508.80	Ea.
ITS Network Equipment - Switch - Etherwan - EX73402-0AB (Hardened Managed Ethernet Switch - 16 10/100 Ethernet Ports + 2 1000Base LX Ports, 10KM Optics w/ Duplex SC Connectors, Din Rail Mount, Terminal Block or DC Jack Power Connector)	EX73402-0AB	\$1,559.40	Ea.
ITS Network Equipment - Switch - Etherwan - EX73402-0BB (Hardened Managed Ethernet Switch - 16 10/100 Ethernet Ports + 2 1000Base LX Ports, 20KM Optics w/ Duplex SC Connectors, Din Rail Mount, Terminal Block or DC Jack Power Connector)	EX73402-0BB	\$1,739.95	Ea.
ITS Network Equipment - Switch - Etherwan - ED3575 (Hardened Managed Ethernet Switch, 6 10/100, Ethernet Ports, 2 1000Base TX or SFP Combo Ports, 2-port Copper Pair Ethernet Extender, Din Rail, Mount, Terminal Block or DC Jack Power Connector)	ED3575	\$1,468.55	Ea.
ITS Network Equipment - Switch - Moxa - EDS-510E-3GTXSFP-T (Hardened Managed Ethernet Switch, 7 10/100 Ethernet Ports, 3 10/100/1000BaseTX or 100/1000BaseSFP Combo Ports)	EDS-510E-3GTXSFP-T	\$1,141.95	Ea.
ITS Network Equipment - Switch - Omron Automation - S8VKG03024 (Power Supply for Moxa, Wide Temp, Din Mount, 30W @ 24VDC)	S8VKG03024	\$40.25	Ea.
ITS Network Equipment - Switch - Moxa - SFP-1GLXLC-T (Hardened SFP Module, 1000Base-LX with Duplex LC Connectors, 10KM Optics, -40 to 85 C Operating Temperature)	SFP-1GLXLC-T	\$255.30	Ea.

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ITS Network Equipment - Switch - Moxa - SFP-1GLHLC-T (Hardened SFP Module, 1000Base-LX with Duplex LC Connectors, 30KM Optics, -40 to 85 C Operating Temperature)	SFP-1GLHLC-T	\$350.75	Ea.
Camera Assembly - AXIS - Q6045-C Mk II (PTZ Dome Network Camera, 32x Zoom, 1080P, Active Cool IP-66)	Q6045-C Mk II	\$4,007.75	Ea.
Camera Assembly - AXIS - T8008 PS12 (Power Supply for Axis Q60XX-C Series)	T8008 PS12	\$391.00	Ea.
Camera Assembly - AXIS - T91A67 (Pole Mounting Bracket)	T91A67	\$96.77	Ea.

**\*\*EFFECTIVE 04/21/16\*\***

Additional Items to be Added to 11096-C

Part #	Item Description	Unit	Quantity	Unit Price	Extension
GS-3-GS2	DUAL CAMERA GS2 PROCESSOR, 1U	Each	1	\$11,785.20	\$11,785.20
GS-2-TS2-OPT	TS2 (SDLC) IO CONTROLLER FOR GS2 PROCESSOR	Each	1	\$37.95	\$37.95
GS-3-TS2	TS2 CABLES, Y CONNECTION TO SDLC, 6FT	Each	1	\$96.60	\$96.60
GS-3-PFM	SOFTWARE, PERFORMANCE MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS	Each	1	\$3,864.00	\$3,864.00
GS-3-PFM+	SOFTWARE, PERFORMANCE PLUS MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS, ADVANCED ALERTS	Each	1	\$5,313.00	\$5,313.00
GS-3-PED	SOFTWARE, PEDESTRIAN	Each	1	\$755.55	\$755.55
GS-3-CAM	GRIDSMART BELL CAMERA	Each	1	\$3,103.85	\$3,103.85
GS-3-TCS	GRIDSMART TRADITIONAL CAMERA, STOPBAR, SPECIAL SCENARIO	Each	1	\$1,509.95	\$1,509.95
GS-3-TCA	GRIDSMART TRADITIONAL CAMERA, ADVANCED DETECTION	Each	1	\$1,509.95	\$1,509.95
GS-2-TS1-OPT	TS1 IO CONTROLLER FOR GS2 PROCESSOR	Each	1	\$37.95	\$37.95
GS-3-TS1	TS1 CABLES, 12FT	Each	1	\$217.35	\$217.35
GS-3-SMCH	SMART CONNECT, HYBRID BOX, QUICK CONNECTOR, TERMINAL STRIP FOR CAT 5E WITH SURGE, SWIVEL BRACKET	Each	1	\$374.90	\$374.90
GS-3-SMC	JUNCTION BOX WITH CONNECTOR, SWIVEL BRACKET	Each	1	\$265.65	\$265.65
GS-3-SMC2	SMART CONNECT, TERMINAL STRIP BOX, SWIVEL BRACKET, TERMINAL STRIP JUNCTION BOX WITH SURGE	Each	1	\$302.45	\$302.45
GS-3-TEN	1.9" TO 4.5" TENON BRACKET	Each	1	\$157.55	\$157.55
GS-3-CBL	BRACKET, 84" CABLE BRACKET	Each	1	\$157.55	\$157.55
GS-3-BND	BRACKET, 36" BANDED BRACKET	Each	1	\$133.40	\$133.40
GS-3-A34	34" 90 DEGREE MOUNTING ARM	Each	1	\$66.70	\$66.70
GS-3-A58	58" 90 DEGREE MOUNTING ARM	Each	1	\$85.10	\$85.10
GS-3-A78	78" 90 DEGREE MOUNTING ARM	Each	1	\$127.65	\$127.65
GS-3-CAT5	CABLE, CAT 5E BURIAL, SHIELDED, GEL-FILLED, 1000FT	Each	1	\$543.95	\$543.95
GS-3-RBA	ETHERNET REPEATER BOARD USED TO EXTEND CAT 5 CABLE BEYOND 100M.	Each	1	\$441.60	\$441.60
GS-3-EPM	ETHERNET PROTECTION MODULES, PROTECTS SURGES BETWEEN PROCESSOR AND CAMERA	Each	1	\$90.85	\$90.85

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**EFFECTIVE 12/05/16**

ADDITIONAL ITEMS TO BE ADDED TO 11096-C

Part #	Item Description	Unit	Quantity	Unit Price	Extension
SW720-H.264-HD30	SIDEWINDER PTZ CAMERA, 85-265 VAC, BOTTOM EGRESS, HD 30X OPTICAL ZOOM, H.264	Each	1	\$4,317.10	\$4,317.10
SW720-H.264-HD30 POE	SIDEWINDER POE PTZ CAMERA, 85-265 VAC, BOTTOM EGRESS, HD 30X OPTICAL ZOOM, H.264	Each	1	\$4,651.75	\$4,651.75
MS CONNECTOR	1 MS CONNECTOR FOR CUSTOMER SUPPLIED CABLE	Each	1	\$37.95	\$37.95
MS CONNECTOR WITH CABLE	1 MS CONNECTOR WITH 3FT PIGTAIL	Each	1	\$55.20	\$55.20
SW720-H.264-SD	SIDEWINDER PTZ CAMERA, 120 VAC, BOTTOM EGRESS, SD, H.264	Each	1	\$4,614.95	\$4,614.95
SWPTM1-A	SIDEWINDER PTZ, POST TOP MOUNT BRACKET FOR USE WITH LOWERING DEVICE	Each	1	\$95.45	\$95.45
SWWM1 W/VPA	SIDEWINDER WALL MOUNT WITH VERTICAL POLE MOUNT ADAPTER	Each	1	\$162.15	\$162.15
15-4-913	SIDEWINDER MOUNTING BASE, ROUND, 6" RISER	Each	1	\$232.30	\$232.30
SWCH.264-MS	PRICE PER FT, SIDEWINDER IP CABLE FOR H.264 - MS CONNECTOR TO RJ45 / POWER PLUG	Foot	1	\$6.90	\$6.90
SWCH.264-AVS	PRICE PER FT, SIDEWINDER ANALOG CABLE FOR H.264 - MS CONNECTOR TO RJ45 / POWER PLUG WITH ANALOG VIDEO COAX AND SERIAL DATA	Foot	1	\$8.05	\$8.05
SW RJ45 BOX	SIDEWINDER RJ45 SERIAL DATA BREAKOUT BOX	Each	1	\$105.80	\$105.80
SWCH.264-MS-POE	PRICE PER FT, SIDEWINDER CABLE FOR H.264 POE - MS CONNECTOR TO CAT 5E	Foot	1	\$5.75	\$5.75
EX2 ATC NEMA CONTROLLER TS2-1	ATC NEMA EX2 TS2-1 CONTROLLER, LOCAL SOFTWARE, POWER CABLE	Each	1	\$3,513.25	\$3,513.25
EX2 ATC NEMA CONTROLLER TS2-2	ATC NEMA CONTROLLER, TS2, TYPE 2, D CONNECTOR, LOCAL SOFTWARE, POWER CABLE	Each	1	\$3,953.70	\$3,953.70
350I ATC CABINET	350I ATC ALUMINUM CABINET, 67" H X 45" W X 26" D, FOUNDATION MOUNTED, ANCHOR BOLTS, 4 DOORS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-HV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) CMU, FITA, FOTA, SERVICE ASSEMBLY, (1) SHELF	Each	1	\$21,049.60	\$21,049.60
350I ATC CABINET DC	350I ATC ALUMINUM CABINET, 67" H X 45" W X 26" D, FOUNDATION MOUNTED, 4 DOORS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-LV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) LV CMU, SHELF, FITA, FOTA, SERVICE ASSEMBLY, (3) SHELF	Each	1	\$26,467.25	\$26,467.25
352I ATC CABINET	352I ATC ALUMINUM CABINET, 67" H X 24" W X 30" D, FOUNDATION MOUNTED, ANCHOR BOLTS, 2 DOORS, UP TO 24 INPUTS AND 16 OUTPUTS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-HV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) CMU, FOTA, FITA, SERVICE ASSEMBLY, (1) SHELF	Each	1	\$17,839.95	\$17,839.95
352I ATC CABINET DC	352I ATC ALUMINUM CABINET, 67" H X 24" W X 30" D, FOUNDATION MOUNTED, 2 DOORS, UP TO 24 INPUTS AND 16 OUTPUTS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-LV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) LV CMU, FOTA, FITA, SERVICE ASSEMBLY (2) SHELF	Each	1	\$22,982.75	\$22,982.75
357I ATC CABINET	357I ATC ALUMINUM CABINET, 36" X 21" W X 18"D, ANCHOR BOLTS, COMBINED INPUT/OUTPUT ASSEMBLY 8 SLOTS (4 IN, 4 OUT), NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (1) CMU, (5) 2202-HV HDSP/ FLASHER, (4) OUTPUT SURGE, (2) SIU, FITA, FOTA, SERVICE ASSEMBLY	Each	1	\$13,744.80	\$13,744.80

Additional Items to be Added to 11096-C

Part #	Item Description	Unit	Quantity	Unit Price	Extension
BACKPACK ATC CABINET	25" X 16" X 15" ALUMINUM CABINET, SINGLE DOOR, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (5) 2202-HV HDSP/FLASHER, (1) SIU, (1) CMU W/ETHERNET, FITA, FOTA, SERVICE ASSEMBLY	Each	1	\$12,230.25	\$12,230.25
CMU DATAKEY PROGRAMMER	CMU DATAKEY PROGRAMMER	Each	1	\$655.50	\$655.50
GPS CLOCK	NEMA STAND ALONE GPS TIME CLOCK MODULE WITH M59205 NEMA/POWER CABLE	Each	1	\$739.45	\$739.45
CABINET DISPLAY	120VAC CABINET DISPLAY, ATC	Each	1	\$770.50	\$770.50
DC BATTERY	79AH MK 8A24HEI	Each	1	\$273.70	\$273.70
1RU8126MS-001	ITS COMMANDER	Each	1	\$1,259.25	\$1,259.25
CP621DT	CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 21" X 72" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	Each	1	\$2,826.70	\$2,826.70
CP820DT	CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 20" X 96" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	Each	1	\$3,318.90	\$3,318.90
CP920DT	CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 20" X 108" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	Each	1	\$3,577.65	\$3,577.65
CP830DT	CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 30" X 96" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	Each	1	\$4,451.65	\$4,451.65
CP1030DT	CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 30" X 120" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	Each	1	\$5,387.75	\$5,387.75
HSNS BRACKET	HORIZONTAL POLE BRACKET	Each	1	\$632.50	\$632.50

PRICING SHEET: NIGP CODE , 83829

Payment Term: NET 30 DAYS

Vendor Number: 2011001490-0 VC0000007227

Certificates of Insurance Required

Contract Period: To cover the period ending **January 31, 2015-2018.**

**ENTERPRISE NETWORKS SOLUTIONS, 1955 N VAL VISTA DR. SUITE 101, MESA, AZ 85213**

COMPANY NAME:	<u>Enterprise Networks Solutions</u>
DOING BUSINESS AS (DBA) NAME:	<u>Enterprise Networks Solutions</u>
MAILING ADDRESS:	<u>1955 N. Val Vista Dr. Building 101 Mesa, AZ 85213</u>
REMIT TO ADDRESS:	<u>1955 N. Val Vista Dr. Building 101 Mesa, AZ 85213</u>
TELEPHONE NUMBER:	<u>480-505-1111</u>
FACSIMILE NUMBER:	<u>480-505-1112</u>
WEB SITE:	<u>www.ens-az.com</u>
REPRESENTATIVE NAME:	<u>Larry Potthoff</u>
REPRESENTATIVE TELEPHONE NUMBER:	<u>480-505-1111</u>
REPRESENTATIVE E-MAIL:	<u>larry@ens-az.com</u>

	<u>YES</u>	<u>NO</u>	<u>REBATE</u>
WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
WILL ACCEPT PROCUREMENT CARD FOR PAYMENT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

FUEL COMPRISES (if section for fuel price adjustment is located in the solicitation document) 0% OF TOTAL BID AMOUNT

NET 30 DAYS

LOT NAME	TITLE	PRICE	UNIT
Blanket Labor Rates	ITS Technician	\$70.00	hour
Blanket Labor Rates	Operations Engineer	\$150.00	hour
Blanket Labor Rates	Principal	\$150.00	hour
Blanket Labor Rates	Senior Systems Engineer	\$150.00	hour
ITS NETWORK EQUIPMENT MATERIALS - Server	Digi 76000752	\$75.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Installation Labor Cost	\$150.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Mobilization, General Conditions and Incidentals Cost	\$155.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Server	\$645.15	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Installation Labor Cost	\$150.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Mobilization, General Conditions and Incidentals Cost	\$150.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$3,146.50	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$8,680.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$6,160.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$4,760.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$3,640.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$2,026.50	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$1,816.50	Each

**ENTERPRISE NETWORKS SOLUTIONS, 1955 N VAL VISTA DR. SUITE 101, MESA, AZ 85213**

ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$1,116.50	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Installation Labor Cost	\$150.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Jumper Cable	\$22.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Mobilization, General Conditions and Incidentals Cost	\$150.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	RuggedCom	\$12.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Switch	\$1,390.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Installation Labor Cost	\$150.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Mobilization, General Conditions and Incidentals Cost	\$150.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Transition	\$685.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Installation Labor Cost	\$150.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Jumper Cable	\$22.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Mobilization, General Conditions and Incidentals Cost	\$150.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom 25-10-0100	\$293.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom 25-10-0101	\$477.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom P	\$12.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Switch	\$1,971.00	each
PRODUCT TRAINING	4-Hour Training Course - ITS NETWORK EQUIPMENT	\$800.00	each
PRODUCT TRAINING	8-Hour Training Course - ITS NETWORK EQUIPMENT	\$1,600.00	each
PRODUCT TRAINING	Additional Student - ITS NETWORK EQUIPMENT	\$1,600.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Colubris / HP Procurve	\$806.55	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Installation Labor Cost	\$150.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	L-COM	\$53.55	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost	\$150.00	each
VIDEO CODEC - Encoder	Installation Labor Cost	\$155.00	each

## ENTERPRISE NETWORKS SOLUTIONS, 1955 N VAL VISTA DR. SUITE 101, MESA, AZ 85213



## Arista Networks Price List - September 1st, 2014

Product Number	Description	USD Global List Price	Contract (11096-C) Discount %
<b>Arista 7500E Series Modular Switches</b>			
DCS-7504E-BND	Arista 7504E chassis bundle. Includes 7504 chassis, 4x2900PS, 6xFabric-E modules, 1xSupervisorE	\$119,994	25%
DCS-7508E-BND	Arista 7508E chassis bundle. Includes 7508 chassis, 4x2900PS, 6xFabric-E modules, 1xSupervisorE	\$155,994	25%
DCS-7500E-SUP	Supervisor module for 7500E series chassis	\$19,194	25%
DCS-7500E-SUP#	Supervisor module for 7500E series chassis (ships in chassis)	\$19,194	25%
DCS-7504E-BND-D	Arista 7504E chassis bundle. Includes 7504 chassis, 4x2900PS, 6xFabric-E modules, 1xSupervisorE-SSD	\$125,994	25%
DCS-7508E-BND-D	Arista 7508E chassis bundle. Includes 7508 chassis, 4x2900PS, 6xFabric-E modules, 1xSupervisorE-SSD	\$161,994	25%
DCS-7500E-SUP-D	Supervisor module for 7500E series chassis with SSD	\$25,194	25%
DCS-7500E-SUP-D#	Supervisor module for 7500E series chassis with SSD (ships in chassis)	\$25,194	25%
DCS-7504E-FM	Fabric-E (integrated fan) Module for 7504-E Chassis, required for fabric slots 1-6	\$11,994	25%
DCS-7508E-FM	Fabric-E (integrated fan) Module for 7508-E Chassis, required for fabric slots 1-6	\$16,794	25%
DCS-7500E-36Q-LC	36 port 40GbE QSFP+ wire-speed linecard for 7500E Series (spare)	\$95,994	25%
DCS-7500E-36Q-LC#	36 port 40GbE QSFP+ wire-speed linecard for 7500E Series (ships in chassis)	\$95,994	25%
DCS-7500E-48S-LC	48 port 10GbE SFP+ wire-speed linecard for 7500E Series (spare)	\$39,594	25%
DCS-7500E-48S-LC#	48 port 10GbE SFP+ wire-speed linecard for 7500E Series (ships in chassis)	\$39,594	25%
DCS-7500E-72S-LC	48 port 10GbE SFP+ & 2 x SR10 Embedded (MPO) wire-speed linecard for 7500E Series (spare)	\$47,994	25%
DCS-7500E-72S-LC#	48 port 10GbE SFP+ & 2 x SR10 Embedded (MPO) wire-speed linecard for 7500E Series (ships in chassis)	\$47,994	25%
DCS-7500E-12CM-LC	12 x SR10 Embedded (MPO) wire-speed linecard for 7500E Series (Spare)	\$143,994	25%
DCS-7500E-12CM-LC#	12 x SR10 Embedded (MPO) wire-speed linecard for 7500E Series (ships in chassis)	\$143,994	25%
DCS-7500E-6C2-LC	6-port 100GbE CFP2 wire-speed linecard for 7500E Series	\$39,995	25%
DCS-7500E-6C2-LC#	6-port 100GbE CFP2 wire-speed linecard for 7500E Series (ships in Chassis)	\$39,995	25%
<b>Arista 7500E/7500 Series Accessories</b>			
LIC-MOD-1-E	Enhanced Software License for Arista Modular Switches - 4 slots (OSPF, BGP, PIM)	\$15,995	25%
LIC-MOD-2-E	Enhanced Software License for Arista Modular Switches - 8 & 16 slots (OSPF, BGP, PIM)	\$29,995	25%
LIC-MOD-1-Z	Monitoring & provisioning license for Arista Modular switches - 4 slots (ZTP, LANZ, API, TapAgg)	\$9,995	25%
LIC-MOD-2-Z	Monitoring & provisioning license for Arista Modular switches - 8 & 16 slots (ZTP, LANZ, API, TapAgg)	\$19,995	25%
LIC-MOD-1-V	Virtualization license for Arista Modular switches - 4 slots (VMTracer and VXLAN)	\$6,595	25%
LIC-MOD-2-V	Virtualization license for Arista Modular switches - 8 & 16 slots (VMTracer and VXLAN)	\$9,995	25%
DCS-7504-CH	Arista 7504 empty chassis. 2 Supervisor slots, 8 Linecard slots, 6 Fabric Module slots	\$23,994	25%
DCS-7504-FM	Fabric Module for 7504 chassis, (includes integrated fan) required for fabric slots 1-6	\$11,634	25%
DCS-7508-CH	Arista 7508 empty chassis. 2 Supervisor slots, 8 Linecard slots, 6 Fabric Module slots	\$35,994	25%
DCS-7508-FM	Fabric Module for 7508 chassis, required for fabric slots 1-6	\$16,794	25%
DCS-7508-FAN	Fan module for 7508 chassis. Provides front-to-back airflow	\$810	25%
PWR-2900AC	2900W AC Power Supply for 7500 series	\$3,594	25%
DCS-7500-LCVR	Blank cover for 7500 linecard slot	\$414	25%
DCS-7500-SCVR	Blank cover for 7500 supervisor slot	\$234	25%
KIT-7508	Spare accessory kit for Arista 7508 switches. Includes 4xC19-C20 power cords, 2-post & 4-post mounting brackets	\$1,195	25%
CAB-C19-C20	Power Cord C19 to C20 (2.5m)	\$59	25%
CAB-C19-L6-20P	Power Cord C19 to L6-20P (2.5m)	\$59	25%
<b>Arista 7300X Series Modular Switches</b>			
DCS-7304X-BND-F	Arista 7304X chassis bundle. Includes 7304 chassis, 2x3000PS, 4xFabrics/fans, 1x Supervisor (F-R)	\$54,995	25%
DCS-7304X-BND-R	Arista 7304X chassis bundle. Includes 7304 chassis, 2x3000PS, 4xFabrics/fans, 1x Supervisor (R-F)	\$54,995	25%
DCS-7304X-BND-D-F	Arista 7304X chassis bundle. Includes 7304 chassis, 2x3000PS, 4xFabrics/ fans, 1xSupervisor & SSD (F-R)	\$57,995	25%
DCS-7304X-BND-D-R	Arista 7304X chassis bundle. Includes 7304 chassis, 2x3000PS, 4xFabrics/fans, 1x Supervisor & SSD (R-F)	\$57,995	25%
DCS-7308X-BND-F	Arista 7308X chassis bundle. Includes 7308 chassis, 4x3000PS, 4xFabrics/fans, 1x Supervisor (F-R)	\$89,995	25%
DCS-7308X-BND-R	Arista 7308X chassis bundle. Includes 7308 chassis, 4x3000PS, 4 Fabrics/fans, 1x Supervisor (R-F)	\$89,995	25%
DCS-7308X-BND-D-F	Arista 7308X chassis bundle. Includes 7308 chassis, 4x3000PS, 4xFabrics/fans, 1x Supervisor & SSD (F-R)	\$92,995	25%
DCS-7308X-BND-D-R	Arista 7308X chassis bundle. Includes 7308 chassis, 4x3000PS, 4xFabrics/fans, 1x Supervisor & SSD (R-F)	\$92,995	25%
DCS-7316X-BND-F	Arista 7316X chassis bundle. Includes 7316 chassis, 6x3000PS, 4xFabrics/fans, 1x Supervisor (F-R)	\$199,995	25%
DCS-7316X-BND-R	Arista 7316X chassis bundle. Includes 7316 chassis, 6x3000PS, 4 Fabrics/ fans, 1x Supervisor (R-F)	\$199,995	25%
DCS-7316X-BND-D-F	Arista 7316X chassis bundle. Includes 7316 chassis, 6x3000PS, 4xFabrics/fans, 1x Supervisor & SSD (F-R)	\$202,995	25%
DCS-7316X-BND-D-R	Arista 7316X chassis bundle. Includes 7316 chassis, 6x3000PS, 4xFabrics/fans, 1x Supervisor & SSD (R-F)	\$202,995	25%
DCS-7300-SUP	Supervisor module for 7300 Series chassis	\$16,995	25%
DCS-7300-SUP#	Supervisor module for 7300 Series chassis	\$16,995	25%
DCS-7300-SUP-D	Supervisor module for 7300 Series chassis, & SSD	\$19,995	25%
DCS-7300-SUP-D#	Supervisor module for 7300 Series chassis, & SSD	\$19,995	25%
DCS-7300X-64S-LC	Arista 7300X 48-port 10GbE SFP+ & 4 port 40GbE QSFP+ linecard (spare)	\$21,995	25%
DCS-7300X-64S-LC#	Arista 7300X 48-port 10GbE SFP+ & 4 port 40GbE QSFP+ linecard (ships in chassis)	\$21,995	25%
DCS-7300X-64T-LC	Arista 7300X 48-port RJ45 10GBASE-T & 4 port 40GbE QSFP+ linecard (spare)	\$21,995	25%
DCS-7300X-64T-LC#	Arista 7300X 48-port RJ45 10GBASE-T & 4 port 40GbE QSFP+ linecard (ships in chassis)	\$21,995	25%
DCS-7300X-32Q-LC	Arista 7300X 32-port 40GbE QSFP+ linecard (spare)	\$35,995	25%
DCS-7300X-32Q-LC#	Arista 7300X 32-port 40GbE QSFP+ linecard (ships in chassis)	\$35,995	25%
<b>Arista 7300X Series Accessories</b>			
LIC-MOD-1-E	Enhanced Software License for Arista Modular Switches - 4 slots (OSPF, BGP, PIM)	\$15,995	25%
LIC-MOD-2-E	Enhanced Software License for Arista Modular Switches - 8 & 16 slots (OSPF, BGP, PIM)	\$29,995	25%

**ENTERPRISE NETWORKS SOLUTIONS, 1955 N VAL VISTA DR. SUITE 101, MESA, AZ 85213**

LIC-MOD-1-Z	Monitoring & provisioning license for Arista Modular switches - 4 slots (ZTP, LANZ, API, TapAgg)	\$9,995	25%
LIC-MOD-2-Z	Monitoring & provisioning license for Arista Modular switches - 8 & 16 slots (ZTP, LANZ, API, TapAgg)	\$19,995	25%
LIC-MOD-1-V	Virtualization license for Arista Modular switches - 4 slots (VMTracer and VXLAN)	\$6,595	25%
LIC-MOD-2-V	Virtualization license for Arista Modular switches - 8 & 16 slots (VMTracer and VXLAN)	\$9,995	25%
DCS-7304-CH	Arista 7304 empty chassis, 2 supervisor slots, 4 linecard slots, 4 fabric module slots	\$10,995	25%
DCS-7304X-FM-F	Fabric-X (integrated fans) module for 7304 chassis, required for slots 1-4. Front-to-rear air	\$5,495	25%
DCS-7304X-FM-R	Fabric-X (integrated fans) module for 7304 chassis, required for slots 1-4. Front-to-rear air	\$5,495	25%
DCS-7308-CH	Arista 7308 empty chassis, 2 supervisor slots, 8 linecard slots, 4 fabric module slots	\$21,995	25%
DCS-7308X-FM-F	Fabric-X (integrated fans) module for 7308 chassis, required for slots 1-4. Front-to-rear air	\$9,995	25%
DCS-7308X-FM-R	Fabric-X (integrated fans) module for 7308 chassis, required for slots 1-4. Rear-to-front air	\$9,995	25%
DCS-7316-CH	Arista 7316 empty chassis, 2 supervisor slots, 16 linecard slots, 4 fabric module slots	\$45,995	25%
DCS-7316X-FM-F	Fabric-X (integrated fans) module for 7316 chassis, required for slots 1-4. Front-to-rear air	\$29,995	25%
DCS-7316X-FM-R	Fabric-X (integrated fans) module for 7316 chassis, required for slots 1-4. Rear-to-front air	\$29,995	25%
PWR-3K-AC-F	Spare 3kW AC Power Supply for 7300 series (front-to-rear airflow switch)	\$2,995	25%
PWR-3K-AC-F#	3kW AC Power Supply for 7300 series (front-to-rear airflow switch)	\$2,995	25%
PWR-3K-AC-R	Spare 3kW AC Power Supply for 7300 series (rear-to-front airflow switch)	\$2,995	25%
PWR-3K-AC-R#	3kW AC Power Supply for 7300 series (rear-to-front airflow switch)	\$2,995	25%
FAN-7002-F	Spare fan module for Arista 7250 / 7050 2RU and 7300 switches (front to rear airflow)	\$150	25%
FAN-7002-R	Spare fan module for Arista 7250 / 7050 2RU and 7300 switches (rear to front airflow)	\$150	25%
DCS-7300-LCVR	Blank cover for 7300 linecard slot	\$345	25%
DCS-7300-SCVR	Blank cover for 7300 supervisor slot	\$195	25%
DCS-7300-PCVR	Blank cover for 7300 power supply slot	\$100	25%
KIT-7304	Spare accessory kit for Arista 7304 switches	\$250	25%
KIT-7308	Spare accessory kit for Arista 7308 switches	\$250	25%
KIT-7316	Spare accessory kit for Arista 7316 switches	\$500	25%
KIT-7304-MMR	Spare Mid Mount Rack Brackets for 7304 switches	\$45	25%
KIT-7308-MMR	Spare Mid Mount Rack Brackets for 7308 switches	\$45	25%
KIT-7316-4PR	Spare 4 Post Rack Mount Brackets for 7316 switches	\$150	25%
KIT-7300-4PR	Spare 4 Post Rack Mount Brackets for 7304 and 7308 switches	\$55	25%

Product Number	Description	USD Global List Price	Contract (11096-C) Discount %
<b>Arista 7280SE Series 10/40/100 Gigabit Ethernet Switches</b>			
DCS-7280SE-72-F	Arista 7280E, 48x10GbE (SFP+) & 2x100GbE MXP switch, front-to-rear air, 2x AC and 2xC13-C14 cords	\$49,995	25%
DCS-7280SE-72-R	Arista 7280E, 48x10GbE (SFP+) & 2x100GbE MXP switch, rear-to-front air, 2x AC and 2xC13-C14 cords	\$49,995	25%
DCS-7280SE-72#	Arista 7280E, 48x10GbE (SFP+) & 2x100GbE MXP switch, 2xC13-C14 cords. Requires 2 PSU and 4 fans sold separately	\$48,295	25%
DCS-7280SE-64-F	Arista 7280E, 48x10GbE (SFP+) & 4x40GbE QSFP+ switch, front-to-rear air, 2x AC and 2xC13-C14 cords	\$34,995	25%
DCS-7280SE-64-R	Arista 7280E, 48x10GbE (SFP+) & 4x40GbE QSFP+ switch, rear-to-front air, 2x AC and 2xC13-C14 cords	\$34,995	25%
DCS-7280SE-64#	Arista 7280E, 48x10GbE (SFP+) & 4x40GbE QSFP+ switch, 2xC13-C14 cords. Requires 2 PSU and 4 fans sold separately	\$33,295	25%
<b>Arista 7250X Series 40 Gigabit Ethernet Switches</b>			
DCS-7250QX-64-F	Arista 7250, 64xQSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$69,995	25%
DCS-7250QX-64-R	Arista 7250, 64xQSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$69,995	25%
DCS-7250QX-64#	Arista 7250, 64xQSFP+ switch, no fans, no psu, 2 x C13-C14 cords	\$65,555	25%
DCS-7250QX-64-D#	Arista 7250, 64xQSFP+ switch, SSD, no fans, no psu, 2 x C13-C14 cords	\$68,555	25%
<b>Arista 7150 Series 10 Gigabit Ethernet SFP+ Switches</b>			
DCS-7150S-64-CL-F	Arista 7150S, 48x10GbE (SFP+) & 4xQSFP+ switch with clock, front-to-rear air, 2xAC, 2xC13-C14 cords	\$29,995	25%
DCS-7150S-64-CL-R	Arista 7150S, 48x10GbE (SFP+) & 4xQSFP+ switch with clock, rear-to-front air, 2xAC, 2xC13-C14 cords	\$29,995	25%
DCS-7150S-64-CL#	Arista 7150S, 48x10GbE (SFP+), & 4xQSFP+ with clock, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$28,595	25%
DCS-7150S-64-CLD#	Arista 7150S, 48x10GbE (SFP+), & 4xQSFP+ with SSD and clock, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$31,595	25%
DCS-7150S-52-CL-F	Arista 7150S, 52x10GbE (SFP+) switch with clock, front-to-rear air, 2xAC, 2xC13-C14 cords	\$24,995	25%
DCS-7150S-52-CL-R	Arista 7150S, 52x10GbE (SFP+) switch with clock, rear-to-front air, 2xAC, 2xC13-C14 cords	\$24,995	25%
DCS-7150S-52-CL#	Arista 7150S, 52x10GbE (SFP+), with clock, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$23,595	25%
DCS-7150S-52-CLD#	Arista 7150S, 52x10GbE (SFP+), with SSD and clock, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$26,595	25%
DCS-7150S-24-F	Arista 7150S, 24x10GbE (SFP+) switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$12,995	25%
DCS-7150S-24-R	Arista 7150S, 24x10GbE (SFP+) switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$12,995	25%
DCS-7150S-24#	Arista 7150S, 24x10GbE (SFP+) switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$11,595	25%
DCS-7150S-24-CL#	Arista 7150S, 24x10GbE (SFP+), with clock, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$12,595	25%
DCS-7150S-24-CLD#	Arista 7150S, 24x10GbE (SFP+), with SSD and clock, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$15,595	25%
<b>Arista 7050X Series 40 Gigabit Ethernet Switches</b>			
DCS-7050QX-32S-F	Arista 7050X, 32xQSFP+ & 4xSFP+ switch, front-to-rear airflow and dual 460W AC power supplies	\$29,995	25%
DCS-7050QX-32S-R	Arista 7050X, 32xQSFP+ & 4xSFP+ switch, rear-to-front airflow and dual 460W AC power supplies	\$29,995	25%
DCS-7050QX-32S#	Arista 7050X, 32xQSFP+ & 4xSFP+ switch, no fans, no psu (requires fans and psu)	\$28,315	25%
DCS-7050QX-32S-D#	Arista 7050X, 32xQSFP+ & 4xSFP+ switch, SSD, no fans, no psu (requires fans and psu)	\$31,915	25%
DCS-7050QX-32-F	Arista 7050, 32xQSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$29,995	25%
DCS-7050QX-32-R	Arista 7050, 32xQSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$29,995	25%
DCS-7050QX-32#	Arista 7050, 32xQSFP+ switch, no fans, no psu, 2 x C13-C14 cords	\$28,315	25%
DCS-7050QX-32D#	Arista 7050, 32xQSFP+ switch, SSD, no fans, no psu, 2 x C13-C14 cords	\$31,915	25%
<b>Arista 7050X Series 10/40 Gigabit Ethernet Switches</b>			
DCS-7050SX-64-F	Arista 7050X, 48x10GbE (SFP+) & 4xQSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$25,995	25%
DCS-7050SX-64-R	Arista 7050X, 48x10GbE (SFP+) & 4xQSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$25,995	25%

