Joe McGee Construction Co. Inc.

6609 Steve Lee Drive

Lake, Mississippi 39092

City of Ridgeland, Mississippi

Ridgeland City Hall Board Room

304 Highway 51

Ridgeland, Mississippi 39157

Bid for construction of: RICE ROAD EXTENSION

JMC COR#: 07743-MC

BID DATE: 01/26/2021 @ 2:00 PM

Duplicate Copy of Proposal Sheets

SECTION C

PROPOSAL AND BID FORM

PROPOSAL

Proposal of Joe McGee Construction Co., Inc. (hereinafter called "BIDDER"), organized and existing under the laws of the State of Mississippi doing business as a Corporation (corporation, partnership, limited liability company, or individual) to the **CITY OF RIDGELAND,** (hereinafter called "OWNER"). In compliance with your advertisement for Bids, BIDDER, hereby proposes to perform all WORK for construction of

"RICE ROAD EXTENSION"

in strict accordance with the CONTRACT DOCUMENTS, within the time set forth herein, and at the prices stated below. By submission of the BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been developed independently, without consultation, communication or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in a written "NOTICE TO PROCEED" and to fully complete the Project within **210** consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of **$ 500.00** for each consecutive calendar day thereafter as provided for elsewhere in these CONTRACT DOCUMENTS.

BIDDER ACKNOWLEDGES receipt of the following ADDENDA:

NUMBER: #1 DATE: 01/21/2021

NUMBER: _____ DATE: _____

NUMBER: _____ DATE: _____

NUMBER: _____ DATE: _____

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to this bid.

BIDDER understands that the quantities mentioned below are approximate only and are subject to either increase or decrease, and hereby proposes to perform any increased or decreased quantities of work at the Unit Price Bid.

In accordance with the requirements of the Plans, Specifications and Contract Documents, BIDDER proposes to furnish all necessary materials, equipment, labor, tools and other means of construction and to construct the Project in accordance with the Contract Documents within the specified Contract Time for the following Unit Prices specified.

BIDDER further agrees to execute the contract agreement as bound herein within ten (10) days after receipt of contract forms from the OWNER.

BIDDER agrees to pay as liquidated damages the amount provided herein for each consecutive calendar day after the Contract completion date specified in a written "NOTICE TO PROCEED" that he fails to complete the work unless the Contract Time is extended by a written Change Order.

BIDDER also proposes to execute a Performance Bond and a Payment Bond, as shown in the Specifications, each in an amount of not less than **one hundred percent (100%)** of the total of the Base Bid. These Bonds shall not only serve to guarantee the completion of the work on the BIDDERS part, but also to guarantee the excellence of both workmanship and materials until the work is finally accepted.

BIDDER encloses a Bid Bond or Certified Check for **5% of Base Bid Amount** DOLLARS ($ 590) and hereby agree that in case of failure to execute the Contract and furnish the required Bonds within (10) days after the Receipt of Contract Forms, the amount of this Certified Check or Bid Bond will be forfeited to the OWNER, as liquidated damages arising out of his failure to execute the Contract as proposed.

It is understood that in case BIDDER is awarded the work, the Certified Check or Bid Bond submitted as Bid security will be returned as stipulated in the Specifications.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provision of the Equal Opportunity Clause set forth in the Federal Requirements, if applicable.

The low BIDDER shall supply the names and address of major MATERIAL SUPPLIERS AND SUBCONTRACTORS when required to do so by the OWNER.

Inspection trips for prospective BIDDERS will be coordinated thru OWNER prior to submission of proposal.

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or base bid amount: **SEE PAGE C-4 FOR BID ITEMS.**

NOTES:

1. Unit price amounts are to be shown in figures where indicated. Where a discrepancy in the unit price and the extension of any items occurs, the unit price will govern.

2. Unit prices shall include all labor, materials, bonding, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

3. Any erasure, change or alteration of any kind must be initialed by the BIDDER.

4. Bid prices shall include sales tax and all other applicable taxes and fees.

5. Any item of work not specified on the Proposal as a separate pay item or indicated as an absorbed cost in a pay item but which is incidental to completion of the work shall be considered as an absorbed cost with full compensation included in the unit price bid for the particular item involved.

6. OWNER reserves the right to award any combination of base and additive alternate bids (if any) it deems advantageous and in the event that all specified bid item units are lump sum (LS), the OWNER reserves the right to delete any such item or combination of such items from the project. The OWNER further reserves the right to delete any item or items desired from the Bid Schedule after the Contract has been awarded. Any deletions, if any made, shall be by Change Order and BIDDER hereby agrees to accept such Change Orders.

BID FORM
CITY OF RIDGELAND, MS
RICE ROAD EXTENSION
JANUARY 2021
WEI NO. 0019127

BASE BID ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL COST
201-B001	CLEARING AND GRUBBING	ACRE	2	$ 15,000.00	30,000.00
202-B050	REMOVAL OF CONCRETE COMBINATION CURB AND GUTTER	LF	145	$ 14.50	2,102.50
202-B188	REMOVAL OF PAVEMENT, ALL TYPES AND DEPTHS	SY	280	$ 12.00	3,360.00
203-EX020	BORROW EXCAVATION, AH, FME, CLASS B15	CY	17,500	$ 19.00	332,500.00
203-G001	EXCESS EXCAVATION, FM, AH	CY	20,550	$ 13.00	267,150.00
211-B001	TOPSOIL FOR SLOPE TREATMENT, CONTRACTOR FURNISHED	CY	500	$ 27.00	13,500.00
216-A001	SOLID SODDING	SY	1,500	$ 4.75	7,125.00
225-A001	GRASSING	ACRE	1	$ 3,000.00	3,000.00
226-A001	TEMPORARY GRASSING	ACRE	1	$ 1,100.00	1,100.00
234-A001	TEMPORARY SILT FENCE	LF	3,720	$ 3.60	13,392.00
237-A002	WATTLES, 20"	LF	600	$ 7.00	4,200.00
307-C002	12" SOIL-LIME-WATER MIXING, CLASS C	SY	6,325	$ 3.20	20,240.00
307-D001	LIME	TON	171	$ 365.00	62,415.00
307-S001	BITUMINOUS CURING SEAL	GAL	1,270	$ 5.50	6,985.00
403-A002	12.5-MM, MT,ASPHALT PAVEMENT	TON	620	$ 105.00	65,100.00
403-A005	19-MM, MT,ASPHALT PAVEMENT	TON	1,995	$ 85.00	169,575.00
403-A014	9.5-MM, MT, ASPHALT PAVEMENT	TON	930	$ 100.00	93,000.00
406-A002	COLD MILLING OF BITUMINOUS PAVEMENT, ALL DEPTHS	SY	4,180	$ 3.25	13,585.00
407-A001	ASPHALT FOR TACK COAT	GAL	1,640	$ 3.75	6,150.00
503-C010	SAW CUT, FULL DEPTH	LF	144	$ 10.00	1,440.00
601-B001	CLASS B STRUCTURAL CONCRETE, MINOR STRUCTURES	CY	120	$ 2,400.00	288,000.00
602-A001	REINFORCING STEEL	LB	9,713	$ 1.00	9,713.00
603-CA011	18" REINFORCED CONCRETE PIPE, CLASS III	LF	2,864	$ 43.00	123,152.00
603-CA026	24" REINFORCED CONCRETE PIPE, CLASS III	LF	248	$ 56.00	13,888.00
603-CA040	30" REINFORCED CONCRETE PIPE, CLASS III	LF	164	$ 73.00	11,972.00
603-CB004	24" REINFORCED CONCRETE END SECTION	EA	1	$ 900.00	900.00
603-CB005	30" REINFORCED CONCRETE END SECTION	EA	1	$ 1,100.00	1,100.00
604-A001	CASTINGS	LB	2,686	$ 3.50	9,401.00
604-B001	GRATINGS	LB	254	$ 3.50	889.00
608-C001	DETECTABLE WARNING PANELS	SF	80	$ 44.00	3,520.00
907-608-D003	STAMPED AND COLORED CONCRETE SIDEWALK	SY	50	$ 135.00	6,750.00
609-D003	COMBINATION CONCRETE CURB AND GUTTER TYPE 2	LF	125	$ 22.00	2,750.00
609-D012	COMBINATION CONCRETE CURB AND GUTTER TYPE 3A MODIFIED	LF	3,500	$ 20.00	70,000.00
616-A001	CONCRETE MEDIAN AND/OR ISLAND PAVEMENT, 10-INCH	SY	10	$ 135.00	1,350.00
616-A004	CONCRETE MEDIAN AND/OR ISLAND PAVEMENT, 4-INCH	SY	83	$ 55.00	4,565.00
618-A001	MAINTENANCE OF TRAFFIC	LS	1	$ 40,000.00	40,000.00

619-A1002	TEMPORARY TRAFFIC STRIPE, CONTINUOUS WHITE	LF	7,042	$ 0.55	3,873.10
619-A2002	TEMPORARY TRAFFIC STRIPE, CONTINUOUS YELLOW	LF	6,972	$ 0.55	3,834.60
619-A3002	TEMPORARY TRAFFIC STRIPE, SKIP WHITE	LF	600	$ 0.55	330.00
619-A5001	TEMPORARY TRAFFIC STRIPE, DETAIL	LF	2,149	$ 1.00	2,149.00
619-A6001	TEMPORARY TRAFFIC STRIPE, LEGEND	SF	516	$ 2.00	1,032.00
619-A6002	TEMPORARY TRAFFIC STRIPE, LEGEND	LF	572	$ 1.50	858.00
619-H1001	TRAFFIC SIGNALS	LS	1	$ 43,000.00	43,000.00
620-A001	MOBILIZATION	LS	1	$ 225,000.00	225,000.00
626-A003	6" THERMOPLASTIC TRAFFIC STRIPE, SKIP WHITE	LF	600	$ 1.00	600.00
626-B003	6" THERMOPLASTIC TRAFFIC STRIPE, CONTINUOUS WHITE	LF	681	$ 1.00	681.00
626-C003	6" THERMOPLASTIC EDGE STRIPE, CONTINUOUS WHITE	LF	6,361	$ 0.75	4,770.75
626-E003	6" THERMOPLASTIC TRAFFIC STRIPE CONTINUOUS YELLOW	LF	6,972	$ 0.75	5,229.00
626-G002	THERMOPLASTIC STRIPE, DETAIL WHITE	LF	2,030	$ 2.00	4,060.00
626-G003	THERMOPLASTIC DETAIL STRIPE, YELLOW	LF	119	$ 2.00	238.00
626-H004	THERMOPLASTIC LEGEND, WHITE	SF	716	$ 5.00	3,580.00
626-H005	THERMOPLASTIC LEGEND, WHITE	LF	572	$ 3.25	1,859.00
627-K001	RED-CLEAR REFLECTIVE HIGH PERFORMANCE RAISED MARKERS	EA	55	$ 6.50	357.50
627-L001	TWO-WAY YELLOW REFLECTIVE HIGH PERFORMANCE RAISED MARKERS	EA	52	$ 6.50	338.00
630-A003	STANDARD ROADSIDE SIGNS, SHEET ALUMINUM, 0.125" THICKNESS	SF	71	$ 60.00	4,260.00
630-C003	STEEL U-SECTION POSTS, 3.0 LB/FT	LF	114	$ 12.00	1,368.00
630-K002	WELDED AND SEAMLESS STEEL PIPE POSTS, 3"	LF	14	$ 135.00	1,890.00
907-632-A007	SOLID STATE TRAFFIC CABINET ASSEMBLY, TYPE III CABINET, TYPE 1 CONTROLLER	EA	1	$ 22,000.00	22,000.00
907-632-J001	POWER SERVICE PEDESTAL	EA	1	$ 4,400.00	4,400.00
907-632-PP001	TRAFFIC SIGNAL REMOTE MONITORING SYSTEM	EA	1	$ 7,800.00	7,800.00
907-633-A001	UNINTERRUPTABLE POWER SUPPLY	EA	1	$ 13,000.00	13,000.00
907-634-A028	TRAFFIC SIGNAL EQUIPMENT POLE, TYPE II(L), 22' SHAFT, 40' ARM	EA	1	$ 23,000.00	23,000.00
907-634-A031	TRAFFIC SIGNAL EQUIPMENT POLE, TYPE II(L), 22' SHAFT, 55' ARM	EA	2	$ 28,000.00	56,000.00
907-634-A047	TRAFFIC SIGNAL EQUIPMENT POLE, TYPE II(L), 30' SHAFT, 55' ARM	EA	1	$ 30,000.00	30,000.00
907-634-C001	POLE FOUNDATIONS, CLASS "B" CONCRETE	CY	16	$ 650.00	10,400.00
635-A059	TRAFFIC SIGNAL HEAD, TYPE 1	EA	5	$ 850.00	4,250.00
635-A065	TRAFFIC SIGNAL HEAD, TYPE 2 FYA	EA	2	$ 1,300.00	2,600.00
635-A070	TRAFFIC SIGNAL HEAD, TYPE 3	EA	2	$ 1,300.00	2,600.00
635-A073	TRAFFIC SIGNAL HEAD, TYPE 4	EA	1	$ 1,300.00	1,300.00
635-A076	TRAFFIC SIGNAL HEAD, TYPE 6	EA	2	$ 850.00	1,700.00
907-636-B014	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, IMSA 20-1, AWG 14, 5 CONDUCTOR	LF	292	$ 1.10	321.20
907-636-B016	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, IMSA 20-1, AWG 14, 8 CONDUCTOR	LF	976	$ 3.25	3,172.00
907-636-B034	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, PTZ CAMERA CONTROL CABLE	LF	85	$ 5.50	467.50
907-636-B037	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, THHN, AWG #10, 2 CONDUCTOR	LF	728	$ 2.10	1,528.80
907-636-B053	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, THHN, AWG #6, 3 CONDUCTOR	LF	90	$ 7.50	675.00
907-637-A002	PULLBOX ENCLOSURE, TYPE 2	EA	4	$ 650.00	2,600.00