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DCS-7050SX-64#	Arista 7050X, 48x10GbE (SFP+) & 4xQSFP+ switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$24,407	25%
DCS-7050SX-64-D#	Arista 7050X, 48x10GbE (SFP+) & 4xQSFP+ switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$27,407	25%
DCS-7050SX-72-F	Arista 7050X, 48x10GbE (SFP+) & 6x40GbE (2xMXP) switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$29,995	25%
DCS-7050SX-72-R	Arista 7050X, 48x10GbE (SFP+) & 6x40GbE (2xMXP) switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$29,995	25%
DCS-7050SX-72#	Arista 7050X, 48x10GbE (SFP+) & 6x40GbE (2xMXP) switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$28,407	25%
DCS-7050SX-72-D#	Arista 7050X, 48x10GbE (SFP+) & 6x40GbE (2xMXP) switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$31,407	25%
DCS-7050SX-96-F	Arista 7050X, 48x10GbE (SFP+) & 12x40GbE (4xMXP) switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$39,995	25%
DCS-7050SX-96-R	Arista 7050X, 48x10GbE (SFP+) & 12x40GbE (4xMXP) switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$39,995	25%
DCS-7050SX-96#	Arista 7050X, 48x10GbE (SFP+) & 12x40GbE (4xMXP) switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$38,407	25%
DCS-7050SX-96-D#	Arista 7050X, 48x10GbE (SFP+) & 12x40GbE (4xMXP) switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$41,407	25%
DCS-7050SX-128-F	Arista 7050, 96x10GbE (SFP+) & 8xQSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$39,995	25%
DCS-7050SX-128-R	Arista 7050, 96x10GbE (SFP+) & 8xQSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$39,995	25%
DCS-7050SX-128#	Arista 7050, 96x10GbE (SFP+) & 8xQSFP+ switch, no fans, no psu, 2 x C13-C14 cords	\$37,955	25%
DCS-7050SX-128-D#	Arista 7050, 96x10GbE (SFP+) & 8xQSFP+ switch, SSD, no fans, no psu, 2 x C13-C14 cords	\$40,955	25%
<b>Arista 7050X Series 10GBASE-T Switches</b>			
DCS-7050TX-48-F	Arista 7050X, 32xRJ45 (1/10GBASE-T) & 4xQSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$16,995	25%
DCS-7050TX-48-R	Arista 7050X, 32xRJ45 (1/10GBASE-T) & 4xQSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$16,995	25%
DCS-7050TX-48#	Arista 7050X, 32xRJ45 (1/10GBASE-T) & 4xQSFP+ switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$14,407	25%
DCS-7050TX-48-D#	Arista 7050X, 32xRJ45 (1/10GBASE-T) & 4xQSFP+ switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$18,407	25%
DCS-7050TX-64-F	Arista 7050X, 48xRJ45 (1/10GBASE-T) & 4xQSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$25,995	25%
DCS-7050TX-64-R	Arista 7050X, 48xRJ45 (1/10GBASE-T) & 4xQSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$25,995	25%
DCS-7050TX-64#	Arista 7050X, 48xRJ45 (1/10GBASE-T) & 4xQSFP+ switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$24,407	25%
DCS-7050TX-64-D#	Arista 7050X, 48xRJ45 (1/10GBASE-T) & 4xQSFP+ switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$27,407	25%
<b>Arista 7050 Series 10/40 Gigabit Ethernet Switches</b>			
DCS-7050S-64-F	Arista 7050, 48x10GbE (SFP+) & 4xQSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$24,995	25%
DCS-7050S-64-R	Arista 7050, 48x10GbE (SFP+) & 4xQSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$24,995	25%
DCS-7050S-64-F-DC	Arista 7050, 48x10GbE (SFP+) & 4xQSFP+ switch, front-to-rear air, 2xDC	\$25,895	25%
DCS-7050S-64-R-DC	Arista 7050, 48x10GbE (SFP+) & 4xQSFP+ switch, rear-to-front air, 2xDC	\$25,895	25%
DCS-7050S-64#	Arista 7050, 48x10GbE (SFP+) & 4xQSFP+ switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$23,595	25%
DCS-7050S-64-D#	Arista 7050, 48x10GbE (SFP+) & 4xQSFP+ switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$26,595	25%
DCS-7050S-52-F	Arista 7050, 52x10GbE (SFP+) switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$19,995	25%
DCS-7050S-52-R	Arista 7050, 52x10GbE (SFP+) switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$19,995	25%
DCS-7050S-52-F-DC	Arista 7050, 52x10GbE (SFP+) switch, front-to-rear air, 2xDC	\$20,895	25%
DCS-7050S-52-R-DC	Arista 7050, 52x10GbE (SFP+) switch, rear-to-front air, 2xDC	\$20,895	25%
DCS-7050S-52#	Arista 7050, 52x10GbE (SFP+) switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$18,595	25%
DCS-7050S-52-D#	Arista 7050, 52x10GbE (SFP+) switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$21,595	25%
DCS-7050Q-16-F	Arista 7050, 16xQSFP+ & 8xSFP+ combo port switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$29,995	25%
DCS-7050Q-16-R	Arista 7050, 16xQSFP+ & 8xSFP+ combo port switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$29,995	25%
DCS-7050Q-16#	Arista 7050, 16xQSFP+ & 8xSFP+ combo port switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$28,595	25%
DCS-7050Q-16-D#	Arista 7050, 16xQSFP+ & 8xSFP+ combo port switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$31,595	25%
<b>Arista 7050 Series 10GBASE-T Switches</b>			
DCS-7050T-64-F	Arista 7050, 48xRJ45(1/10GBASE-T) & 4xQSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$25,194	25%
DCS-7050T-64-R	Arista 7050, 48xRJ45(1/10GBASE-T) & 4xQSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$25,194	25%
DCS-7050T-64#	Arista 7050, 48xRJ45(1/10GBASE-T) & 4xQSFP+ switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$23,514	25%
DCS-7050T-64-D#	Arista 7050, 48xRJ45(1/10GBASE-T) & 4xQSFP+ switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$27,114	25%
DCS-7050T-52-F	Arista 7050, 48xRJ45(1/10GBASE-T) & 4xSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$19,194	25%
DCS-7050T-52-R	Arista 7050, 48xRJ45(1/10GBASE-T) & 4xSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$19,194	25%
DCS-7050T-52#	Arista 7050, 48xRJ45(1/10GBASE-T) & 4xSFP+ switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$17,514	25%
DCS-7050T-52-D#	Arista 7050, 48xRJ45(1/10GBASE-T) & 4xSFP+ switch, SSD, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$21,114	25%
DCS-7050T-36-F	Arista 7050, 32xRJ45(1/10GBASE-T) & 4xSFP+ switch, front-to-rear air, 2xAC, 2xC13-C14 cords	\$16,194	25%
DCS-7050T-36-R	Arista 7050, 32xRJ45(1/10GBASE-T) & 4xSFP+ switch, rear-to-front air, 2xAC, 2xC13-C14 cords	\$16,194	25%
DCS-7050T-36#	Arista 7050, 32xRJ45(1/10GBASE-T) & 4xSFP+ switch, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$14,514	25%
<b>Arista 7000 Series Gigabit Ethernet Switches</b>			
DCS-7010T-48-F	Arista 7010T, 48x RJ45 (100/1000), 4 x SFP+ (1/10GbE) switch, front to rear air, 2x AC, 2xC13-C14 cords	\$7,995	25%
DCS-7010T-48-R	Arista 7010T, 48x RJ45 (100/1000), 4 x SFP+ (1/10GbE) switch, rear to front air, 2x AC, 2xC13-C14 cords	\$7,995	25%
DCS-7048T-A-F	Arista 7048-A switch 48xRJ45(100/1000), 4xSFP+(1 or 10GbE),ZTP, front-to-rear fans, 2xAC, 2xC13-C14 cords	\$11,995	25%
DCS-7048T-A-R	Arista 7048-A switch 48xRJ45(100/1000), 4xSFP+(1 or 10GbE),ZTP, rear-to-front fans, 2xAC, 2xC13-C14 cords	\$11,995	25%
DCS-7048T-A#	Arista 7048-A switch 48xRJ45(100/1000), 4xSFP+(1 or 10GbE),ZTP, 2xC13-C14 cords. Requires 2 PSU & 4 fans sold separately	\$10,315	25%
<b>Arista 7250X/7050X Series Accessories</b>			
PWR-750AC-F	Spare 750 Watt AC power supply for Arista 7050SX-128 Switches (front-to-rear airflow)	\$720	25%
PWR-750AC-R	Spare 750 Watt AC power supply for Arista 7050SX-128 Switches (rear-to-front airflow)	\$720	25%
PWR-750AC-F#	Configurable 750 Watt AC power supply for Arista 7050SX-128 Switches (front-to-rear airflow)	\$720	25%
PWR-750AC-R#	Configurable 750 Watt AC power supply for Arista 7050SX-128 Switches (rear-to-front airflow)	\$720	25%
PWR-1100AC-F	Spare 1100 Watt AC power supply for Arista 7250QX-64 Switches (front-to-rear airflow)	\$1,920	25%
PWR-1100AC-R	Spare 1100 Watt AC power supply for Arista 7250QX-64 Switches (rear-to-front airflow)	\$1,920	25%
PWR-1100AC-F#	Configurable 1100 Watt AC power supply for Arista 7250QX-64 Switches (front-to-rear airflow)	\$1,920	25%
PWR-1100AC-R#	Configurable 1100 Watt AC power supply for Arista 7250QX-64 Switches (rear-to-front airflow)	\$1,920	25%
FAN-7002-F	Spare fan module for Arista 7250 / 7050 2RU and 7300 switches (front to rear airflow)	\$150	25%
FAN-7002-R	Spare fan module for Arista 7250 / 7050 2RU and 7300 switches (rear to front airflow)	\$150	25%
FAN-7002-F#	Configurable fan module for Arista 7250 / 7050 2RU and 7300 switches (front to rear airflow)	\$150	25%

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FAN-7002-R#	Configurable fan module for Arista 7250 / 7050 2RU and 7300 switches (rear to front airflow)	\$150	25%
KIT-2POST	Spare 2 post rack mount installation kit for Arista 7050X 2RU switches	\$50	25%
KIT-7002	Spare accessory kit for Arista 7050X 1RU/2RU tool-less switches	\$100	25%
KIT-1U-2POST-NT	Spare 1RU 2 post rail kit for 1RU tool less systems (7050QX-32S and 7050SX-64)	\$50	25%
KIT-4POST-NT	Spare 1RU/2RU tool-less rail kits for 4-post installation (7250QX, 7050SX, 7050QX-32S)	\$75	25%
<b>Arista 7x50 / 7100 / 7050 / 7048 Series Accessories</b>			
LIC-7048-E	Enhanced License for Arista 48-port Gigabit Ethernet Switches (OSPF, BGP, PIM)	\$3,594	25%
LIC-7048-V	Virtualization license for Arista Fixed 48-port 1G (VMTracer)	\$1,800	25%
LIC-FIX-1-E	Enhanced L3 License for Arista Fixed switches, 24-36 port 10G (BGP, OSPF, ISIS, PIM, NAT)	\$3,954	25%
LIC-FIX-2-E	Enhanced L3 License for Arista Fixed switches, 40-128 port 10G (BGP, OSPF, ISIS, PIM, NAT)	\$7,914	25%
LIC-FIX-3-E	Enhanced L3 License for Arista Fixed switches, 144-256 port 10G (BGP, OSPF, ISIS, PIM, NAT)	\$11,995	25%
LIC-FIX-1-Z	Monitoring & provisioning license for Arista Fixed switches 24-36 port 10G (ZTP, LANZ, TapAgg, API, Time-stamp)	\$1,794	25%
LIC-FIX-2-Z	Monitoring & provisioning license for Arista Fixed switches 40-128 port 10G (ZTP, LANZ, TapAgg, API, Time-stamp)	\$3,594	25%
LIC-FIX-3-Z	Monitoring & provisioning license for Arista Fixed switches 144-256 port 10G (ZTP, LANZ, TapAgg, API, Time-stamp)	\$4,795	25%
LIC-FIX-1-V	Virtualization license for Arista Fixed switches 24-36 port 10G (VMTracer and VXLAN)	\$1,800	25%
LIC-FIX-2-V	Virtualization license for Arista Fixed switches 40-128 port 10G (VMTracer and VXLAN)	\$3,600	25%
LIC-FIX-3-V	Virtualization license for Arista Fixed switches 144-256 port 10G (VM Tracer and VXLAN)	\$5,395	25%
PWR-460AC-F	Spare 460 Watt AC power supply for Arista 7150, 7124SX(FX), 7050 /QX-32 & 7048-A Switches (front-to-rear airflow)	\$654	25%
PWR-460AC-R	Spare 460 Watt AC power supply for Arista 7150, 7124SX(FX), 7050 /QX-32 & 7048-A Switches (rear-to-front airflow)	\$654	25%
PWR-460DC-F	Spare 460 Watt DC power supply for Arista 7150, 7124SX(FX), 7050 /QX-32 & 7048-A Switches (front-to-rear airflow)	\$1,194	25%
PWR-460DC-R	Spare 460 Watt DC power supply for Arista 7150, 7124SX(FX), 7050 /QX-32 & 7048-A Switches (rear-to-front airflow)	\$1,194	25%
PWR-460AC-F#	Configurable 460 Watt AC power supply for Arista 7150, 7124SX(FX), 7050 /QX-32 & 7048-A Switches (front-to-rear airflow)	\$654	25%
PWR-460AC-R#	Configurable 460 Watt AC power supply for Arista 7150, 7124SX(FX), 7050 /QX-32 & 7048-A Switches (rear-to-front airflow)	\$654	25%
PWR-460DC-F#	Configurable 460 Watt DC power supply for Arista 7150, 7124SX(FX), 7050 /QX-32 & 7048-A Switches (front-to-rear airflow)	\$1,194	25%
PWR-460DC-R#	Configurable 460 Watt DC power supply for Arista 7150, 7124SX(FX), 7050 /QX-32 & 7048-A Switches (rear-to-front airflow)	\$1,194	25%
PWR-500AC-F	Spare 500 Watt AC power supply for Arista 7050X Switches (front-to-rear airflow)	\$650	25%
PWR-500AC-R	Spare 500 Watt AC power supply for Arista 7050X Switches (rear-to-front airflow)	\$650	25%
PWR-500AC-F#	Configurable 500 Watt AC power supply for Arista 7050X Switches (front-to-rear airflow)	\$650	25%
PWR-500AC-R#	Configurable 500 Watt AC power supply for Arista 7050X Switches (rear-to-front airflow)	\$650	25%
FAN-7000-F	Spare fan module for Arista 7150,7124SX(FX), 7050/1RU 7050X & 7048-A switches (front-to-rear airflow)	\$100	25%
FAN-7000-R	Spare fan module for Arista 7150, 7124SX(FX), 7050/1 RU 7050X2 & 7048-A switches (rear-to-front airflow)	\$100	25%
FAN-7000-F#	Configurable fan module for Arista 7150, 7124SX(FX), 7050 /1 RU 7050X & 7048-A switches (front-to-rear airflow)	\$100	25%
FAN-7000-R#	Configurable fan module for Arista 7150, 7124SX(FX), 7050/1RU 7050X & 7048-A switches (rear-to-front airflow)	\$100	25%
FAN-7010	Spare fan module for Arista 7010 switches (reversible airflow)	\$100	25%
KIT-7010	Spare accessory kit for Arista 7010T switches	\$45	25%
KIT-7000	Spare accessory kit for Arista 7150, 7048-A, 7050 /QX-32 & 7124SX(FX) switches	\$72	25%
CAB-C13-C14	Power Cord C13 to C14 (2m)	\$17	25%
CAB-C13-US	Power Cord, North America,C13 to NEMA 5-15P, 8 Feet (2.5m)	\$17	25%
CAB-C13-EU	Power Cord, Europe,C13 to CEE 7/7, 8 Feet (2.5m)	\$17	25%
CAB-C13-UK	Power Cord, United Kingdom,C13 to BS 1363/A, 8 Feet (2.5m)	\$17	25%
CAB-C13-AUS	Power Cord, Australia,C13 to AS/NZS 3112, 8 Feet (2.5m)	\$17	25%
CAB-C13-IT	Power Cord, Italy,C13 to CEI 23-16, 8 Feet (2.5m)	\$17	25%
CAB-C13-AR	Power Cord, Argentina,C13 to IRAM 2073, 8 Feet (2.5m)	\$17	25%

Product Number	Description	USD Global List Price	Contract (11096-C) Discount %
<b>100GbE CFP2 Transceiver</b>			
CFP2-100G-LR4	100GBASE-LR4 CFP2 (Long Reach)	\$55,995	25%
<b>40GbE QSFP+ Transceiver</b>			
QSFP-40G-UNIV	40G QSFP+ Universal transceiver, up to 150m over OM3 duplex, or 500m over duplex single-mode fiber	\$2,995	25%
QSFP-40G-SR4	40GBASE-SR4 QSFP+ transceiver, up to 100m over parallel OM3 or 150m over OM4 multi-mode fiber	\$1,995	25%
QSFP-40G-XSR4	40GBASE-XSR4 QSFP+ transceiver, up to 300m over parallel OM3 or 450m over OM4 multi-mode fiber	\$2,995	25%
QSFP-40G-LR4	40GBASE-LR4 QSFP+ transceiver, up to 10KM over single-mode fiber	\$9,995	25%
QSFP-40G-LRL4	40GBASE-LRL4 QSFP+ transceiver, up to 1KM over single-mode fiber	\$4,495	25%
QSFP-40G-PLR4	40G QSFP+ transceiver, up to 10km over parallel single-mode (4x10G LR up to 10km) MTP-12	\$5,995	25%
QSFP-40G-PLRL4	40G QSFP+ transceiver, up to 1km over parallel single-mode (4x10G LR up to 1km) MTP-12	\$2,994	25%
<b>10GbE Small Form Factor Pluggables (SFP+)</b>			
SFP-10G-SRL	10GBASE-SRL SFP+ (Short Reach Lite)	\$395	25%
SFP-10G-SR	10GBASE-SR SFP+ (Short Reach)	\$445	25%
SFP-10G-LRL	10GBASE-LRL SFP+ (Long Reach Lite)	\$645	25%
SFP-10G-LR	10GBASE-LR SFP+ (Long Reach)	\$1,295	25%
SFP-10G-ER	10GBASE-ER SFP+ (Extended Reach to 40km)	\$8,394	25%
SFP-10G-ZR	10GBASE-ZR SFP+ (Extended Reach to 80km)	\$9,995	25%
<b>GbE Small Form Factor Pluggables (SFP)</b>			
SFP-1G-SX	1000BASE-SX SFP (Short Haul)	\$126	25%

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SFP-1G-LX	1000BASE-LX SFP (Long Haul)	\$232	25%
SFP-1G-T	1000BASE-T SFP (RJ-45 Copper)	\$158	25%
<b>10GbE SFP+ to SFP+ Twinax Copper Cables</b>			
CAB-SFP-SFP-0.5M	10GBASE-CR twinax copper cable with SFP+ connectors on both ends (0.5m)	\$79	25%
CAB-SFP-SFP-1M	10GBASE-CR twinax copper cable with SFP+ connectors on both ends (1m)	\$95	25%
CAB-SFP-SFP-1.5M	10GBASE-CR twinax copper cable with SFP+ connectors on both ends (1.5m)	\$103	25%
CAB-SFP-SFP-2M	10GBASE-CR twinax copper cable with SFP+ connectors on both ends (2m)	\$110	25%
CAB-SFP-SFP-2.5M	10GBASE-CR twinax copper cable with SFP+ connectors on both ends (2.5m)	\$119	25%
CAB-SFP-SFP-3M	10GBASE-CR twinax copper cable with SFP+ connectors on both ends (3m)	\$127	25%
CAB-SFP-SFP-5M	10GBASE-CR twinax copper cable with SFP+ connectors on both ends (5m)	\$158	25%
CAB-SFP-SFP-7M	10GBASE-CR twinax copper cable with SFP+ connectors on both ends (7m)	\$215	25%
<b>4 x 10GbE QSFP+ to 4 x SFP+ Twinax Copper Cables</b>			
CAB-Q-S-0.5M	4 x 10GbE QSFP+ to 4 x SFP+ twinax copper cable, 0.5M	\$450	25%
CAB-Q-S-1M	4 x 10GbE QSFP+ to 4 x SFP+ twinax copper cable, 1M	\$474	25%
CAB-Q-S-2M	4 x 10GbE QSFP+ to 4 x SFP+ twinax copper cable, 2M	\$516	25%
CAB-Q-S-3M	4 x 10GbE QSFP+ to 4 x SFP+ twinax copper cable, 3M	\$576	25%
CAB-Q-S-5M	4 x 10GbE QSFP+ to 4 x SFP+ twinax copper cable, 5M	\$654	25%
<b>10GbE SFP+ to SFP+ Active Optical Cables</b>			
AOC-S-S-10G-3M	SFP+ to SFP+ 10GbE Active Optical Cable 3 meter	\$315	25%
AOC-S-S-10G-5M	SFP+ to SFP+ 10GbE Active Optical Cable 5 meter	\$325	25%
AOC-S-S-10G-7M	SFP+ to SFP+ 10GbE Active Optical Cable 7 meter	\$335	25%
AOC-S-S-10G-10M	SFP+ to SFP+ 10GbE Active Optical Cable 10 meter	\$350	25%
AOC-S-S-10G-15M	SFP+ to SFP+ 10GbE Active Optical Cable 15 meter	\$375	25%
AOC-S-S-10G-20M	SFP+ to SFP+ 10GbE Active Optical Cable 20 meter	\$400	25%
AOC-S-S-10G-25M	SFP+ to SFP+ 10GbE Active Optical Cable 25 meter	\$450	25%
AOC-S-S-10G-30M	SFP+ to SFP+ 10GbE Active Optical Cable 30 meter	\$500	25%
<b>40GbE QSFP+ to QSFP+ Twinax Copper Cables</b>			
CAB-Q-Q-0.5M	40GbE QSFP+ to QSFP+ twinax copper cable, 0.5M	\$156	25%
CAB-Q-Q-1M	40GbE QSFP+ to QSFP+ twinax copper cable, 1M	\$192	25%
CAB-Q-Q-2M	40GbE QSFP+ to QSFP+ twinax copper cable, 2M	\$228	25%
CAB-Q-Q-3M	40GbE QSFP+ to QSFP+ twinax copper cable, 3M	\$276	25%
CAB-Q-Q-5M	40GbE QSFP+ to QSFP+ twinax copper cable, 5M	\$348	25%
CAB-Q-Q-7M	40GbE QSFP+ to QSFP+ twinax copper cable, 7M	\$516	25%
<b>40GbE QSFP+ to QSFP+ Active Optical Cables</b>			
AOC-Q-Q-40G-3M	QSFP+ to QSFP+ 40GbE Active Optical Cable 3 meter	\$895	25%
AOC-Q-Q-40G-5M	QSFP+ to QSFP+ 40GbE Active Optical Cable 5 meter	\$995	25%
AOC-Q-Q-40G-7M	QSFP+ to QSFP+ 40GbE Active Optical Cable 7 meter	\$1,095	25%
AOC-Q-Q-40G-10M	QSFP+ to QSFP+ 40GbE Active Optical Cable 10 meter	\$1,095	25%
AOC-Q-Q-40G-15M	QSFP+ to QSFP+ 40GbE Active Optical Cable 15 meter	\$1,195	25%
AOC-Q-Q-40G-20M	QSFP+ to QSFP+ 40GbE Active Optical Cable 20 meter	\$1,195	25%
AOC-Q-Q-40G-25M	QSFP+ to QSFP+ 40GbE Active Optical Cable 25 meter	\$1,395	25%
AOC-Q-Q-40G-30M	QSFP+ to QSFP+ 40GbE Active Optical Cable 30 meter	\$1,395	25%
AOC-Q-Q-40G-50M	QSFP+ to QSFP+ 40GbE Active Optical Cable 50 meter	\$1,595	25%
AOC-Q-Q-40G-75M	QSFP+ to QSFP+ 40GbE Active Optical Cable 75 meter	\$1,795	25%
AOC-Q-Q-40G-100M	QSFP+ to QSFP+ 40GbE Active Optical Cable 100 meter	\$1,995	25%
<b>MTP Fiber Cables</b>			
CAB-M24PM24P-M5	OM4 MTP24 to MTP24 - Direct connect for port to port (swaps the Tx and the Rx rows), 5m	\$995	25%
CAB-M24P3M12P-M5	OM4 MTP24 to 3x MTP12 - Direct connect for 1x MTP SR12 to 3 QSFP+ SR4, 5m	\$1,195	25%
CAB-M24P12LC-M5	OM4 MTP24 to 12x LC - Direct connect for 1x MTP SR12 to 12 SFP+ SR, 5m	\$945	25%
CAB-M24PM24T-M5	OM4 MTP24 to MTP24 - Port to trunk, non-pinned to pinned, 5m	\$995	25%
CAB-M24P2M12T-M5	OM4 MTP24 to 2x MTP12 - Port to 2x12 fiber trunks, non-pinned to pinned, 5m	\$1,045	25%
CAB-M12PM12P-M5	OM4 MTP12 to MTP12 - Direct connect for port to port (8 fiber cross over), 5m	\$645	25%
CAB-M12PM12T-M5	OM4 MTP12 to MTP12 - Port to trunk, non-pinned to pinned (8 fiber), 5m	\$645	25%
CAB-M12P4LC-M5	OM4 MTP12 to 4 LC - Direct connect for 1x QSFP+ SR4 to 4 SFP+ SR, 5m	\$395	25%
CAB-M12PM12P-S5	SM MTP12 to MTP12 - Direct connect for port to port (12 fiber cross over), 5m	\$595	25%
CAB-M12PM12T-S5	SM MTP12 to MTP12 - Port to trunk, non-pinned to pinned (8 fiber), 5m	\$695	25%
CAB-M12P4LC-S5	SM MTP12 to 4 LC - Direct connect for 1x QSFP+ PRLR4 to 4 SFP+ LR, 5m	\$595	25%
CAB-M24PM24P-M3	OM4 MTP24 to MTP24 - Direct connect for port to port (swaps the Tx and the Rx rows), 3m	\$895	25%
CAB-M24P3M12P-M3	OM4 MTP24 to 3x MTP12 - Direct connect for 1x MTP SR12 to 3 QSFP+ SR4, 3m	\$1,095	25%
CAB-M24P12LC-M3	OM4 MTP24 to 12x LC - Direct connect for 1x MTP SR12 to 12 SFP+ SR, 3m	\$845	25%
CAB-M24PM24T-M3	OM4 MTP24 to MTP24 - Port to trunk, non-pinned to pinned, 3m	\$895	25%
CAB-M24P2M12T-M3	OM4 MTP24 to 2x MTP12 - Port to 2x12 fiber trunks, non-pinned to pinned, 3m	\$945	25%
CAB-M12PM12P-M3	OM4 MTP12 to MTP12 - Direct connect for port to port (12 fiber cross over), 3m	\$545	25%
CAB-M12PM12T-M3	OM4 MTP12 to MTP12 - Port to trunk, non-pinned to pinned (8 fiber), 3m	\$545	25%
CAB-M12P4LC-M3	OM4 MTP12 to 4 LC - Direct connect for 1x QSFP+ SR4 to 4 SFP+ SR, 3m	\$345	25%
CAB-M12PM12P-S3	SM MTP12 to MTP12 - Direct connect for port to port (12 fiber cross over), 3m	\$595	25%
CAB-M12PM12T-S3	SM MTP12 to MTP12 - Port to trunk, non-pinned to pinned (8 fiber), 3m	\$695	25%
CAB-M12P4LC-S3	SM MTP12 to 4 LC - Direct connect for 1x QSFP+ PRLR4 to 4 SFP+ LR, 3m	\$595	25%



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SFP-10G-DW-32.68	10GBASE-DWDM 40KM 1532.68nm (ITU Channel 56) SFP+ Optics Module (100-GHz ITU grid)	\$7,495	25%
SFP-10G-DW-31.90	10GBASE-DWDM 40KM 1531.90nm (ITU Channel 57) SFP+ Optics Module (100-GHz ITU grid)	\$7,495	25%
SFP-10G-DW-31.12	10GBASE-DWDM 40KM 1531.12nm (ITU Channel 58) SFP+ Optics Module (100-GHz ITU grid)	\$7,495	25%
SFP-10G-DW-30.33	10GBASE-DWDM 40KM 1530.33nm (ITU Channel 59) SFP+ Optics Module (100-GHz ITU grid)	\$7,495	25%

**Arista Networks Direct Service Pricing (Arista provides levels 1/2/3 to End-User)**

Product Number	Description	USD Global List Price	Contract (11096-C) Discount %
<b>Arista A-Care Services</b>			
SVC-REINS-FIX	A-Care Service Reinstatement fee for Arista 1RU Switches	\$700	10%
SVC-REINS-7500	A Care Service Reinstatement fee for Arista 7500 Series Switches	\$2,995	10%
SVC-DEMO-CONV	A Care Demo/Eval Conversion Fee	\$420	10%
<b>Professional Services</b>			
SVE-PS-NET-1D	1-Day of Network Consulting Services	\$4,495	10%
SVE-PS-NET-1Y	1-Year of Network Consulting Services	\$359,995	10%
<b>Training</b>			
SVE-TRAIN-ACE-3D	Regional 3-Day ACE Training Class	\$3,295	10%
SVE-TRAIN-ACE-V	Regional 3-Day virtual ACE Training Class	\$2,995	10%
SVE-TRAIN-ONSITE	Custom Onsite ACE Training (up to 18 students per class)	\$49,995	10%
<b>Arista 7000 Family 1 Month A-Care Service Contracts</b>			
<b>Arista 7500E Series Modular Switches</b>			
SVC-7508E-1M-NB	1-Month A-Care Software & 8x5xNBD Hardware Replacement/Same Day Ship for 7508E	\$1,900	10%
SVC-7508E-1M-4H	1-Month A-Care 24x7x4 Software & Hardware Replacement for 7508E	\$2,600	10%
SVC-7508E-1M-2H	1-Month A-Care 24x7x2 Software & Hardware Replacement for 7508E	\$3,500	10%
SVC-7504E-1M-NB	1-Month A-Care Software & 8x5xNBD Hardware Replacement/Same Day Ship for 7504E	\$1,400	10%
SVC-7504E-1M-4H	1-Month A-Care 24x7x4 Software & Hardware Replacement for 7504E	\$1,900	10%
SVC-7504E-1M-2H	1-Month A-Care 24x7x2 Software & Hardware Replacement for 7504E	\$2,550	10%
<b>Arista 7500 Series Modular Switches</b>			
SVC-7508-1M-SW	1-Month A-Care Software only service for Arista 7508	\$606	10%
SVC-7508-1M-BAS	1-Month A-Care Software & Basic Hardware Return to Factory Replacement for 7508	\$808	10%
SVC-7508-1M-NB	1-Month A-Care Software & 8x5xNBD Hardware Replacement/Same Day Ship for 7508	\$1,010	10%
SVC-7508-1M-4H	1-Month A-Care 24x7x4 Software & Hardware Replacement for 7508	\$1,466	10%
SVC-7508-1M-2H	1-Month A-Care 24x7x2 Software & Hardware Replacement for 7508	\$1,979	10%
SVC-7504-1M-SW	1-Month A-Care software only service for 7504	\$380	10%
SVC-7504-1M-BAS	1-Month A-Care Software & Basic Hardware Return to Factory Replacement for 7504	\$500	10%
SVC-7504-1M-NB	1-Month A-Care Software & 8x5xNBD Hardware Replacement/Same Day Ship for 7504	\$630	10%
SVC-7504-1M-4H	1-Month A-Care 24x7x4 Software & Hardware Replacement for 7504	\$920	10%
SVC-7504-1M-2H	1-Month A-Care 24x7x2 Software & Hardware Replacement for 7504	\$1,242	10%
<b>Arista 7300X Series Modular Switches</b>			
SVC-7316X-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7316X	\$1,350	10%
SVC-7316X-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7316X	\$1,600	10%
SVC-7316X-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7316X	\$1,800	10%
SVC-7308X-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7308X	\$650	10%
SVC-7308X-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7308X	\$750	10%
SVC-7308X-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7308X	\$900	10%
SVC-7304X-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7304X	\$400	10%
SVC-7304X-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7304X	\$475	10%
SVC-7304X-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7304X	\$575	10%
<b>Arista 7280SE Series 10/40/100 Gigabit Ethernet Switches</b>			
SVC-7280SE-72-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7280SE-72	\$335	10%
SVC-7280SE-72-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7280SE-72	\$500	10%
SVC-7280SE-72-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7280SE-72	\$675	10%
SVC-7280SE-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7280SE-64	\$233	10%
SVC-7280SE-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7280SE-64	\$350	10%
SVC-7280SE-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7280SE-64	\$470	10%
<b>Arista 7250X Series 40 Gigabit Ethernet Switches</b>			
SVC-7250QX-64-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7250QX-64	\$250	10%
SVC-7250QX-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7250QX-64	\$300	10%
SVC-7250QX-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7250QX-64	\$450	10%
SVC-7250QX-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7250QX-64	\$600	10%
SVC-7250QXD-64-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7250QXD-64	\$280	10%
SVC-7250QXD-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7250QXD-64	\$325	10%
SVC-7250QXD-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7250QXD-64	\$475	10%
SVC-7250QXD-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7250QXD-64	\$650	10%

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<b>Arista 7150 Series 10GbE SFP+ Switches</b>			
SVC-7150S-64-CL-1M-SW	1-Month A-Care Software Only Service for 7150S-64-CL	\$120	10%
SVC-7150S-64-CL-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7150S-64-CL	\$150	10%
SVC-7150S-64-CL-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7150S-64-CL	\$200	10%
SVC-7150S-64-CL-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7150S-64-CL	\$300	10%
SVC-7150S-64-CL-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7150S-64-CL	\$400	10%
SVC-7150S-64-CLD-1M-SW	1-Month A-Care Software Only Service for 7150S-64-CLD	\$140	10%
SVC-7150S-64-CLD-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7150S-64-CLD	\$190	10%
SVC-7150S-64-CLD-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7150S-64-CLD	\$250	10%
SVC-7150S-64-CLD-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7150S-64-CLD	\$350	10%
SVC-7150S-64-CLD-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7150S-64-CLD	\$460	10%
SVC-7150S-52-CL-1M-SW	1-Month A-Care Software Only Service for 7150S-52-CL	\$100	10%
SVC-7150S-52-CL-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7150S-52-CL	\$125	10%
SVC-7150S-52-CL-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7150S-52-CL	\$170	10%
SVC-7150S-52-CL-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7150S-52-CL	\$230	10%
SVC-7150S-52-CL-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7150S-52-CL	\$310	10%
SVC-7150S-52-CLD-1M-SW	1-Month A-Care Software Only Service for 7150S-52-CLD	\$120	10%
SVC-7150S-52-CLD-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7150S-52-CLD	\$165	10%
SVC-7150S-52-CLD-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7150S-52-CLD	\$210	10%
SVC-7150S-52-CLD-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7150S-52-CLD	\$300	10%
SVC-7150S-52-CLD-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7150S-52-CLD	\$390	10%
SVC-7150S-24-1M-SW	1-Month A-Care Software Only Service for 7150S-24	\$50	10%
SVC-7150S-24-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7150S-24	\$65	10%
SVC-7150S-24-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7150S-24	\$85	10%
SVC-7150S-24-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7150S-24	\$120	10%
SVC-7150S-24-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7150S-24	\$162	10%
SVC-7150S-24-CL-1M-SW	1-Month A-Care Software Only Service for 7150S-24-CL	\$52	10%
SVC-7150S-24-CL-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7150S-24-CL	\$70	10%
SVC-7150S-24-CL-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7150S-24-CL	\$94	10%
SVC-7150S-24-CL-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7150S-24-CL	\$125	10%
SVC-7150S-24-CL-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7150S-24-CL	\$169	10%
SVC-7150S-24-CLD-1M-SW	1-Month A-Care Software Only Service for 7150S-24-CLD	\$70	10%
SVC-7150S-24-CLD-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7150S-24-CLD	\$98	10%
SVC-7150S-24-CLD-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7150S-24-CLD	\$128	10%
SVC-7150S-24-CLD-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7150S-24-CLD	\$185	10%
SVC-7150S-24-CLD-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7150S-24-CLD	\$250	10%
<b>Arista 7124FX Application Switches</b>			
SVC-7124FX-1M-SW	1-Month A-Care Software Only Service for 7124FX	\$208	10%
SVC-7124FX-1M-BAS	1-Month A-Care Software & Basic Hardware Return to Factory Replacement for 7124FX	\$292	10%
SVC-7124FX-1M-NB	1-Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7124FX	\$375	10%
SVC-7124FX-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7124FX	\$542	10%
SVC-7124FX-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7124FX	\$708	10%
<b>Arista 7100 Series SFP+ Switches</b>			
SVC-7124SX-1M-SW	1-Month A-Care Software Only Service for 7124SX	\$50	10%
SVC-7124SX-1M-BAS	1-Month A-Care Software & Basic Hardware Return to Factory Replacement for 7124SX	\$65	10%
SVC-7124SX-1M-NB	1-Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7124SX	\$85	10%
SVC-7124SX-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7124SX	\$120	10%
SVC-7124SX-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7124SX	\$162	10%
SVC-7124SXD-1M-SW	1-Month A-Care Software Only Service for 7124SX with SSD	\$65	10%
SVC-7124SXD-1M-BAS	1-Month A-Care Software & Basic Hardware Return to Factory Replacement for 7124SX with SSD	\$85	10%
SVC-7124SXD-1M-NB	1-Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7124SX with SSD	\$115	10%
SVC-7124SXD-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7124SX with SSD	\$160	10%
SVC-7124SXD-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7124SX with SSD	\$216	10%
SVC-7148S-1M-SW	1-Month A-Care Software Only Service for 7148S	\$79	10%
SVC-7148S-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7148S	\$106	10%
SVC-7148S-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7148S	\$132	10%
SVC-7148S-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7148S	\$192	10%
SVC-7148S-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7148S	\$259	10%
SVC-7148SX-1M-SW	1-Month A-Care Software Only Service for 7148SX	\$100	10%
SVC-7148SX-1M-BAS	1-Month A-Care Software & Basic Hardware Return to Factory Replacement for 7148SX	\$133	10%
SVC-7148SX-1M-NB	1-Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7148SX	\$167	10%
SVC-7148SX-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7148SX	\$242	10%
SVC-7148SX-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7148SX	\$327	10%
<b>Arista 7050X Series 40 Gigabit Ethernet Switches</b>			
SVC-7050QX-32S-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050QX-32S	\$165	10%
SVC-7050QX-32S-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050QX-32S	\$224	10%
SVC-7050QX-32S-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050QX-32S	\$320	10%
SVC-7050QXD-32S-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050QXD-32S	\$190	10%
SVC-7050QXD-32S-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050QXD-32S	\$250	10%
SVC-7050QXD-32S-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050QXD-32S	\$350	10%
SVC-7050QX-32-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050QX-32	\$165	10%
SVC-7050QX-32-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050QX-32	\$224	10%
SVC-7050QX-32-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050QX-32	\$320	10%
SVC-7050QXD-32-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050QXD-32	\$190	10%
SVC-7050QXD-32-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050QXD-32	\$250	10%
SVC-7050QXD-32-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050QXD-32	\$350	10%
<b>Arista 7050X Series 10/40 Gigabit Ethernet Switches</b>			
SVC-7050SX-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SX-64	\$145	10%

**ENTERPRISE NETWORKS SOLUTIONS, 1955 N VAL VISTA DR. SUITE 101, MESA, AZ 85213**

SVC-7050SX-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SX-64	\$210	10%
SVC-7050SX-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SX-64	\$284	10%
SVC-7050SXD-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SXD-64, with SSD	\$200	10%
SVC-7050SXD-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SXD-64, with SSD	\$300	10%
SVC-7050SXD-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SXD-64, with SSD	\$405	10%
SVC-7050SX-72-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SX-72	\$200	10%
SVC-7050SX-72-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SX-72	\$300	10%
SVC-7050SX-72-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SX-72	\$400	10%
SVC-7050SXD-72-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SXD-72	\$230	10%
SVC-7050SXD-72-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SXD-72	\$330	10%
SVC-7050SXD-72-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SXD-72	\$430	10%
-	-	-	-
SVC-7050SX-96-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SX-96	\$267	10%
SVC-7050SX-96-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SX-96	\$400	10%
SVC-7050SX-96-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SX-96	\$533	10%
SVC-7050SXD-96-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SXD-96	\$297	10%
SVC-7050SXD-96-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SXD-96	\$430	10%
SVC-7050SXD-96-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SXD-96	\$563	10%
-	-	-	-
SVC-7050SX-128-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SX-128	\$165	10%
SVC-7050SX-128-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SX-128	\$224	10%
SVC-7050SX-128-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SX-128	\$320	10%
SVC-7050SXD-128-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SXD-128	\$190	10%
SVC-7050SXD-128-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SXD-128	\$250	10%
SVC-7050SXD-128-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SXD-128	\$350	10%
<b>Arista 7050X Series 10GBASE-T Switches</b>			
SVC-7050TX-48-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050TX-48	\$81	10%
SVC-7050TX-48-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050TX-48	\$115	10%
SVC-7050TX-48-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050TX-48	\$155	10%
SVC-7050TXD-48-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050TXD-48	\$111	10%
SVC-7050TXD-48-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050TXD-48	\$155	10%
SVC-7050TXD-48-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050TXD-48	\$209	10%
-	-	-	-
SVC-7050TX-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050TX-64	\$126	10%
SVC-7050TX-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050TX-64	\$178	10%
SVC-7050TX-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050TX-64	\$240	10%
SVC-7050TXD-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050TXD-64	\$173	10%
SVC-7050TXD-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050TXD-64	\$240	10%
SVC-7050TXD-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050TXD-64	\$324	10%
<b>Arista 7050 Series 10/40 Gigabit Ethernet Switches</b>			
SVC-7050S-64-1M-SW	1-Month A-Care Software Only Service for 7050S-64	\$90	10%
SVC-7050S-64-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050S-64	\$110	10%
SVC-7050S-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050S-64	\$145	10%
SVC-7050S-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050S-64	\$210	10%
SVC-7050S-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050S-64	\$284	10%
SVC-7050SD-64-1M-SW	1-Month A-Care Software Only Service for 7050SD-64 with SSD	\$120	10%
SVC-7050SD-64-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050SD-64, with SSD	\$160	10%
SVC-7050SD-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SD-64, with SSD	\$200	10%
SVC-7050SD-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SD-64, with SSD	\$300	10%
SVC-7050SD-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SD-64, with SSD	\$405	10%
SVC-7050S-52-1M-SW	1-Month A-Care Software Only Service for 7050S-52	\$70	10%
SVC-7050S-52-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050S-52	\$90	10%
SVC-7050S-52-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050S-52	\$120	10%
SVC-7050S-52-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050S-52	\$170	10%
SVC-7050S-52-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050S-52	\$230	10%
SVC-7050SD-52-1M-SW	1-Month A-Care Software Only Service for 7050SD-52	\$94	10%
SVC-7050SD-52-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050SD-52	\$122	10%
SVC-7050SD-52-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050SD-52	\$165	10%
SVC-7050SD-52-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050SD-52	\$230	10%
SVC-7050SD-52-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050SD-52	\$311	10%
SVC-7050Q-16-1M-SW	1-Month A-Care Software Only Service for 7050Q-16	\$105	10%
SVC-7050Q-16-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050Q-16	\$135	10%
SVC-7050Q-16-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050Q-16	\$180	10%
SVC-7050Q-16-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050Q-16	\$255	10%
SVC-7050Q-16-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050Q-16	\$344	10%
SVC-7050QD-16-1M-SW	1-Month A-Care Software Only Service for 7050QD-16	\$134	10%
SVC-7050QD-16-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050QD-16	\$175	10%
SVC-7050QD-16-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050QD-16	\$237	10%
SVC-7050QD-16-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050QD-16	\$330	10%
SVC-7050QD-16-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050QD-16	\$446	10%
<b>Arista 7050 Series 10GBASE-T Switches</b>			
SVC-7050T-64-1M-SW	1-Month A-Care Software Only Service for 7050T-64	\$73	10%
SVC-7050T-64-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050T-64	\$94	10%
SVC-7050T-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050T-64	\$126	10%
SVC-7050T-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050T-64	\$178	10%
SVC-7050T-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050T-64	\$240	10%
SVC-7050TD-64-1M-SW	1-Month A-Care Software Only Service for 7050TD-64	\$98	10%
SVC-7050TD-64-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050TD-64	\$128	10%
SVC-7050TD-64-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050TD-64	\$173	10%
SVC-7050TD-64-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050TD-64	\$240	10%
SVC-7050TD-64-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050TD-64	\$324	10%

**ENTERPRISE NETWORKS SOLUTIONS, 1955 N VAL VISTA DR. SUITE 101, MESA, AZ 85213**

SVC-7050T-52-1M-SW	1-Month A-Care Software Only Service for 7050T-52	\$56	10%
SVC-7050T-52-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050T-52	\$72	10%
SVC-7050T-52-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050T-52	\$96	10%
SVC-7050T-52-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050T-52	\$136	10%
SVC-7050T-52-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050T-52	\$184	10%
SVC-7050TD-52-1M-SW	1-Month A-Care Software Only Service for 7050TD-52	\$77	10%
SVC-7050TD-52-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050TD-52	\$101	10%
SVC-7050TD-52-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050TD-52	\$137	10%
SVC-7050TD-52-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050TD-52	\$190	10%
SVC-7050TD-52-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050TD-52	\$257	10%
SVC-7050T-36-1M-SW	1-Month A-Care Software Only Service for 7050T-36	\$47	10%
SVC-7050T-36-1M-BAS	1 Month A-Care Software & Basic Hardware Return to Factory Replacement for 7050T-36	\$61	10%
SVC-7050T-36-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7050T-36	\$81	10%
SVC-7050T-36-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7050T-36	\$115	10%
SVC-7050T-36-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7050T-36	\$155	10%
<b>Arista 7000 Series Gigabit Ethernet Switch</b>			
SVC-7010T-1M-NB	1 Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7010T-48	\$34	10%
SVC-7010T-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7010T-48	\$50	10%
SVC-7010T-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7010T-48	\$67	10%
SVC-7048A-1M-SW	1-Month A-Care Software Only Service for 7048T-A	\$30	10%
SVC-7048A-1M-BAS	1-Month A-Care Software & Basic Hardware Return to Factory Replacement for 7048T-A	\$40	10%
SVC-7048A-1M-NB	1-Month A-Care Software & NBD Hardware Replacement/Same Day Ship for 7048T-A	\$50	10%
SVC-7048A-1M-4H	1-Month A-Care Software & 24x7x4 Hour Hardware Replacement for 7048T-A	\$74	10%
SVC-7048A-1M-2H	1-Month A-Care Software & 24x7x2 Hour Hardware Replacement for 7048T-A	\$100	10%

PRICING SHEET: NIGP CODE , 83829

Payment Term: NET 30 DAYS

Vendor Number: 2011001472 0

Certificates of Insurance Required

Contract Period: To cover the period ending January 31, ~~2015~~ 2018.

**ETHERWAN SYSTEMS, INC., 4570 E. EISENHOWER CIRCLE, ANAHEIM, CA 92807**

COMPANY NAME:	<u>EtherWan Systems, Inc</u>
DOING BUSINESS AS (DBA) NAME:	<u>2011001486 0</u>
MAILING ADDRESS:	<u>4570 E. Eisenhower Circle, Anaheim, CA 92807</u>
REMIT TO ADDRESS:	<u></u>
TELEPHONE NUMBER:	<u>714-779-3800</u>
FACSIMILE NUMBER:	<u>714-779-3806</u>
WEB SITE:	<u></u>
REPRESENTATIVE NAME:	<u>Michelle Bishop</u>
REPRESENTATIVE TELEPHONE NUMBER:	<u>714-779-3800</u>
REPRESENTATIVE E-MAIL:	<u>michelle.bishop@etherwan.com</u>

	<u>YES</u>	<u>NO</u>	<u>REBATE</u>
WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

WILL ACCEPT PROCUREMENT CARD FOR PAYMENT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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FUEL COMPRISES (if section for fuel price adjustment is located in the solicitation document) **0% OF TOTAL BID AMOUNT**

NET 30 DAYS

Lot Name	Product Code	Title	Price	Unit
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	KP-AA96-480	EtherWan	\$8.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	41-136044-1	EtherWan	\$60.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EX71620-A0B	Switch	\$1,050.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	ED3175-82B	Switch	\$1,050.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	EX-78440-A0B	Switch	\$1,538.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	SDR-240-48	Traco	\$270.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	EX45062-A0B	Transition	\$795.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	EX71802-0VB	Switch	\$810.00	each

**\*\*EFFECTIVE 12/16/15\*\***

Description	Product Code	Price	Unit
<b>Hardened (-40°C - 75°C) Managed Ethernet Switch with 8 10/100TX Ports + 2 Gigabit SFP Slots. DIN Rail or Panel Mount. Terminal Block or DC Jack Power Connector (12VDC - 48VDC).</b>	<b>EX71802-0VB</b>	<b>\$810.00</b>	<b>Ea.</b>
<b>Power Supply, Hardened ( -40C - +75C ) External 100-240 VAC Input; TS2 rated; 12VDC Output Power</b>	<b>41-136046-1</b>	<b>\$60.00</b>	<b>Ea.</b>

ETHERWAN SYSTEMS, INC., 4570 E. EISENHOWER CIRCLE, ANAHEIM, CA 92807

<b>SFP Module, Hardened (-40°C - 75°C) Gigabit, 9/125 µm, SM, 10Km, 1310nm, Duplex LC Connectors</b>	<b>EX-1250TSP-MB4L-AS</b>	<b>\$169.00</b>	<b>Ea.</b>
<b>Hardened (-40°C - 75°C) Managed Ethernet Switch with 8 10/100TX Ports + 2 Gigabit Fiber Ports. DIN Rail or Panel Mount. Terminal Block or DC Jack Power Connector (12VDC - 48VDC).</b>	<b>EX71802-0AB</b>	<b>\$1,095.00</b>	<b>Ea.</b>
<b>Hardened (-40°C - 75°C) Managed Ethernet Switch with 8 10/100TX Ports + 2 Gigabit Fiber Ports. DIN Rail or Panel Mount. Terminal Block or DC Jack Power Connector (12VDC - 48VDC).</b>	<b>EX71802-0BB</b>	<b>\$1,247.00</b>	<b>Ea.</b>
<b>Hardened (-40°C - 75°C) Managed 16 10/100TX Ports + 2 Combo Gigabit TX / Fiber Ports Ethernet Switch. DIN Rail or Panel Mount. Terminal Block or DC Jack Power Connector (12VDC - 32VDC).</b>	<b>EX73402-0AB</b>	<b>\$1,289.00</b>	<b>Ea.</b>
<b>Hardened (-40°C - 75°C) Managed 16 10/100TX Ports + 2 Combo Gigabit TX / Fiber Ports Ethernet Switch. DIN Rail or Panel Mount. Terminal Block or DC Jack Power Connector (12VDC - 32VDC).</b>	<b>EX73402-0BB</b>	<b>\$1,441.00</b>	<b>Ea.</b>
<b>SFP Module, Hardened (-40°C - 75°C) Gigabit, 9/125 µm, SM, 20Km, 1310nm Duplex LC Connector</b>	<b>EX-1250TSP-MB5L-AS</b>	<b>\$323.00</b>	<b>Ea.</b>
<b>N/A</b>	<b>ED3575</b>	<b>\$1,216.00</b>	<b>Ea.</b>

PRICING SHEET: NIGP CODE , 83829

Payment Term: NET 30 DAYS

Vendor Number: 2011001486 0

Certificates of Insurance Required

Contract Period: To cover the period ending **January 31, 2015-2018.**

**GRAYBAR ELECTRIC INC.3350 W. EARLL DR. PHOENIX, AZ 85017**

COMPANY NAME:	<u>Graybar Electric</u>
DOING BUSINESS AS (DBA) NAME:	
MAILING ADDRESS:	<u>3350 W. Earll Dr. Phoenix, AZ 85017</u>
REMIT TO ADDRESS:	<u>Graybar File 57072 Los Angeles, CA 90074-7072</u>
TELEPHONE NUMBER:	<u>602-269-2131</u>
FACSIMILE NUMBER:	<u>602-269-4993</u>
WEB SITE:	<u>www.graybar.com</u>
REPRESENTATIVE NAME:	<u>Sheila Diaz Stephanie Atkins</u>
REPRESENTATIVE TELEPHONE NUMBER:	<u>602 327 3543 480-495-9222</u>
REPRESENTATIVE E-MAIL:	<u>sheila.diaz@graybar.com Stephanie.atkins@graybar.com</u>

	<u>YES</u>	<u>NO</u>	<u>REBATE</u>
WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

WILL ACCEPT PROCUREMENT CARD FOR PAYMENT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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FUEL COMPRISES (if section for fuel price adjustment is located in the solicitation document) **0% OF TOTAL BID AMOUNT**

NET 30 DAYS

Lot Name	Product Code	Title	Price	Unit
Blanket Labor Rates		ITS Technician	\$0.00	hour
Blanket Labor Rates		Operations Engineer	\$0.00	hour
Blanket Labor Rates		Principal	\$0.00	hour
Blanket Labor Rates		Secretary/Clerical	\$0.00	hour
Blanket Labor Rates		Senior Systems Engineer	\$0.00	hour
Blanket Labor Rates		Technician IMSA I	\$0.00	hour
Blanket Labor Rates		Technician IMSA II	\$0.00	hour
CAMERA ASSEMBLY		Camera: Bosch VG4-524-ECS1M/5001	\$4,660.00	each
CAMERA ASSEMBLY		Camera: Cohu -Helios 3960 HD	\$6,950.00	each
CAMERA ASSEMBLY		Camera: Cohu i-dome - 3925-3100	\$3,960.00	each
CAMERA ASSEMBLY	SD427-PRE1	Camera: Pelco Spectra 4 PTZ CCTV	\$3,587.00	each
CAMERA ASSEMBLY	SD4E35-HCPE1	Camera: Pelco - Spectra IV	\$4,102.00	each
CAMERA ASSEMBLY		Camera: Pelco ES30PC/ES31PC	\$3,689.00	each
CAMERA ASSEMBLY		Installation Labor Cost	\$0.00	each
CAMERA ASSEMBLY		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
CCTV CABINET		CCTV CABINET	\$0.00	each
ELECTRICAL CONDUCTORS MATERIALS	7840A	Belden	\$1.25	linear foot
ELECTRICAL CONDUCTORS MATERIALS	7921A	Belden	\$0.75	linear foot

**GRAYBAR ELECTRIC INC.3350 W. EARLL DR. PHOENIX, AZ 85017**

ELECTRICAL CONDUCTORS MATERIALS	7838A	Belden	\$0.40	linear feet
ELECTRICAL CONDUCTORS MATERIALS		Installation Labor Cost	\$0.00	linear foot
ELECTRICAL CONDUCTORS MATERIALS		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
ELECTRICAL CONDUCTORS MATERIALS	AQC815	West Penn	\$0.25	linear foot
ELECTRICAL CONDUCTORS MATERIALS	AQ296	West Penn	\$1.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	LG250-U-0	AFL	\$174.64	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	FM00087-B	AFL	\$238.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	C223492-0003	AFL	\$56.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	LV012-K-C5101N1	AFL	\$0.65	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	LV096-K-C810N1	AFL	\$1.80	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	LG-350-AC	AFL	\$290.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	LL-2400	AFL	\$12.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	FM000742	AFL	\$145.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	LL-4808L	AFL	\$16.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS		Installation Labor Cost	\$0.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS		Mobilization, General Conditions and Incidentals Cost (1-250ft)	\$0.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS		Mobilization, General Conditions and Incidentals Cost (2,501-5,000ft)	\$0.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS		Mobilization, General Conditions and Incidentals Cost (5,001-7,500ft)	\$0.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS		Mobilization, General Conditions and Incidentals Cost (7,501-10,000ft)	\$0.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS		Mobilization, General Conditions and Incidentals Cost (greater than 10,001ft)	\$0.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	NP2	NeatPatch	\$61.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	NP2	NeatPatch	\$61.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	MX-F1-LC-02	Siemon	\$10.06	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	MX-PNL-24	Siemon	\$31.00	each

**GRAYBAR ELECTRIC INC.3350 W. EARLL DR. PHOENIX, AZ 85017**

FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	MX5-FO7	Siemon	\$4.50	Each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	MX-F1-LCU-02C	Siemon	\$10.06	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	FOSC-ACC-C-TRAY-24	Tyco	\$19.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	FOSC-450-C6-6NT	Tyco	\$270.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server		Digi 76000752	\$120.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server		Ditek DTK-Z8-LVLP	\$100.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server		Installation Labor Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	70001919	Server	\$950.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	KP-AA96-480	EtherWan	\$8.33	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	41-136044-1	EtherWan	\$117.86	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)		Installation Labor Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)		Jumper Cable	\$25.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EX71620-AOB	Switch	\$1,250.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)		Belden 7838A	\$0.40	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)		Installation Labor Cost	\$0.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)		Jumper Cable	\$25.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)		Mobilization, General Conditions and Incidentals Cost	\$0.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)		Router	\$5,112.43	each
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)		Belden 7838A	\$0.40	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)		Installation Labor Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)		Jumper Cable	\$25.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	RS1000-R-DP-HI-XX-XX-TX01-TC2-XX	Router	\$4,300.00	each

**GRAYBAR ELECTRIC INC.3350 W. EARLL DR. PHOENIX, AZ 85017**

ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)		Installation Labor Cost	\$0.00	Each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)		Jumper Cable	\$25.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)		RuggedCom	\$20.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)		Switch	\$1,651.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)		Installation Labor Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)		Jumper Cable	\$25.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	6KP8V-45SLC	Switch	\$2,621.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	TSP180-148	Traco	\$180.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	SISTP1014-141-LRT	Transition	\$705.68	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)		Installation Labor Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)		Jumper Cable	\$25.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	99-25-0100	RuggedCom 25-10-0100	\$270.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)		RuggedCom 25-10-0101	\$495.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	99-50-0001	RuggedCom P	\$20.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RS900G-HI-D-2SFP	Switch	\$1,315.00	each
LIGHTNING PROTECTION	615800	Ground Rod	\$20.00	each
LIGHTNING PROTECTION	BARE-CU SD 8	Grounding Conductor	\$1.00	linear foot
LIGHTNING PROTECTION		Installation Labor Cost	\$0.00	each
LIGHTNING PROTECTION		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
Miscellaneous	25-10-0109	SFP Connector	\$1,800.00	each
PRODUCT TRAINING		4-Hour Training Course - CAMERA ASSEMBLY	\$0.00	each
PRODUCT TRAINING		4-Hour Training Course - ELECTRICAL CONDUCTORS	\$0.00	each

**GRAYBAR ELECTRIC INC.3350 W. EARLL DR. PHOENIX, AZ 85017**

PRODUCT TRAINING		4-Hour Training Course - FIBER OPTIC CABLE AND EQUIPMENT	\$0.00	Each
PRODUCT TRAINING		4-Hour Training Course - ITS NETWORK EQUIPMENT	\$0.00	each
PRODUCT TRAINING		4-Hour Training Course - RADIO COMMUNICATIONS EQUIPMENT	\$0.00	each
PRODUCT TRAINING		8-Hour Training Course - CAMERA ASSEMBLY	\$0.00	each
PRODUCT TRAINING		8-Hour Training Course - ELECTRICAL CONDUCTORS	\$0.00	each
PRODUCT TRAINING		8-Hour Training Course - FIBER OPTIC CABLE AND EQUIPMENT	\$0.00	each
PRODUCT TRAINING		8-Hour Training Course - ITS NETWORK EQUIPMENT	\$0.00	each
PRODUCT TRAINING		8-Hour Training Course - RADIO COMMUNICATIONS EQUIPMENT	\$0.00	each
PRODUCT TRAINING		Additional Student - CAMERA ASSEMBLY	\$0.00	each
PRODUCT TRAINING		Additional Student - ELECTRICAL CONDUCTORS	\$0.00	each
PRODUCT TRAINING		Additional Student - FIBER OPTIC CABLE AND EQUIPMENT	\$0.00	each
PRODUCT TRAINING		Additional Student - ITS NETWORK EQUIPMENT	\$0.00	each
PRODUCT TRAINING		Additional Student - RADIO COMMUNICATIONS EQUIPMENT	\$0.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS		Belden 7838A	\$0.40	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS		Belden 7838A	\$0.40	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS		Belden 7840A	\$1.25	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS		Belden 7921A	\$0.75	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS		Colubris / HP Procurve	\$0.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	HG5819P	HyperTechnologies	\$50.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS		HyperTechnologies	\$9.27	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS		Installation Labor Cost	\$0.00	each

**GRAYBAR ELECTRIC INC.3350 W. EARLL DR. PHOENIX, AZ 85017**

RADIO COMMUNICATIONS EQUIPMENT MATERIALS	HG5421G	L-COM	\$64.00	Each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS		West Penn AQ296	\$1.00	linear foot
VIDEO CODEC - Decorder	DTK-VSP-BNC-A	CCTV Surge Protector	\$35.00	each
VIDEO CODEC - Decorder	9003-2 AND 9010	Chassis/Power Supply	\$175.00	each
VIDEO CODEC - Decorder	S-60 D-MC/SA	Encoder	\$825.00	each
VIDEO CODEC - Decorder		Installation Labor Cost	\$0.00	each
VIDEO CODEC - Decorder		Jumper Cable	\$0.75	linear foot
VIDEO CODEC - Decorder		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
VIDEO CODEC - Decorder	DTK-120HW	Surge Protector	\$35.00	each
VIDEO CODEC - Encoder	DTK-VSP-BNC-A	CCTV Surge Protector	\$35.00	each
VIDEO CODEC - Encoder	9003-2 AND 9010	Chassis/Power Supply	\$175.00	each
VIDEO CODEC - Encoder	C60-E-MC/SA	Encoder	\$1,475.00	each
VIDEO CODEC - Encoder		Installation Labor Cost	\$0.00	each
VIDEO CODEC - Encoder		Jumper Cable	\$25.00	linear foot
VIDEO CODEC - Encoder		Mobilization, General Conditions and Incidentals Cost	\$0.00	each
VIDEO CODEC - Encoder	DTK-120HW	Surge Protector	\$35.00	each

PRICING SHEET: NIGP CODE , 83829

Payment Term: NET 30 DAYS

Vendor Number: 2011001541 0

Certificates of Insurance Required

Contract Period: To cover the period ending **January 31, 2015-2018.**

**REDHAWK SOLUTIONS, LLC, 2602 W. BLOOMFIELD RD., PHOENIX, AZ 85029**

ITS Engineers, 21620 N 19<sup>th</sup> Avenue, A-4, 22505 N 19th Ave, Phoenix, Az 85027

COMPANY NAME:	<u>Redhawk Solutions, LLC</u>
	<u>ITS Engineers &amp; Constructors of Utah Inc.</u>
DOING BUSINESS AS (DBA) NAME:	<u>ITS Engineers</u>
MAILING ADDRESS:	<u>2602 W. Bloomfield Rd, Phoenix, AZ 85029</u>
	<u>22505 N 19th Avenue Phoenix, AZ 85027</u>
REMIT TO ADDRESS:	<u>2602 W. Bloomfield Rd, Phoenix, AZ 85029</u>
	<u>22505 N 19th Avenue Phoenix, AZ 85027</u>
TELEPHONE NUMBER:	<u>602-980-2992 (623) 780-4050</u>
FACSIMILE NUMBER:	<u>(623) 780-4054</u>
WEB SITE:	<u>ITSengineers.com</u>
REPRESENTATIVE NAME:	<u>Michael Wendtland</u>
REPRESENTATIVE TELEPHONE NUMBER:	<u>(480) 235-6800</u>
REPRESENTATIVE E-MAIL:	<u><a href="mailto:michael@redhawksolutionsaz.com">michael@redhawksolutionsaz.com</a></u>
	<u><a href="mailto:michael@itsengineers.com">michael@itsengineers.com</a></u>

	<u>YES</u>	<u>NO</u>	<u>REBATE</u>
WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
WILL ACCEPT PROCUREMENT CARD FOR PAYMENT:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

FUEL COMPRISES (if section for fuel price adjustment is located in the solicitation document) **<1% OF TOTAL BID AMOUNT**

NET 30 DAYS

<u>Lot Name</u>	<u>Title</u>	<u>Price</u>	<u>Unit</u>
Blanket Labor Rates	ITS Technician	\$90.00	hour
Blanket Labor Rates	Operations Engineer	\$120.00	hour
Blanket Labor Rates	Principal	\$200.00	hour
Blanket Labor Rates	Secretary/Clerical	\$40.00	hour
Blanket Labor Rates	Senior Systems Engineer	\$145.00	hour
Blanket Labor Rates	Technician IMSA I	\$65.00	hour
Blanket Labor Rates	Technician IMSA II	\$75.00	hour
CAMERA ASSEMBLY	Camera: Bosch VG4-524-ECS1M/5001	\$3,850.00	each
CAMERA ASSEMBLY	Camera: Cohu -Helios 3960 HD	\$7,500.00	each
CAMERA ASSEMBLY	Camera: Cohu i-dome -3925-3100	\$4,500.00	each
CAMERA ASSEMBLY	Camera: Pelco Spectra 4 PTZ CCTV	\$4,950.00	each
CAMERA ASSEMBLY	Camera: Pelco - Spectra IV	\$4,950.00	each
CAMERA ASSEMBLY	Camera: Pelco ES30PC/ES31PC	\$5,200.00	each
CAMERA ASSEMBLY	Installation Labor Cost	\$800.00	each
CAMERA ASSEMBLY	Mobilization, General Conditions and Incidentals Cost	\$1,500.00	each
CCTV CABINET	CCTV CABINET	\$3,900.00	each

**REDHAWK SOLUTIONS, LLC, 2602 W. BLOOMFIELD RD., PHOENIX, AZ 85029**ITS Engineers, 21620 N 19<sup>th</sup> Avenue, A 4, 22505 N 19<sup>th</sup> Ave, Phoenix, Az 85027

ELECTRICAL CONDUCTORS MATERIALS	Belden	\$1.47	linear foot
ELECTRICAL CONDUCTORS MATERIALS	Belden	\$0.88	linear foot
ELECTRICAL CONDUCTORS MATERIALS	Belden	\$0.48	linear feet
ELECTRICAL CONDUCTORS MATERIALS	Installation Labor Cost	\$0.30	linear foot
ELECTRICAL CONDUCTORS MATERIALS	Mobilization, General Conditions and Incidentals Cost	\$2,500.00	each
ELECTRICAL CONDUCTORS MATERIALS	West Penn	\$0.29	linear foot
ELECTRICAL CONDUCTORS MATERIALS	West Penn	\$1.18	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$3,800.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$335.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$249.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$0.77	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$2.05	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$22.10	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$78.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$15.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$208.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Installation Labor Cost	\$0.20	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (1-250ft)	\$500.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (2,501-5,000ft)	\$2.25	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (5,001-7,500ft)	\$1.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (7,501-10,000ft)	\$1.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (greater than 10,001ft)	\$0.90	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	NeatPatch	\$79.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	NeatPatch	\$79.00	each

**REDHAWK SOLUTIONS, LLC, 2602 W. BLOOMFIELD RD., PHOENIX, AZ 85029**ITS Engineers, 21620 N 19<sup>th</sup> Avenue, A 4, 22505 N 19<sup>th</sup> Ave, Phoenix, Az 85027

FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$15.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$10.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$40.00	Each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$15.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Tyco	\$25.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Tyco	\$295.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Digi 76000752	\$90.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Ditek DTK-Z8-LVLP	\$119.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Installation Labor Cost	\$400.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Mobilization, General Conditions and Incidentals Cost	\$100.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Server	\$690.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EtherWan	\$18.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EtherWan	\$100.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Installation Labor Cost	\$200.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Jumper Cable	\$12.95	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Mobilization, General Conditions and Incidentals Cost	\$100.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$1,295.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Belden 7838A	\$0.48	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Installation Labor Cost	\$100.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Jumper Cable	\$4.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Mobilization, General Conditions and Incidentals Cost	\$100.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Router	\$4,395.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Belden 7838A	\$0.48	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Installation Labor Cost	\$400.00	each

**REDHAWK SOLUTIONS, LLC, 2602 W. BLOOMFIELD RD., PHOENIX, AZ 85029**  
ITS Engineers, 21620 N 19<sup>th</sup> Avenue, A 4, 22505 N 19<sup>th</sup> Ave, Phoenix, Az 85027

ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Jumper Cable	\$4.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Mobilization, General Conditions and Incidentals Cost	\$100.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Router	\$4,275.00	Each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Installation Labor Cost	\$400.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Jumper Cable	\$12.95	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Mobilization, General Conditions and Incidentals Cost	\$100.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	RuggedCom	\$15.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Switch	\$15.95	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Installation Labor Cost	\$400.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Jumper Cable	\$12.95	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Mobilization, General Conditions and Incidentals Cost	\$100.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Switch	\$3,895.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Traco	\$200.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Transition	\$715.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Installation Labor Cost	\$400.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Jumper Cable	\$12.95	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Mobilization, General Conditions and Incidentals Cost	\$100.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom 25-10-0100	\$255.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom 25-10-0101	\$480.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom P	\$15.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Switch	\$1,299.00	each
LIGHTNING PROTECTION	Ground Rod	\$29.00	each
LIGHTNING PROTECTION	Grounding Conductor	\$0.65	linear foot
LIGHTNING PROTECTION	Installation Labor Cost	\$500.00	each
LIGHTNING PROTECTION	Mobilization, General Conditions and Incidentals Cost	\$100.00	each

**REDHAWK SOLUTIONS, LLC, 2602 W. BLOOMFIELD RD., PHOENIX, AZ 85029**  
ITS Engineers, 21620 N 19<sup>th</sup> Avenue, A 4, 22505 N 19<sup>th</sup> Ave, Phoenix, Az 85027

Miscellaneous	SFP Connector	\$1,725.00	each
PRODUCT TRAINING	4-Hour Training Course - CAMERA ASSEMBLY	\$1,200.00	each
PRODUCT TRAINING	4-Hour Training Course - ELECTRICAL CONDUCTORS	\$1,200.00	Each
PRODUCT TRAINING	4-Hour Training Course - FIBER OPTIC CABLE AND EQUIPMENT	\$1,200.00	each
PRODUCT TRAINING	4-Hour Training Course - ITS NETWORK EQUIPMENT	\$1,200.00	each
PRODUCT TRAINING	4-Hour Training Course - RADIO COMMUNICATIONS EQUIPMENT	\$1,200.00	each
PRODUCT TRAINING	8-Hour Training Course - CAMERA ASSEMBLY	\$2,400.00	each
PRODUCT TRAINING	8-Hour Training Course - ELECTRICAL CONDUCTORS	\$2,400.00	each
PRODUCT TRAINING	8-Hour Training Course - FIBER OPTIC CABLE AND EQUIPMENT	\$2,400.00	each
PRODUCT TRAINING	8-Hour Training Course - ITS NETWORK EQUIPMENT	\$2,400.00	each
PRODUCT TRAINING	8-Hour Training Course - RADIO COMMUNICATIONS EQUIPMENT	\$2,400.00	each
PRODUCT TRAINING	Additional Student - CAMERA ASSEMBLY	\$0.01	each
PRODUCT TRAINING	Additional Student - ELECTRICAL CONDUCTORS	\$0.01	each
PRODUCT TRAINING	Additional Student - FIBER OPTIC CABLE AND EQUIPMENT	\$0.01	each
PRODUCT TRAINING	Additional Student - ITS NETWORK EQUIPMENT	\$0.01	each
PRODUCT TRAINING	Additional Student - RADIO COMMUNICATIONS EQUIPMENT	\$0.01	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7838A	\$0.48	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7838A	\$0.48	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7840A	\$1.47	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7921A	\$0.88	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Colubris / HP Procurve	\$990.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	HyperTechnologies	\$75.00	each

**REDHAWK SOLUTIONS, LLC, 2602 W. BLOOMFIELD RD., PHOENIX, AZ 85029**  
~~ITS Engineers, 21620 N 19<sup>th</sup> Avenue, A-4, 22505 N 19<sup>th</sup> Ave, Phoenix, Az 85027~~

RADIO COMMUNICATIONS EQUIPMENT MATERIALS	HyperTechnologies	\$45.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Installation Labor Cost	\$400.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	L-COM	\$75.00	Each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost	\$400.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	West Penn AQ296	\$1.18	linear foot
VIDEO CODEC - Decorder	CCTV Surge Protector	\$45.00	each
VIDEO CODEC - Decorder	Chassis/Power Supply	\$225.00	each
VIDEO CODEC - Decorder	Encoder	\$975.00	each
VIDEO CODEC - Decorder	Installation Labor Cost	\$400.00	each
VIDEO CODEC - Decorder	Jumper Cable	\$4.00	linear foot
VIDEO CODEC - Decorder	Mobilization, General Conditions and Incidentals Cost	\$100.00	each
VIDEO CODEC - Decorder	Surge Protector	\$45.00	each
VIDEO CODEC - Encoder	CCTV Surge Protector	\$45.00	each
VIDEO CODEC - Encoder	Chassis/Power Supply	\$225.00	each
VIDEO CODEC - Encoder	Encoder	\$1,695.00	each
VIDEO CODEC - Encoder	Installation Labor Cost	\$400.00	each
VIDEO CODEC - Encoder	Jumper Cable	\$4.00	linear foot
VIDEO CODEC - Encoder	Mobilization, General Conditions and Incidentals Cost	\$100.00	each
VIDEO CODEC - Encoder	Surge Protector	\$45.00	each

**REDHAWK SOLUTIONS, LLC, 2602 W. BLOOMFIELD RD., PHOENIX, AZ 85029**  
 IFS Engineers, 21620 N 19<sup>th</sup> Avenue, A 4, 22505 N 19<sup>th</sup> Ave, Phoenix, Az 85027

**\*\*EFFECTIVE 04/21/16\*\***

## Gridsmart Equipment

Manufacturer	Part Number	Description	Unit	Unit Price
GRIDSMT	GS-3-GS2	DUAL CAMERA GS2 PROCESSOR, 1U	Each	\$ 11,995.00
GRIDSMT	GS-2-TS2-OPT	TS2 (SDLC) IO CONTROLLER FOR GS2 PROCESSOR	Each	\$ 33.00
GRIDSMT	GS-3-TS2	TS2 CABLES, Y CONNECTION TO SDLC, 6FT	Each	\$ 85.00
GRIDSMT	GS-3-PFM	SOFTWARE, PERFORMANCE MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS	Each	\$ 3,369.00
GRIDSMT	GS-3-PFM+	SOFTWARE, PERFORMANCE PLUS MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS, ADVANCED ALERTS	Each	\$ 4,629.00
GRIDSMT	GS-3-PED	SOFTWARE, PEDESTRIAN	Each	\$ 659.00
GRIDSMT	GS-3-CAM	GRIDSMART BELL CAMERA	Each	\$ 3,495.00
GRIDSMT	GS-3-TCS	GRIDSMART TRADITIONAL CAMERA, STOPBAR, SPECIAL SCENARIO	Each	\$ 1,315.00
GRIDSMT	GS-3-TCA	GRIDSMART TRADITIONAL CAMERA, ADVANCED DETECTION	Each	\$ 1,315.00
GRIDSMT	GS-2-TS1-OPT	TS1 IO CONTROLLER FOR GS2 PROCESSOR	Each	\$ 33.00
GRIDSMT	GS-3-TS1	TS1 CABLES, 12FT	Each	\$ 189.00
GRIDSMT	GS-3-SMCH	SMART CONNECT, HYBRID BOX, QUICK CONNECTOR, TERMINAL STRIP FOR CAT 5E WITH SURGE, SWIVEL BRACKET	Each	\$ 329.00
GRIDSMT	GS-3-SMC	JUNCTION BOX WITH CONNECTOR, SWIVEL BRACKET	Each	\$ 239.00
GRIDSMT	GS-3-SMC2	SMART CONNECT, TERMINAL STRIP BOX, SWIVEL BRACKET, TERMINAL STRIP JUNCTION BOX WITH SURGE	Each	\$ 269.00
GRIDSMT	GS-3-TEN	1.9" TO 4.5" TENON BRACKET	Each	\$ 139.00
GRIDSMT	GS-3-CBL	BRACKET, 84" CABLE BRACKET	Each	\$ 139.00

**REDHAWK SOLUTIONS, LLC, 2602 W. BLOOMFIELD RD., PHOENIX, AZ 85029**  
 IFS Engineers, 21620 N 19<sup>th</sup> Avenue, A-4, 22505 N 19th Ave, Phoenix, Az 85027

**\*\*EFFECTIVE 04/21/16\*\***

Manufacturer	Part Number	Description	Unit	Unit Price
GRIDSMT	GS-3-BND	BRACKET, 36" BANDED BRACKET	Each	\$ 119.00
GRIDSMT	GS-3-A34	34" 90 DEGREE MOUNTING ARM	Each	\$ 59.00
GRIDSMT	GS-3-A58	58" 90 DEGREE MOUNTING ARM	Each	\$ 75.00
GRIDSMT	GS-3-A78	78" 90 DEGREE MOUNTING ARM	Each	\$ 115.00
GRIDSMT	GS-3-CAT5	CABLE, CAT 5E BURIAL, SHIELDED, GEL-FILLED, 1000FT	Each	\$ 475.00
GRIDSMT	GS-3-RBA	ETHERNET REPEATER BOARD USED TO EXTEND CAT 5	Each	\$ 385.00
GRIDSMT	GS-3-EPM	ETHERNET PROTECTION MODULES, PROTECTS SURGES BETWEEN PROCESSOR AND CAMERA	Each	\$ 85.00

**NOTES**

- Materials Lead Time is 8 to 10 Weeks
- All Prices are Plus Tax and Freight
- Manufacturer Pricing may be subject to increase after 30 days
- Includes standard manufacturer warranties
- For questions regarding this quote contact:
- Michael Wendtland (480) 235-6800 michael@redhawksolutionsaz.com

### Installation Services

Manufacturer	Part Number	Description	Unit	Unit Price
Labor		Project Manager	Hour	\$ 125.00
Labor		Electrician	Hour	\$ 85.00
Labor		Operator	Hour	\$ 65.00
Labor		Laborer	Hour	\$ 35.00
Equipment		Bucket Truck	Hour	\$ 45.00
Equipment		Service Truck	Hour	\$ 25.00
Equipment		Pick-Up Truck	Hour	\$ 19.00
Equipment		Air Compressor	Hour	\$ 12.00
Equipment		Arrow Board	Hour	\$ 15.00
Sub-Contracted Services		Traffic Control, ETC	Lump	Cost +18%

PRICING SHEET: NIGP CODE , 83829

Payment Term: NET 30 DAYS

Vendor Number: ~~2011001309-0~~ **201100750 0**

Certificates of Insurance Required

Contract Period: To cover the period ending **January 31, 2015-2018.**

**ROADWAY ELECTRIC LLC., 2033 W. MOUNTAIN VIEW ROAD, PHOENIX, AZ 85021**

COMPANY NAME: ROADWAY ELECTRIC LLC  
 DOING BUSINESS AS (DBA) NAME: \_\_\_\_\_  
 MAILING ADDRESS: 2033 W. MOUNTAIN VIEW ROAD PHOENIX, AZ 85021  
 REMIT TO ADDRESS: \_\_\_\_\_  
 TELEPHONE NUMBER: 602-943-8300  
 FACSIMILE NUMBER: 602-9438305  
 WEB SITE: WWW.ROADWAYELECTRIC.COM  
 REPRESENTATIVE NAME: STEVE MCCRAY  
 REPRESENTATIVE TELEPHONE NUMBER: 602-943-8300  
 REPRESENTATIVE E-MAIL: SMCCRAY@ROADWAYELECTRIC.COM

WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT: 

<u>YES</u>	<u>NO</u>	<u>REBATE</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	

WILL ACCEPT PROCUREMENT CARD FOR PAYMENT: 

<input type="checkbox"/>	<input checked="" type="checkbox"/>
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FUEL COMPRISES (if section for fuel price adjustment is located in the solicitation document) \_\_\_\_\_ % OF TOTAL BID AMOUNT

NET 30 DAYS

<u>Lot Name</u>	<u>Title</u>	<u>Price</u>	<u>Unit</u>
Blanket Labor Rates	ITS Technician	\$65.00	hour
Blanket Labor Rates	Operations Engineer	\$65.00	hour
Blanket Labor Rates	Principal	\$81.00	hour
Blanket Labor Rates	Secretary/Clerical	\$35.00	hour
Blanket Labor Rates	Senior Systems Engineer	\$65.00	hour
Blanket Labor Rates	Technician IMSA I	\$56.00	hour
Blanket Labor Rates	Technician IMSA II	\$62.00	hour
CAMERA ASSEMBLY	Camera: Bosch VG4-524-ECS1M/5001	\$6,215.00	each
CAMERA ASSEMBLY	Camera: Cohu -Helios 3960 HD	\$13,690.00	each
CAMERA ASSEMBLY	Camera: Cohu i-dome -3925-3100	\$6,215.00	each
CAMERA ASSEMBLY	Camera: Pelco Spectra 4 PTZ CCTV	\$3,990.00	each
CAMERA ASSEMBLY	Camera: Pelco - Spectra IV	\$3,910.00	each
CAMERA ASSEMBLY	Camera: Pelco ES30PC/ES31PC	\$4,465.00	each
CAMERA ASSEMBLY	Installation Labor Cost	\$1,040.00	each
CAMERA ASSEMBLY	Mobilization, General Conditions and Incidentals Cost	\$1,230.00	each
CCTV CABINET	CCTV CABINET	\$1,730.00	each
ELECTRICAL CONDUCTORS MATERIALS	Belden	\$1.50	linear foot
ELECTRICAL CONDUCTORS MATERIALS	Belden	\$0.30	linear foot
ELECTRICAL CONDUCTORS MATERIALS	Belden	\$0.48	linear feet
ELECTRICAL CONDUCTORS MATERIALS	Installation Labor Cost	\$0.15	linear foot