907-637-A003	PULLBOX ENCLOSURE, TYPE 3	EA	2	$ 950.00	1,900.00
907-637-C003	TRAFFIC SIGNAL CONDUIT, UNDERGROUND, PVC COATED, 2"	LF	35	$ 16.00	560.00
907-637-C004	TRAFFIC SIGNAL CONDUIT, UNDERGROUND, PVC COATED, 3"	LF	143	$ 12.00	1,716.00
907-637-C011	TRAFFIC SIGNAL CONDUIT, UNDERGROUND, ROLLED PIPE, 3"	LF	624	$ 14.00	8,736.00
907-643-A004	VIDEO VEHICLE DETECTION SENSOR, TYPE 1A	EA	2	$ 5,000.00	10,000.00
907-643-B001	VIDEO VEHICLE DETECTION CABLE	LF	440	$ 3.25	1,430.00
907-643-E001	MULTI-SENSOR VEHICLE DETECTION SENSOR	EA	2	$ 13,000.00	26,000.00
907-643-F001	MULTI-SENSOR VEHICLE DETECTION CABLE	LF	488	$ 3.25	1,586.00
907-645-B001	ACCESSIBLE PEDESTRIAN DETECTION ASSEMBLY	EA	2	$ 1,000.00	2,000.00
647-A001	REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT	LS	1	$ 4,400.00	4,400.00
907-650-A003	ON STREET VIDEO EQUIPMENT, PTZ TYPE	EA	1	$ 5,500.00	5,500.00
907-653-A001	TRAFFIC SIGN	SF	34	$ 21.00	714.00
607-653-B001	STREET NAME SIGN	SF	53	$ 75.00	3,975.00
907-659-A001	TRAFFIC MANAGEMENT CENTER MODIFICATIONS	LS	1	$ 16,000.00	16,000.00
907-659-C001	TRAFFIC MANAGEMENT CENTER MODIFICATIONS - TRAINING	LS	1	$ 10,000.00	10,000.00
907-661-B002	FIBER OPTIC DROP CABLE, 12 SM	LF	50	$ 7.50	375.00
907-663-A001	NETWORK SWITCH, TYPE A	EA	1	$ 2,300.00	2,300.00
999	MATERIALS TESTING ALLOWANCE	ALLOW	1	$25,000.00	$25,000.00
				TOTAL BASE BID	$2,323,183.95

ALTERNATE 2 - PAVE MULTI-USE PATH FROM STA 4+00 to 21+50

403-A005	19-MM, MT,ASPHALT PAVEMENT	TON	260	$ 106.00	27,560.00
403-A014	9.5-MM, MT, ASPHALT PAVEMENT	TON	130	$ 132.00	17,160.00
216-A001	SOLID SODDING	SY	1,500	$ 5.00	7,500.00
608-C001	DETECTABLE WARNING PANELS	SF	48	$ 46.00	2,208.00
907-608-D003	STAMPED AND COLORED CONCRETE SIDEWALK	SY	26	$ 144.00	3,744.00
907-608-D003	CONCRETE SIDEWALK, WITH REINFORCEMENT	SY	13	$ 61.00	793.00
				TOTAL ALTERNATE 2	$58,965.00

RESPECTFULLY SUBMITTED BY: Joe McGee Construction Co., Inc.
(PLEASE PRINT)

SIGNATURE:

NAME AND TITLE: Jason McGee / Vice President
(PLEASE PRINT)

ADDRESS: 6609 Steve Lee Drive
Lake, MS 39092

PHONE NUMBER: 601-775-3754

CERTIFICATE OF RESPONSIBILITY NO. 07743-MC

JOE MCGEE CONSTRUCTION COMPANY, INC. MISSISSIPPI 1988 CORPORATE SEAL

(SEAL) IF BY CORPORATION

CORPORATE CERTIFICATE

(To be executed if BIDDER is a Corporation)

I, Lynn McGee certify that I am the Secretary of the Corporation named as CONTRACTOR in the foregoing Proposal; that Jason McGee who signed said Proposal on behalf of the CONTRACTOR, was then Vice President of said Corporation; that said Proposal was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporate powers.

Name: Lynn McGee

Title: V.P.

Signature: Lynn McGee

(CORPORATE SEAL)

JOE MCGEE CONSTRUCTION COMPANY INC
CORPORATE SEAL
1988
MISSISSIPPI

PARTNERSHIP CERTIFICATE

(To be executed if BIDDER is a Partnership)

STATE OF _____

COUNTY OF _____

On this _____ day of _____ 2021, before me personally appeared _____, known to be and known by me to be the person who executed the above instrument, who being by me first duly sworn, did depose and say that he is general partner in the firm of:

_____; That said firm consists of himself and _____; and that he executed the foregoing instrument for and on behalf of said firm for the uses and purposes stated herein.

Signature _____

Title _____

(SEAL)
Sworn before me this ____ day of _____ 2021

_____, Notary Public

My commission expires _____

LIMITED LIABILITY COMPANY CERTIFICATE

(To be executed if BIDDER is a LLC)

I, the undersigned _____, hereby certify that I am the Manager of _____ (the "Company") or if the Company does not have a Manager, a Member of the Company with full power and authority to bind the Company; that _____ who executed the Proposal on behalf of the Company is _____ of the Company with full power and authority to execute same on behalf of the Company, and that the Proposal and the Contract, if awarded to the Company, are within the powers and authority of the Company.

Signature _____

Title _____

(SEAL)
Sworn before me this ____ day of _____ 2021

_____, Notary Public

My commission expires _____

NONRESIDENT BIDDER CERTIFICATE

(to be executed if a BIDDER is a nonresident)

I, _____, hereby certify that the CONTRACTOR, _____, is domiciled in the State of _____ and (check and complete one):

(____) attached is a copy of the State of _____'s current law pertaining to the treatment of nonresident CONTRACTORS. Paragraph _____, page _____ of said law grants resident CONTRACTORS a _____ percent preference over nonresident CONTRACTORS for similar projects.

(____) the State of _____ has no current law pertaining to the treatment of nonresident contractors.

(____) I claim "resident contractor" status based upon having been qualified to do business in this state and having maintained a permanent full-time office in the State of Mississippi for two (2) years prior to January 1, 1986. Proof of such claim must be submitted and approved before contract is signed.

Signature _____

Title _____

(SEAL)
Sworn before me this ____ day of _____ 2021

_____, Notary Public

My commission expires _____

NON-COLLUSION AFFIDAVIT
(TO BE EXECUTED IN DUPLICATE)

STATE OF MISSISSIPPI
COUNTY OF Newton

I, Jason McGee
(name of person signing affidavit)

individually, and in my capacity as Vice President
(title)

of Joe McGee Construction Co., Inc.
(name of firm, partnership, limited liability company, or corporation.)
being duly sworn, on oath do depose and say as follows:

(a) That Joe McGee Construction Co, Inc. Bidder on the **"RICE ROAD EXTENSION"** for the **CITY OF RIDGELAND** has not either directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its officers, partners, employees or principal owners.

(b) further, that neither said legal entity nor any of its directors, officers, partners, principal owners or managerial employees are currently debarred from bidding on public contracts by the State of Mississippi or any of its agencies; or by one or more of the other states or any of their agencies; or by the Federal Highway Administration.

Signature

Title Vice President

JOE MCGEE CONSTRUCTION COMPANY, INC
MISSISSIPPI
1988
CORPORATE SEAL

(SEAL)
Sworn before me this 26th day of January 2021

Patricia L. Brown, Notary Public

My commission expires May 15, 2022

STATE OF MISSISSIPPI
NOTARY PUBLIC
ID # 29579
PATRICIA L. BROWN
Commission Expires
May 15, 2022
NEWTON COUNTY

NOTE: FAILURE TO PROPERLY SIGN AND NOTARIZE THIS AFFIDAVIT WILL DISQUALIFY THE BID.

NON-COLLUSION AFFIDAVIT
(TO BE EXECUTED IN DUPLICATE)

STATE OF MISSISSIPPI
COUNTY OF Newton

I, Jason McGee
(name of person signing affidavit)

individually, and in my capacity as Vice President
(title)

of Joe McGee Construction Co., Inc.
(name of firm, partnership, limited liability company, or corporation.)
being duly sworn, on oath do depose and say as follows:

(a) That Joe McGee Construction Co., Inc. Bidder on the **"RICE ROAD EXTENSION"** for the **CITY OF RIDGELAND** has not either directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its officers, partners, employees or principal owners.

(b) further, that neither said legal entity nor any of its directors, officers, partners, principal owners or managerial employees are currently debarred from bidding on public contracts by the State of Mississippi or any of its agencies; or by one or more of the other states or any of their agencies; or by the Federal Highway Administration.

Signature

Title Vice President

JOE MCGEE CONSTRUCTION COMPANY, INC. MISSISSIPPI 1988 CORPORATE SEAL

(SEAL)
Sworn before me this 26th day of January, 2021

, Notary Public

My commission expires May 15, 2022

STATE OF MISSISSIPPI NOTARY PUBLIC ID # 29579 PATRICIA L. BROWN Commission Expires May 15, 2022 NEWTON COUNTY

NOTE: FAILURE TO PROPERLY SIGN AND NOTARIZE THIS AFFIDAVIT WILL DISQUALIFY THE BID.

END OF SECTION
C-12

SECTION D

BID BOND

BID BOND

KNOW ALL MEN BY THESE PRESENTS:

That Joe McGee Construction Company, Inc.
(Name of Contractor)

P.O. Box 340, Lake, MS 39092
(Address of Contractor)

a Corporation hereinafter called "Principal", and
(Corporation, Partnership, Limited Liability Company or Individual)

Travelers Casualty and Surety Company of America hereinafter called "Surety",
(Name of Surety)

are held and firmly bound unto the **CITY OF RIDGELAND** hereinafter called **"OWNER"** in the penal sum of 5% of Total Bid, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents. Signed, this the 26th day of January, 2021. The Condition of the above obligation is such that whereas the Principal has submitted to the **CITY OF RIDGELAND** a certain BID, attached hereto and hereby made a part thereof to enter into a contract in writing, for the construction of:

"RICE ROAD EXTENSION"

NOW, THEREFORE,

(a) If said BID shall be rejected, or,

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract on the Contract form as attached hereto (properly completed in accordance with said BID) and shall furnish BONDS for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection herewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these present to be signed by their officers, the day and year first set forth above.

Joe McGee Construction Company, Inc. (L.S.) Travelers Casualty and Surety Company of America
Principal Surety

By: Darrah McGee, Vice President By: Brody Eric Buckley/Attorney-in-Fact
Resident MS Agent/Fisher Brown Bottrell Insurance, Inc.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

END OF SECTION

TRAVELERS	Travelers Casualty and Surety Company of America Travelers Casualty and Surety Company St. Paul Fire and Marine Insurance Company

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Brody Eric Buckley** of **Jackson, Mississippi**, their true and lawful Attorney-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **3rd** day of **February, 2017.**

State of Connecticut

City of Hartford ss.

By: _____
Robert L. Raney, Senior Vice President

On this the **3rd** day of **February, 2017**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June, 2021**

Marie C Tetreault
Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 26th day of January, 2021

Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney-in-Fact and the details of the bond to which the power is attached.

State of Mississippi

BOARD OF CONTRACTORS

ACTIVE

JOE MCGEE CONSTRUCTION COMPANY, INC
POST OFFICE BOX 340 6609 STEVE LEE DR.
LAKE, MS 39092

is duly registered and entitled to perform

1) BRIDGES 2) BUILDING CONSTRUCTION
3) CONSTRUCTION MANAGEMENT 4) GRADING
5) HWY. DRAINAGE 6) PAVING
7) WATER & SEWER

We have hereunto set our hand and caused the Seal of the Mississippi Board of Contractors to be affixed this 8 day of Apr., 2020

BOARD OF CONTRACTORS ★ STATE OF MISSISSIPPI ★

CERTIFICATE OF RESPONSIBILITY
No. 07743-MC
Expires Apr. 8, 2021

Joel A. Carroll

CHAIRMAN OF THE BOARD

CENTRALBIDDING
FROM CENTRAL AUCTION HOUSE

Rice Road Extension
City of Ridgeland

ADDENDUM No. 1

CITY OF RIDGELAND, MISSISSIPPI

"RICE ROAD EXTENSION"

January 21, 2021

Contract Documents, Drawings and Specifications shall be amended/clarified as set forth herein below:

Revisions to Contract Documents:

1. Replace the BID FORM on Page C-4 with the **attached** revised BID FORM.

2. In SECTION J.1 – PROJECT SPECIAL CONDITIONS, add paragraph 1-03:

   A. "The ENGINEER has provided a base line from which all layout is to be done. Preservation of reference points will be the responsibility of the CONTRACTOR. The CONTRACTOR must provide all grades, stakes, string lines, and other control work necessary for completion of the project in accordance with the requirements of the Specifications and Drawings.

3. In SECTION J.1 – PROJECT SPECIAL CONDITIONS, replace paragraph 1-12 with the following:

   A. Scope: The CONTRACTOR will employ and pay for the services of Burns Cooley Dennis, Inc. to perform testing services. Employment of a testing laboratory shall in no way relieve CONTRACTOR of his obligation to perform work in accordance with the contract and/or Technical Specifications.

4. In Specification SECTION 904, add NTB-1241 Fuel and Material Adjustments

5. In Specification SECTION 904, add NTB-9001 Materials Testing Allowance

6. Add SECTION L – Geotechnical Exploration Report, SECTION M – Natchez Trace Permit, and SECTION N – MDOT Permit

Revisions to Drawings:

7. Revised plan sheet GN-1 is attached hereto.
8. Revised plan sheet GN-2 is attached hereto.
9. Revised plan sheet SQ-1 is attached hereto.
10. Revised plan sheet SQ-2 is attached hereto.
11. Revised plan sheet EQ-3 is attached hereto.
12. Revised plan sheet WK-3A is attached hereto.
13. Revised plan sheet PMD-1 is attached hereto.
14. Revised plan sheet TCP-2 is attached hereto.
15. Revised plan sheet TSI-1A is attached hereto.
16. Revised plan sheet TEMP-1 is attached hereto.