**ROADWAY ELECTRIC LLC., 2033 W. MOUNTAIN VIEW ROAD, PHOENIX, AZ 85021**

ELECTRICAL CONDUCTORS MATERIALS	Mobilization, General Conditions and Incidentals Cost	\$450.00	Each
ELECTRICAL CONDUCTORS MATERIALS	West Penn	\$0.30	linear foot
ELECTRICAL CONDUCTORS MATERIALS	West Penn	\$1.25	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$2,485.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$285.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$210.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$0.78	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$2.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$19.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$175.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$14.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	AFL	\$185.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Installation Labor Cost	\$0.30	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (1-250ft)	\$1,170.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (2,501-5,000ft)	\$1,985.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (5,001-7,500ft)	\$3,190.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (7,501-10,000ft)	\$3,565.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost (greater than 10,001ft)	\$5,865.00	linear foot
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	NeatPatch	\$72.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	NeatPatch	\$72.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$12.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$5.50	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$36.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Siemon	\$12.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Tyco	\$22.00	each
FIBER OPTIC CABLE AND EQUIPMENT MATERIALS	Tyco	\$320.00	each

**ROADWAY ELECTRIC LLC., 2033 W. MOUNTAIN VIEW ROAD, PHOENIX, AZ 85021**

ITS NETWORK EQUIPMENT MATERIALS - Server	Digi 76000752	\$82.00	Each
ITS NETWORK EQUIPMENT MATERIALS - Server	Ditek DTK-Z8-LVLP	\$120.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Installation Labor Cost	\$1,975.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Mobilization, General Conditions and Incidentals Cost	\$535.00	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Server	\$665.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EtherWan	\$11.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	EtherWan	\$84.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Installation Labor Cost	\$535.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Jumper Cable	\$17.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Mobilization, General Conditions and Incidentals Cost	\$550.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$1,385.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Belden 7838A	\$0.48	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Installation Labor Cost	\$535.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Jumper Cable	\$24.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Mobilization, General Conditions and Incidentals Cost	\$550.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Router	\$5,420.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Belden 7838A	\$0.48	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Installation Labor Cost	\$995.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Jumper Cable	\$24.00	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Mobilization, General Conditions and Incidentals Cost	\$550.00	each
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Router	\$4,470.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Installation Labor Cost	\$535.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Jumper Cable	\$24.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Mobilization, General Conditions and Incidentals Cost	\$550.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	RuggedCom	\$14.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Switch	\$1,740.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Installation Labor Cost	\$535.00	each

**ROADWAY ELECTRIC LLC., 2033 W. MOUNTAIN VIEW ROAD, PHOENIX, AZ 85021**

ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Jumper Cable	\$15.00	Each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Mobilization, General Conditions and Incidentals Cost	\$550.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Switch	\$2,780.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Traco	\$245.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Transition	\$625.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Installation Labor Cost	\$535.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Jumper Cable	\$24.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Mobilization, General Conditions and Incidentals Cost	\$550.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom 25-10-0100	\$280.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom 25-10-0101	\$515.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom P	\$14.00	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Switch	\$1,380.00	each
LIGHTNING PROTECTION	Ground Rod	\$17.00	each
LIGHTNING PROTECTION	Grounding Conductor	\$0.54	linear foot
LIGHTNING PROTECTION	Installation Labor Cost	\$480.00	each
LIGHTNING PROTECTION	Mobilization, General Conditions and Incidentals Cost	\$885.00	each
Miscellaneous	SFP Connector	\$1,880.00	each
PRODUCT TRAINING	4-Hour Training Course - CAMERA ASSEMBLY	\$815.00	each
PRODUCT TRAINING	4-Hour Training Course - ELECTRICAL CONDUCTORS	\$815.00	each
PRODUCT TRAINING	4-Hour Training Course - FIBER OPTIC CABLE AND EQUIPMENT	\$815.00	each
PRODUCT TRAINING	4-Hour Training Course - ITS NETWORK EQUIPMENT	\$815.00	each
PRODUCT TRAINING	4-Hour Training Course - RADIO COMMUNICATIONS EQUIPMENT	\$815.00	each
PRODUCT TRAINING	8-Hour Training Course - CAMERA ASSEMBLY	\$1,630.00	each
PRODUCT TRAINING	8-Hour Training Course - ELECTRICAL CONDUCTORS	\$1,630.00	each
PRODUCT TRAINING	8-Hour Training Course - FIBER OPTIC CABLE AND EQUIPMENT	\$1,630.00	each
PRODUCT TRAINING	8-Hour Training Course - ITS NETWORK EQUIPMENT	\$1,630.00	each
PRODUCT TRAINING	8-Hour Training Course - RADIO COMMUNICATIONS EQUIPMENT	\$1,630.00	each
PRODUCT TRAINING	Additional Student - CAMERA ASSEMBLY	\$75.00	each

**ROADWAY ELECTRIC LLC., 2033 W. MOUNTAIN VIEW ROAD, PHOENIX, AZ 85021**

PRODUCT TRAINING	Additional Student - ELECTRICAL CONDUCTORS	\$75.00	Each
PRODUCT TRAINING	Additional Student - FIBER OPTIC CABLE AND EQUIPMENT	\$75.00	each
PRODUCT TRAINING	Additional Student - ITS NETWORK EQUIPMENT	\$75.00	each
PRODUCT TRAINING	Additional Student - RADIO COMMUNICATIONS EQUIPMENT	\$75.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7838A	\$0.48	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7838A	\$0.48	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7840A	\$0.48	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Belden 7921A	\$0.89	linear foot
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Colubris / HP Procurve	\$1,255.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	HyperTechnologies	\$440.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	HyperTechnologies	\$190.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Installation Labor Cost	\$2,500.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	L-COM	\$535.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost	\$550.00	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	West Penn AQ296	\$1.25	linear foot
VIDEO CODEC - Decoder	CCTV Surge Protector	\$42.00	each
VIDEO CODEC - Decoder	Chassis/Power Supply	\$57.00	each
VIDEO CODEC - Decoder	Encoder	\$1,665.00	each
VIDEO CODEC - Decoder	Installation Labor Cost	\$355.00	each
VIDEO CODEC - Decoder	Jumper Cable	\$0.93	linear foot
VIDEO CODEC - Decoder	Mobilization, General Conditions and Incidentals Cost	\$550.00	each
VIDEO CODEC - Decoder	Surge Protector	\$42.00	each
VIDEO CODEC - Encoder	CCTV Surge Protector	\$42.00	each
VIDEO CODEC - Encoder	Chassis/Power Supply	\$145.00	each
VIDEO CODEC - Encoder	Encoder	\$1,665.00	each
VIDEO CODEC - Encoder	Installation Labor Cost	\$355.00	each
VIDEO CODEC - Encoder	Jumper Cable	\$7.00	linear foot
VIDEO CODEC - Encoder	Mobilization, General Conditions and Incidentals Cost	\$550.00	each
VIDEO CODEC - Encoder	Surge Protector	\$42.00	each

ROADWAY ELECTRIC LLC., 2033 W. MOUNTAIN VIEW ROAD, PHOENIX, AZ 85021

\*\*EFFECTIVE 04/21/16\*\*

Item #	Item Description	Estimated Quantity	Unit	Unit Price
<b>01-MATERIAL</b>				
001	FURNISH GS-3-GS2 DUAL CAMERA GS2 PROCESSOR, 1U	1.00	EACH	\$14,610.00
002	FURNISH GS-2-TS2-OPT TS2 (SDLC) IO CONTROLLER FOR GS2 PROCESSOR	1.00	EACH	\$47.00
003	FURNISH GS-3-TS2 TS2 CABLES, Y CONNECTION TO SDLC, 6FT	1.00	EACH	\$120.00
004	FURNISH GS-3-PFM SOFTWARE, PERFORMANCE MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS	1.00	EACH	\$4,790.00
005	FURNISH GS-3-PFM+ SOFTWARE, PERFORMANCE PLUS MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS, ADVANCED ALERTS	1.00	EACH	\$6,585.00
006	FURNISH GS-3-PED SOFTWARE, PEDESTRIAN	1.00	EACH	\$935.00
007	FURNISH GS-3-CAM GRIDSMART BELL CAMERA	1.00	EACH	\$3,845.00
008	FURNISH GS-3-TCS GRIDSMART TRADITIONAL CAMERA, STOPBAR, SPECIAL SCENARIO	1.00	EACH	\$1,870.00
009	FURNISH GS-3-TCA GRIDSMART TRADITIONAL CAMERA, ADVANCED DETECTION	1.00	EACH	\$1,870.00
010	FURNISH GS-2-TS1-OPT TS1 IO CONTROLLER FOR GS2 PROCESSOR	1.00	EACH	\$47.00
011	FURNISH GS-3-TS1 TS1 CABLES, 12FT	1.00	EACH	\$270.00
012	FURNISH GS-3-SMCH SMART CONNECT, HYBRID BOX, QUICK CONNECTOR, TERMINAL STRIP FOR CAT 5E WITH SURGE, SWIVEL BRACKET	1.00	EACH	\$465.00
013	FURNISH GS-3-SMC JUNCTION BOX WITH CONNECTOR, SWIVEL BRACKET	1.00	EACH	\$330.00
014	FURNISH GS-3-SMC2 SMART CONNECT, TERMINAL STRIP BOX, SWIVEL BRACKET, TERMINAL STRIP JUNCTION BOX WITH SURGE	1.00	EACH	\$375.00
015	FURNISH GS-3-TEN 1.9" TO 4.5" TENON BRACKET	1.00	EACH	\$195.00
016	FURNISH GS-3-CBL BRACKET, 84" CABLE BRACKET	1.00	EACH	\$195.00
017	FURNISH GS-3-BND BRACKET, 36" BANDED BRACKET	1.00	EACH	\$165.00
018	FURNISH GS-3-A34 34" 90 DEGREE MOUNTING ARM	1.00	EACH	\$83.00
019	FURNISH GS-3-A58 58" 90 DEGREE MOUNTING ARM	1.00	EACH	\$105.00
020	FURNISH GS-3-A78 78" 90 DEGREE MOUNTING ARM	1.00	EACH	\$160.00
021	FURNISH GS-3-CAT5 CABLE, CAT 5E BURIAL, SHIELDED, GEL-FILLED, 1000FT	1.00	EACH	\$675.00
022	FURNISH GS-3-RBA ETHERNET REPEATER BOARD USED TO EXTEND CAT 5 CABLE BEYOND 100M.	1.00	EACH	\$545.00
023	FURNISH GS-3-EPM ETHERNET PROTECTION MODULES, PROTECTS SURGES BETWEEN PROCESSOR AND CAMERA	1.00	EACH	\$115.00

**ROADWAY ELECTRIC LLC., 2033 W. MOUNTAIN VIEW ROAD, PHOENIX, AZ 85021****\*\*EFFECTIVE 04/21/16\*\***

<b>Item #</b>	<b>Item Description</b>	<b>Estimated Quantity</b>	<b>Unit</b>	<b>Unit Price</b>
002A	INSTALL GS-2-TS2-OPT TS2 (SDLC) IO CONTROLLER FOR GS2 PROCESSOR	1.00	EACH	\$180.00
003A	INSTALL GS-3-TS2 TS2 CABLES, Y CONNECTION TO SDLC, 6FT	1.00	EACH	\$180.00
004A	INSTALL GS-3-PFM SOFTWARE, PERFORMANCE MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS	1.00	EACH	\$1,070.00
005A	INSTALL GS-3-PFM+ SOFTWARE, PERFORMANCE PLUS MODULE LICENCE, INCLUDES COUNTS, VOLUME, REPORTS, ADVANCED ALERTS	1.00	EACH	\$1,070.00
006A	INSTALL GS-3-PED SOFTWARE, PEDESTRIAN	1.00	EACH	\$1,070.00
007A	INSTALL GS-3-CAM GRIDSMART BELL CAMERA	1.00	EACH	\$460.00
008A	INSTALL GS-3-TCS GRIDSMART TRADITIONAL CAMERA, STOPBAR, SPECIAL SCENARIO	1.00	EACH	\$460.00
009A	INSTALL GS-3-TCA GRIDSMART TRADITIONAL CAMERA, ADVANCED DETECTION	1.00	EACH	\$460.00
010A	INSTALL GS-2-TS1-OPT TS1 IO CONTROLLER FOR GS2 PROCESSOR	1.00	EACH	\$180.00
011A	INSTALL GS-3-TS1 TS1 CABLES, 12FT	1.00	EACH	\$180.00
012A	INSTALL GS-3-SMCH SMART CONNECT, HYBRID BOX, QUICK CONNECTOR, TERMINAL STRIP FOR CAT 5E WITH SURGE, SWIVEL BRACKET	1.00	EACH	\$180.00
013A	INSTALL GS-3-SMC JUNCTION BOX WITH CONNECTOR, SWIVEL BRACKET	1.00	EACH	\$180.00
014A	INSTALL GS-3-SMC2 SMART CONNECT, TERMINAL STRIP BOX, SWIVEL BRACKET, TERMINAL STRIP JUNCTION BOX WITH SURGE	1.00	EACH	\$180.00
015A	INSTALL GS-3-TEN 1.9" TO 4.5" TENON BRACKET	1.00	EACH	\$285.00
016A	INSTALL GS-3-CBL BRACKET, 84" CABLE BRACKET	1.00	EACH	\$285.00
017A	INSTALL GS-3-BND BRACKET, 36" BANDED BRACKET	1.00	EACH	\$285.00
018A	INSTALL GS-3-A34 34" 90 DEGREE MOUNTING ARM	1.00	EACH	\$285.00
019A	INSTALL GS-3-A58 58" 90 DEGREE MOUNTING ARM	1.00	EACH	\$285.00
020A	INSTALL GS-3-A78 78" 90 DEGREE MOUNTING ARM	1.00	EACH	\$285.00
021A	INSTALL GS-3-CAT5 CABLE, CAT 5E BURIAL, SHIELDED, GEL-FILLED, 1000FT	1.00	EACH	\$1,615.00
022A	INSTALL GS-3-RBA ETHERNET REPEATER BOARD USED TO EXTEND CAT 5 CABLE BEYOND 100M.	1.00	EACH	\$180.00
023A	INSTALL GS-3-EPM ETHERNET PROTECTION MODULES, PROTECTS SURGES BETWEEN PROCESSOR AND CAMERA	1.00	EACH	\$180.00
<b>001A</b>	<b>Install GS-3-G52 Dual Camera GS2 Processor, 1U</b>	<b>1.00</b>	<b>EA</b>	<b>\$320.00</b>

**ROADWAY ELECTRIC LLC., 2033 W. MOUNTAIN VIEW ROAD, PHOENIX, AZ 85021****EFFECTIVE 12/05/16**

Item #	Item Description	Estimated Quantity	Unit	Unit Price	Total Price
001	SW720-H.264-HD30 SIDEWINDER PTZ CAMERA, 85-265 VAC, BOTTOM EGRESS, HD 30X OPTICAL ZOOM, H.264	1.00	EACH	\$4,985.00	\$4,985.00
002	SW720-H.264-HD30 POE SIDEWINDER POE PTZ CAMERA, 85-265 VAC, BOTTOM EGRESS, HD 30X OPTICAL ZOOM, H.264	1.00	EACH	\$5,375.00	\$5,375.00
003	MS CONNECTOR 1 MS CONNECTOR FOR CUSTOMER SUPPLIED CABLE	1.00	EACH	\$44.00	\$44.00
004	MS CONNECTOR WITH CABLE 1 MS CONNECTOR WITH 3FT PIGTAIL	1.00	EACH	\$64.00	\$64.00
005	SW720-H.264-SD SIDEWINDER PTZ CAMERA, 120 VAC, BOTTOM EGRESS, SD, H.264	1.00	EACH	\$5,330.00	\$5,330.00
006	SWPTM1-A SIDEWINDER PTZ, POST TOP MOUNT BRACKET FOR USE WITH LOWERING DEVICE	1.00	EACH	\$110.00	\$110.00
007	SWWM1 W/VPA SIDEWINDER WALL MOUNT WITH VERTICAL POLE MOUNT ADAPTER	1.00	EACH	\$185.00	\$185.00
008	15-4-913 SIDEWINDER MOUNTING BASE, ROUND, 6" RISER	1.00	EACH	\$270.00	\$270.00
009	SWCH.264-MS PRICE PER FT, SIDEWINDER IP CABLE FOR H.264 - MS CONNECTOR TO RJ45 / POWER PLUG	1.00	LF	\$8.00	\$8.00
010	SWCH.264-AVS PRICE PER FT, SIDEWINDER ANALOG CABLE FOR H.264 - MS CONNECTOR TO RJ45 / POWER PLUG WITH ANALOG VIDEO COAX AND SERIAL DATA	1.00	LF	\$9.50	\$9.50
011	SW RJ45 BOX SIDEWINDER RJ45 SERIAL DATA BREAKOUT BOX	1.00	EACH	\$120.00	\$120.00
012	SWCH.264-MS-POE PRICE PER FT, SIDEWINDER CABLE FOR H.264 POE - MS CONNECTOR TO CAT 5E	1.00	LF	\$6.50	\$6.50
013	EX2 ATC NEMA CONTROLLER TS2-1 ATC NEMA EX2 TS2-1 CONTROLLER, LOCAL SOFTWARE, POWER CABLE	1.00	EACH	\$4,060.00	\$4,060.00
014	MCCAIN EX2 ATC NEMA CONTROLLER TS2-2 ATC NEMA CONTROLLER, TS2, TYPE 2, D CONNECTOR, LOCAL SOFTWARE, POWER CABLE	1.00	EACH	\$4,565.00	\$4,565.00
015	MCCAIN 350I ATC CABINET 350I ATC ALUMINUM CABINET, 67" H X 45" W X 26" D, FOUNDATION MOUNTED, ANCHOR BOLTS, 4 DOORS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-HV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) CMU, FITA, FOTA, SERVICE ASSEMBLY, (1) SHELF	1.00	EACH	\$24,310.00	\$24,310.00
016	MCCAIN 350I ATC CABINET DC 350I ATC ALUMINUM CABINET, 67" H X 45" W X 26" D, FOUNDATION MOUNTED, 4 DOORS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-LV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) LV CMU, SHELF, FITA, FOTA, SERVICE SSEMBLY, (3) SHELF	1.00	EACH	\$30,570.00	\$30,570.00
017	MCCAIN 352I ATC CABINET 352I ATC ALUMINUM CABINET, 67" H X 24" W X 30" D, FOUNDATION MOUNTED, ANCHOR BOLTS, 2 DOORS, UP TO 24 INPUTS AND 16 OUTPUTS, NEMA ATC EX2	1.00	EACH	\$20,610.00	\$20,610.00

**ROADWAY ELECTRIC LLC., 2033 W. MOUNTAIN VIEW ROAD, PHOENIX, AZ 85021**

**EFFECTIVE 12/05/16**

Item #	Item Description	Estimated Quantity	Unit	Unit Price	Total Price
018	CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-HV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) CMU, FOTA, FITA, SERVICE ASSEMBLY, (1) SHELF MCCAIN 352I ATC CABINET DC 352I ATC ALUMINUM CABINET, 67" H X 24" W X 30" D, FOUNDATION MOUNTED, 2 DOORS, UP TO 24 INPUTS AND 16 OUTPUTS, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (9) 2202-LV HDSP/FLASHER, (8) OUTPUT SURGE, (2) SIU, (1) LV CMU, FOTA, FITA, SERVICE ASSEMBLY (2) SHELF	1.00	EACH	\$26,550.00	\$26,550.00
019	MCCAIN 357I ATC CABINET 357I ATC ALUMINUM CABINET, 36" X 21" W X 18"D, ANCHOR BOLTS, OMBINED INPUT/OUTPUT ASSEMBLY 8 SLOTS (4 IN, 4 OUT), NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (1) CMU, (5) 2202-HV HDSP/FLASHER, (4) OUTPUT SURGE, (2) SIU, FITA, FOTA, SERVICE ASSEMBLY	1.00	EACH	\$15,880.00	\$15,880.00
020	MCCAIN BACKPACK ATC CABINET 25" X 16" X 15" ALUMINUM CABINET, SINGLE DOOR, NEMA ATC EX2 CONTROLLER TS2 TYPE 1, CONTROLLER POWER CABLE, ADU, (5) 2202-HV HDSP/FLASHER, (1) SIU, (1) CMU W/ETHERNET, FITA, FOTA, SERVICE ASSEMBLY	1.00	EACH	\$14,130.00	\$14,130.00
021	MCCAIN CMU DATAKEY PROGRAMMER	1.00	EACH	\$755.00	\$755.00
022	MCCAIN GPS CLOCK NEMA STAND ALONE GPS TIME CLOCK MODULE WITH M59205 NEMA/POWER CABLE	1.00	EACH	\$855.00	\$855.00
023	MCCAIN CABINET DISPLAY 120VAC CABINET DISPLAY, ATC	1.00	EACH	\$890.00	\$890.00
024	DC BATTERY 79AH MK 8A24HEI	1.00	EACH	\$315.00	\$315.00
025	SOUTHERN 1RU8126MS-001 ITS COMMANDER	1.00	EACH	\$1,455.00	\$1,455.00
026	SOUTHERN CP621DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 21" X 72" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	1.00	EACH	\$3,265.00	\$3,265.00
027	SOUTHERN CP820DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 20" X 96" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	1.00	EACH	\$3,835.00	\$3,835.00
028	SOUTHERN CP920DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 20" X 108" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	1.00	EACH	\$4,130.00	\$4,130.00
029	SOUTHERN CP830DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 30" X 96" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	1.00	EACH	\$5,140.00	\$5,140.00
030	SOUTHERN CP1030DT CLEAN PROFILE LED INTERNALLY ILLUMINATED STREET NAME SIGN, 30" X 120" VIEWABLE AREA, DOUBLE SIDED, DIAMOND GRADE FILM, EZ BRACKET	1.00	EACH	\$6,225.00	\$6,225.00
031	SWFAB IISNS BRACKET HORIZONTAL POLE BRACKET	1.00	EACH	\$730.00	\$730.00

PRICING SHEET: NIGP CODE , 83829

Payment Term:

NET 30 DAYS

Vendor Number:

2011001479-0 VC0000003967

Certificates of Insurance

Required

Contract Period:

To cover the period ending **January 31, 2015-2018.**

**TRANSCORE ITS, LLC, 8158 ADAMS DR., LIBERTY CENTRE, HUMMELSTOWN, PA 17053**

COMPANY NAME:	<u>TransCore ITS LLC</u>
DOING BUSINESS AS (DBA) NAME:	<u>TransCore</u>
MAILING ADDRESS:	<u>15300 N. 90th Street Suite 750 Scottsdale, Az 85260</u>
REMIT TO ADDRESS:	<u>P.O. Box 933493 Atlanta, GA 31193-3493</u>
TELEPHONE NUMBER:	<u>480-551-4600</u>
FACSIMILE NUMBER:	<u>480-661-5490</u>
WEB SITE:	<u>www.transcore.com</u>
REPRESENTATIVE NAME:	<u>Dwayne Fontaine</u>
REPRESENTATIVE TELEPHONE NUMBER:	<u>480-551-4690</u>
REPRESENTATIVE E-MAIL:	<u>dwayne.fontaine@transcore.com</u>

	<u>YES</u>	<u>NO</u>	<u>REBATE</u>
WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

WILL ACCEPT PROCUREMENT CARD FOR PAYMENT:	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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FUEL COMPRISES (if section for fuel price adjustment is located in the solicitation document)      **0% OF TOTAL BID AMOUNT**

NET 30 DAYS

<u>Lot Name</u>	<u>Title</u>	<u>Price</u>	<u>Unit</u>
Blanket Labor Rates	ITS Technician	\$64.80	hour
Blanket Labor Rates	Operations Engineer	\$158.76	hour
Blanket Labor Rates	Principal	\$187.92	hour
Blanket Labor Rates	Secretary/Clerical	\$58.32	hour
Blanket Labor Rates	Senior Systems Engineer	\$145.80	hour
Blanket Labor Rates	Technician IMSA I	\$75.00	hour
Blanket Labor Rates	Technician IMSA II	\$95.58	hour
CAMERA ASSEMBLY	Installation Labor Cost	\$616.74	each
CAMERA ASSEMBLY	Mobilization, General Conditions and Incidentals Cost	\$402.33	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Installation Labor Cost	\$193.53	each
ITS NETWORK EQUIPMENT MATERIALS - Server	Mobilization, General Conditions and Incidentals Cost	\$140.64	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Installation Labor Cost	\$180.57	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Mobilization, General Conditions and Incidentals Cost	\$140.64	each
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Installation Labor Cost	\$183.51	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (first lot)	Mobilization, General Conditions and Incidentals Cost	\$140.64	linear foot
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Installation Labor Cost	\$169.91	each
ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Mobilization, General Conditions and Incidentals Cost	\$216.35	each

**TRANSCORE ITS, LLC, 8158 ADAMS DR, LIBERTY CENTRE, HUMMELSTOWN, PA 17053**

ITS NETWORK EQUIPMENT MATERIALS- Router (second lot)	Router	\$5,447.75	Each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Installation Labor Cost	\$283.82	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Mobilization, General Conditions and Incidentals Cost	\$233.66	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (fourth lot)	Switch	\$2,397.62	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Installation Labor Cost	\$177.42	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (second lot)	Mobilization, General Conditions and Incidentals Cost	\$140.64	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Installation Labor Cost	\$183.51	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Mobilization, General Conditions and Incidentals Cost	\$140.64	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom 25-10-0100	\$351.92	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	RuggedCom 25-10-0101	\$627.43	each
ITS NETWORK EQUIPMENT MATERIALS- Switch (third lot)	Switch	\$1,654.92	each
Miscellaneous	SFP Connector	\$2,358.10	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Installation Labor Cost	\$522.93	each
RADIO COMMUNICATIONS EQUIPMENT MATERIALS	Mobilization, General Conditions and Incidentals Cost	\$177.15	each
VIDEO CODEC - Decoder	Installation Labor Cost	\$210.16	each
VIDEO CODEC - Decoder	Mobilization, General Conditions and Incidentals Cost	\$233.66	each
VIDEO CODEC - Encoder	Installation Labor Cost	\$233.66	each
VIDEO CODEC - Encoder	Mobilization, General Conditions and Incidentals Cost	\$220.95	each

PRICING SHEET: NIGP CODE 83829

Terms: NET 30

Vendor Number: 2011001538 0

Certificates of Insurance Required

Contract Period: To cover the period ending **January 31, 2015-2018.**

**CONTRACTOR TO BE REMOVED FROM CONTRACT, EFFECTIVE FEBRUARY 01, 2015**

PHOENIX HIGHWAY PRODUCTS, INC., 2631 NORTH 37TH DRIVE, PHOENIX, AZ 85009

COMPANY NAME:	<u>Phoenix Highway Products Inc.</u>
DOING BUSINESS AS (DBA) NAME:	<u>Phoenix Highway Products</u>
MAILING ADDRESS:	<u>2631 N. 37th Drive Phoenix, Az 85009</u>
REMIT TO ADDRESS:	<u>2631 N. 37th Drive Phoenix, AZ 85009</u>
TELEPHONE NUMBER:	<u>602 344 7770</u>
FACSIMILE NUMBER:	<u>602 344 7771</u>
WEB SITE:	<u>www.phoenixhighwayproducts.com</u>
REPRESENTATIVE NAME:	<u>Tom McGovern</u>
REPRESENTATIVE TELEPHONE NUMBER:	<u>6023447770</u>
REPRESENTATIVE E MAIL:	<u>tom@phoenixhighwayproducts.com</u>

-			
-			
WILL ALLOW OTHER GOVERNMENTAL ENTITIES TO PURCHASE FROM THIS CONTRACT:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	REBATE

-			
WILL ACCEPT PROCUREMENT CARD FOR PAYMENT:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	

- FUEL COMPRISES (if section for fuel price adjustment is located in the solicitation document) % OF TOTAL BID AMOUNT

NET 30 DAYS

<u>Lot Name</u>	<u>Title</u>	<u>Price</u>	<u>Unit</u>
ITS NETWORK EQUIPMENT MATERIALS - Switch (first lot)	Switch	\$1,197.00	each
ITS NETWORK EQUIPMENT MATERIALS - Router (second lot)	Router	\$2,185.00	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (second lot)	Switch	\$3,619.50	each
ITS NETWORK EQUIPMENT MATERIALS - Switch (third lot)	Switch	\$2,028.25	each
VIDEO CODEC - Encoder	Chassis/Power Supply	\$183.75	each
VIDEO CODEC - Encoder	Eneoder	\$1,575.00	each

PRICING SHEET: NIGP CODE , 83829

Vendor Number: \_\_\_\_\_ 2011001473-0

Certificates of Insurance \_\_\_\_\_ Required

Contract Period: \_\_\_\_\_ To cover the period ending January 31, 2015.

## ITS DEVICES, COMMUNICATIONS AND EQUIPMENT

### 1.0 INTENT:

The intent of this Invitation for Bid is to establish a pricing agreement for the purpose of obtaining Electrical Conductors, Fiber Optic Cable and Equipment, Closed Circuit Television, Radio Communications Equipment, and ITS Network Equipment to be used by the Maricopa County Department of Transportation. Delivery is required F.O.B. Destination, to any delivery location within Maricopa County as covered by Purchase Order only.

Other governmental entities under agreement with the County may have access to services provided hereunder (see also Sections 2.9 and 2.10 below).

The County reserves the right to add additional contractors, at the County's sole discretion, in cases where the currently listed contractors are of an insufficient number or skill-set to satisfy the County's needs or to ensure adequate competition on any project or task order work.

### 2.0 SPECIFICATIONS:

#### 2.1 TECHNICAL REQUIREMENTS:

##### 2.1.1 ELECTRICAL CONDUCTORS

The work under this section shall consist of furnishing and installing electrical conductors for traffic signals and intersection lighting in accordance with the Traffic Signal Plan, requirements of these specifications, and MAG specifications.

##### 2.1.1.1 MATERIAL REQUIREMENTS:

2.1.1.1.1 **Electrical Conductors:** The wire shall be annealed copper and shall be uncoated unless otherwise specified. The wire shall be solid for number 10, 12 and 14 AWG and smaller diameter wire, conforming to the requirements of ASTM B 3 for annealed bare copper wire. Conductors for sizes number 8 AWG and larger diameter wire shall be stranded and shall conform to ASTM B 8 for Class B stranding, unless otherwise specified, the conductors shall be insulated with THW grade thermoplastic compound and shall meet the requirements of UL 83. Insulation colors shall be permanent and an integral part of the insulation and shall not be applied as a surface treatment of coating. The insulation thickness shall conform to the requirements of the NEC. Conductor insulation shall be a solid color unless otherwise specified. The color shall be continuous over the entire length of the conductor.

Wire and cable shall be UL listed and rated at 600 volts. The UL label shall be present on each reel, coil or container of wire or cable. When requested, the Contractor shall submit to the Engineer the manufacturer's written certification that the product conforms to the requirements of these specifications.

All single conductors shall have plain, distinctive and permanent markings on the outer surface throughout their entire length showing the manufacturer's name or trademark, insulation type, conductor size, voltage rating and the number of conductors in the cable. Insulation colors shall be permanent and an integral part of the insulation and shall not be applied as a surface treatment coating.

Conductor colors and sizes for use in traffic signal and intersection lighting shall be as specified on the Traffic Signal Plan conductor schedule, and MCDOT Details 4799-1 and 4799-2.

2.1.1.1.2 **(A) Loop Detector Lead-In Cables:** Loop detector lead-in shielded cables shall be two conductor, stranded, twisted pair, tinned copper, polyethylene insulated cable with a polyethylene jacket, rated at 600 volts and 140 degrees Fahrenheit and shall be in conformance with IMSA Specification 50-2.

2.1.1.1.3 **(B) Wire Tagging:** Individual conductors for each vehicular and pedestrian phase group shall be secured together by two layers of plastic electrical tape and tagged with an approved wire I.D. marker (3M Scotchcode Wire Marker Tape or approved equal). Cables for each vehicular and pedestrian phase group shall be wrapped with two layers of plastic electrical tape and tagged with an approved wire I.D. marker (Scotchcode all cabinets and in pull boxes).

When IMSA cable is specified, wire insulation color assignment shall be in accordance with MCDOT Details 4799-1 and 4799-2.

2.1.1.1.4 **(C) IMSA Cables:** IMSA cable shall be used when specified on the plans. IMSA cables shall be polyethylene insulated copper conductors, polyvinyl chloride jacketed, rated at 600 volts for use in underground conduit or as aerial cable conforming to IMSA Specification 19-1.

The IMSA 19-1 cable shall be provided with the number and size of conductors as specified on the plans. The colors and tracers shall be permanent and an integral part of the insulation and shall not be painted, surface coated or adhered to surface. Ink strips are unacceptable. Conductor insulation colors shall be standard IMSA colors (as shown by the following table). Cable conductor color, phase and interval assignments shall be in accordance with MCDOT Details 4799-1 and 4799-2.

2.1.1.1.5 **(D) Telephone Communication Cable:** Telephone communication cable shall be used when specified on the plans. Telephone communication cable shall be in accordance with IMSA Specification 40-2. Cable shall be 19 AWG, 25 conductor, solid, twisted pair, polyethylene jacketed, with a rating of 300 volts.

Conductor Number	Insulation Color	Stripe Color	Conductor Number	Insulation Color	Stripe Color
1	Black	-	11	Blue	Black
2	White	-	12	Black	White
3	Red	-	13	Red	White
4	Green	-	14	Green	White
5	Orange	-	15	Blue	White
6	Blue	-	16	Black	Red
7	White	Black	17	White	Red
8	Red	Black	18	Orange	Red
9	Green	Black	19	Blue	Red
10	Orange	Black	20	Red	Green

2.1.1.2 WIRING PROCEDURES:

- 2.1.1.2.1 **General Requirements:** All wiring shall be in conformance with the NEC and the requirements of these specifications. All wire nuts and other wiring devices shall be UL listed. Conductor sizes and colors shall be as specified on the Traffic Signal Plan conductor schedule. Conductors shall be pulled into runs in a smooth continuous. Approved lubricants shall be used for inserting conductors in conduit. Before installation, conductors' ends shall be taped for moisture protection until connections are made. Splices are permitted in pull boxes, pedestals and cabinets.

Conductors shall have a minimum of 36 inches of slack from the conduit end bell in the pull box.

All phase wiring shall be boxed at the intersection, terminated and spliced in the number seven (# 7) pull boxes.

- 2.1.1.2.2 **Conductor Splices:** Splices shall be made utilizing wire nut connectors (Ideal model numbers 451, 452 and 454, or approved equal). Wire stripping length and wire size combinations shall be in accordance with the manufacturer's instructions supplied with the wire nut connector. Soldered connections will not be permitted. All phases shall be spliced in all pull boxes and unused phase wiring shall be spliced to the ground rod in the controller cabinet.

Splices shall be dipped or brushed with a minimum of three coats of liquid waterproof splicing compound (3M Scotch Kote or approved equal). The finished splices shall be such that their electrical and mechanical characteristics and insulation quality are equal to those of the original cable.

- 2.1.1.2.3 **Bonding and Grounding:** All metallic enclosures such as cabinets, pedestals, poles, conduit and cable sheaths shall be bonded to form a continuous grounded system. Non-metallic portions of the system, such as PVC conduit, shall have a No. 8 AWG bare copper bond wire installed with suitable connections to form a continuous grounded system.

At each service disconnect, cabinet foundation, or where otherwise specified, an approved copper-plated ground rod shall be installed. Each ground rod shall be a one piece solid rod of the copper weld type or approved equal and shall be a minimum of 5/8 inch in diameter and 10.0 feet long. The rod shall be driven vertically into the ground to a minimum 9.0 feet below the surface. If the rod cannot be driven vertically it shall be installed in accordance with article 250-83 of the NEC. The ground rod may be located in a pull box. The service equipment neutral (grounded conductor) and the system grounding conductor (No. 8 AWG bond, solid) shall be connected to the ground rod with a copper-plated bolt or a brass bolt on the ground clamp.

The grounding electrode system shall be in accordance with articles 250-81 and 250-83 of the NEC.

Pole foundations shall have 25 feet of number 4 AWG bare copper conductor coiled and placed at the bottom of the excavation before concrete is poured. Pole foundation grounding electrodes shall be

connected to the pole grounding screw in the hand hole with an approved lug connector.

A ground resistance test shall be performed for each installed ground rod prior to final connection of the utility service. Pole foundation coil grounds shall be tested as determined by the Engineer in the field.

The ground resistance shall be measured with a three terminal, fall of potential, direct reading, battery powered earth tester with a 0.50 to 500 ohm scale or digital read-out. The 25 ohm reading shall be approximately at mid scale.

The test shall be performed according to the manufacturer's instructions and OSHA requirements. Two auxiliary copper clad ground rods shall be driven into the ground a minimum of 3 feet. The lateral spacing for each test rod shall be given in writing on the test report form and the spacing shall be approved by the Engineer.

All tests shall be performed in the presence of the Engineer and the test results shall be written down, dated and given to the Engineer for approval.

Each ground rod or foundation ground shall be isolated with the bond wires disconnected when the test is being performed. The resistance to ground shall be 25 ohms or less. If it is not, additional ground rods shall be installed as required at least 15 feet from the original ground and shall be bonded to it. The test shall then be repeated for multiple grounds as necessary to achieve proper grounding below 25 ohms. As many additional ground rods shall be installed as is necessary to achieve proper grounding of 25 ohms or less.

The test shall be performed when the soil is dry. The contractor shall not add any chemical, or salt solutions to any portion of the grounding system. All grounding rods and foundation grounds to be tested shall be installed a minimum of ten days prior to testing unless otherwise determined by the Engineer in the field.

Electrolytic grounding may be used in lieu of ground electrodes for the cabinet grounding system. Electrolytic grounding systems shall be self-activating, sealed and maintenance free. Electrolytic ground systems shall hydroscopically extract moisture from the air to activate the electrolytic process without addition of chemicals or water.

Hazardous material shall not be used to improve the performance of the electrolytic ground. Electrolytic systems shall be UL listed and have a minimum life expectancy of 30 years.