Pre-bid Conference:

17. A Pre-bid Conference was held on Tuesday, January 11, 2021 at 10:00 AM. A copy of the agenda and the attendees list is attached and made part of this Addendum. The following questions were received during the Pre-bid Conference and via email from plan holders. These questions together with the answers below are made part of this Addendum.

Q: Are traffic control items to be absorbed into Maintenance of Traffic? Q: Is any other traffic control up to the Contractor?
A: Yes. Traffic control plans are in the plan set and should be treated as minimum requirements.

Q: Per General Note 48, is the contractor responsible for all utility relocation cost?
A: The contractor is not responsible for the cost of relocation but shall coordinate with the utility company for any relocations necessary. Utility conflicts are not grounds for additional cost to the Owner.

Q: What is the cutoff day for questions?
A: January 21 at 12 p.m.

Q: How much for the hauling permit? Q: Where can you cut over the Highway 51 from the interstate?
A: There is no cost for the permit. If a designated truck route is used a permit is not required. Avoid School Street and new City Hall parking lot

Q: Will there be any asphalt required in the City Center parking lot?
A: No, but there will be new curb needed to tie to the existing curb as shown on plans. Asphalt work stops at B.O.P.

Q: General Conditions says Owner shall employ and pay for materials testing and the contract specifications say the Contractor will do testing. Will materials testing be employed and payed for by the Owner or the Contractor?
A: The Contractor is responsible for paying for testing services, per the Supplemental General Conditions. See information to bidders

Q: Why is "Paragraph A" deleted on page J.1-2? is construction staking a requirement of the contractor? Q: Will controls be given to the Contractor?
A: Contractor is responsible for all staking and grades. A: Controls are already in place.

Q: What kind of cameras for the detection?
A: Specified in the special provisions.

Q: A note on the temporary signal sheet states "to be done by others". Is this required by the Contractor?
A: Temporary signal will be completed by the Contractor.

Q: Will the same meter be used for power on the temporary signal and permanent signal?
A: A new meter will be required at the power service pedestal for the permanent signal.

Q: Will the same fiber that is in the existing pull box and controller be used?
A: There is quantity in the plans if additional fiber is needed.

Q: 2" PVC spares are currently shown. Do you want to change to 3" PVC spares?
A: Yes

Q: Can the debris from the clearing and grubbing be burned, or does it need to be chipped and hauled off?
A: Debris is to be chipped and hauled off.

Q: Are there any foundations or debris left in the old prestress yard?
A: Possible debris could be encountered.

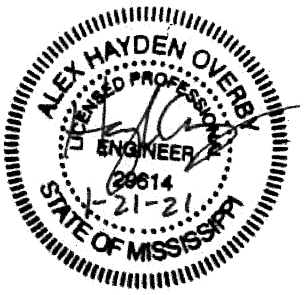
Q: Will precast drainage units be allowed on this project?
A: Precast drainage units are allowed according to MDOT Standard Specifications section 601.02.3, but tops are to be poured in place.

Q: Are the soils report, Natchez Trace Permit, and MDOT permit available?
A: See added SECTION L, M, and N

Q: Traffic control quantities shown on the Estimated Quantities appear not to match?
A: Traffic control shall be completed per MDOT requirements and the suggested traffic control plan. The items will be paid for in the lump sum Maintenance of Traffic pay item. The estimated quantity sheet has been updated.

Q: How are the precast barriers that are to be relocated and remain to be paid?
A: Precast barriers shall be permanently relocated from the Hwy 51 intersection to the new intersection at station 11+00. The required length to remain shall be absorbed in the Maintenance of Traffic Pay item.

Bidders shall acknowledge receipt of Addendum No. 1 on Page C-1 of the Proposal.



By: _____
Hayden Overby, PE
Waggoner Engineering, Inc.

CITY OF RIDGELAND – RICE ROAD EXTENSION

Pre-Bid Conference
January 12, 2021 at 10:00 AM CDT
Dial-in Number: 601-487-4999
Conference ID: 846894

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1. **Introductions & Roll Call of Attendees**
   a. Introductions
      Hayden Overby, Waggoner Engineering, Inc., Project Manager
      David Calvert, Waggoner Engineering, Inc., Construction Manager
      Alan Hart, City of Ridgeland, Director of Community Development
      Chris Bryson, City of Ridgeland, City Engineer

2. **Description of Project**

   a. Project Scope

   b. Funding Source

   c. Project Schedule
      i. Bid Opening: Tuesday, January 26, 2021 at 2:00 PM CDT Electronic bidding will be provided through Central Bidding. Bids can be submitted electronically or physically.
      ii. Contract Time: 210 Calendar Days (liquidated damages $500/day)

   d. General Discussion
      i. Safety is most important aspect of the project (traffic control, training, PPE, etc.)
      ii. Project crosses Natchez Trace Parkway and MDOT right-of-way
      iii. Erosion control is extremely important
      iv. No access from School Street
      v. No material adjustments

4. **RFI's -- Requests for Information prior to Bid**
   a. Email Subject line to include: "RFI - Ridgeland – Rice Road Extension"
   b. All RFI's to be in written form and sent electronically to attention of: Hayden.Overby@waggonereng.com and Cc: David.calvert@waggonereng.com

5. **Questions and Answers (Questions will be answered by addenda and copies will be furnished to all Bidders)**

6. **Adjournment**

City of Ridgeland, Mississippi
Rice Road Extension

Pre-Bid Sign-In Sheet
January 12, 2021 at 10:00 AM CDT

Name	Representing	E-Mail Address
Hayden Overby	Waggoner Engineering, Inc.	hayden.overby@waggonereng.com
David Calvert	Waggoner Engineering, Inc.	david.calvert@waggonereng.com
Alan Hart	City of Ridgeland	Alan.Hart@ridgelandms.org
Chris Bryson	City of Ridgeland	Chris.Bryson@ridgelandms.org
Mike McCollum	City of Ridgeland	
Dexter Robinson	City of Ridgeland	
Landon Hood	Eutaw Construction Company, Inc.	
James Gill	Gregory Construction, Inc.	
Tim Temple	Hemphill Construction Co, Inc.	
Dylan Cross	Southern Rock, LLC	
Daniel Steadham	Lewis Electric, Inc.	

CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR

"RICE ROAD EXTENSION "

CITY OF RIDGELAND, MISSISSIPPI

the city of RIDGELAND

JANUARY 2021

ALEX HAYDEN OVERBY
LICENSED PROFESSIONAL
ENGINEER
29614
12-23-20
STATE OF MISSISSIPPI

WAGGONER

WAGGONER ENGINEERING, INC.
143-A LeFleurs Square
Jackson, Mississippi 39211
WEI # 0019127

CONTRACT DOCUMENTS AND SPECIFICATIONS
FOR
CITY OF RIDGELAND, MS

"RICE ROAD EXTENSION"

TABLE OF CONTENTS

SECTION A

ADVERTISEMENT FOR BIDS

ADVERTISEMENT FOR BIDS
FOR
RICE ROAD EXTENSION
CITY OF RIDGELAND, MISSISSIPPI

NOTICE is hereby given that the City of Ridgeland, Mississippi will receive written and electronic sealed bids for the construction of that certain project designated as Rice Road Extension until the hour **of 2:00 PM, local time, on Tuesday, January 26, 2021**, in the Ridgeland City Hall Board room, 304 Highway 51, Ridgeland, Mississippi 39157; or, electronically at *www.centralbidding.com* for furnishing of all labor and materials. Bids are to be stated for the construction of 0.31 miles of roadway and all other related items of work required to complete the project as shown and specified in the Contract Documents.

The **Total Contract Time will be 210 consecutive calendar days** and the **liquidated damages will be $500** per consecutive calendar day thereafter. A non-mandatory **pre-bid conference will at 10:00 A.M., local time, on Tuesday, January 12, 2021** via conference call. A bid bond or a certified cashier's check in the amount of 5% of the total bid price is required.

Official Bid Documents may be obtained from Waggoner Engineering, Inc. by accessing Central Bidding at *www.centralbidding.com*. For any questions relating to the electronic bidding process and to register, please call Central Bidding at 225-810-4814.

The City of Ridgeland reserves the right to amend the specifications and contract documents as necessary prior to bid and agrees to notify all having requested bid packets. The City of Ridgeland reserves the right to accept or reject any and all bids and to waive any and all informalities.

The City of Ridgeland, Mississippi hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, religion or national origin in consideration for an award.

Contract award will be made to the lowest and best bidder offering the low aggregate amount for the base bid item, plus additive or deductive bid alternates applied in the order, which is most beneficial to the Owner, and within funds available for the project.

The Mayor and Board of Aldermen reserve the right to accept or reject any and all bids and to waive any and all informalities.

BY ORDER OF THE MAYOR AND BOARD OF ALDERMEN, ON THIS THE 15TH DAY OF December 2020.

CITY OF RIDGELAND, MISSISSIPPI

BY: **(s) Gene F. McGee, Mayor**

PUBLISH: **THURSDAY, DECEMBER 24, 2020 and THURSDAY, DECEMBER 31, 2020** IN THE *MADISON COUNTY JOURNAL*.

SECTION B

INFORMATION TO BIDDERS

INFORMATION FOR BIDDERS

1. **Receipt and Opening of Bids:** Bids will be received by the City of Ridgeland no later than **2:00 PM** on **Tuesday, January 26, 2021,** in the Ridgeland City Hall Board Room, 304 Highway 51, Ridgeland, Mississippi 39157.

2. **Bids:**

   A. Shall be made on the forms provided and all applicable blank spaces filled in. Alterations, erasures or changes of any kind must be initialed by the BIDDER and shall not contain any recapitulation of the work to be done. No oral, telephonic or telegraphic proposals will be considered.

   B. **BIDDERS ARE HEREBY NOTIFIED THAT ANY PROPOSAL ACCOMPANIED BY LETTERS, QUALIFYING IN ANY MANNER, THE CONDITION UNDER WHICH THE PROPOSAL IS TENDERED, WILL BE CONSIDERED AS AN IRREGULAR BID AND SHALL NOT BE CONSIDERED IN MAKING THE AWARD.**

   C. Bids may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Bids received after the time and date specified shall not be considered.

   D. Submit bids **(in duplicate)** in an opaque sealed envelope marked in the lower left hand corner as follows:

      1. Bid for construction of: **"RICE ROAD EXTENSION"**

      2. Certificate of Responsibility No. _____.

   E. Any addenda issued during the bidding shall be noted on the Bid Form and shall become a part of the executed Contract.

3. **Method of Bidding**:

   A. The bid will consist of a base bid amount in accordance with the totals bid per various items and schedules of the project Bid Form with various additive and/or deductive alternatives.

   B. The City of Ridgeland reserves the right to reject any or all bids and to waive any or all informalities.

   C. The Owner may negotiate bid price adjustments with the low responsive bidder, including changes in the contract documents, in order to enter a contract for an amount not to exceed the funds allocated if the low bidder is not more than ten percent (10%) above the funds allocated.

D. The City of Ridgeland reserves the right to award the base bid and any additive or deductive alternatives which are in the best interest of the Owner.

E. The Contract will only become effective when signed by the Owner. Prior to the Owner's signature, any and all costs incurred shall be the sole responsibility of the bidder.

4. **Addenda and Interpretations:**

A. Should a BIDDER find discrepancies in, or omissions from, the drawings or specifications or should they be in doubt as to their written meaning, they should at once notify the ENGINEER, who will send a written instruction or interpretation to all known holders of the documents. The ENGINEER will not be responsible for any oral instructions.

B. Addenda to specifications or drawings that may be issued before or during the time of bidding shall be included in the bid form and will become a part of the Contract.

5. **Certificate of Responsibility Number:**

A. Each CONTRACTOR submitting a bid must show on the face of the envelope containing the bid, their State of Mississippi Certificate of Responsibility Number unless there appears a statement on the face of the envelope that the enclosed bid does not exceed $50,000.00 with respect to public projects or $100,000.00 with respect to private projects.

B. **No bids will be accepted, opened or considered unless the above information is given as specified.**

C. Sufficient evidence that said Certificate of Responsibility Number has been issued and is in effect at the time of receiving bids, and that BIDDER'S Certificate of Responsibility work classification(s) qualifies them to perform the type(s) of work required for this project, must be submitted when required by OWNER or ENGINEER.

6. **Notice to Nonresident Bidders:**

A. A nonresident BIDDER domiciled in a state having laws granting preference to local contractors shall be awarded Mississippi public contracts only on the same basis as the nonresident BIDDERS's state awards contracts to Mississippi contractors bidding under similar circumstances; and resident contractors actually domiciled in Mississippi, be they corporate, individuals or partnerships, are to be granted preference over nonresidents in awarding of contracts in the same manner and to the same extent as provided by the laws of the state of domicile of the nonresident. This preference, if it is a percentage of the bid or other monetary amount, is not to be added to the nonresident BIDDER's bid by the nonresident BIDDER. The ENGINEER will add a line to the bid tabulation report that shows the

amount of the nonresident BIDDER premium when the bids are tabulated for the sole purpose of determining the order of the BIDDERs.

B. When a nonresident CONTRACTOR submits a bid for a public project, he shall attach thereto a copy of his resident state's current bid law pertaining to such state's treatment of nonresident CONTRACTORS.

C. Nonresident BIDDERS Certificate: CONTRACTOR must complete the Nonresident BIDDERS Certificate included in the Contract Documents (Section C) and submit same as part of their bid.

D. As used in this section, the term "resident contractors" includes a nonresident person, firm or corporation that has been qualified to do business in this state and has maintained a permanent full-time office in the State of Mississippi for two (2) years prior to January 1, 1986, and the subsidiaries and affiliates of such a person, firm or corporation.