Following installation, the Contractor shall verify the resistance to ground of the cabinet grounding system is less than 5 ohms using the 3 terminal fall of potential method. If the tested resistance is greater than 5 ohms, the Contractor shall install as many ground electrodes as is necessary to meet the requirement.

#### 2.1.1.3 MEASUREMENT:

Conductors for traffic signals and intersection lighting will be measured on a lump sum basis.

2.1.1.4 PAYMENT:

Conductors, measured as provided above, will be paid for at the contract lump sum price, which price shall be full compensation for the item, COMPLETE IN PLACE.

2.1.2 FIBER OPTIC CABLE AND EQUIPMENT

The work under this section shall consist of furnishing, installing, and testing underground and outdoor fiber optic cable and related equipment, including trunkline cable, branch cable, jumper cable, pigtails, connectors, patch panels, splice trays, splice units, termination units, splice and termination units, and underground splice closures.

2.1.2.1 MATERIAL REQUIREMENTS:

2.1.2.1.1 **Fiber Optic Cable:** Unless otherwise stated, all fiber optic cable shall be single mode fiber optic (SMFO) cables that are of loose tube construction, filled with a waterblocking material, shall be riser plenum outdoor rated and constructed by a certified ISO 9001 or 9002 manufacturer.

Fiber optic cable shall be dielectric and comply with the requirements of US Department of Agriculture Rural Utility Services specification RUS 1755.900, IEC 60793, and ITU G652.D except as modified by the Specifications. The fiber optic cable shall comply with GR20-CORE, EIA/TIA, and REA/RUS PE-90. The color code shall comply with ANSI/EIA 359-A, 598-A, IEC 60304. Fiber optic cable installed indoors shall also comply with the requirements of Article 770 of the NEC.

2.1.2.1.1.1 (A) **Fiber Optic Cable Performance and Construction:** Use fiber optic cable that complies with the following requirements:

Cladding diameter	125 ± 0.7 μm
Core-to-cladding offset	≤ 0.8 μm
Cladding non-circularity	≤ 0.5%
Maximum attenuation	≤0.35 dB/km at 1310 nm; ≤0.25 dB/km at 1550 nm
Microbend attenuation (1 turn, 32 mm diameter)	≤ 0.05 dB at 1550 nm
Microbend attenuation (480 turns, 75 mm diameter)	≤ 0.05 dB at 1310 nm
Allowable Bending Radius for Fiber	≥ 15 mm
Attenuation uniformity	No point discontinuity greater than 0.05 dB at either 1310 nm or 1550 nm
Mode-field diameter (matched cladding)	8.6 ± 0.4 μm at 1310 nm; 10.5 ± 1.0 μm at 1550 nm
Maximum chromatic dispersion	≤ 3.5 ps/(nm x km) from 1285 nm to 1330 nm and < 18 ps/(nm x km) at 1550 nm
Fiber polarization mode dispersion	≤ 0.2 ps/(km) <sup>1/2</sup>
Fiber coating	Dual layered, UV cured acrylate applied by the fiber manufacturer

Coating diameter	245 $\mu\text{m} \pm 5 \mu\text{m}$
Minimum storage temperature range for Cable	-40°C to +75°C (-40°F to 167°F)
Minimum operating temperature range for Cable	-20°C to +70°C (-4°F to 158°F)
Rated life	Certify a 25 year life expectancy when installed to manufacturer's specifications
Ensure the change in attenuation for single-mode from -20°C to +70°C (-4°F to 158°F) does not exceed 0.2 dB/km at 1550 nm, with 80% of the measured values no greater than 0.1 dB/km at 1550 nm.	

**Buffer Tubes:** Each buffer tube shall be filled with a non-hygroscopic, non-nutritive to fungus, electrically non-conductive, homogenous gel that is free from dirt and foreign matter. The gel shall allow free movement of the fibers, without loss of performance, during installation and normal operation including expansion and contraction of the buffer tubes. The gel shall be readily removable with conventional nontoxic solvents.

Buffer tubes shall be stranded around a central member using the reverse oscillation or "S-Z", stranding process. Use filler rods when needed in trunkline cable to lend symmetry to the cable section.

The nominal outer diameter of the tubes shall be 2.7mm for tubes with 12 fibers or less.

**Central Strength Member:** The fiber optic cable shall have a central strength member designed to prevent buckling of the cable. The central member shall be covered with a super absorbent polymer in order to prevent water migration through the center of the cable core should the core become exposed.

**Cable Core:** The fiber optic cable shall use a dry water-blocking material to block the migration of moisture in the cable interstices.

Two polyester yarn binders shall be applied counter-helically in order to secure the buffer tubes to the central member. The binders shall not crush or deform the buffer tubes. The binders shall be non-hygroscopic, non-wicking and dielectric with low shrinkage.

For single layer cables, the yarn binders shall contain super absorbent polymers to prevent water migration.

**Tensile Strength Members:** The fiber optic cable shall have tensile strength members designed to minimize cable elongation due to installation forces and temperature variation.

Underground fiber optic cable shall withstand a 600 lb tensile load applied per EIA-455- 33 where the change in attenuation does not exceed 0.2 dB during loading and 0.1 dB after loading. Use cable rated for an installed tensile service load of 200 lbs or more.

**Cable Jacket:** The fiber optic cable jacket shall be constructed of medium density polyethylene (MDPE) that has been applied directly over the tensile strength members and water-blocking

material. The jacket shall have at least one ripcord designed for easy sheath removal.

**Cable Markings:** Provide cable with markings that include cable length markings (in feet) and the year of manufacture. In addition, provide cable with markings approved by MCDOT, to distinguish between trunkline (between communication hubs) and branch cables (spliced to trunkline cables). All cable markings shall be labeled with indelible markings.

**Environmental:** Cable shall be capable of withstanding the following conditions without damage or decrease in function:

1. Cable operating temperature per EIA/TIA-455-03;
2. Total immersion in water with natural mineral and salt contents;
3. Salt spray or salt water immersion for extended periods; and
4. Wasp and hornet spray.

- 2.1.2.1.1.2 **(B) Cable Length and Shipping:** Base the length of each fiber optic cable on field measurements. Include in the measurement, the required amount of slack cable at pull boxes, field cabinets, hubs, and equipment racks as required by the Plans.

Stencil, letter, or provide the following information on a weatherproof tag firmly attached to the reel:

1. Factory order number;
2. Job number;
3. Ship date;
4. Manufacturer's cable code;
5. Type of cable (single mode, outdoor);
6. Beginning and ending length markings; and
7. Measured length and attenuation.

- 2.1.2.1.1.3 **(C) Trunkline Fiber Optic Cable:** Trunkline fiber optic cable shall have a minimum of 96 fibers, with 12 fibers per buffer tube.

- 2.1.2.1.1.4 **(D) Branch Fiber Optic Cable:** Branch fiber optic cable shall have a minimum of 12 fibers, with 12 fibers per buffer tube, and factory installed male Ultra Physical Contact (UPC) LC connectors on one end for each fiber in the cable. Leave the other end of the branch cable bare for splicing to the trunkline fiber.

- 2.1.2.1.1.5 **(E) Fiber Optic Jumper Cable:** Jumper cables shall meet the following requirements:

1. 250  $\mu$ m buffering of each fiber;
2. 900  $\mu$ m buffering of each fiber applied after the initial 250  $\mu$ m buffering;
3. Maximum factory measured insertion loss of 0.5 dB per EIA/TIA 455-171;
4. Less than 0.2 dB loss when subjected to EIA/TIA-455-1B, 300 cycles, 0.5 kg;
5. Aramid yarn strength member;
6. Rugged 0.12" (approximate) PVC sheathing;

7. Minimum bend radius of 12" following installation, 25" during installation;
8. Minimum tensile strength of 480 lbs;
9. UPC LC Connectors that are factory terminated; and
10. Lanyard dust caps for fiber optic connectors.

2.1.2.1.1.6 **(F) Fiber Optic Pigtail:** Fiber optic pigtails shall meet the requirements for jumper cable, except as amended by this section. Pigtails that are totally contained within a fiber optic splice or termination unit, need not have a 0.12" PVC jacket. All fiber optic pigtails shall be UPC type LC. The other end shall be left bare for splicing to fiber.

2.1.2.1.1.7 **(G) Fiber Optic Connectors:** Fiber optic connectors shall meet the following requirements:

1. Pre-installed by the cable manufacturer;
2. Type shall be factory machine polished UPC LC and factory terminated;
3. Designed for terminating single mode fiber with 125 µm cladding;
4. Return loss factory-measured – 55 dB (UPC) or less from -40°C to +70°C (-40°F to 158°F);
5. Factory-measured attenuation less than 0.5 dB; and
6. Connector attenuation will not change more than 0.2 dB following 4800 rematings; and
7. Lanyard dust caps for fiber optic connectors.

Connectorized cable shall have strain relief boots that can withstand an axial pull of 25 lbs with no physical damage to the connector or performance of the fiber.

Hand polished connectors are not authorized for use.

#### 2.1.2.1.2 Fiber Optic Splice And Distribution Equipment

2.1.2.1.2.1 **(A) Fiber Optic Patch Panels:** Fiber optic patch panels shall have protective covers for all unused couplers.

2.1.2.1.2.2 **(B) Splice Trays:** Splice trays shall be designed specifically for housing singlemode fusion splices protected by heat-shrink sleeves. Splice trays shall be easy to install and remove, and have provisions for a minimum entry of four buffer tubes.

2.1.2.1.2.3 **(C) Fiber Optic Splice and Termination Units:** Fiber optic splice and fiber optic termination units shall be properly sized for the required number of splices and terminations subject to the minimum requirements stated for each configuration. Fiber optic splice and termination units shall meet the following requirements:

1. Have provisions for minimum of 6 fiber optic cable entries;
2. Rack mounted;
3. Have front and rear doors or removable panels;

4. Have a top, bottom, and 4 sides that fully enclose the interior and protect its contents from physical damage;
5. Manufactured using 16 gauge aluminum or approved equivalent and corrosion resistant;
6. Provisions for neatly routing cables, buffer tubes, and fan-out tubing;
7. Have internal feed-through provisions that allow cables to be internally routed between two units installed adjacent to each other; and
8. Have provisions for externally securing the fiber optic cable, sheath, and central strength member.
9. Suited for Patch and Splice Modules
10. Include removable front and rear fiber routing guides
11. Textured black powder coat finish
12. 4RU Panels conforming to 15.5x17x15x7 (in)
13. Aluminum construction per ASTM B209
14. Unloaded weight of 9 lbs (4RU), 5lbs (2RU), and 4 lbs (1RU)
15. Use LGX interconnect platform

**Fiber Optic Splice Units:** Fiber optic splice units shall consist of a single housing with provisions for installation of multiple splice trays as required. The splice unit shall have provisions for future installation of 2 splice trays of minimum 12 splice capacity each, in addition to the required amount.

The splice unit shall have a pull-out shelf that allows easy access to the splice tray, buffer tube and fiber storage area that permits fusion splicing to be conducted at a minimum distance of 16 feet from the housing. Units with hinged shelves are not acceptable. The following permanent marking shall be provided on the door or front access panel: "Communication Fiber Optic Cable Splice Area Inside".

Try this instead: Fiber optic splice units shall consist of a single modular housing that has LGX interconnect adaptability. Each Patch and Splice module should use sr-15e fiber that can be configured for up to 24 fiber splices to LC connectors and corresponding bulkheads. These patch and splice modules should be self-contained with the bulkheads providing one connection interface and the internal splice chips providing the other connection interface. Mounting provisions for the patch and splice modules should include individual rack or wall-mountable brackets that allow for setup in limited-space applications.

**Fiber Optic Termination Units:** Fiber optic termination units shall consist of a single housing with provisions for installation of one or more patch panels as required. Patch panels shall face to the front of the rack.

Fiber optic termination units shall have cable management brackets or rings, integral to the unit, that

secure and support cables between patch panels or splice trays to the vertical rack members while maintaining a minimum 1.5" cable radius. Jumper cable troughs may be provided in lieu of this requirement.

The following permanent marking shall be provided on the front of the unit: "Communication Fiber Optic Cable Termination Area Inside".

**Integrated Fiber Optic Splice and Termination Units:** Integrated fiber optic splice and termination units shall consist of a single housing with provisions for patch panels and splice trays. Integrated splice and termination units shall meet the requirements stated herein for splice units and termination units.

The following permanent marking shall be provided on the door or front access panel: "Communication Fiber Optic Cable Termination and Splice Area Inside".

2.1.2.1.2.4 **(D) Jumper Cable Troughs:** Jumper cable troughs shall be designed to secure, support, store, and horizontally route jumper cables and other fiber optic cables from vertical frame members on one side of the rack, to vertical frame members on the other side of the rack. Jumper cable troughs shall be designed to maintain the manufacturers minimum bend radius for jumper cables cable bend radius when transitioning from the trough to vertical frame member. The capacity of each cable trough shall exceed the number of jumpers it houses. The finish of the jumper cable troughs shall match the finish of the fiber optic termination equipment.

2.1.2.1.2.5 **(E) Underground Splice Closures:** Underground splice closures shall be cylindrical, butt-end style, corrosion resistant, water-tight, and meet the requirements of GR-771-CORE. Underground splice closures shall seal, bond, anchor, and provide efficient routing, storage, organization, and protection for fiber optic cable and splices. Internal configuration shall have end cap with a minimum of two express ports for entry and exit of uncut trunkline cable and a minimum of three additional ports for branch cables.

The splice enclosure shall be designed to seal terminations using gel-sealing technology. The use of heat-shrink is no longer authorized. The gel seal cable terminations shall automatically adjust to the cable size and shape, and require no special tools, tapes or mastics to install. The splice enclosure shall support a minimum of 96 splices.

Splice closures shall have a reliable seal design with both the cable jackets and core tube sealed, without the use of water-blocking materials. The gel seals shall be reusable and cabling shall be easy to remove. The splice closure shall be opened and completely resealed without loss of performance. Use splice closures that

are at least 12" shorter in length than the inside long dimension of the pull box.

**2.1.2.2 CONSTRUCTION REQUIREMENTS:**

**2.1.2.2.1 Fiber Optic Cable:** Approval of the fiber pulling plan is required prior to any installation of fiber optic cable. The ITS inspector shall be present at all times during the installation of fiber optic cable.

The pull tape shall be threaded through the pulling eye and sewn back onto itself to reduce the possibility of breakage. A swivel shall be used between the tape and cable to prevent cable twisting. Tension-sensitive, breakable links shall be used to protect the fiber optic cable from over-tension for pulls over 700'.

The Contractor shall install fiber optic cable continuous and without splices between allowable splice points as identified on the Plans and in the Specifications. Only splice fibers in splice closures and at fiber optic splice units that are housed at hub locations and/or the Traffic Management Center (TMC). The Contractor shall perform all final length measurements and order cable accordingly.

The Contractor shall:

- Carefully handle fiber optic cable;
- Not pull cable along the ground or over or around obstructions;
- Not pull cable over edges or corners, over or around obstructions or through unnecessary curves or bends;
- Not exceed fiber optic cable bend radius at any time;
- Not exceed the maximum pulling tensions at any time; and
- Use manufacturer approved pulling grips, cable guides, feeders, shoes and bushings to prevent damage to the cable during installation.

When removing cable from the reel prior to installation, shall be placed in a "figure-eight" configuration to prevent kinking or twisting. The Contractor shall take care to relieve pressure on the cable at crossovers by placement of cardboard shims (or approved equivalent method) or by creating additional "figure-eights". If storing cable, use a cable reel for long lengths and for short lengths store in a "figure eight" pattern larger than the fibers minimum bend radius.

The Contractor shall furnish the Engineer with the cable manufacturer's recommended procedures, maximum pulling tension, a list of the cable manufacturer's approved pulling lubricants, and the lubricant manufacturer's procedures for use. The Contractor shall adhere to the manufacturer's installation procedures when installing fiber optic cable. The pulling tension shall be monitored using a strip chart recorder when mechanical pulling techniques are used. If at any time during the pull the cable tension is at 85% of the maximum allowed, the Contractor shall stop the pull and troubleshoot the problem to determine if there is an obstruction, low lubricant, or other difficulties that may cause a high-tension problem. After the tension problem has been thought to have been resolved, continue the pull, and closely monitor the cable tension. If the problem continues,

the Contractor shall notify the Engineer of the problem and cease installation until the problem can be identified.

High-performance fiber optic cable lubricant shall be used to lubricate the conduit for long cable duct pulls beyond 700' or pulls with numerous turns totaling over 180 degrees. The lubricant must be suitable for outdoor temperatures, flame retardant, unable to affect the properties of the cable jacket, and have a low coefficient of 0.25 when used on PE jacketed or other types of cables. The lubricant should be present at all points of the duct, cable feed locations, intermediate pull locations, bend locations and approved by UL or CSA. The lubricant shall be applied with a lubricant collar and pump. The Contractor shall use lubricants in quantities and in accordance with the procedures recommended by the lubricant manufacturer.

The Contractor shall furnish attachment hardware, installation guides, and other necessary equipment, not specifically listed herein, as necessary to install the fiber optic cable.

**2.1.2.2.1.1 (A) Underground Fiber Optic Cable:** At each splice point, coil 150 ft of slack fiber optic cable per cable entry. Each #9 pull box without a splice closure shall have a minimum of 300 ft of fiber optic cable slack installed. At each intermediate No. 7 ITS Pull Box the Contractor shall install 50 ft of slack per cable. At each field cabinet, provide a minimum of 16 ft of slack for each fiber optic cable. All cable shall be stowed per project plans and MCDOT Standard Details.

Underground fiber optic cable shall be installed only in fiber optic conduit, unless shown otherwise in the plans. Do not direct bury underground fiber optic cable.

If the cable is pulled by mechanical means, the Contractor shall obtain the Engineer's approval for the cable pulling equipment. Cable pulling equipment shall have a mechanism to ensure that the maximum allowable pulling tension is not exceeded at any time during installation.

**2.1.2.2.1.2 (B) Outdoor Fiber Optic Cable Installed Indoors:** For outdoor fiber optic cable installations indoors, the Contractor shall follow the requirements of local building codes and NEC Article 770, inclusive of the Fine Print Notes.

Splices for outdoor fiber cable installed indoors shall be housed in a rack-mounted fiber optic splice unit or integrated fiber optic termination unit. Coil 16' of slack fiber optic cable and stow it in the rack.

**2.1.2.2.1.3 (C) Fiber Optic Jumper Cable:** Install jumper cables only in field cabinets and indoor locations. Provide permanent markings on duplex jumper cables that provide a visual distinction between the two fibers. Provide strain relief for jumper cables at both ends and elsewhere as needed. Adhere to manufacturer recommended installation and minimum bend radius requirements.

2.1.2.2.1.4 **(D) Fiber Optic Pigtails:** Install fiber optic pigtails only in enclosed fiber optic splice and termination units located in field cabinets and indoor locations. When splicing pigtails to individual fibers, match the color of single fiber pigtails with the color of the fiber. Alternatively, single fiber pigtails may be routed through colored fan-out tubing that matches the color of the fiber.

2.1.2.2.2 **Splicing and Terminations:** Only splice fibers at locations that are identified on the splice tables in the Plans. Splice tables in the Plans shall not be revised without approval from the Engineer. All splices shall be protected and stored in underground splice closures for outdoor installations, and in fiber optic splice units or integrated fiber optic splice and termination units for indoor installations.

For indoor installations, the fiber optic cable shall enter the rear of the fiber optic splice unit or integrated fiber optic splice and termination unit. The fiber optic cable sheath and central member shall be secured inside the unit prior to buffer tube fan-out. All entry holes not used shall be plugged. Buffer tubes with fiber designated for splicing shall be routed into and secured in a splice tray. Remaining buffer tubes shall be secured within the splice unit and not accessed.

2.1.2.2.2.1 **(A) Splicing Methods:** All splices shall be accomplished by means of the fusion splice technique. Each splice shall not add more than 0.1 dB attenuation when splicing new fiber to new fiber, and 0.3 dB attenuation when splicing new fiber to existing fiber. Splices found to exceed the maximum allowed dB attenuation when tested with an OTDR shall be re-spliced, at no additional cost, until this requirement is met.

Each splice shall be packaged in a protective heat-shrink sleeve and secured in the splice tray. The heat-shrink sleeve shall be approved for use by the fiber optic cable manufacturer and installed in such a manner as to protect the fiber from scoring, dirt accumulation, moisture intrusion, and microbending.

All fibers in a buffer tube shall be spliced within the same splice tray. When splicing to fiber optic pigtails, use spiral wrap (or similar approved method) to group and protect pigtails routed from each splice tray to the corresponding patch panel.

Fiber optic cable splices will fall into one of the following categories:

Mid-cable splices: Perform mid-cable splices when splices are not required for all fibers of a cable. Only fibers within a buffer tube that are designated for splicing shall be accessed, spliced, and secured neatly within the splice tray. The remaining fibers in the buffer tube that are not designated for splicing shall be secured neatly within the splice tray and not cut. Removal of the

buffer tube to access the fibers shall be accomplished using equipment specifically designed for buffer tube removal without damaging the individual coated fibers.

Full-cable splice: Perform full-cable splices when the distance exceeds the maximum length of fiber optic cable available on a reel. All fibers, including spares, shall be spliced together to provide a continuous optical path. All fibers shall be secured neatly within the splice trays.

2.1.2.2.2.2 **(B) Termination Methods:** Use LC connectors for terminating fiber optic cables to equipment and patch panels in field cabinets. Use cables with LC type connectors for terminating fiber optic cables at patch panels located at hubs and the TMC.

All connector types shall use an Ultra Physical Contact (UPC) machine polished connector. No hand polishes are permitted or authorized.

Measured attenuation at each termination (inclusive of 2 connectors and coupler) shall not exceed 0.5 dB.

Fiber terminations shall be neatly, and permanently labeled on the connector module to designate transmit or receive (when appropriate) and the fiber optic strand number or other designation as determined by the Engineer. Spare fibers shall be terminated when called for by the Plans, and labeled as determined by the Engineer.

Protective covers shall be used on all optical connectors and terminations at all times until terminated.

Field Termination: Factory installed connectorized branch cables shall be used for field termination of fiber optic cable in equipment cabinets. LC connectors with strain relief boots shall be attached at the factory. The factory connectorized branch cables shall be supplied in sufficient lengths to be spliced to the trunk cable in the splice vault and installed in conduit to the equipment cabinet without intermediate splices.

Termination at Hubs and TMC: Termination of fiber optic cable at hubs and the TMC shall be accomplished by fusion splicing fiber to factory prepared, fiber optic pigtails with LC connectors terminated at patch panels. Jumper cables shall have LC connectors. Field termination of fibers to connectors shall not be permitted.

2.1.2.2.3 **Fiber Optic Distribution Equipment:** The Contractor shall install a sufficient number of patch panels to terminate all fibers. Blank patch panel covers, of same finish and manufacture as the patch panel, shall be installed for all unused patch panel spaces on fiber optic termination units.

Fiber optic patch panels shall have couplers to allow applications to be easily installed and removed from the termination housing.

2.1.2.2.4 **Labeling:** Comply with the requirements of Section 2.1.6.2.1.

2.1.2.3 TESTING REQUIREMENTS:

Fiber optic cable and distribution equipment shall meet the following certification, factory and stand-alone test requirements. General test requirements are covered in this section. See Figure 2.1.2.3.3 for a Sample Fiber Test Report.

The ITS inspector shall be present at all times during the testing of fiber optic cable.

2.1.2.3.1 **Design Approval Tests (DAT):** Submit certification or test results for all required factory testing of fiber optic cable. Submittal of RUS certification will satisfy this requirement for the tests that are required by RUS 1755.900.

2.1.2.3.2 **Factory Acceptance Tests (FAT):** Test all fiber optic cable, pigtails, jumper cables and patch panels in the factory to demonstrate compliance with specification requirements. Submit a copy of the results of factory tests to the Engineer.

2.1.2.3.3 **Stand-Alone Tests:**

2.1.2.3.3.1 **(A) Pre-Installation Testing:** The Contractor shall visually inspect all cable and equipment upon delivery and again prior to installation. Test any equipment that is found to have visual damage. The Contractor shall perform pre-installation on-reel testing of all fiber optic cable strands prior to installation. Test using an OTDR to ensure fiber optic cable strands are free of breaks and micro bends.

2.1.2.3.3.2 **(B) Post-Installation Testing:** The Contractor shall purchase legal copies of the testing standards listed below and provide them to the Engineer a minimum of 7 days prior to any fiber optic cable testing. The standards that are required to be purchased include:

- EIA/TIA-526-7– “Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant”
- TIA/EIA-455-8 (FOTP8) – “Measurement of Splice or Connector Loss and Reflectance Using an OTDR”

Prior to testing, the Contractor shall furnish the Engineer with a fiber optic testing plan and procedures. Testing of spare fiber is required. The Contractor shall identify any unacceptable losses and make corrective actions at no additional cost. Failed splices may be remade and re-tested for compliance. Replace any cable in its entirety that is found not compliant to the Specifications. Perform the following post-installation tests using the procedures of TIA/EIA-526-7A and all standards and procedures invoked therein, subject to the following clarification:

**Power Meter Tests:** The contractor shall conduct uni-directional power meter tests for each fiber to measure installed fiber cable attenuation, demonstrate connectivity, and correct splicing. The contractor shall perform Power Meter Tests on each fiber strand in accordance with Method A.3 of TIA/EIA-526-7 – “Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant” and submit test results for each fiber to the Engineer as required by TIA/EIA-526-7. Submit test results for each link to the Engineer. Power meter tests shall be conducted after all splices have been made and all connectors, jumper cables, and pigtailed are in place. Each link shall be tested separately from each field cabinet to the respective trunk cable termination panel in the Hub(s) and from field cabinet to field cabinet for fiber links that do not go directly to a hub. The use of fiber optic jumpers to couple the connectors together in equipment cabinets to create a continuous end to end link shall not be permitted.

**OTDR Tests:** The contractor shall conduct bi-directional tests using an OTDR in accordance with TIA/EIA-455-8 (FOTP8) for each fiber strand from field cabinet to hub location, between hub locations, between field cabinet locations, inclusive of all branch cables, pigtailed, and patch panels to demonstrate that attenuation for each fiber strand, termination, and splice, individually and as a whole, comply with allowable losses in accordance with the fiber assignment tables. Test fibers at 1310 nm and 1550 nm. The OTDR shall be set to operate in auto event mode with the event threshold set at 0.1dB or lower. The Contractor shall submit printed and electronic OTDR traces for approval. Any electronic traces submitted that were shot without the auto events feature shall be re-tested by the Contractor at no additional cost. The Contractor shall clearly annotate each event (connector, pigtail, splice, etc.), event location, and identify the measured loss.

Following completion of all testing, and approval by the Engineer, the Contractor shall compile and submit two organized test ~~notebooks~~ **file (electronic file)** that include all required test results, summary tables, OTDR traces, and electronically saved test data. Test ~~notebooks—file (electronic file)~~ shall at a minimum, include the following:

1. Identification of each fiber by cable (as it is identified in the field), buffer tube, color, and string number as appropriate;
2. A summary sheet with each submittal that clearly illustrates length and measured loss versus budgeted loss for each fiber or connected fiber string as appropriate; and
3. Calculations and notations for each fiber and wavelength that include total loss, measured dB/km loss, the number of connectors/terminations, pigtailed, and jumper cables and any anomalies over 0.1 dB.



2.1.2.4 WARRANTY REQUIREMENTS:

If specific warranty requirements apply, they are listed under specific equipment requirements of the specifications. The cost of warranties and repairs are included as part of the contract unit price.

Within 60 days following approval of material and equipment, the Contractor shall submit a preliminary Warranty Administration Plan (WAP) to the Engineer for approval.

The WAP is to address how the warranty period shall be administered, including the following requirements:

1. A 24 hour, seven day a week telephone number for MCDOT initiated warranty requests;
2. Repair or replace failed items that prevent normal operation of the system or any of the subsystems within 5 calendar days after notification. Respond to all other warranty requests within 14 calendar days;
3. Track each repair performed during the warranty period by serial number. Account for removals, replacements, and repaired items put back in service or into the spare inventory. Reset the warranty period for all repaired or replaced items. Establish a new warranty period for all new items;
4. Perform routine maintenance during the warranty period per vendor recommendations.
5. Provide a summary of all routine maintenance activities required, whether or not they fall within the one-year warranty period;
6. When used, replenish spare equipment inventory within 2 weeks, or stated vendor lead-time, whichever is greater;
7. Provide a complete list of equipment and vendor warranty periods, including spare equipment. Use Figure 480.1 or similar approved form; and
8. Provide copies of all warranty paperwork.

Submit a final WAP to the Engineer for approval at least 45 days prior to final acceptance. An approved WAP is required prior to final acceptance.

Prior to final acceptance, furnish an inventory of spare parts.

Within 90 days and no later than 30 days prior to the end of the one-year warranty period, submit the following to the Engineer for approval:

1. A complete list of all equipment (by serial number) that have warranties extending beyond the one year warranty period, including spare equipment. Use Figure 2.1.2.4 or similar approved form; and
2. All warranty paperwork extending beyond the one-year period, transferring ownership of the warranties to MCDOT.

Repair or replace defective fiber optic cable and equipment for a period of two years following final acceptance of the system.

**Figure 2.1.2.4 Equipment Warranties**

Project Name Equipment Warranties						
Submitted By:			Project No.:			
Date:			Federal Project No.:			
Serial #	Description	Location	Warranty Duration	Expiration Date	Date Received	Other Information

2.1.2.5 DOCUMENTATION:

Deliver a minimum of two sets of maintenance manuals to the Engineer for all furnished equipment. The manuals shall be supplied in durable, loose-leaf, three ring binders of appropriate size. All sections shall be permanently titled and have pages numbered and indexed for easy and efficient removal and replacement. In addition, an electronic copy of all manuals shall be provided for all equipment and software.

Format maintenance manuals in two sections that include the following material for all furnished equipment and components:

**Section 1**

- Description for each type of equipment and its components.
- Description of operation.
- Troubleshooting procedures at system and device levels.
- Preventative maintenance and adjustment procedures.
- “As-built” drawings including block diagrams, signal path, and detailed device and system connection diagrams (reference Section 2.1.6.2.3).
- Equipment source reference including manufacturer and nearest authorized service centers along with associated addresses and telephone numbers.
- Final warranty administration plan.

**Section 2**

- Manufacture’s operation and installation.
- Manufacture’s service and repair guides.

Prior to installing fiber optic cable the Contractor shall provide a fiber pulling plan showing reel setup, assist winch, “figure eight”, and assist wheel locations. The fiber pull plan shall identify the estimated pulling tension, route length, number of turns, pull direction, splice enclosure locations, and accessibility. The fiber pulling plan should also include cable pulling lubricants, pulling grips, breakaway swivel, dynamometer, and any other hardware that will be used to assist in maintaining cable’s minimum bend radius. The Contractor shall submit the fiber pulling plan to the Engineer for review and approval two weeks prior to install. The Contractor shall not install fiber optic cable without prior approval of the fiber pulling plan.

The Contractor shall provide post installation as-built drawings that document fiber distances between manhole/handholes, splice locations, amount and location of coiled slack, and type, size, and number of installed fiber optic cables.

2.1.2.6 TRAINING:

When required, training shall be provided in two sessions.

The first training session shall be for maintenance and troubleshooting. This session shall be a minimum of four hours in length for each type of field device installed, including communications. This session shall be oriented for the County maintenance staff.

The second training session shall be for operations. This session shall be a minimum of four hours in length for each type of field device installed. This session shall be oriented for the County Traffic Management staff.

2.1.2.7 MEASUREMENT:

Fiber optic cable will be measured by the linear foot for actual cable length installed, for each type installed. The length of cable required to be coiled for cable slack will be measured and included in the total measured amount.

Fiber optic splice units, termination units, integrated splice and termination units, and underground splice closures will be measured as a unit for each type installed.

Fiber optic jumper cables, pigtailed, patch panels, terminations, splice trays, and splices are included as part of and considered incidental to the listed pay items.

2.1.2.8 PAYMENT:

The accepted quantities of items, measured as above, will be paid for at the contract unit price, COMPLETE IN PLACE. The cost of testing, warranty, documentation, and training are included in the unit price of the each item.

2.1.3 CLOSED CIRCUIT TELEVISION

The work under this section shall consist of furnishing, installing, and testing CCTV equipment including camera assemblies (camera systems and cables, lightning and surge protection), cabinets, software, and various accessories as needed.

2.1.3.1 MATERIAL REQUIREMENTS:

2.1.3.1.1 **Camera Assembly:** Provide a camera assembly that interoperates with an existing central software driver, available from 360 Surveillance. A list of available software drivers may be found at: <http://360surveillance.com>. All components of the camera assembly shall be off-the-shelf items.

The total weight of pole mounted CCTV equipment shall not exceed 45 lbs.

Electronic equipment and power supply shall meet the minimum requirements of NEMA Standards Publications No. TS-2, Section 2 Environmental Standards and Test Procedures. The Contractor shall provide step-up/step-down transformers and AC to DC power conversion as needed to match the power requirements of each component.

The Contractor shall submit an original or copy of a Certificate of Compliance along with required equipment lists and supporting

material, including warranty information to the Engineer for approval as part of the material and/or equipment list.

If requested by the Engineer, the Contractor shall furnish laboratory results or independent certifications that substantiate compliance with the stated requirements.

Materials or equipment covered by the certificate may be sampled and tested at any time, and, if found not in conformity with the requirements of the project plans or specifications, will be subject to rejection, whether in place or not.

Certificate of Compliance shall contain the following information:

1. A description of the material or equipment supplied;
2. Means of material identification, such as label, lot number, or marking;
3. Statement that the material complies in all respects with the requirements of these Specifications. When identified in the Specifications, Certificates shall state compliance to specific cited standards, such as RUS 1755.900, NEMA TS-2, etc. and specific required tests, such as burn-through testing for fiber optic conduit;
4. Clearly state any exceptions to the requirements of the Specifications; and
5. The name, title, and signature of a person having legal authority to bind the manufacturer or the supplier of the material. The date of the signature shall also be given. The name and address of the manufacturer or supplier of the material shall be shown on the certificate. A copy or facsimile reproduction (FAX) will be acceptable; however, the original certificate shall be made available upon request. The person signing the certificate shall be in one of the following categories:
  - An officer of a corporation.
  - A partner in a business partnership or an owner.
  - A general manager
  - Any person having been given the authority in writing by one of the three listed above.

2.1.3.1.1.1 **(A) Camera and Lens:** Cameras shall produce quality video that is clear, low-bloom, low-lag, video with no jitter, interlace, pairing, or ghosting when viewed at the TMC. Cameras and lenses shall be provided that meet the following requirements:

<b>Function/Feature</b>	<b>Requirement</b>
Camera	Day/Night (35X), DSP, color, solid state
Signal Format	NTSC
Scanning System	2:1 Interlace
Image Sensor	1/4" charged coupled device (CCD)
Effective Pixels	768 (H) X 494 (V) (NTSC)
Horizontal Resolution	> 520 TV Lines (NTSC)
Lens Mount	C-type lens mount or integrated camera/lens combination
Lens	f/1.2 (f = 3.8 - 91.2 mm optical) or better
Zoom	35X optical, 12X digital or better

Zoom speed (optical range)	3.2 / 4.6 / 6.6 seconds
Horizontal	55.8° at 3.4 mm wide zoom;
Angle of view	1.7° at 119 mm telephoto zoom
Focus	Automatic with manual override
Maximum Sensitivity @35 IRE NTSC/EIA	0.063 lux at 1/4 sec shutter (color) 0.55 lux at 1/60 sec shutter (color) 0.00018 lux at 1/2 sec shutter (B-W)
Sync System	Internal / AC line lock, phase adjustable via remote control, V-Sync
White Balance	Automatic with manual override
Shutter Speed NTSC	Automatic (electronic iris) / Manual 1/2 ~1/30,000
Iris Control	Automatic Iris Control with manual override
Gain Control	Automatic / OFF
Video Output	1 Vp-p, 75 ohms
Video Signal to Noise	> 50 dB
Presets	60 minimum
Wide Dynamic Range	128 X
Cable length	The supported length of cable between the camera mounted CCTV and the cabinet equipment is 500' minimum distance using RG59/U

Cameras shall have power input circuitry designed to protect the internal electronics from damage from power surge and from under voltage conditions per the guidelines of IEEE C62.36-1991.

Cameras and lens combinations shall automatically recover from over and under voltage conditions, when the prime power is returned to values defined by the Specifications, by returning to the last position prior to the over/under voltage condition.

Lenses shall mechanically or electrically protect the motor from overrunning in extreme positions.

2.1.3.1.1.2 **(B) Pan/Tilt Unit:** Pan/tilt units shall be designed specifically for the environmental conditions that they will be subjected to while meeting the following minimum requirements:

Function/Feature	Minimum Requirement
Pan range	0° to 360°
Tilt range	10° up and 83° down from the horizontal axis
Pan/tilt minimum speed (manual)	40° pan/second and 20° tilt/second.
Presets	60 minimum

Pan/tilt units that pan or tilt at speeds in excess of 30°/second shall have variable speed operation.

Pan/tilt units shall use housings that are corrosion resistant, rated NEMA 4 or better, and provide for feed through cabling.

Pan/tilt units shall have either adjustable worm gears drives or stepper motors that are capable of instantaneous reverse motor action, are corrosion resistant, do not require lubrication, and meet the following minimum requirements:

<b>Description Minimum</b>	<b>Requirement</b>
Allowable load (worm gear motor)	40 lbs
Allowable load (stepper motor)	20 lbs
Bearings	Heavy-duty ball or roller bearings.
Gears	Hardened steel.
Finish	Light color baked enamel or anodized.
Cabling	Internal feed through cabling.

2.1.3.1.1.3 **(B1) Precision Pan/Tilt Units:** Precision pan/tilt units shall meet the requirements stated for pan/tilt units except that they shall have stepper motors and stop on a programmed pan/tilt preset within an accuracy of 1/4°. The pan/tilt unit shall provide the remote user with variable pan and tilt speeds. The minimum rate of pan shall be 80°/second. The minimum rate of tilt shall be 40°/second.

2.1.3.1.1.4 **(C) Environmental Enclosure:** Environmental enclosures shall be used to house the camera and lens. Environmental enclosures shall be sealed and corrosion resistant. The interface with the pan/tilt unit shall be achieved in a manner that leaves no exposed cabling.

The environmental enclosure shall be equipped with a thermostatically controlled heater/fan.

The environmental enclosure shall have a corrosion resistant sun shield that covers the upper half of the enclosure. The sun shield shall permit air to freely circulate between the sun shield and the environmental enclosure.

Environmental enclosure shall be cylindrical in shape (or approved equal) not exceeding 5.2” outside diameter, or hemispherical dome no larger than 15” for the lower half.

The enclosure shall have an optically clear, impact resistant front window (for cylindrical enclosure) or dome acrylic lens (for dome enclosures). The front window or acrylic lens shall not yellow, introduce appreciable light loss, or distort over a 10-year service life when exposed to a desert environment.