7. **Bid Security**: Each bid must be accompanied by a certified check of the BIDDER, or a Bid Bond prepared on the form of a bid bond as included herein, duly executed by the BIDDER as principal and having as surety thereon a surety company licensed by the State of Mississippi and signed by an agent resident in Mississippi, **in the amount of five percent (5%) of the base bid.**

8. **Liquidated Damages for Failure to Enter into Contract**: The successful BIDDER, upon their failure or refusal to execute and deliver the contract and bonds required within ten (10) days after they have received the contract for execution, shall forfeit to the OWNER, as liquidated damages, the bid security deposited with their bid.

9. **Security for Faithful Performance**: Simultaneously with their delivery of the executed Contract, the CONTRACTOR shall furnish Contract Performance and Payment Bonds in the full amount of the Contract for the payment of all persons performing labor on this Contract and for furnishing all materials in connection with this Contract. The surety on such Bond or Bonds shall be a duly authorized Surety Company doing business in the State of Mississippi.

10. **Law and Regulations**: The BIDDERS'S attention is directed to the fact that all applicable state laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the Contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

11. **Condition of Work**: Each BIDDER shall visit the site and inform themselves fully of the conditions at the site relating to the completion of the project. Failure to do so will not relieve a successful BIDDER of their obligation to furnish all material and labor necessary to carry out the provisions of their contract.

12. **Obligation of BIDDER**: At the time of the opening of bids, each BIDDER will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Drawings, Specifications and Contract Documents (including addenda issued, if any).

13. **Time of Completion**: BIDDER must agree to commence work on or before the date specified in a written "Notice to Proceed" from the OWNER and to fully complete the project within the number of consecutive calendar days as set forth in these Contract Documents.

14. **Proposal Guarantees**: Proposal guarantees will be returned to the unsuccessful BIDDERS as soon as a Contract has been awarded and to the successful bidder after they have executed the Contract and have furnished Contract Performance and Payment Bonds and Certificates of Insurance as required.

15. **Non-Collusion Affidavit**: CONTRACTOR must complete **(in duplicate)** the non-collusion affidavits included in the Contract Documents (Section C) and submit same as part of their bid. **FAILURE TO DO SO WILL DISQUALIFY THEIR BID.**

16. **Interpretations**: No oral interpretation made to any BIDDER as to the meaning of the Drawings and Specifications or Contract Documents shall be considered an effective modification of the provisions of the Contract Documents. Written and oral requests for interpretation of the Drawings and Specifications shall be submitted to the ENGINEER for a formal decision which will be given in writing to all Drawing and Specification holders.

17. **Subcontractor**: The BIDDER is specifically advised that any person, firm or other party to whom it proposes to award a subcontract must be acceptable to the OWNER. **The total allowable subcontract amount shall not exceed fifty percent (50%) of contract amount unless otherwise approved by the OWNER.**

18. **Qualifications of Subcontractors: Material and Equipment Suppliers:**

    A. Within ten (10) working days after award of contract, the CONTRACTOR will submit to the OWNER and the ENGINEER for acceptance, a list of the names of Subcontractors and such other persons and organizations (including those who are to furnish principal items of materials or equipment) proposed for those portions of the Work as to which the identity of the Subcontractors and other persons and organizations must be submitted as specified in the Contract Documents. Within thirty (30) working days after receiving the list, the ENGINEER will notify the CONTRACTOR in writing if either the OWNER or the ENGINEER, after due investigation, has reasonable objection to any Subcontractor, person or organization on such list. The failure of the OWNER or the ENGINEER to make objection to any Subcontractor, person or organization on the list within thirty (30) working days of receipt shall constitute an acceptance of such Subcontractor, person or organization but shall not constitute a waiver of any right of the OWNER or the ENGINEER to reject any Work, Material or Equipment that is not in conformance with the requirements of the Contract Documents.

B. The CONTRACTOR will not employ any Subcontractor, other person or organization, whether initially or as a substitute, against whom the OWNER or the ENGINEER may have reasonable objection, nor will the CONTRACTOR be required to employ a Subcontractor who has been accepted by the OWNER and the ENGINEER, unless the ENGINEER determines that there is good cause for doing so.

C. The CONTRACTOR shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of monies due Subcontractors or other persons or organizations, except as may otherwise be required by law. OWNER or ENGINEER may furnish to Subcontractors or other persons or organizations, to the extent practicable, evidence of amounts paid to the CONTRACTOR on account of specific Work done in accordance with the schedule of values.

D. The divisions and sections of the Specifications and the identifications of Drawings shall not control the CONTRACTOR in dividing the Work among Subcontractors or delineating the Work to be performed by specific trades.

E. The CONTRACTOR agrees to bind specifically every Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the OWNER.

F. All Work performed for the CONTRACTOR by a Subcontractor shall be pursuant to an appropriate agreement between the CONTRACTOR and the Subcontractor.

G. The CONTRACTOR shall be responsible for the coordination of the trades and Subcontractors engaged in the Work.

a. The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the CONTRACTOR by the terms of these General Conditions and other Contract Documents insofar as applicable to the Work of Subcontractors, and to give the CONTRACTOR the same power as regards terminating subcontracts that the OWNER may exercise over the CONTRACTOR under provisions of the Contract Documents.

b. The OWNER or ENGINEER will not undertake to settle differences between the CONTRACTOR and his Subcontractors or between Subcontractors.

c. If in the opinion of the ENGINEER, a Subcontractor on the Project proves to be incompetent or otherwise unsatisfactory, he shall be replaced if and when the CONTRACTOR is so directed in writing.

19. **Qualifications of BIDDERS**: The OWNER may make such investigations as he deems necessary to determine the ability of the BIDDER to perform the Work and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject a Bid if the evidence submitted by or investigation of such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the items of Work contemplated therein.

20. **Insurance**: The CONTRACTOR will be required to carry the types and amounts of insurance specified in the Project Supplemental Conditions, Section J.4, as enclosed herein for the full term of the Contract.

21. **Contract Award**: Award of Contract, if made, shall be within **60 days** of date of Receipt of Bids.

22. **Issuance of "Notice to Proceed":** If the Contract is awarded, the OWNER will issue the "Notice to Proceed" within **60 days** after the date of agreement of the Contract.

24. **Pre-Bid Conference:** A non-mandatory pre-bid conference will be at 10:00 A.M., local time, on Tuesday, January 12, 2021 via conference. The call-in information is as follows:

Dial-in Number: 601-487-4999
Conference ID: 846894

23. If discrepancies arise between Section I – Standard General Conditions and Section K – Supplemental General Conditions, Section K shall govern.

END OF SECTION

SECTION C

PROPOSAL AND BID FORM

PROPOSAL

Proposal of Joe McGee Construction Co., Inc. (hereinafter called "BIDDER"), organized and existing under the laws of the State of Mississippi doing business as a Corporation (corporation, partnership, limited liability company, or individual) to the **CITY OF RIDGELAND,** (hereinafter called "OWNER"). In compliance with your advertisement for Bids, BIDDER, hereby proposes to perform all WORK for construction of

"RICE ROAD EXTENSION"

in strict accordance with the CONTRACT DOCUMENTS, within the time set forth herein, and at the prices stated below. By submission of the BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to his own organization, that this BID has been developed independently, without consultation, communication or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in a written "NOTICE TO PROCEED" and to fully complete the Project within **210** consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of **$ 500.00** for each consecutive calendar day thereafter as provided for elsewhere in these CONTRACT DOCUMENTS.

BIDDER ACKNOWLEDGES receipt of the following ADDENDA:

NUMBER: #1 DATE: 01/21/2021

NUMBER: _____ DATE: _____

NUMBER: _____ DATE: _____

NUMBER: _____ DATE: _____

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to this bid.

BIDDER understands that the quantities mentioned below are approximate only and are subject to either increase or decrease, and hereby proposes to perform any increased or decreased quantities of work at the Unit Price Bid.

In accordance with the requirements of the Plans, Specifications and Contract Documents, BIDDER proposes to furnish all necessary materials, equipment, labor, tools and other means of construction and to construct the Project in accordance with the Contract Documents within the specified Contract Time for the following Unit Prices specified.

BIDDER further agrees to execute the contract agreement as bound herein within ten (10) days after receipt of contract forms from the OWNER.

BIDDER agrees to pay as liquidated damages the amount provided herein for each consecutive calendar day after the Contract completion date specified in a written "NOTICE TO PROCEED" that he fails to complete the work unless the Contract Time is extended by a written Change Order.

BIDDER also proposes to execute a Performance Bond and a Payment Bond, as shown in the Specifications, each in an amount of not less than **one hundred percent (100%)** of the total of the Base Bid. These Bonds shall not only serve to guarantee the completion of the work on the BIDDERS part, but also to guarantee the excellence of both workmanship and materials until the work is finally accepted.

BIDDER encloses a Bid Bond or Certified Check for **5% of Base Bid Amount** DOLLARS ($ 590) and hereby agree that in case of failure to execute the Contract and furnish the required Bonds within (10) days after the Receipt of Contract Forms, the amount of this Certified Check or Bid Bond will be forfeited to the OWNER, as liquidated damages arising out of his failure to execute the Contract as proposed.

It is understood that in case BIDDER is awarded the work, the Certified Check or Bid Bond submitted as Bid security will be returned as stipulated in the Specifications.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provision of the Equal Opportunity Clause set forth in the Federal Requirements, if applicable.

The low BIDDER shall supply the names and address of major MATERIAL SUPPLIERS AND SUBCONTRACTORS when required to do so by the OWNER.

Inspection trips for prospective BIDDERS will be coordinated thru OWNER prior to submission of proposal.

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or base bid amount: **SEE PAGE C-4 FOR BID ITEMS.**

NOTES:

1. Unit price amounts are to be shown in figures where indicated. Where a discrepancy in the unit price and the extension of any items occurs, the unit price will govern.

2. Unit prices shall include all labor, materials, bonding, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

3. Any erasure, change or alteration of any kind must be initialed by the BIDDER.

4. Bid prices shall include sales tax and all other applicable taxes and fees.

5. Any item of work not specified on the Proposal as a separate pay item or indicated as an absorbed cost in a pay item but which is incidental to completion of the work shall be considered as an absorbed cost with full compensation included in the unit price bid for the particular item involved.

6. OWNER reserves the right to award any combination of base and additive alternate bids (if any) it deems advantageous and in the event that all specified bid item units are lump sum (LS), the OWNER reserves the right to delete any such item or combination of such items from the project. The OWNER further reserves the right to delete any item or items desired from the Bid Schedule after the Contract has been awarded. Any deletions, if any made, shall be by Change Order and BIDDER hereby agrees to accept such Change Orders.

BID FORM
CITY OF RIDGELAND, MS
RICE ROAD EXTENSION
JANUARY 2021
WEI NO. 0019127

BASE BID

ITEM NO.	DESCRIPTION	UNIT	QTY.	UNIT COST	TOTAL COST
201-B001	CLEARING AND GRUBBING	ACRE	2	$ 15,000.00	30,000.00
202-B050	REMOVAL OF CONCRETE COMBINATION CURB AND GUTTER	LF	145	$ 14.50	2,102.50
202-B188	REMOVAL OF PAVEMENT, ALL TYPES AND DEPTHS	SY	280	$ 12.00	3,360.00
203-EX020	BORROW EXCAVATION, AH, FME, CLASS B15	CY	17,500	$ 19.00	332,500.00
203-G001	EXCESS EXCAVATION, FM, AH	CY	20,550	$ 13.00	267,150.00
211-B001	TOPSOIL FOR SLOPE TREATMENT, CONTRACTOR FURNISHED	CY	500	$ 27.00	13,500.00
216-A001	SOLID SODDING	SY	1,500	$ 4.75	7,125.00
225-A001	GRASSING	ACRE	1	$ 3,000.00	3,000.00
226-A001	TEMPORARY GRASSING	ACRE	1	$ 1,100.00	1,100.00
234-A001	TEMPORARY SILT FENCE	LF	3,720	$ 3.60	13,392.00
237-A002	WATTLES, 20"	LF	600	$ 7.00	4,200.00
307-C002	12" SOIL-LIME-WATER MIXING, CLASS C	SY	6,325	$ 3.20	20,240.00
307-D001	LIME	TON	171	$ 365.00	62,415.00
307-S001	BITUMINOUS CURING SEAL	GAL	1,270	$ 5.50	6,985.00
403-A002	12.5-MM, MT,ASPHALT PAVEMENT	TON	620	$ 105.00	65,100.00
403-A005	19-MM, MT,ASPHALT PAVEMENT	TON	1,995	$ 85.00	169,575.00
403-A014	9.5-MM, MT, ASPHALT PAVEMENT	TON	930	$ 100.00	93,000.00
406-A002	COLD MILLING OF BITUMINOUS PAVEMENT, ALL DEPTHS	SY	4,180	$ 3.25	13,585.00
407-A001	ASPHALT FOR TACK COAT	GAL	1,640	$ 3.75	6,150.00
503-C010	SAW CUT, FULL DEPTH	LF	144	$ 10.00	1,440.00
601-B001	CLASS B STRUCTURAL CONCRETE, MINOR STRUCTURES	CY	120	$ 2,400.00	288,000.00
602-A001	REINFORCING STEEL	LB	9,713	$ 1.00	9,713.00
603-CA011	18" REINFORCED CONCRETE PIPE, CLASS III	LF	2,864	$ 43.00	123,152.00
603-CA026	24" REINFORCED CONCRETE PIPE, CLASS III	LF	248	$ 56.00	13,888.00
603-CA040	30" REINFORCED CONCRETE PIPE, CLASS III	LF	164	$ 73.00	11,972.00
603-CB004	24" REINFORCED CONCRETE END SECTION	EA	1	$ 900.00	900.00
603-CB005	30" REINFORCED CONCRETE END SECTION	EA	1	$ 1,100.00	1,100.00
604-A001	CASTINGS	LB	2,686	$ 3.50	9,401.00
604-B001	GRATINGS	LB	254	$ 3.50	889.00
608-C001	DETECTABLE WARNING PANELS	SF	80	$ 44.00	3,520.00
907-608-D003	STAMPED AND COLORED CONCRETE SIDEWALK	SY	50	$ 135.00	6,750.00
609-D003	COMBINATION CONCRETE CURB AND GUTTER TYPE 2	LF	125	$ 22.00	2,750.00
609-D012	COMBINATION CONCRETE CURB AND GUTTER TYPE 3A MODIFIED	LF	3,500	$ 20.00	70,000.00
616-A001	CONCRETE MEDIAN AND/OR ISLAND PAVEMENT, 10-INCH	SY	10	$ 135.00	1,350.00
616-A004	CONCRETE MEDIAN AND/OR ISLAND PAVEMENT, 4-INCH	SY	83	$ 55.00	4,565.00
618-A001	MAINTENANCE OF TRAFFIC	LS	1	$ 40,000.00	40,000.00