2.1.3.1.1.5 **(C1) Cylindrical Enclosure:** The finish of the environmental enclosure and sun shield and the finish of the pan/tilt unit housing shall match.

2.1.3.1.1.6 **(C2) Dome Enclosure:** Either the upper or lower half of the dome enclosure shall be easy to remove without the use of tools.

A safety wire (or approved equivalent) shall be used to hold the removed half when disconnected. Bond the dome enclosure to mounting arm/bracket, and ensure that the mounting arm/bracket is bonded to the CCTV pole or structure. It is preferred to have an exterior corrosion resistant pin connector that enables testing of the camera assembly within the dome without unsealing the dome.

2.1.3.1.1.7 **(D) Mounting:** Provide all mounting equipment and adapter plates needed to securely mount the pan/tilt unit or dome assembly to the CCTV pole or other structure as required. Mounting shall comply with MCDOT Standard details or approved alternative drawings.

All cylindrical cameras shall be mounted to the top of the pole using a custom signal cap. The diameter of the signal cap shall be determined by the size of the pole. The signal cap shall have a 2" hole where the cylindrical camera will be mounted to the top of the pole.

All cylindrical cameras shall be pole top cameras unless otherwise specified by the Engineer.

All dome cameras shall be mounted to the pole using a pendant arm and strapped to the pole using 3/4" BAND-IT® type 201 stainless steel bands or approved equal. Straps utilizing a worm gear to tighten and hold the strap shall not be used.

2.1.3.1.1.8 **(E) CCTV Cabinet:** The Contractor will furnish and install a pole mounted Type G cabinet (**"G" NEMA Controller Cabinet, TS 2 Type 1**) for each CCTV location, per MCDOT Detail 2.1.25.

All equipment shall be mounted to the signal cabinet either by the use of a panel or din mount railings.

2.1.3.1.2 **Cables:** Power and control cables shall comply with IMSA 20-1 specification requirements (latest revision).

Coaxial cable shall be RG-59/U and shall meet or exceed the following characteristics:

- Solid copper conductor
- Braided copper shield with 95% coverage
- Attenuation not to exceed 0.65dB/100 feet from 1MHz through 5MHz

- Outdoor rated and UV resistant

The coaxial cable may be replaced by an optical fiber.

A composite cable shall be used for power, camera control, and video between the camera and the cabinet unless otherwise approved by the Engineer.

Each pull box, cabinet, or conduit entry point shall have a minimum of 6' feet of cable slack.

Strain relief shall be used to hold the weight of the electrical, video, and data cables when they hang in a vertical, sloping or horizontal position. The Contractor shall submit a proposed method of strain relief for approval by the Engineer.

An 8' service loop is required at the top of the CCTV camera pole or signal pole. A cable grip shall be placed at the beginning and the end of the service loops to support the weight of the cable and the loop inside the pole.

Drilling of a 1" hole into the signal pole to accommodate the cable is authorized for dome cameras.

A grommet shall be used at each hole to prevent the cable from being frayed or damaged.

There shall be no visible cables hanging from the pole or the CCTV Camera enclosure and mounting arm.

2.1.3.1.3 **CCTV Camera Panel:** A CCTV Camera panel shall be used to mount all CCTV equipment located in one door cabinets.

The CCTV camera panel shall be mounted in the lower left hand corner of the cabinet.

Install surge protectors in the CCTV panel/cabinet for all conductors (power, data, and video) between pole mounted and cabinet mounted CCTV equipment. Ground each surge protector to a terminal block mounted to the cabinet rack. Bond the terminal block directly to the cabinet ground using a #8 AWG copper ground wire. Surge protector leads shall be a minimum 3' in length and installed straight as possible.

Wire, ground, and bond equipment shall be in accordance with Section 250-86 of the NEC.

The panel shall be mounted using the existing vertical "C" channels in the cabinet.

The following equipment shall be included in the cost of the camera control panel and mounted onto the camera panel per MCDOT Standard Details:

1. Single gang outlet box with RJ45 test jack;
2. Coaxial Cable Surge Protector;
3. Low Voltage Camera Control Cable Surge Protector;
4. Electrical Bus Bar (ground);
5. Power Cable Surge Protector;

6. 110 Volt Duplex Receptacle Outlet;
7. 6 Outlet Surge Protection;
8. Camera Power;

The camera control panel shall provide adequate space to install the following equipment, paid for separately, per MCDOT Standard Details:

1. Video Encoder; and
2. Video Encoder Power Supply.

The cable shall be tested on the reel and wired directly to the CCTV camera panel.

The CCTV camera panel shall be bench tested with the camera for no-less-than 24 hours as a unit to include the CCTV camera, all cabling, all surge suppression, the CCTV Remote Monitor Port, and Video Encoder.

Installation shall conform to MCDOT standard details.

- 2.1.3.1.3.1 **(A) Coaxial Cable Surge Protector:** One coaxial cable surge protector shall be installed on the coaxial cable that meets the following requirements:

Class:	Coaxial Cable Protector
Connector:	BNC type
Attenuation:	<0.3 dB @ 0.3 KHz to 1.1 MHz; <-3.0 dB loss @ 3.0 to 4.0 MHz
Input/Output impedance:	75 ohms nominal
Peak Surge Current:	1000 amperes minimum
Response Time:	5 nanosecond or less
Operating Temperature:	-40° C to +85° C
Band Pass:	0 - 2 GHz
Operation Environment:	Outdoor use, out of direct weather (5% to 100% non-condensing)

The equipment shall be the DITEK DTK-VSP-BNC-A, or approved equal.

- 2.1.3.1.3.2 **(B) Power Cable Surge Protector:** Power cable surge protectors shall be installed on all power conductors. Power cable surge protectors shall meet the following requirements:

Class:	AC Hard Wired Transient Voltage Surge Suppressor
Connection Method:	Hardwire parallel connection
Continuous Current:	Unlimited (Parallel Connection)
Peak Surge Current:	20,000-amperes
Response Time:	< 0.5 nanoseconds installed, < 1 nanosecond Component Level
Suppressed Voltage Rating:	600V
EMI / RFI Noise Filter:	Yes
Max Continuous Operating Voltage (MCOV):	130 VRMS / 185 VPK
Operating Temperature:	-40° C to +85° C
Operation Environment:	Outdoor use, out of direct weather (5% to 100% non-condensing)

The equipment shall be the DITEK DTK-120HW, or approved equal.

- 2.1.3.1.3.3 **(C) Low Voltage Camera Control Cable Surge Protector:** Low voltage control cable surge protectors shall be installed on each data conductor. Low voltage control cable surge protectors shall meet the following requirements:

Class	Low voltage surge protection for RS422 and RS485 systems
Connection Method:	Screw Terminals
Continuous Current:	< 180mAmps @ 2 ohms
Peak Surge Current:	120A (per pair)
Response Time:	< 1 nanosecond
Service Voltage:	< 5 V
Wiring Configuration:	8 pair

The equipment shall be the DITEK, 8-wire DTK-Z8-LVLP, or approved equal.

- 2.1.3.1.4 **Video CODEC:** The video CODEC shall allow for the transmission of live video, data, and audio over an existing Ethernet network, requiring an Internet Protocol (IP) address or Internet Explorer 5.5 or higher, or shall work as an analog-to-Ethernet “bridge” controlling matrices, multiplexers, and pan/tilt/zoom cameras. The video CODEC shall operate in a box-to-box configuration allowing for the encoded video to be decoded and displayed on an analog monitor. The video CODEC shall have PTZ functions from web interface.

- 2.1.3.1.4.1 **(A) Operational Requirements:**

**Video:**

Compression algorithm: Dual Stream, MPEG-4, H.264  
 Video format: 1x NTSC / PAL (Auto detect)  
 Connector type: BNC  
 Data rate (bandwidth): 9.6 kbps to 4 Mbps  
 Encoding-decoding latency: 200 ms  
 Frame rate: 1 to 30 fps  
 Video Decoder: Used to display the video on a standard analog NTSC or PAL monitor  
 In-/output level: 1 Vpp (±3 dB)  
 Input impedance: 75Ω/Hi-Z selectable  
 Number of output streams: 5 (multi- and/or unicast)  
 Image Resolution NTSC: D1 720x480, HD1 352x480, 2CIF 720x240, CIF 352x240, QCIF 176x144

**Audio:**

Connector Type: RJ45  
 In-/output level: 0 dBV (+6 dBV max.)  
 Input impedance: >50 kΩ or 600 Ω bal.  
 Max. bandwidth: 20 Hz to 20 kHz  
 Number of channels: 2 (full duplex)  
 Number of streams: 3 (multi- and/or unicast)  
 Output impedance: <50 Ω bal.

Sampling rate: 44, 16 or 8 kHz (selectable)  
Sampling resolution: 16-bits (linear PCM or G.711)  
Signal to Noise Ratio: >75 dBA  
Total harmonic distortion: <0.25% at nom. level

**Transmission Interface:**

Connector: RJ45  
Interface: 10/100Base-TX Fast Ethernet  
Number of interfaces: 1  
Protocols: MPEG-ES or TS, RTP, UDP, IP, DHCP, IGMP, MX/IP, HTTP, and SNMPv2  
Selectable: Auto Negotiation, Half Duplex/Full Duplex, 10/100 Mb

**Management:**

Network Management & Control: SNMPv2, SNM™, MX™, HTTP (password protected)  
PC Software: Manages the installation and maintenance of all hardware transmitters and receivers on the network

**Environmental:**

Operating temperature: -40 to +74° C (-40° to +165.2° F)  
Relative humidity: <95% (no condensation)  
Five Year Warranty

**Mechanical:**

Dimensions (h x w x d): 5.0 x 1.4 x 7.5 in.  
Housing: Rack-mount or standalone  
Weight (approx.): 1.0 lbs

**Contact Closure:**

Connector type: RJ45  
Input: +3 V pull-up, 2 kΩ  
Latency: <5 ms  
Number of channels: 2 (full duplex)  
Number of streams: 2x 3 (multi- and/or unicast)  
Output Fail-safe, potential-free  
Switch rating: 2 A at 30 Vdc  
Threshold 1.5 V

**Data:**

Connector: RJ45  
Data rate: UART mode 300 to 230.4k baud, Latency <5 ms  
Data rate sampling mode: DC to 19.2 kbps  
Format: Asynchronous, serial  
Interfaces: 1x RS232, 1x RS422/485 (2- or 4-wire)  
Latency: 10 ms  
Number of channels: 2 (full duplex)  
Number of streams: 2x 3 (multi- and/or unicast)  
Sampling rate: 153 k samples/sec

2.1.3.1.4.2 **(B) Material Requirements:** The Video CODEC shall interoperate with an existing central software driver, available from 360 Surveillance. A list of available software drivers may be found at: <http://360surveillance.com>. All components of the Video CODEC shall be off-the-shelf items

The video CODEC shall be constructed using the latest available techniques with a minimum number of parts, subassemblies, circuits, cards, and modules to maximize standardization and commonality in the equipment design.

Equipment shall be designed for ease of maintenance, with all component parts being readily accessible for inspection and maintenance. Test points shall be provide for checking essential voltages and waveforms.

All external screws, nuts, and locking washers shall be stainless steel. Self-tapping screws shall not be used unless specifically approved by the Engineer.

All parts shall be made out of corrosion resistant material, such as plastic, stainless steel, anodized aluminum or brass.

All materials shall be protected from fungus growth and moisture deterioration.

All dissimilar metals shall be separated by an inert dielectric material.

2.1.3.1.5 **Environmental:** All electronic equipment installed in the field shall meet the minimum environmental requirements of NEMA Standards Publication No. TS-2, Section 2, Environmental Standards and Test Procedures, including, but not limited to:

1. Power Interruption;
2. Temperature and Humidity;
3. Transients, Power Service and Input Terminals;
4. Nondestruct Transient Immunity;
5. Vibration; and
6. Shock.

All equipment exposed to the environment shall be corrosion resistant and designed to withstand 80 mph winds with a 30% gust factor, and withstand the effects of sand, dust, and hose-directed water per the hose down test described in the latest edition of the NEMA Standards Publication 250. All connections shall be watertight.

Camera equipment shall meet the above environmental requirements, except that the camera assembly shall perform to the stated specifications over an ambient temperature range of -30°F to +158°F.

2.1.3.1.6 **Text Generation:** Camera assemblies shall have the capability to generate and superimpose two lines of text on the video stream, one for camera ID text and one for preset text. Provide a minimum of 20

alphanumeric characters per line that are between 20 and 30 horizontal TV lines in height. Provide the remote user with the ability to enable, disable, and edit the text messages. Store text messages within the camera assembly using non-volatile memory.

Camera location ID text consists of a single, user defined text message that is unique to each camera location.

- 2.1.3.1.7 **Maintenance Software Requirements:** Provide software that can be used to provide local operation and full diagnostic support for each different camera assembly monitor.

During submittals, furnish a list of minimum requirements for the County maintenance laptop computers. If local software requires an operating system that is not offered by the County laptops, then furnish and install the necessary operating system including a start-up screen that allows the user to choose the appropriate operating system.

Software requirements will be waived if identical software is already loaded on the County's maintenance laptop computers, or if the CCR provides local operation and diagnostic capabilities.

- 2.1.3.1.8 **Maintenance Laptop Computer Interface:** Provide a data/control interface and a video interface in the CCTV cabinet for the County's maintenance laptop computer. The interface between the maintenance laptop computer, video monitor, and the camera assembly may be accomplished by disconnecting the data and video cables from the communication end equipment, and connecting them to the laptop computer and monitor respectively.

- 2.1.3.1.9 **Communication Requirements:** The communication signal format shall be matched to the central system.

- 2.1.3.1.10 **Communication Protocol:** The camera communication protocol shall be compatible with an existing driver available to MCDOT from 360 Surveillance of Vancouver, British Columbia and with the existing CCTV camera system.

2.1.3.2 CONSTRUCTION REQUIREMENTS:

The Contractor shall set electrical or mechanical pan and tilt limit stops at positions determined by the Engineer. The Contractor shall program in camera location identification text labels obtained from the Engineer.

The cables in the cabinet from device to device shall not be longer than required. The cables shall be routed for permanent installation and any excess will be cut to remove the slack. The only exception is the 6' slack at the cable entry point for the cabinet.

The Contractor shall provide post installation pictures in electronic format of the mounted CCTV camera, the slack for each pull box, the CCTV Camera Panel, and the cabinet as part of the inspection. Each photo shall be clearly labeled with the photo location and equipment shown. Any discrepancies with the installation shall be resolved by the Contractor.

2.1.3.3 TESTING REQUIREMENTS:

The Contractor shall demonstrate that the equipment and the systems furnished and installed under the contract function in full compliance with the requirements of the contract documents. The Contractor shall furnish and maintain all required test equipment. Conduct tests in the presence of the Engineer using approved test procedures and submit the test results to the Engineer using approved test data forms. The Engineer will review the test results for conformance with the requirements of the contract documents. If the equipment or systems fail any part of the test, the Contractor shall make necessary corrections and repeat the entire test.

Notify the Engineer of the time, date and place of all tests at least 14 calendar days prior to the date on which a test is planned.

The Engineer may waive the right to witness certain tests.

The Contractor shall ensure that all equipment to be tested is ready for testing prior to the performance of, and Engineer's witnessing of the tests. Costs for transportation, meals, and lodging for the Engineer and his representatives that are associated with delays in the testing will be deducted from monies due, or to become due, or owed to the Contractor.

All test data forms shall be signed by the Contractor or authorized representative.

When tests are witnessed by the Engineer, the Contractor shall obtain the witnessing Engineer's signature on the test data form.

The contract period will not be extended for time loss or delays related to testing.

Failure of any item to meet the requirements for any test will be counted as a defect and the equipment under test will be subject to rejection by the Engineer. Rejected equipment may be re-tested provided all areas of non-compliance have been corrected and evidence thereof is submitted to the Engineer by the Contractor.

For equipment that has failed and subsequently been repaired or modified, the Contractor shall prepare and deliver a report to the Engineer that describes the nature of the failure and the corrective action taken. Re-design and modification of failed equipment shall be done at no additional cost.

The Contractor shall conduct or support tests in the following stages of implementation:

1. Design Approval Test (DAT);
2. Factory Demonstration Test (FDT) (when required);
3. Factory Acceptance Test (FAT);
4. Stand-Alone Test;
5. Subsystem Test (SST);
6. Systems Integration Test (SIT) (when required); and
7. System Acceptance Test (SAT).

DAT verify that certain design parameters are satisfied prior to going to production.

FDT are performed on a production unit and verify that the equipment meets the functional requirements. FAT verify that each unit of equipment as it comes off the production line operates as specified. Stand-alone tests verify that after installation but prior to interconnection, the equipment operates as specified. SSTs verify that units forming a subsystem continue to operate as specified when they are interconnected.

The SIT is performed when previously untested hardware or software is developed and/or added to an existing system to verify that all system interfaces perform properly prior to final acceptance. The duration of the SIT shall be based on the complexity of the design. The SAT verifies that all the interconnected subsystems operate together as one system. Upon successful completion and acceptance of the SAT, the project will advance to the warranty and operational support period.

**2.1.3.3.1 Design Approval Tests (DAT):** A DAT shall be conducted when required by the Specifications. The Contractor shall provide certification from the manufacturer for the following:

1. The equipment has been laboratory tested and meets or exceeds the environmental requirements of the Specifications. Specifically list test results and passing criteria for each required test.
2. The equipment meets the functional requirements stated in the Specifications, and is suitable for the intended application. The certification shall state any requirements that are not met or have not been laboratory tested. Test procedures and results, or independent laboratory certification shall be made available upon request.

DAT certification shall meet the requirements stated in Section 2.1.3.1.1 for Certificates of Compliance. If a DAT and a Certificate of Compliance is required for the same equipment, both requirements may be satisfied by a single Certificate of Compliance.

Submit DAT certification with the equipment submittal data for Engineer's approval.

The Engineer may waive the DAT requirement for equipment that has been previously tested by the Maricopa County Department of Transportation (MCDOT) or certified for use in prior projects where the application is consistent and results deemed favorable.

The Contractor should contact MCDOT for information regarding the DAT or certification status of a particular device.

Provide DAT certification for the camera, lens, pan/tilt unit, environmental enclosure, and camera control receiver for equipment the Contractor desires to have as an approved equal.

**2.1.3.3.2 Factory Demonstration Tests (FDT):** A FDT shall be conducted when required by the Specifications. A FDT shall be conducted on a prototype model before going to production. The FDT requirement for models of equipment previously tested and/or certified by the MCDOT for the types of applications required in the project may be waived by the Engineer.

To gain a waiver, the Contractor shall submit certification from the manufacturer that states that the equipment has been tested and meets all the project requirements.

State any exceptions or requirements not covered by testing. Provide supporting information such as test procedures, data, and results.

Costs for lodging and transportation for the Engineer and his representatives to witness the FDT, will be borne by MCDOT, for one visit lasting for up to five (5) consecutive days. In the event, the FDT requires multiple visits by the Engineer or lasts longer than five consecutive days, the Contractor shall be responsible for the added cost of transportation and lodging beyond what is covered by the County.

**2.1.3.3.3 Factory Acceptance Tests (FAT):** A FAT shall be conducted on each unit of equipment. The FAT shall verify proper operation of all required functions. The Contractor shall submit FAT results for approval and shall not deliver equipment until FAT results have been approved by MCDOT.

**2.1.3.3.4 Stand-Alone Tests:** The stand-alone test verifies after installation, but prior to connection to the system, that the equipment is capable of performing the function for which it was designed. The Contractor shall conduct approved stand-alone tests on each equipment group that performs a specific function. Testing is to use the manufacturer's approved software after the on-site installation of the equipment group is completed. The Contractor shall furnish all necessary test equipment and test software.

For each unit of equipment, conduct approved stand-alone tests that exercise all stand-alone (non-network) functional operations of the equipment including the following:

1. Control of focus, iris, and power on/off;
2. Range of pan, tilt, zoom and digital zoom;
3. Presence and quality of video signal;
4. Camera ID and preset text generation; and
5. Pan and tilt limit stops are set to the Engineer's specification.

The CCTV camera assembly shall be bench tested for no-less-than 24 hours as a unit to include the CCTV camera, all cabling, all surge suppression, and Video Encoder. Refer to Sections 2.1.3.1.1, 2.1.3.1.2, 2.1.3.1.3, 2.1.3.1.4, and 2.1.3.1.5. The Contractor shall request the active electronics configuration information from the Engineer prior to the 24-hour bench test.

After the 24 hour bench test the Contractor shall notify the Engineer that the system is ready for the pre-inspection. The Engineer will schedule the ITS Inspector to conduct the pre-inspection at the Contractor's facility.

The ITS Inspector will inspect the camera system on the reel using the pre-installation CCTV Local Field Operations Test.

After the completion of the pre-installation CCTV Local Field Operations Test the Contractor shall submit the pre-inspection test and the CCTV Camera installation plan to the Engineer. The installation plan shall consist of the camera location, estimated cable

lengths, cable route, cable slack, wiring diagram, and camera configuration.

Once the installation plan is approved by the Engineer an ITS Inspector will be scheduled to meet with the Contractor onsite for installation. The ITS inspector will be present for all stages of the camera installation.

2.1.3.3.5 **Subsystem Tests (SST):** SST verify that units forming a subsystem continue to operate as specified when they are interconnected. A subsystem is defined as a logical grouping of field devices and/or central equipment that when interconnected and communicating, is capable of performing the function for which it was designed (i.e. – CCTV cameras, communications to/from the cameras, central control and display of the video images). The Contractor shall conduct approved SST for the field equipment and related equipment at the hubs and the Traffic Management Center (TMC). Conduct SST on the groups of equipment as identified in the project Special Provisions after the equipment has been installed and interconnected.

Subsystem tests shall not be considered successful until all equipment being tested is operational without failure for 72 consecutive hours.

For each camera location that is installed and interconnected in a system, the Contractor shall conduct approved SST from a workstation at the Traffic Management Center that includes the following:

1. All items in the stand-alone test;
2. Transmission of quality video to the Traffic Management Center;
3. Response to all central software commands identified under functional requirements;
4. Horizontal and vertical resolution\*; and
5. Signal to noise (S/N) ratio of 48 dB or greater\*.

\* Perform these tests if in the opinion of the Engineer the picture quality is substandard. Measure the horizontal/vertical resolution and the S/N ratio on a monitor in the Traffic Management Center for a picture generated by the CCTV camera installation furthest from the Traffic Management Center and at two other locations specified by the Engineer to verify compliance.

2.1.3.3.6 **System Integration Test (SIT):** The SIT is performed when previously untested hardware or software is developed and/or added to an existing system to verify that all system interfaces perform properly prior to final acceptance. The Contractor shall begin the SIT upon completion of all the SSTs. The Contractor is responsible to keep the installed equipment operational during the system final integration as determined by the Engineer. The Contractor shall identify the SIT in the project schedule. The Contractor shall work with the Engineer to troubleshoot all problems related to non-specification compliant equipment and interfaces.

2.1.3.3.7 **System Acceptance Test (SAT):** The SAT verifies that all the interconnected subsystems operate together as one system. The SAT may commence upon completion of the SIT. The SAT consists of a 30-day test period demonstrating that the total system (hardware,

software, materials and construction) is properly installed, is free from identified problems, exhibits stable and reliable performance, and complies with the contract documents.

The Contractor shall demonstrate all system functions using live control equipment.

Test all normal and backup functions of redundant system equipment and include in the SAT any emergency conditions for which the equipment is designed to respond.

The Contractor shall troubleshoot, diagnose, identify, and isolate hardware and software problems and inconsistencies. Formulate possible solutions and implement all corrections needed for the Contractor installed equipment.

The Contractor shall make available on-site, key technical personnel familiar with the design and construction of each major system component within 48 hours of notification of a problem.

The Contractor shall correct all system documentation errors, omissions, and changes discovered and resulting from the SAT and previous testing. System acceptance will not be complete until corrected documentation is submitted.

In the event of a failure of a single piece of equipment during the SAT, the Contractor shall replace or repair the equipment and restart the 30-day test only for that piece of equipment. If the failure of the single piece of equipment prevents the proper operation of other equipment (e.g. – failure of the video encoder prevents proper camera control ), all devices affected by the failure will have the test extended by however many days they were out of service.

The following conditions constitute a minor system failure and will result in a suspension of time during the 30-day SAT. After satisfactory remedial action, the 30-day test will be resumed and extended one additional day:

1. Interference with project operations due to vandalism, traffic accident, power failure, or lightning for which lightning protection devices as specified are not sufficient protection;
2. Failure to complete the objective of any test scenario due to lack of adequate documentation for equipment supplied by the Contractor. The Contractor shall re-test using revised documentation; and
3. Intermittent hardware, software, communication, or operation control malfunctions.

The following constitutes a major system failure. Any one of the following conditions shall result in re-initialization of the SAT from day zero:

1. Failure of 5% of any hardware or performance item within a 14-day period; and
2. Failure to correct any problem that adversely impacts the safety of the traveling public, the Engineer, or his representatives within four hours of notification.

2.1.3.3.8 **Test Procedures, Software, and Data Forms:** The Contractor shall prepare test procedures, software (when needed) and data forms for all required DAT, FDT, FAT, stand-alone, SST, and SAT procedures.

Submit test procedures, software, and data forms to the Engineer for approval at least 45 calendar days before the scheduled testing. The Engineer will review the submitted procedures, software, and data forms and return them within 14 calendar days after receipt. If approved, tests may be conducted as scheduled. If rejected, reschedule the test, revise the submittal accordingly and resubmit for another review. Highlight the portions of the submittal that have changed to aid the Engineer's re-review of the material. Extension of the schedule will not be granted for rejected test procedures, software, and data forms.

As a minimum, prepare test procedures and data forms that include the following:

1. A step-by-step outline of the test sequence to be followed, showing a test of every function of the equipment or system to be tested;
2. A description of the expected operation, pass/fail criteria, and test results;
3. A data form to be used to record all data and quantitative results obtained during the test; and
4. A description of any special equipment, setup, manpower, or conditions required for the test.

#### 2.1.3.4 WARRANTY REQUIREMENTS:

If specific warranty requirements apply, they are listed under specific equipment requirements of the specifications. The cost of warranties and repairs are included as part of the contract unit price.

Within 60 days following approval of material and equipment, the Contractor shall submit a preliminary Warranty Administration Plan (WAP) to the Engineer for approval.

The WAP is to address how the warranty period shall be administered, including the following requirements:

1. A 24 hour, seven day a week telephone number for MCDOT initiated warranty requests;
2. Repair or replace failed items that prevent normal operation of the system or any of the subsystems within 5 calendar days after notification. Respond to all other warranty requests within 14 calendar days;
3. Track each repair performed during the warranty period by serial number. Account for removals, replacements, and repaired items put back in service or into the spare inventory. Reset the warranty period for all repaired or replaced items. Establish a new warranty period for all new items;
4. Perform routine maintenance during the warranty period per vendor recommendations.
5. Provide a summary of all routine maintenance activities required, whether or not they fall within the one-year warranty period;
6. When used, replenish spare equipment inventory within 2 weeks, or stated vendor lead-time, whichever is greater;
7. Provide a complete list of equipment and vendor warranty periods, including spare equipment. Use Figure 480.1 or similar approved form; and

8. Provide copies of all warranty paperwork.

Submit a final WAP to the Engineer for approval at least 45 days prior to final acceptance. An approved WAP is required prior to final acceptance.

Prior to final acceptance, furnish an inventory of spare parts.

Within 90 days and no later than 30 days prior to the end of the one-year warranty period, submit the following to the Engineer for approval:

1. A complete list of all equipment (by serial number) that have warranties extending beyond the one year warranty period, including spare equipment. Use Figure 2.1.2.4 or similar approved form; and
2. All warranty paperwork extending beyond the one-year period, transferring ownership of the warranties to MCDOT.

The front window (cylindrical enclosure) or acrylic lens (dome enclosure) shall have a 5- year warranty against yellowing, appreciable light loss, or distortion. The camera assembly, cables, and camera panel system as a whole shall have a minimum 5-year warranty.

**Figure 2.1.2.4 Equipment Warranties**

Project Name						
Equipment Warranties						
Submitted By:				Project No.:		
Date:				Federal Project No.:		
Serial #	Description	Location	Warranty Duration	Expiration Date	Date Received	Other Information

**2.1.3.5 DOCUMENTATION:**

Deliver a minimum of two sets of maintenance manuals to the Engineer for all furnished equipment. The manuals shall be supplied in durable, loose-leaf, three ring binders of appropriate size. All sections shall be permanently titled and have pages numbered and indexed for easy and efficient removal and replacement. In addition, an electronic copy of all manuals shall be provided for all equipment and software.

Format maintenance manuals in two sections that include the following material for all furnished equipment and components:

**Section 1**

- Description for each type of equipment and its components.
- Description of operation.
- Troubleshooting procedures at system and device levels.
- Preventative maintenance and adjustment procedures.
- “As-built” drawings including block diagrams, signal path, and detailed device and system connection diagrams (reference Section 2.1.6.2.3).
- Equipment source reference including manufacturer and nearest authorized service centers along with associated addresses and telephone numbers.
- Final warranty administration plan.

**Section 2**

- Manufacture's operation and installation.
- Manufacture's service and repair guides.

The Contractor shall provide maintenance manuals for CCTV equipment per the above requirements, including the following diagrams (as appropriate):

1. Video system block diagram showing all components;
2. Video signal path diagram;
3. Control signal path diagram;
4. System connection diagram; and
5. Detailed connection diagrams.

2.1.3.6 TRAINING:

When required, training shall be provided in two sessions.

The first training session shall be for maintenance and troubleshooting. This session shall be a minimum of four hours in length for each type of field device installed, including communications. This session shall be oriented for the County maintenance staff.

The second training session shall be for operations. This session shall be a minimum of four hours in length for each type of field device installed. This session shall be oriented for the County Traffic Management staff.

2.1.3.7 MEASUREMENT:

CCTV camera assembly, including the camera, lens, pan/tilt, camera control receiver, sun shield, environmental enclosure, CCTV camera panel, cables, lightning and surge protection, and any other required accessories, will be measured as a unit for each installed.

CCTV cabinets will be measured as a unit for each type installed.

Video CODEC shall be measured per unit furnished, installed, made fully functional and tested or as otherwise directed by the Engineer.

Testing, warranty, documentation, and training are considered incidental to the item requiring the work.

2.1.3.8 PAYMENT:

The accepted quantities of items, measured as above, will be paid for at the contract unit price, COMPLETE IN PLACE, which price shall be full compensation for the work described. COMPLETE IN PLACE, including all equipment described under this item with all cables and connectors; all documentation and testing, including the cost of furnishing all labor, materials, software, warranty, training, and equipment necessary to complete the work.

2.1.4 RADIO COMMUNICATIONS EQUIPMENT

The work under this section shall consist of furnishing, installing, and testing communications equipment systems including, cabinet, cables, mounting, surge suppression, lightning protection, software, and accessories as indicated.

2.1.4.1 MATERIALS AND EQUIPMENT REQUIREMENTS

2.1.4.1.1 **Wireless Ethernet Transceivers:** The spread spectrum radio equipment shall provide a high reliability, bi-directional, multi-point, multi-platform communication link between field devices and service crews.

Electronic equipment and power supply shall meet the minimum requirements of NEMA Standards Publications No. TS-2, Section 2 Environmental Standards and Test Procedures. The Contractor shall provide step-up/step-down transformers and AC to DC power conversion as needed to match the power requirements of each component.

2.1.4.1.1.1 **(A) Functional Requirements:** The Wireless Ethernet Transceiver equipment shall meet the following requirements.

1. Operate in both the licensed and unlicensed bands: 2.3 GHZ, 2.5 GHZ, 4.9 GHZ, and 5.25 - 5.825 frequency ranges
2. Provide a max modulation of 54 Mbps for unlicensed frequencies and 40 Mbps for licensed frequencies
3. Modular architecture that can support from two to four radios for communication nodes and up to two radios for backhaul or end nodes
4. Operating modes of Point-to-point, Point-to-Multipoint, and Multipoint-to-Multipoint completely configurable via a web interface, command line interface (CLI), and software
5. Software to provide: remote diagnostics, remote maintenance, and spectrum analyzer
6. Radio shall support any combination of roles such as Access Radio, Backhaul Radio, and WiMax Radio
7. Provide Layer 2 and Layer 3 Switch Router functionality
8. Operating temperature of -40° C to +50 ° C
9. Programmable for RF output levels of 1mW, 10mW, or 100mW

The spread spectrum radio equipment shall comply with the following Institute of Electrical and Electronics Engineers (IEEE) Standard Specifications:

1. IEEE 802.3i: 10BASE-T
2. IEEE 802.3u: 100BASE-TX, 100BASE-FX
3. IEEE 802.1d: MAC Bridging
4. IEEE 802.1Q: VLANs
5. IEEE 802.1p: Prioritization
6. IEEE 802.1x: Radius
7. RFC768: UDP
8. RFC791: IP
9. RFC792: ICMP
10. RFC793: TCP
11. RFC826: ARP
12. RFC854: Telnet
13. RFC894: IP over Ethernet
14. RFC959: FTP

- 15. RFC1112: IGMP v1
- 16. RFC1157: SNMP
- 17. RFC1350: TFTP
- 18. RFC1541: DHCP (client)
- 19. RFC2030: SNTP
- 20. RFC2068: HTTP
- 21. RFC2236: IGMP v2

2.1.4.1.1.2 **(B) Physical Requirements:**

- 1. One 10/100 Mbps Ethernet port
- 2. One 100Base-FX Ethernet Interface (SMFO)
- 3. LED indicators for radio communications: PWR, TX DATA, RX DATA
- 4. LED indicators for network communications: 10 Mbps, 100 Mbps, and Activity
- 5. The radio shall comply with IP56, NEMA4, and NEMA4X for wet and dusty conditions

All system components shall provide for a fully functional operation. The spread spectrum assembly shall include all communication equipment and accessories necessary to support the spread spectrum radio site that provides transmitting, receiving, and repeating (for extending range beyond line of sight to the first cabinet on the drop) capabilities for point-to-point, point-to-multipoint, and multipoint-to-multipoint bi-directional configurations.

2.1.4.1.1.3 **(C) Transceiver:** The spread spectrum radio (SSR) shall be off-the-shelf equipment that operates within the licensed and unlicensed bands of 2.3 GHz, 2.5 GHz, 4.9 GHz, and 5.25-5.825 GHz frequency range. The unit shall also support an Ethernet interface. The unit shall be FCC certified.

Radio	Frequency	Transmit Power	Receive Sensitivity	Channel Size
Access Radio	2.3 to 2.4835 GHz	Up to 27.6 dBm	-100 dBm (DSSS) -94 dBm (OFDM)	20 MHz
Backhaul Radio	4.9 to 4.990 GHz	17 dBm (48, 54 Mbps)	-90 dBm @ 6 Mbps	20 MHz
Backhaul Radio	5.25 to 5.35 GHz	17 dBm (48, 54 Mbps)	-90 dBm @ 6 Mbps -71 dBm @ 54 Mbps	20 MHz
Backhaul Radio	5.47 to 5.725 GHz	17 dBm (48, 54 Mbps)	-90 dBm @ 6 Mbps -71 dBm @ 54 Mbps	20 MHz
Backhaul Radio	5.725 to 5.825 GHz	17 dBm (48, 54 Mbps)	-90 dBm @ 6 Mbps -71 dBm @ 54 Mbps	20 MHz
Backhaul Radio	5.825 to 5.875 GHz	17 dBm (48, 54 Mbps)	-90 dBm @ 6 Mbps -71 dBm @ 54 Mbps	20 MHz
WiMax Radio	2.300 to 2.360 GHz	12 dBm @ 10 MHz	-93 dBm @ 6 Mbps	10 MHz
WiMax Radio	2.495 to 2.690 GHz	12 dBm @ 10 MHz	-93 dBm @ 6 Mbps	10 MHz

2.1.4.1.1.4 **(D) External System Antenna:**

**Yagi 900 MHz Antenna:** Shall be a directional Yagi and provide a nominal gain of at least 8.5 dB. The antenna shall be approximately 24” (height) by 6.4” (width). The antenna shall operate within a temperature range of -40°F to +165°F and be non-condensing up to 95% humidity.

**5.8 GHz Panel Antenna:** Shall be a directional panel and provide a nominal gain of at least 19 dB. The antenna shall be approximately 7.45” (height) by 7.45” (width) by 1.37” (width). The antenna shall operate within a temperature range of -40°F to +165°F and be non-condensing up to 95% humidity.

2.1.4.1.1.5 **(E) Cables:** Cabling shall have preinstalled connections for interconnecting the antenna with the transceiver. The cable shall be a low loss Hyperlink CA-400 or approved equal with a maximum attenuation of 3.9 dB per 100 feet @ 900 MHz. Cabling shall have preinstalled connections for powering the transceiver. The power cable shall be Penn Wire AQ29612 or approved equal with an overall shield and Aquaseal tape.

Cabling shall have preinstalled connections for 10/100 Mbps Ethernet connectivity for the transceiver. All Ethernet cable shall be Belden 7921A or approved equal with the specifications of CAT5e, outdoor rated, waterproof, bonded pairs, foil + braid shielding and black outer jacket.

An interconnect cable, 6-foot minimum, shall be provided with the spread spectrum equipment for interconnecting directly to the Field Hardened Ethernet Switch (FHEAS).

Installed cables shall be labeled and fastened in an appropriate manner to portray a professional and neat appearance.

2.1.4.1.1.6 **(F) Lightning Suppressor:** A cabinet mounted lightning suppressor shall be provided as part of the spread spectrum radio system.

Install an RF Transmission Line Surge Suppressor that meets the following requirements:

Class:	RF Transmission Line Surge Suppressor
Connector:	RP TNC type
Frequency Range:	DC, 0 – 6 GHz
VSWR:	1:1.5 Max
Insertion Loss:	0.5 dB Max
Input/Output impedance:	50 ohms
RF Voltage Rating:	90 volts (maximum) for radios that transmit less than 10W Output Power
Gas Tube Insulation Resistance:	10,000 MΩ
Max. Withstand Current:	5 KA
Additional Features:	Multistrike, bi-directional protection with easily replaceable gas tube
Operating Temperature:	-40° C - +75°C
Operation Environment:	Outdoor use, out of direct weather (5% to 100% noncondensing)

The equipment shall be the ALTELICON, Standard 90V Lightning Protector AL6- RTPRTJB, or approved equivalent.

2.1.4.2 MEASUREMENT:

Communications equipment systems will be measured as a unit for each type furnished, installed, and accepted complete in place. Items such as cables, mounting, excavation, surge suppression, lightning protection, local software, and various accessories as needed are included as part of the system.

Radios shall be measured by each type furnished, installed, and accepted complete in place.

2.1.4.3 PAYMENT:

The accepted quantity of items will be paid for at the contract unit price which shall be full compensation for the work described including testing, warranty, documentation, and training.