619-A1002	TEMPORARY TRAFFIC STRIPE, CONTINUOUS WHITE	LF	7,042	$ 0.55	3,873.10
619-A2002	TEMPORARY TRAFFIC STRIPE, CONTINUOUS YELLOW	LF	6,972	$ 0.55	3,834.60
619-A3002	TEMPORARY TRAFFIC STRIPE, SKIP WHITE	LF	600	$ 0.55	330.00
619-A5001	TEMPORARY TRAFFIC STRIPE, DETAIL	LF	2,149	$ 1.00	2,149.00
619-A6001	TEMPORARY TRAFFIC STRIPE, LEGEND	SF	516	$ 2.00	1,032.00
619-A6002	TEMPORARY TRAFFIC STRIPE, LEGEND	LF	572	$ 1.50	858.00
619-H1001	TRAFFIC SIGNALS	LS	1	$ 43,000.00	43,000.00
620-A001	MOBILIZATION	LS	1	$ 225,000.00	225,000.00
626-A003	6" THERMOPLASTIC TRAFFIC STRIPE, SKIP WHITE	LF	600	$ 1.00	600.00
626-B003	6" THERMOPLASTIC TRAFFIC STRIPE, CONTINUOUS WHITE	LF	681	$ 1.00	681.00
626-C003	6" THERMOPLASTIC EDGE STRIPE, CONTINUOUS WHITE	LF	6,361	$ 0.75	4,770.75
626-E003	6" THERMOPLASTIC TRAFFIC STRIPE CONTINUOUS YELLOW	LF	6,972	$ 0.75	5,229.00
626-G002	THERMOPLASTIC STRIPE, DETAIL WHITE	LF	2,030	$ 2.00	4,060.00
626-G003	THERMOPLASTIC DETAIL STRIPE, YELLOW	LF	119	$ 2.00	238.00
626-H004	THERMOPLASTIC LEGEND, WHITE	SF	716	$ 5.00	3,580.00
626-H005	THERMOPLASTIC LEGEND, WHITE	LF	572	$ 3.25	1,859.00
627-K001	RED-CLEAR REFLECTIVE HIGH PERFORMANCE RAISED MARKERS	EA	55	$ 6.50	357.50
627-L001	TWO-WAY YELLOW REFLECTIVE HIGH PERFORMANCE RAISED MARKERS	EA	52	$ 6.50	338.00
630-A003	STANDARD ROADSIDE SIGNS, SHEET ALUMINUM, 0.125" THICKNESS	SF	71	$ 60.00	4,260.00
630-C003	STEEL U-SECTION POSTS, 3.0 LB/FT	LF	114	$ 12.00	1,368.00
630-K002	WELDED AND SEAMLESS STEEL PIPE POSTS, 3"	LF	14	$ 135.00	1,890.00
907-632-A007	SOLID STATE TRAFFIC CABINET ASSEMBLY, TYPE III CABINET, TYPE 1 CONTROLLER	EA	1	$ 22,000.00	22,000.00
907-632-J001	POWER SERVICE PEDESTAL	EA	1	$ 4,400.00	4,400.00
907-632-PP001	TRAFFIC SIGNAL REMOTE MONITORING SYSTEM	EA	1	$ 7,800.00	7,800.00
907-633-A001	UNINTERRUPTABLE POWER SUPPLY	EA	1	$ 13,000.00	13,000.00
907-634-A028	TRAFFIC SIGNAL EQUIPMENT POLE, TYPE II(L), 22' SHAFT, 40' ARM	EA	1	$ 23,000.00	23,000.00
907-634-A031	TRAFFIC SIGNAL EQUIPMENT POLE, TYPE II(L), 22' SHAFT, 55' ARM	EA	2	$ 28,000.00	56,000.00
907-634-A047	TRAFFIC SIGNAL EQUIPMENT POLE, TYPE II(L), 30' SHAFT, 55' ARM	EA	1	$ 30,000.00	30,000.00
907-634-C001	POLE FOUNDATIONS, CLASS "B" CONCRETE	CY	16	$ 650.00	10,400.00
635-A059	TRAFFIC SIGNAL HEAD, TYPE 1	EA	5	$ 850.00	4,250.00
635-A065	TRAFFIC SIGNAL HEAD, TYPE 2 FYA	EA	2	$ 1,300.00	2,600.00
635-A070	TRAFFIC SIGNAL HEAD, TYPE 3	EA	2	$ 1,300.00	2,600.00
635-A073	TRAFFIC SIGNAL HEAD, TYPE 4	EA	1	$ 1,300.00	1,300.00
635-A076	TRAFFIC SIGNAL HEAD, TYPE 6	EA	2	$ 850.00	1,700.00
907-636-B014	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, IMSA 20-1, AWG 14, 5 CONDUCTOR	LF	292	$ 1.10	321.20
907-636-B016	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, IMSA 20-1, AWG 14, 8 CONDUCTOR	LF	976	$ 3.25	3,172.00
907-636-B034	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, PTZ CAMERA CONTROL CABLE	LF	85	$ 5.50	467.50
907-636-B037	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, THHN, AWG #10, 2 CONDUCTOR	LF	728	$ 2.10	1,528.80
907-636-B053	ELECTRIC CABLE, UNDERGROUND IN CONDUIT, THHN, AWG #6, 3 CONDUCTOR	LF	90	$ 7.50	675.00
907-637-A002	PULLBOX ENCLOSURE, TYPE 2	EA	4	$ 650.00	2,600.00

907-637-A003	PULLBOX ENCLOSURE, TYPE 3	EA	2	$ 950.00	1,900.00
907-637-C003	TRAFFIC SIGNAL CONDUIT, UNDERGROUND, PVC COATED, 2"	LF	35	$ 16.00	560.00
907-637-C004	TRAFFIC SIGNAL CONDUIT, UNDERGROUND, PVC COATED, 3"	LF	143	$ 12.00	1,716.00
907-637-C011	TRAFFIC SIGNAL CONDUIT, UNDERGROUND, ROLLED PIPE, 3"	LF	624	$ 14.00	8,736.00
907-643-A004	VIDEO VEHICLE DETECTION SENSOR, TYPE 1A	EA	2	$ 5,000.00	10,000.00
907-643-B001	VIDEO VEHICLE DETECTION CABLE	LF	440	$ 3.25	1,430.00
907-643-E001	MULTI-SENSOR VEHICLE DETECTION SENSOR	EA	2	$ 13,000.00	26,000.00
907-643-F001	MULTI-SENSOR VEHICLE DETECTION CABLE	LF	488	$ 3.25	1,586.00
907-645-B001	ACCESSIBLE PEDESTRIAN DETECTION ASSEMBLY	EA	2	$ 1,000.00	2,000.00
647-A001	REMOVAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT	LS	1	$ 4,400.00	4,400.00
907-650-A003	ON STREET VIDEO EQUIPMENT, PTZ TYPE	EA	1	$ 5,500.00	5,500.00
907-653-A001	TRAFFIC SIGN	SF	34	$ 21.00	714.00
607-653-B001	STREET NAME SIGN	SF	53	$ 75.00	3,975.00
907-659-A001	TRAFFIC MANAGEMENT CENTER MODIFICATIONS	LS	1	$ 16,000.00	16,000.00
907-659-C001	TRAFFIC MANAGEMENT CENTER MODIFICATIONS - TRAINING	LS	1	$ 10,000.00	10,000.00
907-661-B002	FIBER OPTIC DROP CABLE, 12 SM	LF	50	$ 7.50	375.00
907-663-A001	NETWORK SWITCH, TYPE A	EA	1	$ 2,300.00	2,300.00
999	MATERIALS TESTING ALLOWANCE	ALLOW	1	$25,000.00	$25,000.00
				TOTAL BASE BID	$2,323,183.95

ALTERNATE 2 - PAVE MULTI-USE PATH FROM STA 4+00 to 21+50

403-A005	19-MM, MT,ASPHALT PAVEMENT	TON	260	$ 106.00	27,560.00
403-A014	9.5-MM, MT, ASPHALT PAVEMENT	TON	130	$ 132.00	17,160.00
216-A001	SOLID SODDING	SY	1,500	$ 5.00	7,500.00
608-C001	DETECTABLE WARNING PANELS	SF	48	$ 46.00	2,208.00
907-608-D003	STAMPED AND COLORED CONCRETE SIDEWALK	SY	26	$ 144.00	3,744.00
907-608-D003	CONCRETE SIDEWALK, WITH REINFORCEMENT	SY	13	$ 61.00	793.00
				TOTAL ALTERNATE 2	$58,965.00

RESPECTFULLY SUBMITTED BY: Joe McGee Construction Co., Inc.
(PLEASE PRINT)

SIGNATURE:

NAME AND TITLE: Jason McGee / Vice President
(PLEASE PRINT)

ADDRESS: 6609 Steve Lee Drive
Lake, MS 39092

PHONE NUMBER: 601-775-3754

CERTIFICATE OF RESPONSIBILITY NO. 07743-MC

JOE MCGEE CONSTRUCTION COMPANY, INC. MISSISSIPPI 1988 CORPORATE SEAL

(SEAL) IF BY CORPORATION

CORPORATE CERTIFICATE

(To be executed if BIDDER is a Corporation)

I, Lynn McGee certify that I am the Secretary of the Corporation named as CONTRACTOR in the foregoing Proposal; that Jason McGee who signed said Proposal on behalf of the CONTRACTOR, was then Vice President of said Corporation; that said Proposal was duly signed for and in behalf of said Corporation by authority of its governing body and is within the scope of its corporate powers.

Name: Lynn McGee

Title: V.P.

Signature: Lynn McGee

(CORPORATE SEAL)

JOE MCGEE CONSTRUCTION COMPANY, INC.
CORPORATE SEAL
1988
MISSISSIPPI

PARTNERSHIP CERTIFICATE

(To be executed if BIDDER is a Partnership)

STATE OF _____

COUNTY OF _____

On this _____ day of _____ 2021, before me personally appeared _____, known to be and known by me to be the person who executed the above instrument, who being by me first duly sworn, did depose and say that he is general partner in the firm of:
_____; That said firm consists of himself and _____; and that he executed the foregoing instrument for and on behalf of said firm for the uses and purposes stated herein.

Signature _____

Title _____

(SEAL)
Sworn before me this ____ day of _____ 2021

_____, Notary Public

My commission expires _____

LIMITED LIABILITY COMPANY CERTIFICATE

(To be executed if BIDDER is a LLC)

I, the undersigned _____, hereby certify that I am the Manager of _____ (the "Company") or if the Company does not have a Manager, a Member of the Company with full power and authority to bind the Company; that _____ who executed the Proposal on behalf of the Company is _____ of the Company with full power and authority to execute same on behalf of the Company, and that the Proposal and the Contract, if awarded to the Company, are within the powers and authority of the Company.

Signature _____

Title _____

(SEAL)
Sworn before me this ____ day of _____ 2021

_____, Notary Public

My commission expires _____

NONRESIDENT BIDDER CERTIFICATE

(to be executed if a BIDDER is a nonresident)

I, _____, hereby certify that the CONTRACTOR, _____, is domiciled in the State of _____ and (check and complete one):

(____) attached is a copy of the State of _____'s current law pertaining to the treatment of nonresident CONTRACTORS. Paragraph _____, page _____ of said law grants resident CONTRACTORS a _____ percent preference over nonresident CONTRACTORS for similar projects.

(____) the State of _____ has no current law pertaining to the treatment of nonresident contractors.

(____) I claim "resident contractor" status based upon having been qualified to do business in this state and having maintained a permanent full-time office in the State of Mississippi for two (2) years prior to January 1, 1986. Proof of such claim must be submitted and approved before contract is signed.

Signature _____

Title _____

(SEAL)
Sworn before me this ____ day of _____ 2021

_____, Notary Public

My commission expires _____

NON-COLLUSION AFFIDAVIT
(TO BE EXECUTED IN DUPLICATE)

STATE OF MISSISSIPPI
COUNTY OF Newton

I, Jason McGee
(name of person signing affidavit)

individually, and in my capacity as Vice President
(title)

of Joe McGee Construction Co., Inc.
(name of firm, partnership, limited liability company, or corporation.)
being duly sworn, on oath do depose and say as follows:

(a) That Joe McGee Construction Co., Inc. Bidder on the **"RICE ROAD EXTENSION"** for the **CITY OF RIDGELAND** has not either directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its officers, partners, employees or principal owners.

(b) further, that neither said legal entity nor any of its directors, officers, partners, principal owners or managerial employees are currently debarred from bidding on public contracts by the State of Mississippi or any of its agencies; or by one or more of the other states or any of their agencies; or by the Federal Highway Administration.

Signature

Title Vice President

JOE MCGEE CONSTRUCTION COMPANY, INC. MISSISSIPPI 1988 CORPORATE SEAL

(SEAL)
Sworn before me this 26th day of January 2021

Patricia L. Brown, Notary Public

My commission expires May 15, 2022

STATE OF MISSISSIPPI NOTARY PUBLIC ID # 29579 PATRICIA L. BROWN Commission Expires May 15, 2022 NEWTON COUNTY

NOTE: FAILURE TO PROPERLY SIGN AND NOTARIZE THIS AFFIDAVIT WILL DISQUALIFY THE BID.