2.1.5 ITS NETWORK EQUIPMENT

The work under this section shall consist of furnishing, installing, and testing ITS network equipment systems including, router, switch, communications module, and accessories as indicated.

The Contractor shall submit an original or copy of a Certificate of Compliance along with required equipment lists and supporting material, including warranty information to the Engineer for approval as part of the material and/or equipment list.

If requested by the Engineer, the Contractor shall furnish laboratory results or independent certifications that substantiate compliance with the stated requirements.

Materials or equipment covered by the certificate may be sampled and tested at any time, and, if found not in conformity with the requirements of the project plans or specifications, will be subject to rejection, whether in place or not.

Certificate of Compliance shall contain the following information:

1. A description of the material or equipment supplied;
2. Means of material identification, such as label, lot number, or marking;
3. Statement that the material complies in all respects with the requirements of these Specifications. When identified in the Specifications, Certificates shall state compliance to specific cited standards, such as RUS 1755.900, NEMA TS-2, etc. and specific required tests, such as burn-through testing for fiber optic conduit;
4. Clearly state any exceptions to the requirements of the Specifications; and
5. The name, title, and signature of a person having legal authority to bind the manufacturer or the supplier of the material. The date of the signature shall also be given. The name and address of the manufacturer or supplier of the material shall be shown on the certificate. A copy or facsimile reproduction (FAX) will be acceptable; however, the original certificate shall be made available upon request. The person signing the certificate shall be in one of the following categories:

- An officer of a corporation.
- A partner in a business partnership or an owner.
- A general manager
- Any person having been given the authority in writing by one of the three listed above.

Certify that all functional requirements listed herein for hardware, software, and communication protocols are met.

- 2.1.5.1 **General Functional Requirements:** The network equipment shall interface with a combination of T1 leased lines, fiber, Ethernet, wireless, and/or EIA-232 devices to provide communications service to the MCDOT Traffic Management Center (TMC).

Electronic equipment and power supply shall meet the minimum requirements of NEMA Standards Publications No. TS-2, Section 2 Environmental Standards and Test Procedures. The Contractor shall provide step-up/step-down transformers and AC to DC power conversion as needed to match the power requirements of each component.

2.1.5.1.1 **(A) Multifunction T1 Router:** A multi-function network device such as the Industrial Frame Router (single T1 CSU/DSU, Ethernet switch, and Terminal Server) shall receive Ethernet and EIA-232 channels from a Qwest provided T1. The router's internal devices shall provide a port for interfacing the local controller and provide another port for interfacing the multi-point communications transceiver (OTR, TWP modem or spread spectrum equipment). Additional devices such as a CCTV camera assembly, Dynamic Message Signs and Video detection when installed shall receive an Ethernet or EIA-232 port.

2.1.5.1.2 **(B) Field Hardened Network Gateway Router (FHNGR) with four port T1 Multiplexer, and Field Hardened Ethernet Backbone Switch (FHEBS) / Field Hardened Ethernet Access Switch (FHEAS):** A multi-function network device such as the FHNGR (four T1 CSU/DSUs, Ethernet switch, and Terminal Server) shall receive Ethernet and EIA-232 channels from the Qwest provided multi port T1s. The FHNGR for each location shall interface with up to four T1s and will act as the gateway to the MCDOT TMC. Each FHEBS/FHEAS shall provide a pathway to a terminal server for interfacing with the local controller and other analog devices using EIA-232. Additional devices such as a CCTV camera assembly, Dynamic Message Signs and Video detection when installed shall receive an Ethernet or EIA-232 port. This configuration of terminal servers shall be installed in each cabinet.

2.1.5.1.3 **(C) Layer 3 Router, T1 Multiplexer, and Ethernet Switch:** A network device such as a Layer 3 router shall route Ethernet traffic across Local Area Networks (LANs), Virtual Local Area Networks (VLANs), and Wide Area Networks (WANs) to the MCDOT TMC. The Layer 3 router for each side shall interface with the eight-port T1 Multiplexer/Demultiplexer at each Traffic Management Center or Network Operations Center. Each Ethernet switch shall provide a pathway to the Field Hardened Ethernet Access Switches (FHEAS) which will provide a communication link to each cabinet. Devices such as the local controller, CCTV camera assembly, Dynamic Message Signs, and Video detection when installed shall receive an Ethernet or EIA-232 port. This configuration of terminal servers shall be installed in each cabinet.

Two interconnect cables, 4-foot minimum, shall be provided with the line-sharing unit; one for interconnecting to the local controller directly and the other for interconnecting directly to the communication transceiver (OTR, TWP modem or spread spectrum equipment).

2.1.5.2 Industrial Frame Router:

2.1.5.2.1 **(A) Functional Requirements:** Industrial frame routers to be located in the traffic signal controller cabinet shall comply with the following minimum requirements:

1. Minimum four (4) RS232 DTE serial interfaces with DB9 female connectors;
2. Five (5) 10/100 Base TX Ethernet ports;
3. T-1 CSU/DSU interface;
4. Functions to include terminal server, Ethernet switch, IP router, Frame Relay Access Device (FRAD), CSU/DSU, and broadcast of M-cast traffic (IGMP);
5. Operating temperature range from -40 °F to 160 °F;
6. High voltage power range of 90 to 250 VAC;
7. Frequency range of 50 to 60 Hz; and
8. Power consumption: 85 W.

Industrial frame routers shall be supplied with all necessary cabling to provide a functional system.

The industrial frame router shall be Dymec DynaStar 1500 IFR, or approved equivalent.

2.1.5.3 Field Hardened Network Gateway Router (FHNGR):

2.1.5.3.1 **(A) Functional Requirements:** The fiber equipment shall meet the following requirements:

1. High-performance Network Router supporting standard OSI Layer 3 functionality.
2. Router shall support direct connectivity to existing networks configured in ring and mesh fault tolerant topologies enabling applications to operate reliably, and with low latency.
3. All FHNGR, FHEAS, and FHEBS are to be from the same manufacturer.
4. Equipment shall have licenses for all software or hardware in the system.
5. Configurable in point-to-point, daisy-chain, ring, and mesh topologies for connectivity into new and existing fiber optic and copper based Ethernet networks.
6. Designed with an operating system that allows individual ports to be configured for port mirroring, speed, duplex, auto-negotiation, and flow control. The operating system shall also provide for broadcast storm frame filtering with user defined thresholds.
7. Designed with an operating system that allows for the collection of statistics on a per port basis and provides for full support of RMON statistics, history, alarms, and event groups.
8. Designed with an operating system that provides port security to prevent unknown devices from gaining access to the network. Unauthorized attempts to access the network shall result in the port being shut down for a period of time along with Simple Network Management Protocol (SNMP) trap and alarm generation.
9. High-strength 18-gauge galvanized steel enclosure to seal out insects, dirt, smoke, and other contaminants.

10. All modules and assemblies are to be clearly identified with name, model number, serial number, or any other pertinent information required to facilitate equipment maintenance.

The equipment shall comply with the following Institute of Electrical and Electronics Engineers (IEEE) Standard Specifications:

1. IEEE 802.3-10BaseT
2. IEEE 802.3d-MAC Bridges
3. IEEE 802.3u-100BaseTX, 100BaseFX
4. IEEE 802.3x-Flow Control
5. IEEE 802.3z-1000BaseLX
6. RFC1294-Frame Relay
7. RFC1305-NTP
8. RFC1321-PPP (MD5)
9. RFC1332-PPP (IPCP)
10. RFC1334-PPP Authentication
11. RFC1490-Frame Relay
12. RFC1519-CIDR
13. RFC1541-DHCP (client)
14. RFC1661-PPP
15. RFC2068-HTTP
16. RFC2338-VRRP
17. RFC2819-RMON MIB
18. RFC768-UDP
19. RFC783-TFTP
20. RFC791-IP
21. RFC792-ICMP
22. RFC793-TCP
23. RFC826-ARP
24. RFC854-Telnet

**2.1.5.3.2 (B) FHNGR Physical Requirements:**

1. Operates as a Layer 3 to serve as network gateways between the MCDOT
2. TMC, Field Hardened Ethernet Backbone Switch, and the Field Hardened
3. Ethernet Switches in the field.
4. Two built-in 100 MB full-duplex or higher switched Ethernet single-mode fiber
5. ports with the ability to reach the necessary distance.
6. Two switched 10/100 MB Ethernet or higher copper (RJ 45) ports.
7. Four T1/E1 unchannelized WAN ports.

A FHNGR shall be used in conjunction with a terminal server to interface with Video Detection, Wireless Radio system, and the Signal Controller.

**2.1.5.3.3 (C) Serial Expansion Device:**

Serial expansion device shall comply with the following minimum requirements:

1. One (1) 10/100 Ethernet LAN port with RJ45 connector;
2. Four (4) RS-232 serial ports;
3. Surge protection on all ports;
4. 230 Kbps throughput on all ports;

5. LEDs for serial and Ethernet activity;
6. Port buffering up to 64 Kbps per port;
7. Power requirement: 100 to 250 VAC;
8. Frequency range of 47 to 63 Hz;
9. Power consumption 12 W; and
10. Operating temperature range of -29 °F to 165 °F.

The serial expansion device shall be supplied with all necessary cabling to provide full operation. The terminal server shall be compatible with the ASC2/2100 Signal Controller.

#### 2.1.5.4 Field Hardened Ethernet Access Switch (FHEAS):

All FHEAS shall be of the same manufacturer. All equipment shall be new and in strict accordance with the details shown on the plans and the specifications.

A high-performance managed Field Hardened Ethernet Switch shall support standard Open System Interconnection (OSI) Layer 2. FHEAS shall support direct connectivity to existing networks configured in ring and mesh fault tolerant topologies enabling applications to operate reliably, and with low latency.

All equipment shall include licenses, where required, for any software or hardware in the system.

FHEAS shall comply with the following Institute of Electrical and Electronics Engineers (IEEE) Standard Specifications:

1. IEEE 802.1d: Spanning Tree Protocol
2. IEEE 802.1p: Class of Services
3. IEEE 802.1q: VLAN Tagging
4. IEEE 802.1w: Rapid Spanning Tree Protocol
5. IEEE 802.3: 10BASE-T
6. IEEE 802.3ab: 1000BASE-TX
7. IEEE 802.3d: MAC Bridges
8. IEEE 802.3u: 100BASE-TX, 100BASE-FX
9. IEEE 802.3x: Flow Control
10. IEEE 802.3z: 1000BASE-LX
11. RFC768: UDP
12. RFC783: TFTP
13. RFC791: IP
14. RFC792: ICMP
15. RFC793: TCP
16. RFC826: ARP
17. RFC854: Telnet
18. RFC894: IP over Ethernet
19. RFC1112: IGMP v1
20. RFC1493: Bridge MIB
21. RFC1519: CIDR
22. RFC1541: DHCP (client)
23. RFC1907: SNMP v2 MIB
24. RFC2012: TCP MIB
25. RFC2013: UDP MIB
26. RFC2030: SNMP
27. RFC2068: HTTP
28. RFC2236: IGMP v2
29. RFC2578: SNMP v2 SMI
30. RFC2579: SNMP v2 TC
31. RFC2819: RMON MIB

32. RFC2863: IF MIB

All FHEAS shall have a physical design that conforms to the following requirements:

1. Two Gigabit Ethernet full-duplex switched Ethernet single-mode fiber ports.
2. Eight switched 10/100 MB Ethernet or higher copper (RJ 45) ports.
3. Be configurable in point-to-point, daisy-chain, ring, and mesh topologies for connectivity into new and existing fiber optic and copper based Ethernet networks.
4. Designed with an operating system that allows individual ports to be configured for port mirroring, speed, duplex, auto-negotiation, and flow control. The operating system shall also provide for broadcast storm frame filtering with user defined thresholds.
5. Designed with an operating system allows for the collection of statistics on a per port basis and provides for full support of Remote Monitoring (RMON) statistics, history, alarms, and event groups.
6. Designed with an operating system that provides port security to prevent unknown devices from gaining access to the network. Unauthorized attempts to access the network shall result in the port being shut down for a period of time along with Simple Network Management Protocol (SNMP) trap and alarm generation.
7. Have high-strength 18-gauge galvanized steel enclosure to seal out insects, dirt, smoke, and other contaminants.
8. Clearly identify all modules and assemblies with name, model number, serial number, or any other pertinent information required to facilitate equipment maintenance.

The equipment shall have the following functionality and features:

1. Ports Performance
  - Provide Ethernet Single-mode Fiber ports that operate at 1000 Mbps with a link loss budget sufficient for the fiber link it will use.
  - Provide Ethernet RJ-45 ports that auto-negotiate operation at 10/100Mbps or higher if available.
  - Provide external optical attenuators as necessary to support interconnectivity with close range devices upstream or downstream.
2. Packet-Processing:
  - Processing type: store and forward
  - Auto-learning: 8192 Media Access Control (MAC) address
  - Frame buffer memory: 2 Mbit
  - Switching Latency: 7 microsecond
  - Priority queues: 4
  - Virtual Local Area Networks (VLANs): 8192
  - Internet Group Management Protocol (IGMP) multicast groups: 256
  - Switching bandwidth: 5.6 Gbps
3. Ethernet Network Connectors:
  - Eight RJ-45 connector ports for 10/100 Mbps or higher
  - Two dual LC connector 1000 Mbps ports for single-mode fiber
4. LED Indicators: One LED for power; three LEDs per Ethernet port for link, Tx, and Rx activity.
5. Power Supply:
  - AC power connector: Terminal block at rear of power supply chassis
  - Input Voltage: 85 to 264 VAC (auto-ranging)

- Power Consumption: 8 watts (max)
  - Fast Transient Protection: Compliant with IEEE C37.90.1
6. Mechanical:
- Enclosure: Rugged 18-gauge high-strength galvanized steel case with metal mounting plate included. Suitable for stand-alone, shelf, pedestal or wall mounting. Enclosure shall be permanently and clearly identified with name, model number, serial number, and any other pertinent information required to facilitate equipment maintenance.
  - Meet all of its specified requirements when the input power is 115 VAC  $\pm 10\%$ , 60  $\pm 3$  Hz, for any Field Hardened Ethernet Access Switch furnished or installed under this item.
  - Design the equipment such that the failures of the equipment shall not cause the failure of any other unit of equipment connected upstream or downstream of the device.
  - Make all parts out of corrosion resistant material, such as plastic, stainless steel, anodized aluminum or brass.
  - Protect all materials used in construction from fungus growth and moisture deterioration.
  - Meet all specified requirements during uncontrolled environmental operations characterized by an operating temperature range of -34°C (-29°F) to +74°C (165°F) and a humidity range of 10% to 95% (non-condensing).

The FHEAS shall be RuggedComm RS900G, or approved equivalent.

#### 2.1.5.5 Field Hardened Ethernet Backbone Switch (FHEBS):

All FHEBS and FHEAS shall be from the same manufacturer. All equipment shall be new.

A high-performance and Field Hardened Ethernet Backbone Switch shall support standard OSI Layer 2 functionality. The FHEBS shall support direct connectivity to existing networks configured in ring and mesh fault tolerant topologies enabling applications to operate reliably, and with low latency.

FHEBS shall include all equipment licenses, where required, for any software or hardware in the system.

FHEBS shall comply with the following Institute of Electrical and Electronics Engineers (IEEE) Standard Specifications:

1. IEEE 802.1d: Spanning Tree Protocol
2. IEEE 802.1p: Class of Services
3. IEEE 802.1q: VLAN Tagging
4. IEEE 802.1w: Rapid Spanning Tree Protocol
5. IEEE 802.3: 10BASE-T
6. IEEE 802.3ab: 1000BASE-TX
7. IEEE 802.3d: MAC Bridges
8. IEEE 802.3u: 100BASE-TX, 100BASE-FX
9. IEEE 802.3x: Flow Control
10. IEEE 802.3z: 1000BASE-LX
11. RFC768: UDP
12. RFC783: TFTP
13. RFC791: IP
14. RFC792: ICMP
15. RFC793: TCP
16. RFC826: ARP

17. RFC854: Telnet
18. RFC894: IP over Ethernet
19. RFC1112: IGMP v1
20. RFC1493: Bridge MIB
21. RFC1519: CIDR
22. RFC1541: DHCP (client)
23. RFC1661: PPP
24. RFC1907: SNMP v2 MIB
25. RFC2012: TCP MIB
26. RFC2013: UDP MIB
27. RFC2030: SNTP
28. RFC2068: HTTP
29. RFC2236: IGMP v2
30. RFC2578: SNMP v2 SMI
31. RFC2579: SNMP v2 TC
32. RFC2819: RMON MIB
33. RFC2863: IF MIB

FHEBS shall have a physical design that conforms to the following requirements:

1. Operates as a Layer 2 interface to the Network Gateway Router for all Field Hardened Ethernet Switches.
2. Provide three built-in SFP 1000 MB full-duplex switched Ethernet single-mode fiber ports with the ability to reach the necessary distance.
3. Provide six switched 10/100/1000 MB Ethernet copper (RJ 45) ports.
4. Be configurable in point-to-point, daisy-chain, ring, and mesh topologies for connectivity into new and existing fiber optic and copper based Ethernet networks.
5. Designed with an operating system that allows individual ports to be configured for port mirroring, speed, duplex, auto-negotiation, and flow control. The operating system shall also provide for broadcast storm frame filtering with user defined thresholds.
6. Designed with an operating system allows for the collection of statistics on a per port basis and provides for full support of RMON statistics, history, alarms, and event groups.
7. Have high-strength 18-gauge galvanized steel enclosure to seal out insects, dirt, smoke, and other contaminants.
8. Clearly identify all modules and assemblies with name, model number, serial number, or any other pertinent information required to facilitate equipment maintenance.

FHEBS shall have the following functionality and features:

1. Ports Performance
  - Provide Ethernet Single-mode Fiber ports that operate at 1000 Mbps with a link loss budget sufficient for the link it will use.
  - Provide Ethernet RJ-45 ports that auto-negotiate operation at 10/100/1000 Mbps.
  - Provide external optical attenuators as necessary to support interconnectivity with close range devices upstream or downstream.
2. Packet-Processing:
  - Frame buffer memory: 2 Mbit
  - IGMP multicast groups: 256
  - MAC address table size: 64kbytes
  - MAC addresses: 8192
  - Priority Queues: 4

- Switching bandwidth: 9.2 Gbps
  - Switching latency: 7 us
  - Switching method: Store & Forward
  - VLANs: 4094
3. Ethernet Network Connectors:
    - Six RJ-45 connector ports for 10/100/1000 Mbps
    - Three dual LC connector 1000 Mbps ports for single-mode fiber
  4. LED Indicators: One LED for power; three LEDs per Ethernet port for link, Tx, and Rx activity
  5. Power Supply:
    - AC power connector: Terminal block at rear of power supply chassis
    - Input Voltage: 85 to 264 VAC (auto-ranging)
    - Power Consumption: 20 watts (max)
    - Fast Transient Protection: Compliant with IEEE C37.90.1
  6. Mechanical:
    - Enclosure: Rugged 18-gauge high-strength galvanized steel case with metal mounting plate included. Suitable for stand-alone, rack, shelf, pedestal or wall mounting. Enclosure shall be permanently and clearly identified with name, model number, serial number, and any other pertinent information required to facilitate equipment maintenance.

FHEBS shall comply with all specified requirements when the input power is 115 VAC  $\pm$  10%, 60  $\pm$  3 Hz, for any FHEBS furnished or installed under this item.

The equipment shall be designed such that the failures of the equipment shall not cause the failure of any other unit of equipment connected upstream or downstream of the device.

All parts shall be made out of corrosion resistant material, such as plastic, stainless steel, anodized aluminum or brass.

All materials used in construction shall be protected from fungus growth and moisture deterioration.

All specified requirements shall be met during uncontrolled environmental operations characterized by an operating temperature range of -34°C (-29°F) to +74°C (165°F) and a humidity range of 95% (non-condensing).

The FHEBS shall be RuggedComm RSG2200, or approved equivalent.

#### 2.1.5.6 Ethernet Communications Module For The ASC/2S Controller:

2.1.5.6.1 **(A) General:** The work under this item consists of furnishing all materials and equipment to install a plug-in Ethernet Communications Module for the ASC/2S Signal Controller. The Ethernet Communications Module acts as a Terminal Server allowing transmission of signal data across an Ethernet network. The Ethernet module requires an Internet Protocol (IP) address to communicate to the Traffic Management System (TMS) located at the MCDOT TMC. The Ethernet module allows the TMS to poll the signal controller one time a second for status of the signal, push/pull traffic timing plans, and collect logs.

2.1.5.6.2 **(B) Material Requirements:**

Ethernet Module:

1. Exceeds NEMA TS2 and TS1 requirements.
2. Ethernet Version 2.0
3. IEEE 802.3 compliant
4. 10/100 Base-T Auto Sensing
5. Static IP or DHCP Configuration
6. Field Upgradeable firmware via HTTP
7. Configuration and Management through SNMP (read and write)
8. Strong SSL V3.0/TLS V1.0 based encryption (DES, 3DES, AES)
9. 32-bit NET+ARM RISC Processor (55 MHz)
10. Status/Diagnostic LED indicators
11. The Ethernet Module shall be an Econolite ASC/2S Ethernet Module.

## 2.1.5.7 Leased Line Communications Demarcation Point:

2.1.5.7.1 **(A) General:** The work under this item consists of furnishing all materials to install a wooden post and connect 1½ inch conduit to the post for a leased line communications Demarcation Point. The Contractor shall consult MCDOT Standard Details for installation requirements. Conduit shall be paid as a separate item.

2.1.5.7.2 **(B) Material Requirements:**

- 4 inch by 4 inch by 5 foot long treated wood post
- 1½ inch conduit straps securing conduit to wooden post

## 2.1.5.8 CONSTRUCTION REQUIREMENTS:

2.1.5.8.1 **Field Hardened Ethernet Access Switch (FHEAS) Construction Requirements:**

Minimum requirements for the Contractor or designated subcontractors involved in the installation and testing of the Ethernet equipment are:

1. Five years experience in the installation and configuration of Ethernet equipment.
2. Two years direct experience in the configuration and deployment of the Rapid Spanning Tree protocol.
3. Two installed systems where Ethernet switches are installed and the system has been in continuously satisfactory operation for at least two years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the communication system.
4. Necessary documentation of contractor qualifications must be approved by the Engineer prior to purchasing the FHEAS.

Installation of the equipment shall provide for ease of maintenance, all component parts shall be readily accessible for inspection and maintenance. All external screws, nuts and locking washers shall be stainless steel. Self-tapping screws shall not be used unless specifically approved by the Engineer.

Comply with all requirements of the National Electrical Code for all wiring external to the FHEAS switch. Cut all wires to proper length before assembly. Neatly lace wires into cable with nylon lacing or plastic straps. Secure cables with approved clamps for both fiber and copper cable types. Provide service loops at all connections.

Connecting harnesses (i.e. jumper cables) shall be of appropriate length and terminated with matching connectors for interconnection with the FHEAS switches.

Dissimilar metals shall be separated by an inert dielectric material.

**2.1.5.8.2 Field Hardened Ethernet Backbone Switch (FHEBS) Construction Requirements:**

Minimum requirements for the Contractor or **designated** subcontractors involved in the installation and testing of the Ethernet equipment are:

Five years experience in the installation and configuration of Ethernet equipment.

Two years direct experience in the configuration and deployment of the Rapid Spanning Tree protocol.

Two installed systems where Ethernet switches are installed and the system has been in continuously satisfactory operation for at least two years. The Contractor shall submit as proof, photographs or other supporting documents, and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the communication system.

Necessary documentation of subcontractor qualifications must be approved by the Engineer prior to purchasing the FHEBS.

Installation of the equipment shall provide for ease of maintenance, with all component parts being readily accessible for inspection and maintenance.

Ensure that all external screws, nuts and locking washers are stainless steel. Do not use any self-tapping screws unless specifically approved by the Engineer.

Meet all requirements of the National Electrical Code for all wiring external to the ES switch. Cut all wires to proper length before assembly. Neatly lace wires into cable with nylon lacing or plastic straps. Secure cables with approved clamps for both fiber and copper cable types. Provide service loops at all connections.

Provide connecting harnesses (i.e., jumper cables) of appropriate length and terminated with matching connectors for interconnection with the ES switches.

Separate dissimilar metals by an inert dielectric material.

2.1.5.9 TESTING REQUIREMENTS:

The Contractor shall demonstrate that the equipment and the systems furnished and installed under the contract function in full compliance with the requirements of the contract documents. The Contractor shall furnish and maintain all required test equipment. Conduct tests in the presence of the Engineer using approved test procedures and submit the test results to the Engineer using approved test data forms. The Engineer will review the test results for conformance with the requirements of the contract documents. If the equipment or systems fail any part of the test, the Contractor shall make necessary corrections and repeat the entire test.

Notify the Engineer of the time, date and place of all tests at least 14 calendar days prior to the date on which a test is planned.

The Engineer may waive the right to witness certain tests.

The Contractor shall ensure that all equipment to be tested is ready for testing prior to the performance of, and Engineer's witnessing of the tests. Costs for transportation, meals, and lodging for the Engineer and his representatives that are associated with delays in the testing will be deducted from monies due, or to become due, or owed to the Contractor.

All test data forms shall be signed by the Contractor or authorized representative.

When tests are witnessed by the Engineer, the Contractor shall obtain the witnessing Engineer's signature on the test data form.

The contract period will not be extended for time loss or delays related to testing.

Failure of any item to meet the requirements for any test will be counted as a defect and the equipment under test will be subject to rejection by the Engineer. Rejected equipment may be re-tested provided all areas of non-compliance have been corrected and evidence thereof is submitted to the Engineer by the Contractor.

For equipment that has failed and subsequently been repaired or modified, the Contractor shall prepare and deliver a report to the Engineer that describes the nature of the failure and the corrective action taken. Re-design and modification of failed equipment shall be done at no additional cost.

The Contractor shall conduct or support tests in the following stages of implementation:

1. Design Approval Test (DAT);
2. Factory Demonstration Test (FDT) (when required);
3. Factory Acceptance Test (FAT);
4. Stand-Alone Test;
5. Subsystem Test (SST);
6. Systems Integration Test (SIT) (when required); and
7. System Acceptance Test (SAT).

DAT verify that certain design parameters are satisfied prior to going to production.

FDT are performed on a production unit and verify that the equipment meets the functional requirements. FAT verify that each unit of equipment as it comes off

the production line operates as specified. Stand-alone tests verify that after installation but prior to interconnection, the equipment operates as specified. SSTs verify that units forming a subsystem continue to operate as specified when they are interconnected.

The SIT is performed when previously untested hardware or software is developed and/or added to an existing system to verify that all system interfaces perform properly prior to final acceptance. The duration of the SIT shall be based on the complexity of the design. The SAT verifies that all the interconnected subsystems operate together as one system. Upon successful completion and acceptance of the SAT, the project will advance to the warranty and operational support period.

**2.1.5.9.1 Design Approval Tests (DAT):** A DAT shall be conducted when required by the Specifications. The Contractor shall provide certification from the manufacturer for the following:

1. The equipment has been laboratory tested and meets or exceeds the environmental requirements of the Specifications. Specifically list test results and passing criteria for each required test.
2. The equipment meets the functional requirements stated in the Specifications, and is suitable for the intended application. The certification shall state any requirements that are not met or have not been laboratory tested. Test procedures and results, or independent laboratory certification shall be made available upon request.

DAT certification shall meet the requirements stated in Section 2.1.3.1.1 for Certificates of Compliance. If a DAT and a Certificate of Compliance is required for the same equipment, both requirements may be satisfied by a single Certificate of Compliance.

Submit DAT certification with the equipment submittal data for Engineer's approval.

The Engineer may waive the DAT requirement for equipment that has been previously tested by the Maricopa County Department of Transportation (MCDOT) or certified for use in prior projects where the application is consistent and results deemed favorable.

The Contractor should contact MCDOT for information regarding the DAT or certification status of a particular device.

Provide DAT certification for the camera, lens, pan/tilt unit, environmental enclosure, and camera control receiver for equipment the Contractor desires to have as an approved equal.

**2.1.5.9.2 Factory Demonstration Tests (FDT):** A FDT shall be conducted when required by the Specifications. A FDT shall be conducted on a prototype model before going to production. The FDT requirement for models of equipment previously tested and/or certified by the MCDOT for the types of applications required in the project may be waived by the Engineer.

To gain a waiver, the Contractor shall submit certification from the manufacturer that states that the equipment has been tested and meets all the project requirements.

State any exceptions or requirements not covered by testing. Provide supporting information such as test procedures, data, and results.

Costs for lodging and transportation for the Engineer and his representatives to witness the FDT, will be borne by MCDOT, for one visit lasting for up to five (5) consecutive days. In the event, the FDT requires multiple visits by the Engineer or lasts longer than five consecutive days, the Contractor shall be responsible for the added cost of transportation and lodging beyond what is covered by the County.

2.1.5.9.3 **Factory Acceptance Tests (FAT):** A FAT shall be conducted on each unit of equipment. The FAT shall verify proper operation of all required functions. The Contractor shall submit FAT results for approval and shall not deliver equipment until FAT results have been approved by MCDOT.

2.1.5.9.4 **Stand-Alone Tests:** The stand-alone test verifies after installation, but prior to connection to the system, that the equipment is capable of performing the function for which it was designed. The Contractor shall conduct approved stand-alone tests on each equipment group that performs a specific function. Testing is to use the manufacturer's approved software after the on-site installation of the equipment group is completed. The Contractor shall furnish all necessary test equipment and test software.

For each unit of equipment, conduct approved stand-alone tests that exercise all stand-alone (non-network) functional operations of the equipment including the following:

1. Control of focus, iris, and power on/off;
2. Range of pan, tilt, zoom and digital zoom;
3. Presence and quality of video signal;
4. Camera ID and preset text generation; and
5. Pan and tilt limit stops are set to the Engineer's specification.

2.1.5.9.5 **Subsystem Tests (SST):** SST verify that units forming a subsystem continue to operate as specified when they are interconnected. A subsystem is defined as a logical grouping of field devices and/or central equipment that when interconnected and communicating, is capable of performing the function for which it was designed (i.e. – CCTV cameras, communications to/from the cameras, central control and display of the video images). The Contractor shall conduct approved SST for the field equipment and related equipment at the hubs and the Traffic Management Center (TMC). Conduct SST on the groups of equipment as identified in the project Special Provisions after the equipment has been installed and interconnected.

Subsystem tests shall not be considered successful until all equipment being tested is operational without failure for 72 consecutive hours.

2.1.5.9.6 **System Integration Test (SIT):** The SIT is performed when previously untested hardware or software is developed and/or added to an existing system to verify that all system interfaces perform properly prior to final acceptance. The Contractor shall begin the SIT upon completion of all the SSTs. The Contractor is responsible to keep the installed equipment operational during the system final integration as determined by the Engineer. The Contractor shall identify the SIT in the project schedule. The Contractor shall work with the Engineer to troubleshoot all problems related to non-specification compliant equipment and interfaces.

2.1.5.9.7 **System Acceptance Test (SAT):** The SAT verifies that all the interconnected subsystems operate together as one system. The SAT may commence upon completion of the SIT. The SAT consists of a 30-day test period demonstrating that the total system (hardware, software, materials and construction) is properly installed, is free from identified problems, exhibits stable and reliable performance, and complies with the contract documents.

The Contractor shall demonstrate all system functions using live control equipment. Test all normal and backup functions of redundant system equipment and include in the SAT any emergency conditions for which the equipment is designed to respond.

The Contractor shall troubleshoot, diagnose, identify, and isolate hardware and software problems and inconsistencies. Formulate possible solutions and implement all corrections needed for the Contractor installed equipment.

The Contractor shall make available on-site, key technical personnel familiar with the design and construction of each major system component within 48 hours of notification of a problem.

The Contractor shall correct all system documentation errors, omissions, and changes discovered and resulting from the SAT and previous testing. System acceptance will not be complete until corrected documentation is submitted.

In the event of a failure of a single piece of equipment during the SAT, the Contractor shall replace or repair the equipment and restart the 30-day test only for that piece of equipment. If the failure of the single piece of equipment prevents the proper operation of other equipment (e.g. – failure of the video encoder prevents proper camera control ), all devices affected by the failure will have the test extended by however many days they were out of service.

The following conditions constitute a minor system failure and will result in a suspension of time during the 30-day SAT. After satisfactory remedial action, the 30-day test will be resumed and extended one additional day:

1. Interference with project operations due to vandalism, traffic accident, power failure, or lightning for which lightning protection devices as specified are not sufficient protection;
2. Failure to complete the objective of any test scenario due to lack of adequate documentation for equipment supplied by the Contractor. The Contractor shall re-test using revised documentation; and

3. Intermittent hardware, software, communication, or operation control malfunctions.

The following constitutes a major system failure. Any one of the following conditions shall result in re-initialization of the SAT from day zero:

1. Failure of 5% of any hardware or performance item within a 14-day period; and
2. Failure to correct any problem that adversely impacts the safety of the traveling public, the Engineer, or his representatives within four hours of notification.

2.1.5.9.8 **Test Procedures, Software, and Data Forms:** The Contractor shall prepare test procedures, software (when needed) and data forms for all required DAT, FDT, FAT, stand-alone, SST, and SAT procedures.

Submit test procedures, software, and data forms to the Engineer for approval at least 45 calendar days before the scheduled testing. The Engineer will review the submitted procedures, software, and data forms and return them within 14 calendar days after receipt. If approved, tests may be conducted as scheduled. If rejected, reschedule the test, revise the submittal accordingly and resubmit for another review. Highlight the portions of the submittal that have changed to aid the Engineer's re-review of the material. Extension of the schedule will not be granted for rejected test procedures, software, and data forms.

As a minimum, prepare test procedures and data forms that include the following:

1. A step-by-step outline of the test sequence to be followed, showing a test of every function of the equipment or system to be tested;
2. A description of the expected operation, pass/fail criteria, and test results;
3. A data form to be used to record all data and quantitative results obtained during the test; and
4. A description of any special equipment, setup, manpower, or conditions required for the test.

#### 2.1.5.10 WARRANTY REQUIREMENTS:

If specific warranty requirements apply, they are listed under specific equipment requirements of the specifications. The cost of warranties and repairs are included as part of the contract unit price.

Within 60 days following approval of material and equipment, the Contractor shall submit a preliminary Warranty Administration Plan (WAP) to the Engineer for approval.

The WAP is to address how the warranty period shall be administered, including the following requirements:

1. A 24 hour, seven day a week telephone number for MCDOT initiated warranty requests;

2. Repair or replace failed items that prevent normal operation of the system or any of the subsystems within 5 calendar days after notification. Respond to all other warranty requests within 14 calendar days;
3. Track each repair performed during the warranty period by serial number. Account for removals, replacements, and repaired items put back in service or into the spare inventory. Reset the warranty period for all repaired or replaced items. Establish a new warranty period for all new items;
4. Perform routine maintenance during the warranty period per vendor recommendations.
5. Provide a summary of all routine maintenance activities required, whether or not they fall within the one-year warranty period;
6. When used, replenish spare equipment inventory within 2 weeks, or stated vendor lead-time, whichever is greater;
7. Provide a complete list of equipment and vendor warranty periods, including spare equipment. Use Figure 480.1 or similar approved form; and
8. Provide copies of all warranty paperwork.

Submit a final WAP to the Engineer for approval at least 45 days prior to final acceptance. An approved WAP is required prior to final acceptance.

Prior to final acceptance, furnish an inventory of spare parts.

Within 90 days and no later than 30 days prior to the end of the one-year warranty period, submit the following to the Engineer for approval:

1. A complete list of all equipment (by serial number) that have warranties extending beyond the one year warranty period, including spare equipment. Use Figure 2.1.2.4 or similar approved form; and
2. All warranty paperwork extending beyond the one-year period, transferring ownership of the warranties to MCDOT.

**Figure 2.1.2.4 Equipment Warranties**

Project Name						
Equipment Warranties						
Submitted By:				Project No.:		
Date:				Federal Project No.:		
Serial #	Description	Location	Warranty Duration	Expiration Date	Date Received	Other Information

**2.1.5.11 DOCUMENTATION:**

Deliver a minimum of two sets of maintenance manuals to the Engineer for all furnished equipment. The manuals shall be supplied in durable, loose-leaf, three ring binders of appropriate size. All sections shall be permanently titled and have pages numbered and indexed for easy and efficient removal and replacement. In addition, an electronic copy of all manuals shall be provided for all equipment and software.

Format maintenance manuals in two sections that include the following material for all furnished equipment and components:

**Section 1**

- Description for each type of equipment and its components.
- Description of operation.
- Troubleshooting procedures at system and device levels.
- Preventative maintenance and adjustment procedures.
- “As-built” drawings including block diagrams, signal path, and detailed device and system connection diagrams (reference Section 2.1.6.2.3).
- Equipment source reference including manufacturer and nearest authorized service centers along with associated addresses and telephone numbers.
- Final warranty administration plan.

**Section 2**

- Manufacture’s operation and installation.
- Manufacture’s service and repair guides.

The Contractor shall provide maintenance manuals for CCTV equipment per the above requirements, including the following diagrams (as appropriate):

1. Video system block diagram showing all components;
2. Video signal path diagram;
3. Control signal path diagram;
4. System connection diagram; and
5. Detailed connection diagrams.

2.1.5.12 TRAINING:

When required, training shall be provided in two sessions.

The first training session shall be for maintenance and troubleshooting. This session shall be a minimum of four hours in length for each type of field device installed, including communications. This session shall be oriented for the County maintenance staff.

The second training session shall be for operations. This session shall be a minimum of four hours in length for each type of field device installed. This session shall be oriented for the County Traffic Management staff.

2.1.5.13 MEASUREMENT:

The Field Hardened Ethernet Access Switch shall be measured per unit furnished, installed, made fully functional, tested, and accepted by the Engineer.

The Field Hardened Ethernet Backbone Switch shall be measured per each unit furnished, installed, made fully functional, tested, and accepted by the Engineer.

Routers shall be measured by each type furnished, installed, and accepted complete in place.

Switches shall be measured by each type furnished, installed, and accepted complete in place.

Ethernet Communications Module for the ASC/2S Signal Controller shall be measured as a unit for each accepted installation complete in place.

Leased Line Communications Demarcation Point will be measured as a unit for each accepted installation complete in place.

2.1.5.14 PAYMENT:

The accepted quantities of Field Hardened Ethernet Access Switch measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the item, COMPLETE IN PLACE, including all equipment described under this Item with all cables and connectors; all documentation and testing and also includes the cost of furnishing all labor, materials, software, warranty, training and equipment necessary to complete the work.

Field Hardened Ethernet Backbone Switch, measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the item, COMPLETE IN PLACE, including all equipment described under this Item with all cables and connectors; all documentation and testing and also includes the cost of furnishing all labor, materials, software, warranty, training and equipment necessary to complete the work.

The accepted quantity of items will be paid for at the contract unit price which shall be full compensation for the work described including testing, warranty, documentation, and training.