NON-COLLUSION AFFIDAVIT
(TO BE EXECUTED IN DUPLICATE)

STATE OF MISSISSIPPI
COUNTY OF Newton

I, Jason McGee
(name of person signing affidavit)

individually, and in my capacity as Vice President
(title)

of Joe McGee Construction Co., Inc.
(name of firm, partnership, limited liability company, or corporation.)
being duly sworn, on oath do depose and say as follows:

(a) That Joe McGee Construction Co., Inc. Bidder on the **"RICE ROAD EXTENSION"** for the **CITY OF RIDGELAND** has not either directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its officers, partners, employees or principal owners.

(b) further, that neither said legal entity nor any of its directors, officers, partners, principal owners or managerial employees are currently debarred from bidding on public contracts by the State of Mississippi or any of its agencies; or by one or more of the other states or any of their agencies; or by the Federal Highway Administration.

Signature

Title Vice President

JOE MCGEE CONSTRUCTION COMPANY, INC. CORPORATE SEAL 1988 MISSISSIPPI

(SEAL)
Sworn before me this 26th day of January, 2021

Patricia L. Brown, Notary Public

My commission expires May 15, 2022

STATE OF MISSISSIPPI NOTARY PUBLIC ID # 29579 PATRICIA L. BROWN Commission Expires May 15, 2022 NEWTON COUNTY

NOTE: FAILURE TO PROPERLY SIGN AND NOTARIZE THIS AFFIDAVIT WILL DISQUALIFY THE BID.

END OF SECTION
C-12

SECTION D

BID BOND

BID BOND

KNOW ALL MEN BY THESE PRESENTS:

That Joe McGee Construction Company, Inc.
(Name of Contractor)

P.O. Box 340, Lake, MS 39092
(Address of Contractor)

a Corporation hereinafter called "Principal", and
(Corporation, Partnership, Limited Liability Company or Individual)

Travelers Casualty and Surety Company of America hereinafter called "Surety",
(Name of Surety)

are held and firmly bound unto the **CITY OF RIDGELAND** hereinafter called **"OWNER"** in the penal sum of 5% of Total Bid, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents. Signed, this the 26th day of January, 2021. The Condition of the above obligation is such that whereas the Principal has submitted to the **CITY OF RIDGELAND** a certain BID, attached hereto and hereby made a part thereof to enter into a contract in writing, for the construction of:

"RICE ROAD EXTENSION"

NOW, THEREFORE,

(a) If said BID shall be rejected, or,

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract on the Contract form as attached hereto (properly completed in accordance with said BID) and shall furnish BONDS for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection herewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these present to be signed by their officers, the day and year first set forth above.

Joe McGee Construction Company, Inc. (L.S.) Travelers Casualty and Surety Company of America
Principal Surety

By: Brady McGee, Vice President By: Brody Eric Buckley/Attorney-in-Fact
Resident MS Agent/Fisher Brown Bottrell Insurance, Inc.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

END OF SECTION

TRAVELERS	**Travelers Casualty and Surety Company of America** **Travelers Casualty and Surety Company** **St. Paul Fire and Marine Insurance Company**

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company are corporations duly organized under the laws of the State of Connecticut (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint **Brody Eric Buckley** of **Jackson**, **Mississippi**, their true and lawful Attorney-in-Fact to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed, and their corporate seals to be hereto affixed, this **3rd** day of **February**, **2017**.

TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA HARTFORD, CONN. | TRAVELERS CASUALTY AND SURETY COMPANY HARTFORD, CONN. | ST. PAUL FIRE AND MARINE INSURANCE COMPANY CORPORATE SEAL

State of Connecticut

By: _____
Robert L. Raney, Senior Vice President

City of Hartford ss.

On this the **3rd** day of **February**, **2017**, before me personally appeared **Robert L. Raney**, who acknowledged himself to be the Senior Vice President of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.

My Commission expires the **30th** day of **June**, **2021**

MARIE C. TETREAULT NOTARY PUBLIC CONNECTICUT

Marie C Tetreault
Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, **Kevin E. Hughes**, the undersigned, Assistant Secretary of Travelers Casualty and Surety Company of America, Travelers Casualty and Surety Company, and St. Paul Fire and Marine Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which remains in full force and effect.

Dated this 26th day of January, 2021

TRAVELERS CASUALTY AND SURETY COMPANY OF AMERICA HARTFORD, CONN. | TRAVELERS CASUALTY AND SURETY COMPANY HARTFORD, CONN. | ST. PAUL FIRE AND MARINE INSURANCE COMPANY CORPORATE SEAL

Kevin E. Hughes
Kevin E. Hughes, Assistant Secretary

To verify the authenticity of this Power of Attorney, please call us at 1-800-421-3880.
Please refer to the above-named Attorney-in-Fact and the details of the bond to which the power is attached.

SECTION E

CONTRACT

CONTRACT

THIS AGREEMENT, made this the _____ day of _____, 2021, by and between the **CITY OF RIDGELAND** hereinafter called "OWNER" and _____ doing business as (an Individual), (a Partnership), (a Limited Liability Company), or (a Corporation) hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The CONTRACTOR will commence and complete the construction of **"RICE ROAD EXTENSION"** hereinafter called "PROJECT".

2. The CONTRACTOR will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the PROJECT described herein.

3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within __**10**__ calendar days after the date of the NOTICE TO PROCEED and will complete the PROJECT within __**210**__ calendar days, unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS.

4. The CONTRACTOR agrees to perform all of the work described in the CONTRACT DOCUMENTS, and comply with the terms therein for the sum of $_____or as shown in the BID Schedule.

5. The term "CONTRACT DOCUMENTS" means and includes the following:

   A. This Agreement
   B. Instruction to Bidders
   C. Signed Copy of Proposal Form and Bidder's Certificate
   D. Executed Non-Collusion Form and Compliance Statements
   E. Executed Performance Bond
   F. Executed Payment Bond
   G. NSPE General Conditions
   H. Special Contract Provisions
   I. SPECIFICATIONS prepared or issued by **Waggoner Engineering, Inc.** and dated JANUARY 2021.
   K. ADDENDA:
      No.____ Dated _____
      No.____ Dated _____
   L. All state and federal government conditions, specifications, regulations and requirements bound herein.

6. The CONTRACTOR agrees to abide by the following consequences for failure to complete the project within the time specified in the CONTRACT DOCUMENTS:

   A. LIQUIDATED DAMAGES - CONTRACTOR shall pay to OWNER for each and every calendar day that he shall be in default in attaining Completion of the Work within

the time stipulated the sum of $ **500** as liquidated damages. The CONTRACTOR shall be liable for the continued assessment of liquidated damages of **$500** for each calendar day that he shall be in default in completing the Work within the stipulated time as provided herein. Since the OWNER'S losses are due to the CONTRACTOR'S delay and are not readily ascertainable, the amount provided herein for liquidated damages constitutes agreed damages and not a penalty.

B. INDEMNIFICATION - In addition to payment of the above liquidated damages, CONTRACTOR shall fully indemnify and hold harmless the OWNER, the ENGINEER and their officers, personnel, and agents from and against: (1) any and all fines, civil penalties, and assessments levied by the State of Mississippi Office of Pollution Control, State of Mississippi Bureau of Environmental Health or any federal or state court for failure to meet, perform, or comply with any part of the time schedule as defined in the Contract Documents, and (2) any and all claims, damages, losses, expenses, liabilities, actions, judgments, and decrees of any and every nature whatsoever in any manner caused by, resulting from, or arising out of such failure.

C. RIGHT OF SET-OFF - The OWNER, in addition to its other remedies under this Contract and in law and in equity, may deduct from monies which become due the CONTRACTOR under this Contract any unpaid amounts which become due to the OWNER under any of the foregoing provisions.

7. The OWNER will pay to the CONTRACTOR in the manner and at such times set forth in the General Conditions such amount as required by the CONTRACT DOCUMENTS. The OWNER shall retain five percent (5%) of the amount of each payment until final completion and acceptance of all work covered by the CONTRACT DOCUMENTS unless otherwise mutually agreed.

8. The CONTRACTOR agrees to allow the OWNER or a duly authorized representatives thereof, access to books, documents, papers and records of the CONTRACTOR which are directly pertinent to the project which is the subject of this Contract, for the purpose of making audits, examinations, excerpts and transcriptions, and CONTRACTOR agrees to insert an identical access to records clause into all subcontracts.

9. The CONTRACTOR shall be held responsible for forfeiture of monies in the event that an audit indicates his failure to keep adequate records, including change orders, force accounts and payroll records.

10. Attached hereto and made a part of this Contract is a Payment Bond, executed by a Surety Company doing business in the State of Mississippi, in the sum of:

($ _____) _____

(not less than one hundred percent of Contract amount)

11. Attached hereto and made a part of this Contract is a Performance Bond, executed by a Surety Company doing business in the State of Mississippi, in the sum of:

($ _____) _____
(not less than one hundred percent of Contract amount)

12. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in 5 copies each of which shall be deemed an original on the date first above written.

CITY OF RIDGELAND, OWNER

BY: _____
NAME: _____
TITLE: _____

ATTEST:

BY: _____
NAME: _____
TITLE: _____

(SEAL)

CONTRACTOR

BY: _____
NAME: _____
TITLE: _____

ATTEST:

BY: _____
NAME: _____
TITLE: _____

(SEAL)

END OF SECTION
E-3

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SECTION F

PERFORMANCE BOND

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____
(Name of Contractor)

_____
(Address of Contractor)

a _____ hereinafter called "PRINCIPAL", and
(Corporation, Partnership, Limited Liability Company or Individual)

hereinafter called "SURETY",

_____
(Name of Surety)

are held and firmly bound unto the **CITY OF RIDGELAND** hereinafter called "OWNER" in the penal sum of

_____ Dollars ($_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain Contract with the OWNER, dated the _____ day of _____, 2021, a copy of which is hereto attached and made a part hereof for the construction of:

"RICE ROAD EXTENSION"

NOW, THEREFORE, if the PRINCIPAL shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said Contract during the Original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and during the one year guaranty period and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER of all of outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and sees that no change, extension of time, alteration or addition to the terms of the Contract or to the WORK to be performed hereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the loans of this Contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may not yet be satisfied.

WITNESS WHEREOF, this instrument is executed in _five (5)_ counterparts, each of which shall be deemed an original, this the _____ day of _____, 2021.

ATTEST:

_____
(Principal) Secretary

_____
(Principal)

(SEAL)

By _____

_____
(Address)

_____
Witness as to Principal

_____

_____
(Address)

_____

ATTEST:
(SEAL)

_____
(Surety)

By _____
Attorney-in-Fact

_____
Witness as to Surety

_____
(Address)

_____
(Address)

_____

NOTE: Date of BOND **must not be** prior to date of CONTRACT. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

END OF SECTION

SECTION G

PAYMENT BOND

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____
(Name of Contractor)

_____
(Address of Contractor)

a _____ hereinafter called "PRINCIPAL", and
(Corporation, Partnership, Limited Liability Company or Individual)

hereinafter called "SURETY",

_____
(Name of Surety)

are held and firmly bound unto the **CITY OF RIDGELAND** hereinafter called "OWNER" in the penal sum of

_____ Dollars ($_____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain Contract with the OWNER, dated the _____ day of _____, 2021, a copy of which is hereto attached and made a part hereof for the construction of:

"RICE ROAD EXTENSION"

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such Contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect. PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and sees that no change, extension of time, alteration or addition to the terms of the Contract or to the WORK to be performed hereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the loans of this Contract or to the WORK or to the SPECIFICATIONS. PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may not yet be satisfied.
PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may not yet be satisfied.

WITNESS WHEREOF, this instrument is executed in five (5) counterparts, each of which shall be deemed an original, this the _____ day of _____, 2021.

ATTEST:

_____
(Principal) Secretary

_____
(Principal)

(SEAL)

By _____

_____
(Address)

_____
Witness as to Principal

_____
(Address)

_____

ATTEST:
(SEAL)

_____
(Surety)

By _____
Attorney-in-Fact

_____
Witness as to Surety

_____
(Address)

_____
(Address)

_____

NOTE: Date of BOND **must not be** prior to date of CONTRACT. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

END OF SECTION
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SECTION H

CERTIFICATE OF SUFFICIENCY

CERTIFICATE OF SUFFICIENCY

I, _____, Chief Legal Officer for the **CITY OF RIDGELAND** do hereby certify that I have examined the agreement, contract bonds and evidence of insurance offered by the Contractor and I am of the opinion that each of the aforesaid documents is adequate and sufficient and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said documents on behalf of the respective parties named thereon; and that the foregoing documents constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

_____
(Signature)

Name:_____

Date:_____

END OF SECTION
H-1

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SECTION I

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by

CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
www.asce.org

Associated General Contractors of America
2300 Wilson Boulevard, Suite 400, Arlington, VA 22201-3308
(703) 548-3118
www.agc.org

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*—The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*—See Paragraph 11.01 for definition.

17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*—The individual or entity named as such in the Agreement.

20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*—Sections of Division 1 of the Specifications.

22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.

23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*—Polychlorinated biphenyls.

31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.

37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

49. *Unit Price Work*—Work to be paid for on the basis of unit prices.

50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is *evidence* that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation , (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

   a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or

   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or

2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

   a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

   b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

   c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

   1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and

   2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

      a. reviewing and checking all such information and data;

      b. locating all Underground Facilities shown or indicated in the Contract Documents;

      c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

      d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members,

partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

6. include completed operations coverage:

   a. Such insurance shall remain in effect for two years after final payment.

   b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

   1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

   2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.

   3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

   4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

   5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary

Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in

accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a

proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

3) it has a proven record of performance and availability of responsive service.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,

b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services; and

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

   a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

   b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

   c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

   d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.

C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part;

2. approve the Claim; or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

   b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

   c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

   d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

   e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

   f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such

losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances:*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute

resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored

elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety,

and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

   b. consent of the surety, if any, to final payment;

   c. a list of all Claims against Owner that Contractor believes are unsettled; and

   d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's repeated disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or

3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION J

PROJECT SUPPLEMENTAL GENERAL CONDITIONS

SECTION J.1

PROJECT SPECIAL CONDITIONS

SECTION J.1

SPECIAL CONDITIONS

1-01 GENERAL

A. The following Special Conditions consist of special requirements which shall apply to this project and to the CONTRACTOR executing the work.

B. The information contained in these special conditions and technical specifications shall supersede information contained in NSPE, EDA, CDBG or SRF General Conditions if any found elsewhere herein.

C. OWNER shall furnish to CONTRACTOR up to three (3) copies (unless otherwise specified in the General Requirements) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

D. Protect the finished work from damage and loss resulting from carelessness or by reason of the elements and from all other causes until the entire work is completed and accepted. The work is entirely at the CONTRACTOR'S risk. The OWNER assumes no responsibility or obligation whatsoever for damage or loss to the work.

E. At all times protect existing work and adjacent property. Correct all damage thereto caused by construction operations of the CONTRACTOR'S employees at the expense of the CONTRACTOR, and to the complete satisfaction of the OWNER and ENGINEER.

F. **CONSTRUCTION SAFETY IS A PROJECT REQUIREMENT.** The CONTRACTOR shall be responsible for providing Safety equipment and or methods necessary for the safe prosecution of the work by his personnel and the personnel of any sub-contractors, as well as providing safe access and site conditions to all elements of the project for the OWNER, ENGINEER, and their representatives. Such safety requirements shall meet guidelines as contained in OSHA and U.S. Department of Health and Human Services (National Institute for Occupational Safety and Health) (NIOSH) publication sections relative to the work contemplated herein.

G. PAYMENTS TO CONTRACTOR: The OWNER will pay to the CONTRACTOR in the manner and at such times as set forth in the General Conditions, such amounts as required by the Contract Documents. The OWNER shall retain five percent (5%) of the amount of each progress payment until final completion and acceptance of all work covered by the Contract Documents unless otherwise mutually agreed.

1-02 PUBLIC SAFETY AND CONVENIENCE

A. The CONTRACTOR shall at all times so conduct his work as to ensure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work, and to ensure the protection of persons and property in a manner satisfactory to the OWNER and ENGINEER.

B. All work on existing highways, roads or streets, shall be in a manner to assure the least practicable interference with the public use of the facility. The CONTRACTOR shall use reasonable care and precaution to avoid accidents, damage, unnecessary delay or interference with traffic and provide competent flaggers when necessary to ensure maximum public safety.

1-03 CONSTRUCTION STAKES AND GRADES

A. ~~The ENGINEER has provided a base line from which all layout is to be done. Preservation of reference points will be the responsibility of the CONTRACTOR. The CONTRACTOR must provide all grades, stakes, string lines, and other control work necessary for completion of the project in accordance with the requirements of the Specifications and Drawings.~~

B. **No changes to grades will be made without the approval of the ENGINEER.**

1-04 EXISTING WATER, SEWER, ELECTRIC GAS AND UNDERGROUND TELEPHONE FACILITIES

A. Existing water, sewer, gas, electricity, television cable, and buried telephone cable facilities shown on the drawings are approximate locations. The CONTRACTOR is required to coordinate his work with the representative of the respective utility company and protect all other adjacent structures, utilities, and work against damage or interruption of services. Damage which may result from failure of the CONTRACTOR to observe such precautions is the responsibility of the CONTRACTOR.

B. **The OWNER shall be held harmless of the cost of repairing damage to public utilities.**

1-05 UTILITIES

A. Water, electricity, gas or other utilities required on the site of the work by the CONTRACTOR must be arranged for by him and furnished at his expense.

B. Required temporary utility installations are subject to the approval of the ENGINEER and are to be maintained and removed by the CONTRACTOR at his expense prior to completion of the construction work.

1-06 TEMPORARY STORAGE

A. If materials are stored on the site of the work, each CONTRACTOR shall provide and maintain on the premises, where directed, water-tight storage sheds for the storage of materials that would be subject to damage by the weather.

B. The CONTRACTOR shall be responsible for security of material storage sites.

1-07 CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

A. The CONTRACTOR will execute and provide to the ENGINEER at the Pre-construction Conference a compliance statement where required.

B. Such compliance form shall be provided by the ENGINEER.

1-08 LEAD BASED PAINT

A. Use of lead based paint on the project is prohibited.

1-09 TEMPORARY TOILETS

A. Provide and maintain temporary toilets as necessary for use of workmen. Locate toilets in locations acceptable to the OWNER.

B. Toilets shall meet requirements of the State Health Department and any local codes.

1-10 TEMPORARY JOB OFFICE FOR ENGINEER

A. None required for this Contract.

1-11 PROJECT SIGN

A. See requirements specified in these Contract Documents.

1-12 TESTING LABORATORY SERVICES

A. Scope: The CONTRACTOR will employ and pay for the services of an independent laboratory to perform specified services. Employment of a testing laboratory shall in no way relieve CONTRACTOR of his obligation to perform work in accordance with the contract and/or Technical Specifications.

1-13 PRE-CONSTRUCTION CONFERENCE

A. Prior to commencement of construction, a pre-construction conference will be scheduled with the date, time and location of the meeting to be established by the ENGINEER.

B. The ENGINEER will prepare an agenda and distribute advance copies to each participant. The ENGINEER will also prepare and complete the minutes of the meeting and distribute same to all participants.

C. Prior to the pre-construction conference, CONTRACTOR shall submit to ENGINEER an estimated progress schedule, in the form of a bar chart, indicating the starting and completion dates of the various stages of the Work along with anticipated earnings, and a preliminary schedule of Shop Drawings submissions. The ENGINEER shall review and return this schedule or require revisions thereto within fourteen (14) days of its submittal. If there is more than one CONTRACTOR involved in a Project the responsibility for coordinating the Work of all CONTRACTORS shall be as provided in the Special Conditions. Updated progress schedules will be required on a monthly basis at the time of submittal of the CONTRACTOR'S monthly progress pay request.

D. The above schedules will be reviewed during the pre-construction conference to establish procedures for handling Shop Drawings and other submissions and for processing Application for Payment, and to establish a working understanding between the parties as to the Project requirements.

E. Present at the conference will be the OWNER or his representative, ENGINEER, Resident Project Representative, CONTRACTOR, his Superintendent, and major Subcontractors.

END OF SECTION

SECTION J.2

INSTRUCTIONS FOR BONDS

SECTION J.2

INSTRUCTIONS FOR BONDS

1-01 GENERAL

A. The following instructions and requirements for Bonds shall apply to this Project.

1-02 SURETY

A. The surety on each bond must be a responsible surety company, qualified to do business in Mississippi, and shall be satisfactory to the OWNER.

1-03 NAME

A. The name, including full legal name, and residence of each individual party to the bond shall be inserted in the body thereof, and each such party shall sign the bond with their usual signature on the line opposite the seal.

1-04 PARTNERSHIPS

A. If the principals are partners, their individual names will appear in the body of the bond with the recital that they are partners composing a firm, naming it, and shall have all the partners of the firm execute the bond as individuals.

B. The signature of a witness shall appear in the appropriate place, attesting to the signature of each individual party to the bond.

1-05 CORPORATIONS

A. If the principal or surety is a corporation, the name of the State in which incorporated shall be inserted in the appropriate place in the body of the bond, and said instrument shall be executed and attested under the corporate seal as indicated in the form.

B. The official character and authority of the person or persons executing the bond for the principal, if a corporation, shall be secretary or assistant secretary according to the form attached hereto. In lieu of such certificate, there may be attached to the bond copies of so much of the records of the corporation as will show the official character and authority of the officer signing, duly certified by the secretary or assistant secretary, under the corporate seal, to be true copies.

1-06 LIMITED LIABILITY COMPANIES

A. If the principal is a limited liability company, the name of the state under which the limited liability company is organized shall be inserted in the appropriate place in the body of the bond, and said instrument shall be executed and attested.

B. The bond shall be executed by a Manager of the limited liability company if managed by one or more Managers, or by a Member if managed by one or more Members. The bond shall disclose the capacity in which executed by the Member or Manager.

1-07 DATE

A. The date shown on these bonds **must not be** prior to the date of the contract in connection with which they are given.

END OF SECTION

SECTION J.3

SPECIAL PROVISIONS

SECTION J.3

SPECIAL PROVISIONS

1-01 LOCATION AND DESCRIPTION

A. The work required under this Contract includes the furnishing of all materials, tools, equipment, labor and incidentals necessary for the construction of **"RICE ROAD EXTENSION"** and all related items required by the Drawings and Specifications.

B. The summary of work as described above is a general description of the project and responsibilities of the CONTRACTOR and in no way supersedes the specific requirements of the Contract Documents.

1-02 TEMPORARY CONTROLS

A. The CONTRACTOR shall provide and maintain methods, equipment, and temporary construction, as necessary to provide control over environmental conditions at the construction site and adjacent areas. Physical evidence of temporary facilities shall be removed after completion of the work.

B. Noise Control

1. The CONTRACTOR'S vehicles and equipment shall be such as to minimize noise to the greatest degree practical. Noise levels shall conform to the latest OSHA standards and in no case will noise levels be permitted which interfere with the work of the OWNER or others.

C. Water Control

1. The CONTRACTOR shall provide methods to control surface water and water from excavations and structures to prevent damage to the work, the site, or adjoining properties, including beaver control on-site and adjacent thereto.

2. Fill, grading and ditching shall be controlled to direct water away from excavations, pits, tunnels and other construction areas, and to direct the runoff course so as to prevent any erosion, damage or nuisance.

3. The CONTRACTOR shall provide, operate and maintain equipment and facilities of adequate size to control surface water.

4. Drainage water shall be disposed of in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas and in conformance with all environmental requirements.

D. Pollution Control

1. The CONTRACTOR shall provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.

2. The CONTRACTOR shall provide equipment and personnel, perform emergency measures required to contain any spillage, and remove contaminated soils or liquids. The contaminated earth will be removed and disposed of offsite, and replaced with suitable compacted fill and topsoil at no additional cost to the OWNER.

3. The CONTRACTOR shall prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers. All sewage, oil and refuse generated during the course of the work shall not be discharged into any watercourses adjacent to the job site.

E. Erosion Control

1. The CONTRACTOR shall plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation. The areas of bare soil exposure at one time shall be held to a minimum, and temporary control measures such as silt screens, berms, dikes and drains shall be provided.

2. Fills and waste areas shall be constructed by selective placement to eliminate surface silts and clays which will erode.

3. The CONTRACTOR shall periodically inspect earthwork to detect any evidence of the start of erosion, and shall apply corrective measures to control erosion as required by the ENGINEER at no additional cost to the OWNER.

1-03 RECORDS

A. The CONTRACTOR shall maintain a complete and accurate log of any control or survey work as it progresses. Upon completion of major items or upon request, the CONTRACTOR shall submit two (2) copies to the ENGINEER.

1-04 CONTRACT DRAWINGS

A. Contract Drawings identified as **"RICE ROAD EXTENSION**, dated **JANUARY 2021**, are issued with these documents.

1-05 CONTRACT SPECIFICATIONS

A. The Specifications governing the work under this Contract shall be as set forth hereinafter as Technical Specifications together with any and all addenda.

1-06 ENGINEER

A. References in these contract documents to ENGINEER shall refer to **WAGGONER ENGINEERING, INC. (WEI)**

1.07 REVIEW OF THE WORK

A. Resident Project Representatives, who are representatives of the ENGINEER, will be appointed to review materials used and work performed. The Resident Project Representatives will not be authorized to revoke, alter, enlarge or relax the provisions of these Contract Documents, nor to delay the fulfillment of this Contract by failure to inspect materials and work with reasonable promptness. Resident Project Representatives are placed on the work to keep the ENGINEER informed as to the progress of the work and the manner in which it is being done; also to call the attention of the CONTRACTOR to nonconformity with the requirements of the Drawings and Specifications. The Resident Project Representatives will not have authority to approve or accept portions of the work, to issue instructions contrary to the Drawings, Specifications or other parts and sections of these Contract Documents, or to act as foreman for the CONTRACTOR. **The Resident Project Representatives will have authority to reject defective material.**

B. The presence of a Resident Project Representative shall in no way lessen the responsibility of the CONTRACTOR for full compliance with the requirements of these Contract Documents.

1-08 SUGGESTIONS TO CONTRACTOR

A. Means, process or method of work suggested by the ENGINEER or other representative of the OWNER to the CONTRACTOR, if adopted or followed by the CONTRACTOR in whole or in part, shall be used at the risk and responsibility of the CONTRACTOR, and the ENGINEER and the OWNER will assume no responsibility therefor.

1-09 CONTRACTOR'S OBLIGATIONS

A. The CONTRACTOR shall do and perform all work and furnish supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete the work required by the Contract, within the time herein specified, in accordance with the provisions of the Contract, Specifications, Drawings and Supplemental Drawings, and in accordance with the directions of the ENGINEER as given from time-to-time during the progress of the work. He shall furnish, erect, maintain and remove such construction plant

and such temporary works as may be required. The CONTRACTOR shall observe, comply with and be subject to terms, conditions, requirements and limitations of the Contract and Specifications, and shall do, carry on and complete the entire work to the satisfaction of the ENGINEER and the OWNER.

B. The CONTRACTOR shall be responsible for any state and local permits.

1-10 TIME FOR COMPLETION

A. It is hereby understood and mutually agreed, by and between the CONTRACTOR and the OWNER, that the date of beginning and the time for completion as specified in the Contract for the work to be done hereunder are ESSENTIAL CONDITIONS of the Contract; and it is further mutually agreed that the work embraced in this Contract shall be commenced on or before a date to be specified in a written "NOTICE TO PROCEED".