2.1.6 INTELLIGENT TRANSPORTATION SYSTEM GENERAL REQUIREMENTS

This section consists of additional requirements for the work of furnishing and installing complete, functional and operating Intelligent Transportation System (ITS) field devices, such as fiber optic cable and infrastructure, closed circuit television cameras (CCTV), dynamic message signs (DMS), and video image detectors (VID). Unless specified within other sections of these Specifications, the following requirements apply to all materials/equipment supplied by this contract.

2.1.6.1 MATERIAL/EQUIPMENT REQUIREMENTS AND TECHNICAL QUALIFICATIONS

2.1.6.1.1 **Environmental:** All electronic equipment installed in the field shall meet the minimum environmental requirements of NEMA Standards Publication No. TS-2, Section 2, Environmental Standards and Test Procedures, including, but not limited to:

1. Power Interruption;
2. Temperature and Humidity;
3. Transients, Power Service and Input Terminals;
4. Nondestruct Transient Immunity;
5. Vibration; and
6. Shock.

All equipment exposed to the environment shall be corrosion resistant and designed to withstand 80 mph winds with a 30% gust factor, and withstand the effects of sand, dust, and hose-directed water per the hose down test described in the latest edition of the NEMA Standards Publication 250. All connections shall be watertight.

2.1.6.1.2 **Power:** Electronic equipment and power supply shall meet the minimum requirements of NEMA Standards Publications No. TS-2, Section 2 Environmental Standards and Test Procedures.

The Contractor shall provide step-up/step-down transformers and AC to DC power conversion as needed to match the power requirements of each component.

- 2.1.6.1.3 **Regulation and Codes:** All electrical equipment shall conform to the current standards of the National Electrical Manufacturers Association (NEMA), National Electric Safety Code (NESC), and Underwriters' Laboratory Inc. (UL). All material and workmanship shall conform to the requirements of the National Electric Code (NEC), Illumination Engineers Society (IES), Standards of the American Society for Testing and Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), requirements of the project plans, these specifications, the special provisions, and to any other codes, standards, or ordinances which may apply. Whenever references are made to any of the standards mentioned, the reference shall be interpreted to mean the code, ordinance, or standard that is in effect at the time of the bid advertisement.
- 2.1.6.1.4 **Approval of Material, Equipment, and Technical Qualifications:** All materials, equipment, and ITS technical qualifications shall be approved by the Engineer prior to proceeding with the ITS work.
- 2.1.6.1.5 **(A) Materials and Equipment:** Any work in which materials or equipment not previously approved are used shall be performed at the Contractor's risk and may be considered as unauthorized and unacceptable and not subject to the payment provisions of the contract. Such materials or equipment may be subject to removal at the discretion of the Engineer.

Before ordering or installing any material or equipment, the Contractor shall submit four (4) copies of each proposed material and/or equipment list, including shop drawings and warranty information to the County at the pre-construction conference for approval by the Engineer. To be acceptable, the list shall be complete and contain all items supplied on the project by the Contractor, including pre-approved items. MCDOT reserves the right to reject an incomplete or unclear material submittal. All items on the list shall be identified by manufacturer's part number, model, included or excluded options, specification or other pertinent catalogue information. The materials from any catalog cuts shall be clearly indicated by the Contractor. One (1) copy will be returned to the Contractor for further action. Substitution of brand name, part number, or model number may be made if it is in accordance with the specifications and is equal in form, fit, function, performance, reliability, and is approved by the Engineer. All proposed substitutions shall be identified in the material and/or equipment list submitted for approval. The Contractor shall provide complete wiring diagrams for controller assemblies and auxiliary controller cabinets at the time of delivery for testing. A mylar original and four sets of prints shall be provided with each controller assembly. The wiring diagram shall illustrate all circuits and components in detail. All components shall be identified by name or number so as to be clearly noted in the drawings.

- 2.1.6.1.6 **(B) Technical Qualifications:** The Contractor shall submit the technical qualifications of personnel to be used for construction of ITS facilities to the Engineer at the pre-construction conference. The Contractor or subcontractor personnel must be certified by the manufacturer or have an industry standard certification prior to the installation and / or integration of the designated ITS equipment. The

installation and configuration personnel shall have a predetermined number of years of experience in addition to the certification levels as outlined below:

1. Fiber Technician – Minimum is Electronics Technicians Association (ETA) Fiber Optical Installer (FOI) certification or manufacturer fiber certification with five years of hands-on experience.

A year of experience can be waived if a higher level of certification in the appropriate field is possessed.

A copy of a resume with five project references and three professional references may be submitted for consideration of approval for individuals not meeting the required certification and experience levels.

The technical qualifications listed above will be waived for equipment that is designated as “furnish only”.

**2.1.6.1.7 Maricopa County Furnished Material and Equipment:** Field Devices material and equipment furnished by Maricopa County Department of Transportation will be made available to the Contractor as specified in the Special Provisions. All specified items will be available at the following address:

Maricopa County Department of Transportation Warehouse  
2222 South 27th Avenue  
Phoenix, Arizona 85009-6357

The Contractor shall call (602) 506-4885 forty-eight hours prior to pick-up.

The cost of handling and placing all material and equipment, after transfer to the Contractor, shall be considered as included in the contract price for the item in connection with which they are used.

The Contractor shall be held responsible for all material and equipment dispersed to the Contractor. The cost to make good any shortages or deficiencies, from any cause whatsoever and for any damage which may occur after transfer will be deducted from any monies due or becoming due to the Contractor.

**2.1.6.1.8 Product Training:**

A training course for each category of equipment shall be provided as an additional option to be requested from the Contractor as needed. Training shall be considered “hands-on” training and be comprehensive enough to provide administrative, technical, and operational instruction in the use of the provided equipment. Training courses offered shall require a factory certified installer for the installation, configuration, and maintenance of the equipment.

The training course shall be defined into one 4-hour training course and one 8-hour training course blocks. Maricopa County may request individual equipment components or combination of equipment components to be included in the training blocks requested based on the level of detail needing to be trained on each component. The Contractor and Maricopa County shall decide on the training schedule

once equipment needing training has been defined. The training shall be provided after the successful completion of all Subsystem Tests.

Costs should include materials and travel costs for vendor to provide training at a Maricopa County facility. Contractor shall provide materials for up to five students for the training course. Additional materials shall be provided for additional students as a per student cost.

#### 2.1.6.2 METHOD OF CONSTRUCTION:

2.1.6.2.1 **Cable and Active Electronics Labeling and Management:** The Contractor shall provide labeling for all Contractor installed cables. Labeling shall be done in a neat, professional manner using permanent methods and products specifically designed and approved by the Engineer for each label scenario. At a minimum, provide the following labeling:

1. Trunkline and branch cables at pull boxes, cabinets, racks, and other points of entry with the appropriate cable identification number. Use permanently marked, removable cable sleeves;
2. Both ends of jumper cables and pigtails;
3. Sequentially label the jumper cable (front) side of patch panels in a consistent manner throughout the project; and
4. Labeling for all active electronics consisting of the device location, name, IP address, subnet mask, gateway and VLAN.
5. Provide cable routing and management in a neat and professional manner. Group and neatly tie cables to the sides of racks when applicable. Slack or excess cables shall be neatly coiled, tied, and stowed. Strain relief shall be provided for fiber optic cable, jumpers, and pigtails.

2.1.6.2.2 **Labor and Supervision:** The Contractor shall furnish technically qualified labor and supervision with experience in the construction of the ITS field devices and communications equipment encompassed by the project, to include all materials, equipment, tools, transportation and supplies required to complete the work in an acceptable manner; and in full compliance with the Specifications, the project plans, and Special Provisions.

The Contractor shall have on the work site at all times a competent supervisor capable of reading and thoroughly understanding the plans and specifications and be experienced in the construction of ITS field devices and communications encompassed by the project. When construction involves traffic signals, the Contractor's supervisor shall possess an International Municipal Signal Association (IMSA) Level II Traffic Signal Electrician Certification.

2.1.6.2.3 **Plans:** The Plans may graphically describe the location of component parts. Where dimensions on the plans are given or can be computed from other given dimensions, they shall govern over scaled dimension.

After completion of the project the Contractor shall provide the Engineer with a set of as-built drawings on clean prints of the original drawings. The as-built drawing shall indicate in a neat and accurate manner all changes and revisions in the original design. As-built drawings shall be submitted before final payment for completed work will be made.

2.2 USAGE REPORT:

The Contractor, upon request, shall furnish the County a quarterly usage report delineating the acquisition activity governed by the Contract. The format of the report shall be approved by the County and shall disclose the quantity and dollar value of each contract item by individual unit.

2.3 SHIPPING DOCUMENTS:

A packing list or other suitable shipping document shall accompany each shipment and shall include the following:

2.3.1 Contract Serial number.

2.3.2 Contractor's name and address.

2.3.3 Using Agency name and address.

2.3.4 Using Agency purchase order number.

2.3.5 A description of product(s) shipped, including item number(s), quantity (ies), number of containers and package number(s), as applicable..

2.4 ACCEPTANCE:

Upon delivery and/or successful installation, the material(s) shall be deemed accepted and the warranty period shall begin. All documentation shall be completed prior to final acceptance.

2.5 DISCONTINUED MATERIALS:

2.5.1 In the event that a manufacturer discontinues materials, the County may allow the Contractor to provide a substitute for the discontinued item or may cancel the Contract. If the Contractor requests permission to substitute a new material, the Contractor shall provide the following to the County:

2.5.1.1 Documentation from the manufacturer that the material has been discontinued.

2.5.1.2 Documentation that names the replacement material.

2.5.1.3 Documentation that provides clear and convincing evidence that the replacement material meets or exceeds all specifications required by the original solicitation.

2.5.1.4 Documentation that provides clear and convincing evidence that the replacement material will be compatible with all the functions or uses of the discontinued material.

2.5.1.5 Documentation confirming that the price for the replacement is the same as or less than the discontinued material.

2.5.2 Material discontinuance applies only to those materials specifically listed on any resultant contract. This will not apply to catalog items not specifically listed on any resultant contract.

2.6 INVOICES AND PAYMENTS:

2.6.1 The Contractor shall submit two (2) legible copies of their detailed invoice before payment(s) can be made. At a minimum, the invoice must provide the following information:

- Company name, address and contact
- County bill-to name and contact information
- Contract Serial Number
- County purchase order number
- Invoice number and date
- Payment terms
- Date of service or delivery
- Quantity (number of days or weeks)
- Contract Item number(s)
- Description of Purchase (product or services)
- Pricing per unit of purchase
- Freight (if applicable)
- Extended price
- Mileage w/rate (if applicable)
- Arrival and completion time (if applicable)
- Total Amount Due

2.6.2 Problems regarding billing or invoicing shall be directed to the using agency as listed on the Purchase Order.

2.6.3 Payment shall be made to the Contractor by Accounts Payable through the Maricopa County Vendor Express Payment Program. This is an Electronic Funds Transfer (EFT) process. After Contract Award the Contractor shall complete the Vendor Registration Form located on the County Department of Finance Vendor Registration Web Site ([www.maricopa.gov/finance/vendors](http://www.maricopa.gov/finance/vendors)).

2.6.4 EFT payments to the routing and account numbers designated by the Contractor will include the details on the specific invoices that the payment covers. The Contractor is required to discuss remittance delivery capabilities with their designated financial institution for access to those details.

2.7 TAX:

Tax shall not be levied against labor. Sales/use tax will be determined by County. Tax will not be used in determining low price.

2.8 FUEL COST PRICE ADJUSTMENT:

2.8.1 This provision provides for limited increased or decreased costs of motor fuels (fuels) used to perform services under this Contract. This provision does not apply to burner fuel (i.e. propane, natural gas, fuel oil, used motor oil). It applies to motor fuel only. Fuel cost adjustments may be either positive or negative. A positive fuel cost adjustment will result in an increase in payments to Contractor while a negative fuel cost adjustment will result in a decrease in payments to Contractor.

2.8.2 This provision is intended to minimize risk to both parties to this Contract due to fuel cost fluctuations that may occur during the term of this Contract. This provision is not designed to estimate actual quantities of fuel used in providing services under this Contract, but to provide a reasonable basis for calculating a fuel cost adjustment based on average conditions.

- 2.8.3 Application of this provision will come into effect upon Contractor submittal of a fuel cost adjustment request. A request may be submitted only when the increased cost of fuel, established as a percentage of total contract price (base fuel cost) upon award of this Contract, exceeds ten (10%) percent of the base fuel cost. The Contractor may request a fuel surcharge no more than four (4) times annually, during the month(s) of March, June, September and December. The request must be submitted no later than the tenth (10<sup>th</sup>) of the month. Any surcharge shall be effective the first of the following month after receipt and approval. The date of County approval of a fuel cost adjustment request shall become the base date for any future Contractor adjustment requests.
- 2.8.4 Contractor shall include, as part of its price bid, the percentage of total contract price fuel represents (e.g., fuel cost equals 10% of Contractor cost) (see also, Attachment A, Vendor Information). This percentage will represent and establish the base fuel cost for this Contract. The base fuel cost shall be established as the due date for submission of proposals for this Contract. All subsequent fuel cost adjustments shall be based upon the date the County approves a Contractor's request for fuel cost adjustment (e.g. fuel cost adjustment approved by County on January 1, 2006, January 1, 2006 becomes base date for any next Contractor request for adjustment).
- 2.8.5 Fuel Cost Application Requirement. The Contractor must provide documentation including type of motor fuel and fuel invoices with price of the fuel used in providing services under this Contract, from the month bids were due and the month of the cost adjustment request, with any fuel cost adjustment application. The fuel cost adjustment application must be completed with all applicable data, and signed by the Contractor. Any cost adjustment will be calculated by the County by using the bureau of Labor Statistics, Producer Price Index for Gasoline – WPU0571 and #2 Diesel Fuel – WPO57303 (<http://data.bls.gov/cgi-bin/surveymost?wp>).
- 2.8.6 The fuel surcharge shall be based on the current quarterly index of the West Coast (PADD5) Diesel (On-Highway)-All Types or Reformulated Areas Gasoline compared to the previous quarterly index period as reported on the Energy Information Administration (EIA) website: <http://www.eia.doe.gov/>
- 2.8.7 The computation of the fuel surcharge amount shall be determined as follows:
- 2.8.7.1 The fuel cost component from Attachment A (vendor information) of the Contract with Maricopa County, multiplied by the percent of change indicated by the EIA report from the previous index period.
- 2.8.7.2 Upon agreement by the County to the surcharge, the County shall issue written approval of the change prior to any adjusted invoicing submitted for payment.
- 2.8.7.3 The surcharge shall be added as a separate line item to the invoice.

2.9 STRATEGIC ALLIANCE for VOLUME EXPENDITURES (\$AVE)

The County is a member of the \$AVE cooperative purchasing group. \$AVE includes the State of Arizona, many Phoenix metropolitan area municipalities, and many K-12 unified school districts. Under the \$AVE Cooperative Purchasing Agreement, and with the concurrence of the successful Respondent under this solicitation, a member of \$AVE may access a contract resulting from a solicitation issued by the County. If you **do not** want to grant such access to a member of \$AVE, **please so state** in your proposal. In the absence of a statement to the contrary, the County will assume that you do wish to grant access to any contract that may result from this Request for Proposal.

2.10 INTERGOVERNMENTAL COOPERATIVE PURCHASING AGREEMENTS (ICPA's)

County currently holds ICPA's with numerous governmental entities throughout the State of Arizona. These agreements allow those entities, with the approval of the Contractor, to purchase their requirements under the terms and conditions of the County Contract. Please indicate on Attachment A, your acceptance or rejection regarding such participation of other governmental entities. Your response will not be considered as an evaluation factor in awarding a contract.

3.0 SPECIAL TERMS & CONDITIONS:

3.1 CONTRACT TERM:

This Invitation for Bid is for awarding a firm, fixed-price purchasing contract to cover a term of Three (3) years.

3.2 OPTION TO RENEW:

The County may, at its option and with the approval of the Contractor, renew the term of this Contract up to a maximum of Three (3) additional years, (or at the County's sole discretion, extend the contract on a month to month basis for a maximum of six (6) months after expiration). The Contractor shall be notified in writing by the Office of Procurement Services of the County's intention to renew the contract term at least thirty (30) calendar days prior to the expiration of the original contract term.

3.3 PRICE ADJUSTMENTS:

Any requests for reasonable price adjustments must be submitted sixty (60) days prior to the Contract anniversary. Requests for adjustment in cost of labor and/or materials must be supported by appropriate documentation. If County agrees to the adjusted price terms, County shall issue written approval of the change. The reasonableness of the request will be determined by comparing the request with the Consumer Price Index or by performing a market survey.

3.4 INDEMNIFICATION:

3.4.1 To the fullest extent permitted by law, Contractor shall defend, indemnify, and hold harmless County, its agents, representatives, officers, directors, officials, and employees from and against all claims, damages, losses and expenses, including, but not limited to, attorney fees, court costs, expert witness fees, and the cost of appellate proceedings, relating to, arising out of, or alleged to have resulted from the negligent acts, errors, omissions, mistakes or malfeasance relating to the performance of this Contract. Contractor's duty to defend, indemnify and hold harmless County, its agents, representatives, officers, directors, officials, and employees shall arise in connection with any claim, damage, loss or expense that is caused by any negligent acts, errors, omissions or mistakes in the performance of this Contract by the Contractor, as well as any person or entity for whose acts, errors, omissions, mistakes or malfeasance Contractor may be legally liable.

3.4.2 The amount and type of insurance coverage requirements set forth herein will in no way be construed as limiting the scope of the indemnity in this paragraph.

3.4.3 The scope of this indemnification does not extend to the sole negligence of County.

3.5 INSURANCE REQUIREMENTS

3.5.1 Contractor, at Contractor's own expense, shall purchase and maintain the herein stipulated minimum insurance from a company or companies duly licensed by the State of Arizona and possessing a current A.M. Best, Inc. rating of **B++ A-**, VII or higher. In lieu of State of Arizona licensing, the stipulated insurance may be purchased from a company or companies, which are authorized to do business in the State of Arizona,

provided that said insurance companies meet the approval of County. The form of any insurance policies and forms must be acceptable to County.

- 3.5.2 All insurance required herein shall be maintained in full force and effect until all work or service required to be performed under the terms of the Contract is satisfactorily completed and formally accepted. Failure to do so may, at the sole discretion of County, constitute a material breach of this Contract.
- 3.5.3 Contractor's insurance shall be primary insurance as respects County, and any insurance or self-insurance maintained by County shall not contribute to it.
- 3.5.4 Any failure to comply with the claim reporting provisions of the insurance policies or any breach of an insurance policy warranty shall not affect the County's right to coverage afforded under the insurance policies.
- 3.5.5 The insurance policies may provide coverage that contains deductibles or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to County under such policies. Contractor shall be solely responsible for the deductible and/or self-insured retention and County, at its option, may require Contractor to secure payment of such deductibles or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit.
- 3.5.6 County reserves the right to request and to receive, within 10 working days, certified copies of any or all of the herein required insurance certificates. County shall not be obligated to review policies and/or endorsements or to advise Contractor of any deficiencies in such policies and endorsements, and such receipt shall not relieve Contractor from, or be deemed a waiver of County's right to insist on strict fulfillment of Contractor's obligations under this Contract.
- 3.5.7 The insurance policies required by this Contract, except Workers' Compensation, and Errors and Omissions, shall name County, its agents, representatives, officers, directors, officials and employees as Additional Insureds.
- 3.5.8 The policies required hereunder, except Workers' Compensation, ~~and Errors and Omissions~~, shall contain a waiver of transfer of rights of recovery (subrogation) against County, its agents, representatives, officers, directors, officials and employees for any claims arising out of Contractor's work or service.
- 3.5.9 Commercial General Liability:  
  
Commercial General Liability insurance and, if necessary, Commercial Umbrella insurance with a limit of not less than ~~\$1,000,000~~ **\$2,000,000** for each occurrence, ~~\$2,000,000~~ **\$2,000,000** Products/Completed Operations Aggregate, and ~~\$2,000,000~~ **\$4,000,000** General Aggregate Limit. The policy shall include coverage for bodily injury, broad form property damage, personal injury, products and completed operations and blanket contractual coverage, and shall not contain any provision which would serve to limit third party action over claims. There shall be no endorsement or modification of the CGL limiting the scope of coverage for liability arising from explosion, collapse, or underground property damage.
- 3.5.10 Automobile Liability:  
  
Commercial/Business Automobile Liability insurance and, if necessary, Commercial Umbrella insurance with a combined single limit for bodily injury and property damage of not less than ~~\$1,000,000~~ **\$2,000,000** each occurrence with respect to any of the Contractor's owned, hired, and non-owned vehicles assigned to or used in performance of the Contractor's work or services under this Contract.

3.5.11 Workers' Compensation:

3.5.11.1 Workers' Compensation insurance to cover obligations imposed by federal and state statutes having jurisdiction of Contractor's employees engaged in the performance of the work or services under this Contract; and Employer's Liability insurance of not less than **1,000,000** ~~\$100,000~~ for each accident, **1,000,000** ~~\$100,000~~ disease for each employee, and **\$1,000,000** ~~\$500,000~~ disease policy limit.  
(N.B. — ~~\$1,000,000 limits on larger contracts~~)

3.5.11.2 Contractor waives all rights against County and its agents, officers, directors and employees for recovery of damages to the extent these damages are covered by the Workers' Compensation and Employer's Liability or commercial umbrella liability insurance obtained by Contractor pursuant to this Contract.

3.5.12 Errors and Omissions Insurance:

Errors and Omissions insurance and, if necessary, Commercial Umbrella insurance, which will insure and provide coverage for errors or omissions of the Contractor, with limits of no less than \$1,000,000 for each claim.

3.5.13 Certificates of Insurance.

3.5.13.1 Prior to commencing work or services under this Contract, Contractor shall furnish the County with certificates of insurance, or formal endorsements as required by the Contract in the form provided by the County, issued by Contractor's insurer(s), as evidence that policies providing the required coverage, conditions and limits required by this Contract are in full force and effect. Such certificates shall identify this contract number and title.

3.5.13.2 Prior to commencing work or services under this Contract, Contractor shall have insurance in effect as required by the Contract in the form provided by the County, issued by Contractor's insurer(s), as evidence that policies providing the required coverage, conditions and limits required by this Contract are in full force and effect. Such certificates shall be made available to the County upon **(10) business days** ~~48 hours notice~~. BY SIGNING THE AGREEMENT PAGE THE CONTRACTOR AGREES TO THIS REQUIREMENT AND FAILURE TO MEET THIS REQUIREMENT WILL RESULT IN CANCELLATION OF CONTRACT.

3.5.13.2.1 In the event any insurance policy (ies) required by this contract is (are) written on a "claims made" basis, coverage shall extend for two years past completion and acceptance of Contractor's work or services and as evidenced by annual Certificates of Insurance.

3.5.13.2.2 If a policy does expire during the life of the Contract, a renewal certificate must be sent to County fifteen (15) days prior to the expiration date.

3.5.14 Cancellation and Expiration Notice.

Insurance required herein shall not be permitted to expire, be canceled, or materially changed without thirty (30) days prior written notice to the County.

**3.6 PROCUREMENT CARD ORDERING CAPABILITY:**

County may determine to use a procurement card that may be used from time-to-time, to place and make payment for orders under this Contract. Contractors without this capability may be considered non-responsive and not eligible for award consideration.

**3.7 INTERNET ORDERING CAPABILITY:**

It is the intent of County to use the Internet to communicate and to place orders under this Contract. Contractors without this capability may be considered non-responsive and not eligible for award consideration.

**3.8 LANGUAGE FOR REQUIREMENTS CONTRACT:**

3.8.1 Contractors signify their understanding and agreement by signing a bid submittal, that the Contract resulting from the bid will be a requirements contract. However, the Contract does not guarantee any ~~minimum or maximum number~~ of purchases will be made. It only indicates that if purchases are made for the materials contained in the Contract, they will be purchased from the Contractor awarded that item. Orders will only be placed when the County identifies a need and proper authorization and documentation have been approved.

3.8.2 County reserves the right to cancel Purchase Orders within a reasonable period of time after issuance. Should a Purchase Order be canceled, the County agrees to reimburse the Contractor but only for actual and documentable costs incurred by the Contractor due to and after issuance of the Purchase Order. The County will not reimburse the Contractor for any costs incurred after receipt of County notice of cancellation, or for lost profits, shipment of product prior to issuance of Purchase Order, etc.

3.8.3 Contractors agree to accept verbal notification of cancellation from the Office of Procurement Services Procurement Officer with written notification to follow. By submitting a bid in response to this Invitation for Bids, the Contractor specifically acknowledges to be bound by this cancellation policy.

**3.9 ORDERING AUTHORITY.**

3.9.1 The Contractor should understand that any request for purchase of product(s) shall be accompanied by a valid purchase order, issued by Office of Procurement Services, or by a Certified Agency Procurement Aid (CAPA).

3.9.2 County departments, cities, other counties, schools and special districts, universities, nonprofit educational and public health institutions may also purchase from under this Contract at their discretion and/or other state and local agencies (Customers) may procure the products under this Contract by the issuance of a purchase order to the Respondent. Purchase orders must cite the Contract number.

3.9.3 Contract award is in accordance with the Maricopa County Procurement Code. All requirements for the competitive award of this Contract have been met. A purchase order for the product(s) is the only document necessary for Customers to purchase and for the Contractor to proceed with delivery of product(s) available under this Contract.

3.9.4 Any attempt to represent any product not specifically awarded under this Contract is a violation of the Contract. Any such action is subject to the legal and contractual remedies available to the County, inclusive of, but not limited to, Contract cancellation, suspension and/or debarment of the Contractor.

3.10 UNCONDITIONAL TERMINATION FOR CONVENIENCE:

Maricopa County may terminate the resultant Contract for convenience by providing sixty (60) calendar days advance notice to the Contractor.

3.11 TERMINATION FOR DEFAULT:

If the Contractor fails to meet deadlines, or fails to provide the agreed upon service/material altogether, a termination for default will be issued. The termination for default will be issued only after the County deems that the Contractor has failed to remedy the problem after being forewarned.

3.12 TERMINATION BY THE COUNTY:

If the Contractor should be adjudged bankrupt or should make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of its insolvency, the County may terminate the Contract. If the Contractor should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to provide enough properly skilled workers or proper materials, or persistently disregard laws and ordinances, or not proceed with work or otherwise be guilty of a substantial violation of any provision of this Contract, then the County may terminate the Contract. Prior to termination of the Contract, the County shall give the Contractor fifteen- (15) calendar day's written notice. Upon receipt of such termination notice, the Contractor shall be allowed fifteen (15) calendar days to cure such deficiencies.

3.13 STATUTORY RIGHT OF CANCELLATION FOR CONFLICT OF INTEREST:

Notice is given that pursuant to A.R.S. § 38-511 the County may cancel any Contract without penalty or further obligation within three years after execution of the contract, if any person significantly involved in initiating, negotiating, securing, drafting or creating the contract on behalf of the County is at any time while the Contract or any extension of the Contract is in effect, an employee or agent of any other party to the Contract in any capacity or consultant to any other party of the Contract with respect to the subject matter of the Contract. Additionally, pursuant to A.R.S § 38-511 the County may recoup any fee or commission paid or due to any person significantly involved in initiating, negotiating, securing, drafting or creating the contract on behalf of the County from any other party to the contract arising as the result of the Contract.

3.14 OFFSET FOR DAMAGES;

In addition to all other remedies at Law or Equity, the County may offset from any money due to the Contractor any amounts Contractor owes to the County for damages resulting from breach or deficiencies in performance of the contract.

3.15 ADDITIONS/DELETIONS OF SERVICE:

The County reserves the right to add and/or delete materials to a Contract. If a service requirement is deleted, payment to the Contractor will be reduced proportionately, to the amount of service reduced in accordance with the bid price. If additional materials are required from a Contract, prices for such additions will be negotiated between the Contractor and the County.

3.16 SUBCONTRACTING:

3.16.1 The Contractor may not assign a Contract or Subcontract to another party for performance of the terms and conditions hereof without the written consent of the County. All correspondence authorizing subcontracting must reference the Bid Serial Number and identify the job project.

3.16.2 The Subcontractor's rate for the job shall not exceed that of the Prime Contractor's rate, as bid in the pricing section, unless the Prime Contractor is willing to absorb any higher rates. The Subcontractor's invoice shall be invoiced directly to the Prime Contractor,

who in turn shall pass-through the costs to the County, without mark-up. A copy of the Subcontractor's invoice must accompany the Prime Contractor's invoice.

3.17 AMENDMENTS:

All amendments to this Contract shall be in writing and approved/signed by both parties. Maricopa County Office of Procurement Services shall be responsible for approving all amendments for Maricopa County.

3.18 ACCESS TO AND RETENTION OF RECORDS FOR THE PURPOSE OF AUDIT AND/OR OTHER REVIEW:

3.18.1 In accordance with section MCI 367 of the Maricopa County Procurement Code the Contractor agrees to retain all books, records, accounts, statements, reports, files, and other records and back-up documentation relevant to this Contract for six (6) years after final payment or until after the resolution of any audit questions which could be more than six (6) years, whichever is latest. The County, Federal or State auditors and any other persons duly authorized by the Department shall have full access to, and the right to examine, copy and make use of, any and all said materials.

3.18.2 If the Contractor's books, records, accounts, statements, reports, files, and other records and back-up documentation relevant to this Contract are not sufficient to support and document that requested services were provided, the Contractor shall reimburse Maricopa County for the services not so adequately supported and documented.

3.18.3 **If at any time it is determined by the County that a cost for which payment has been made is a disallowed cost, the County shall notify the Contractor in writing of the disallowance. The course of action to address the disallowance shall be at sole discretion of the County, and may include either an adjustment to future claim submitted by the Contractor by the amount of the disallowance, or to require reimbursement forthwith of the disallowed amount by the Contractor by issuing a check payable to Maricopa County.**

3.19 AUDIT DISALLOWANCES:

If at any time it is determined by the County that a cost for which payment has been made is a disallowed cost, the County shall notify the Contractor in writing of the disallowance and the required course of action, which shall be at the option of the County either to adjust any future claim submitted by the Contractor by the amount of the disallowance or to require repayment of the disallowed amount by the Contractor forthwith issuing a check payable to Maricopa County.

3.20 VALIDITY:

The invalidity, in whole or in part, of any provision of the Contract shall not void or affect the validity of any other provision of the Contract.

3.21 RIGHTS IN DATA:

The County shall have the use of data and reports resulting from a Contract without additional cost or other restriction except as may be established by law or applicable regulation. Each party shall supply to the other party, upon request, any available information that is relevant to a Contract and to the performance thereunder.

3.22 PUBLIC RECORDS:

**All Offers submitted and opened are public records and must be retained by the Records Manager at the Office of Procurement Services. Offers shall be open to public inspection after Contract award and execution, except for such Offers deemed to be confidential by the Office of Procurement Services. If an Offeror believes that information in its Offer should**

**remain confidential, it shall indicate as confidential, the specific information and submit a statement with its offer detailing the reasons that the information should not be disclosed. Such reasons shall include the specific harm or prejudice which may arise. The Records Manager of the Office of Procurement Services shall determine whether the identified information is confidential pursuant to the Maricopa County Procurement Code.**

3.23 RELATIONSHIPS:

In the performance of the services described herein, the Contractor shall act solely as an independent contractor, and nothing herein or implied herein shall at any time be construed as to create the relationship of employer and employee, partnership, principal and agent, or joint venture between the County and the Contractor.

3.24 CERTIFICATION REGARDING DEBARMENT AND SUSPENSION

3.24.1 The undersigned (authorized official signing for the Contractor) certifies to the best of his or her knowledge and belief, that the Contractor, defined as the primary participant in accordance with 45 CFR Part 76, and its principals:

3.24.1.1 are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal Department or agency;

3.24.1.2 have not within 3-year period preceding this Contract been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

3.24.1.3 are not presently indicted or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and

3.24.1.4 have not within a 3-year period preceding this Contract had one or more public transaction (Federal, State or local) terminated for cause of default.

3.24.2 Should the Contractor not be able to provide this certification, an explanation as to why should be attached to the Contact.

3.24.3 The Contractor agrees to include, without modification, this clause in all lower tier covered transactions (i.e. transactions with subcontractors) and in all solicitations for lower tier covered transactions related to this Contract.

3.25 ALTERNATIVE DISPUTE RESOLUTION:

3.25.1 After the exhaustion of the administrative remedies provided in the Maricopa County Procurement Code, any contract dispute in this matter is subject to compulsory arbitration. Provided the parties participate in the arbitration in good faith, such arbitration is not binding and the parties are entitled to pursue the matter in state or federal court sitting in Maricopa County for a de novo determination on the law and facts. If the parties cannot agree on an arbitrator, each party will designate an arbitrator and those two arbitrators will agree on a third arbitrator. The three arbitrators will then serve as a panel to consider the arbitration. The parties will be equally responsible for the compensation for the arbitrator(s). The hearing, evidence, and procedure will be in accordance with Rule 74 of the Arizona Rules of Civil Procedure. Within ten (10) days of the completion of the hearing the arbitrator(s) shall:

- 3.25.1.1 Render a decision;
- 3.25.1.2 Notify the parties that the exhibits are available for retrieval; and
- 3.25.1.3 Notify the parties of the decision in writing (a letter to the parties or their counsel shall suffice).
- 3.25.2 Within ten (10) days of the notice of decision, either party may submit to the arbitrator(s) a proposed form of award or other final disposition, including any form of award for attorneys' fees and costs. Within five (5) days of receipt of the foregoing, the opposing party may file objections. Within ten (10) days of receipt of any objections, the arbitrator(s) shall pass upon the objections and prepare a signed award or other final disposition and mail copies to all parties or their counsel.
- 3.25.3 Any party which has appeared and participated in good faith in the arbitration proceedings may appeal from the award or other final disposition by filing an action in the state or federal court sitting in Maricopa County within twenty (20) days after date of the award or other final disposition. Unless such action is dismissed for failure to prosecute, such action will make the award or other final disposition of the arbitrator(s) a nullity.
- 3.26 VERIFICATION REGARDING COMPLIANCE WITH ARIZONA REVISED STATUTES §41-4401 AND FEDERAL IMMIGRATION LAWS AND REGULATIONS:
  - 3.26.1 By entering into the Contract, the Contractor warrants compliance with the Immigration and Nationality Act (INA using e-verify) and all other federal immigration laws and regulations related to the immigration status of its employees and A.R.S. §23-214(A). The contractor shall obtain statements from its subcontractors certifying compliance and shall furnish the statements to the Procurement Officer upon request. These warranties shall remain in effect through the term of the Contract. The Contractor and its subcontractors shall also maintain Employment Eligibility Verification forms (I-9) as required by the Immigration Reform and Control Act of 1986, as amended from time to time, for all employees performing work under the Contract and verify employee compliance using the E-verify system and shall keep a record of the verification for the duration of the employee's employment or at least three years, whichever is longer. I-9 forms are available for download at USCIS.GOV.
  - 3.26.2 The County retains the legal right to inspect contractor and subcontractor employee documents performing work under this Contract to verify compliance with paragraph 3.25.1 of this Section. Contractor and subcontractor shall be given reasonable notice of the County's intent to inspect and shall make the documents available at the time and date specified. Should the County suspect or find that the Contractor or any of its subcontractors are not in compliance, the County will consider this a material breach of the contract and may pursue any and all remedies allowed by law, including, but not limited to: suspension of work, termination of the Contract for default, and suspension and/or debarment of the Contractor. All costs necessary to verify compliance are the responsibility of the Contractor.
- ~~3.27 VERIFICATION REGARDING COMPLIANCE WITH ARIZONA REVISED STATUTES §§35-391.06 AND 35-393.06 BUSINESS RELATIONS WITH SUDAN AND IRAN:
  - ~~3.27.1 The Respondent shall procure all permits, insurance, licenses and pay the charges and fees necessary and incidental to the lawful conduct of his/her business, and as necessary complete any required certification requirements, required by any and all governmental or non-governmental entities as mandated to maintain compliance with and in good standing for all permits and/or licenses. The Respondent shall keep fully informed of existing and future trade or industry requirements, Federal, State and Local laws, ordinances, and regulations which in any manner affect the fulfillment of a Contract and shall comply with the same. Contractor shall immediately notify both Office of~~~~

~~Procurement Services and the using agency of any and all changes concerning permits, insurance or licenses.~~

~~3.27.2 The County may request verification of compliance for any contractor or subcontractor performing work under the Contract. Should the County suspect or find that the Contractor or any of its subcontractors are not in compliance, the County may pursue any and all remedies allowed by law, including, but not limited to: suspension of work, termination of the Contract for default, and suspension and/or debarment of the Contractor. All costs necessary to verify compliance are the responsibility of the Contractor.~~

3.28 CONTRACTOR LICENSE REQUIREMENT:

3.28.1 The Respondent shall procure all permits, insurance, licenses and pay the charges and fees necessary and incidental to the lawful conduct of his/her business, and as necessary complete any required certification requirements, required by any and all governmental or non-governmental entities as mandated to maintain compliance with and in good standing for all permits and/or licenses. The Respondent shall keep fully informed of existing and future trade or industry requirements, Federal, State and Local laws, ordinances, and regulations which in any manner affect the fulfillment of a Contract and shall comply with the same. Contractor shall immediately notify both Office of Procurement Services and the using agency of any and all changes concerning permits, insurance or licenses.

3.28.2 Respondents furnishing finished products, materials or articles of merchandise that will require installation or attachment as part of the Contract, shall possess any licenses required. A Respondent is not relieved of its obligation to possess the required licenses by subcontracting of the labor portion of the Contract. Respondents are advised to contact the Arizona Registrar of Contractors, Chief of Licensing, at (602) 542-1525 to ascertain licensing requirements for a particular contract. Respondents shall identify which license(s), if any, the Registrar of Contractors requires for performance of the Contract.

3.29 INFLUENCE

As prescribed in MC1-1202 of the Maricopa County Procurement Code, any effort to influence an employee or agent to breach the Maricopa County Ethical Code of Conduct or any ethical conduct, may be grounds for Disbarment or Suspension under MC1-902.

An attempt to influence includes, but is not limited to:

3.29.1 A Person offering or providing a gratuity, gift, tip, present, donation, money, entertainment or educational passes or tickets, or any type valuable contribution or subsidy,

3.29.2 That is offered or given with the intent to influence a decision, obtain a contract, garner favorable treatment, or gain favorable consideration of any kind.

If a Person attempts to influence any employee or agent of Maricopa County, the Chief Procurement Officer, or his designee, reserves the right to seek any remedy provided by the Maricopa County Procurement Code, any remedy in equity or in the law, or any remedy provided by this contract.

3.30 POST AWARD MEETING:

The Contractor may be required to attend a post-award meeting with the Using Agency to discuss the terms and conditions of this Contract. This meeting will be coordinated by the Procurement Officer of the Contract.