B. The CONTRACTOR agrees that said work shall be prosecuted regularly and diligently without interruption at such rate of progress as will ensure full completion thereof within the time specified.

C. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the time for the completion of the work described herein is a reasonable time for the completion of same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

D. If the said CONTRACTOR shall neglect, fail or refuse to complete the work within the time herein specified, or extension thereof granted by the OWNER, the CONTRACTOR does hereby agree, as a part of consideration for the awarding of this Contract, to pay to the OWNER the amount specified in the Contract, not as a penalty but as liquidated damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the CONTRACTOR shall be in default after the time stipulated in the contract for completing the work.

1-11 SUPPLEMENTARY DRAWINGS

A. Whenever required by the Specifications or the Drawings, as well as for all undetailed material to be fabricated and furnished by the CONTRACTOR, the CONTRACTOR shall make specialty or detailed shop drawings in amplification of the Drawings referred to in the Contract before commencing the work.

B. Six (6) copies of each drawing and necessary data shall be submitted to the ENGINEER. Each drawing or data sheet shall be clearly marked with the name of the Project, the CONTRACTOR'S name and references to applicable Specification paragraphs and Drawing sheet.

B. After the ENGINEER has reviewed the Drawings and data, three (3) copies will be returned to the CONTRACTOR marked either (1) "Rejected", (2) "Reviewed", (3) "Furnish as Corrected", or (4) "Revise and Resubmit".

D. Unless otherwise directed by the ENGINEER, when Drawings and data are returned marked "Furnish as Corrected", the changes shall be made as noted thereon and six (6) corrected copies furnished to the ENGINEER.

E. When Drawings and data are returned marked "Revise and Resubmit", the corrections shall be made as noted thereon and as instructed by the ENGINEER and six (6) corrected copies resubmitted.

F. The ENGINEER'S review of Drawings and data submitted by the CONTRACTOR will cover only general conformity to the Drawings and Specifications, external connections and dimensions which affect the layout. The ENGINEER'S review of Drawings marked "Reviewed" or "Furnish as Corrected" does not indicate a through review of all dimensions, quantities and details of the material, equipment, device or item shown and does not relieve the CONTRACTOR from the responsibility for errors or deviations from the Contract Requirements.

G. Corrections or comments made on the drawings during the ENGINEER'S review do not relieve the CONTRACTOR from compliance with the requirements of the Drawings and Specifications. Checking will be only for review of general conformance with the information given in the contract Documents. The CONTRACTOR is responsible for: confirming and correlating quantities and dimension; selecting fabrication processes and techniques of construction; coordination his work in a safe and satisfactory manner.

H. Drawings and data, after final processing by the ENGINEER, shall become a part of the Contract Documents and the work shown or described thereby shall be performed in conformity therewith unless otherwise authorized by the OWNER or the ENGINEER.

1-12 CORRECTION OF DEFECTIVE WORK AFTER FINAL ACCEPTANCE

A. The CONTRACTOR hereby agrees to make, at his own expense, repairs or replacements necessitated by defects in materials or workmanship, supplied under terms of this Contract, which become evident within one (1) year after the date of substantial completion. The CONTRACTOR further assumes responsibility for a similar one (1) year guarantee for work and materials provided by subcontractors or manufacturers of packaged equipment components. The effective date for the start of the guarantee or warranty period is defined as the date of substantial completion established by the ENGINEER in the Certificate of Substantial Completion.

1-13 COOPERATION BETWEEN CONTRACTORS

A. If separate contracts are let within the limits of a project, such CONTRACTORS shall arrange and conduct the performance of their work and handling of materials so as to minimize interference with work being performed by other CONTRACTORS within the limits of the same project.

END OF SECTION

SECTION J.4

INSURANCE REQUIREMENTS

SECTION J.4

INSURANCE REQUIREMENTS

1-01 All references to "OWNER" herein shall refer to the **CITY OF RIDGELAND.**

1-02 The CONTRACTOR shall carry insurance as prescribed herein and all policies shall be with companies satisfactory to the OWNER. **See attached sample insurance form for minimum coverage required.**

1-03 If a part of this Contract is sublet, the CONTRACTOR shall require each subcontractor to carry insurance of the same kinds and in like amounts as carried by the prime CONTRACTOR.

1-04 Certificates of insurance shall state that thirty (30) days written notice WILL BE given to the OWNER before the policy is canceled or changed. No CONTRACTOR or subcontractor will be allowed to start construction work on this Contract until all certificates of insurance required herein are filed and approved by the OWNER. The certificates shall show the type, amount, class of operations covered, effective dates and the dates of expiration of policies. In the event the contract time exceed one year CONTRACTOR shall submit renewal certificates for all policies 30 days prior to the expiration of the existing policy.

1-05 The CONTRACTOR shall secure and maintain in effect for the period of the Contract and pay all premiums for the following kinds and amounts of insurance:

A. Workmen's Compensation and Employer's Liability Insurance:

1. This insurance shall protect the CONTRACTOR against all claims under applicable State Workmen's Compensation Laws. The CONTRACTOR shall also be protected and shall cause each subcontractor to be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a Workmen's Compensation law. The liability limits shall not be less than the required statutory limits for Workmen's Compensation and Employer's Liability in the amount of Five Hundred Thousand Dollars ($500,000) for each person. This policy shall include an "all states" endorsement. CONTRACTOR will secure a Waiver of Subrogation endorsement in favor of both OWNER and ENGINEER. CONTRACTOR further agrees to maintain USL&H or other necessary Federal coverages, when applicable, to protect both CONTRACTOR and its employees.

B. CONTRACTOR'S Comprehensive Commercial General Liability Insurance, covering all operations in connection with the performance of this Contract in amounts not less than the following, and shall name OWNER and ENGINEER and its employees as additional insureds:

1. Bodily injury liability in the amount of One Million Dollars ($1,000,000) for each occurrence subject to that limit per accident a total (or aggregate) limit of Two Million Dollars ($2,000,000), in the aggregate for all damages arising out of injury to or destruction of property during the policy period.

2. The Comprehensive General Liability policies carried by both the prime and the subcontractors shall contain an endorsement to include the coverage of the following hazards;

   a. Explosion, collapse, and underground property damage (XCU) to include any damage or destruction of property below the surface of the ground, such as wires, conduits, pipes, mains, sewers, etc. caused by the CONTRACTOR'S operations.

   b. The collapse of or structural injury to buildings, structures or property on or adjacent to the OWNER'S premises caused by the CONTRACTOR'S operations in the removal of other buildings, structures, or supports, or by excavation below the surface of the ground.

   c. Contractual Liability Coverage for the "Hold Harmless" segments of the Contract Documents.

C. CONTRACTOR'S Contingent or Protective Liability and Property Damage:

1. In case part of this Contract is sublet, the CONTRACTOR shall secure contingent or protective liability and property damage insurance to protect him from claims arising from the operation of his subcontractors in the execution of work included in the Contract. In no case shall the amount of such protection be less than the limits of $1,000,000 for each occurrence and $2,000,000 in the aggregate. The coverage in each case shall be acceptable to the OWNER.

D. Automotive Public Liability and Property Damage:

1. The CONTRACTOR shall maintain automobile public liability insurance in the amount of not less than a combined single limit of $1,000,000 to protect him from any and all claims arising from the use of the following:

   a. CONTRACTOR'S own automobiles and trucks.
   b. Hired automobiles and trucks.
   c. Automobiles and trucks owned by sub-contractors.

2. The aforementioned is to cover use of automobiles and trucks on and off the site of the project, and shall name OWNER and ENGINEER and its employees as additional insureds.

E. OWNER'S Protective Liability Policy (OCP):

1. The Contractor shall maintain OWNER'S Protective Liability Insurance with the OWNER as the named insured, and their servants, agents including the ENGINEER and employees as additional insureds in amount not less than the following:

a. Each occurrence in the amount of One Million Dollars ($1,000,000) and Two Million Dollars ($2,000,000) in the aggregate for all damages arising out of any injury or destruction of property.

F. Umbrella liability insurance with a limit of not less than One Million Dollars (1,000,000) providing additional coverage to the policies listed above.

G. Builder's Risk Insurance (Fire and Extended Coverage):

1. Until the Project is completed and is accepted by the OWNER the CONTRACTOR is required to maintain Builder's Risk Insurance (fire and extended coverage) adequate to fully cover the insurable portion of the project for the benefit of the OWNER, the prime CONTRACTOR and sub-contractors as their interests may appear.

1-06. Insurance policies shall remain in effect on portions of the work which have been completed and which may or may not be occupied or utilized by the OWNER prior to the completion and acceptance of the entire work included in the Contract.

END OF SECTION

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SECTION J.5

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

SECTION J.5

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

1-01 REQUIREMENTS INCLUDED

A. Submit Shop Drawings, Product Data and Samples required by Contract Documents.

B. Submit six (6) bound copies to ENGINEER for review unless otherwise specified.

1-02 SHOP DRAWINGS

A. Drawings shall be presented in a clear and thorough manner.

B. Identify details by reference to sheet and detail, schedule or item numbers shown on Contract Drawings.

1-03 PRODUCT DATA

A. Preparation:

1. Clearly mark each copy to identify pertinent products.

2. Show performance characteristics and capacities.

3. Show dimensions and clearances required.

4. Show wiring or piping diagrams and controls as necessary.

B. Manufacturer's standard schematic drawings and diagrams: 1) Modify drawings and diagrams to delete information which is not applicable to the work; 2) Supplement standard information to provide information specifically applicable to the work.

1-04 SAMPLES

A. Office samples shall be adequate to clearly illustrate: 1) Functional characteristics of the product, with integrally related parts and attachment devices; 2) Full range of color, texture, pattern, operation, use, etc.

1-05 CONTRACTOR RESPONSIBILITIES

A. Review Shop Drawings, Product Data and Samples prior to submission to ENGINEER.

B. Determine and verify:

1. Field measurements where necessary.

2. Field construction criteria from drawings or manufacturer's manuals.

3. Catalog numbers and similar data from manufacturer.

4. Conformance with specifications and detailed drawings.

C. Coordinate each submittal with requirements of the Work and of the Contract Documents.

D. Notify the ENGINEER in writing, at time of submission, of deviations in the submittals from requirements of the Contract Documents and provide an explanation for such deviation.

E. Begin no fabrication of items or perform items of work which requires submittals until return of submittals indicating ENGINEER'S review.

1-06 SUBMISSION REQUIREMENTS

A. Transmittal Letter and Submittals:

1. Use transmittal forms acceptable to the ENGINEER.

2. One copy only, with each item completed, is required for each submittal.

a. Submittals tendered with incomplete "Transmittal Letters" will be returned for resubmission.

3. Make submittals promptly and in such sequence as to cause no delay in the work or in the work of other CONTRACTORS, should one or more CONTRACTORS be involved on a project.

B. Number of submittals required:

1. Shop Drawings: Submit the number of opaque reproductions which the Contract Documents require, but in no case less than six (6) copies. Three (3) copies of each will be retained by the ENGINEER for the project files. Three (3) copies will be stamped, indicating any additional requirements, and returned to the CONTRACTOR.

C. Submittals shall contain:

1. The date of submission and the dates of any previous unapproved submissions.

2. The project title and number.

3. The names of:
   a. CONTRACTOR
   b. Supplier
   c. Manufacturer

4. Identification of the product or component, with reference to the applicable specification section number.

5. Field dimensions, clearly identified as such.

6. Relation to adjacent or critical features of the work or materials.

7. Applicable standards, such as ASTM, AWWA, AASHTO, or Federal Specification numbers, etc.

8. Identification of deviations from Contract Specifications.

9. Identification of revisions made on resubmittals.

10. CONTRACTOR'S stamp, initialed or signed, certifying as to review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the submittal, with requirements of the work and of Contract Documents.

1-07 RESUBMISSION REQUIREMENTS

A. Make any corrections or changes in the submittals required and resubmit until approved.

B. Shop Drawings and Product Data

1. Revise initial drawings or data, and resubmit as specified for the initial submittal.

2. Indicate changes which have been made other than those requested by the ENGINEER.

C. Samples: Submit new samples as required for initial submittal.

1-08 ENGINEER'S DUTIES

A. Review submittals with reasonable promptness and in accord with project schedule

B. Affix stamp and initials or signature, and indicate requirements for resubmittal, or review of submittal.

C. Return submittals to CONTRACTOR for distribution or for resubmission.

END OF SECTION

SECTION J.6

RECORD DOCUMENTS

SECTION J.6

RECORD DOCUMENTS

1-01 REQUIREMENTS INCLUDED

A. The CONTRACTOR shall maintain, during the course of the work, and provide to the ENGINEER, upon project completion, record documents as specified herein.

1-02 MAINTENANCE OF DOCUMENTS

A. Maintain in CONTRACTOR'S field office in clean, dry condition the following: (1) Contract Drawings, (2) Specifications, (3) Addenda, (4) Approved Shop Drawings, (5) Change Orders, (6) Other Modifications of Contract, Test Records, Survey Data, Field Orders and (7) All other documents pertinent to the CONTRACTOR'S Work.

B. Provide files and racks for proper storage and easy access as needed.

C. Make documents available at all times for inspection by the ENGINEER and the OWNER.

D. Record documents shall not be used for other purposes and shall not be removed from the field office without the ENGINEER'S approval.

1-03 MARKING SYSTEM

A. Make changes, revisions, additions, deletions, etc., carefully and in legible form acceptable to the ENGINEER.

B. Provide colored pencils for marking changes, revisions, additions, deletions, etc., to the record set of Contract Drawings.

C. Do not use ink or felt tip pens for marking documents.

1-04 RECORDING

A. Label each document "PROJECT RECORD" in large red printed letters.

B. Keep record documents current with work completed.

C. Do not permanently conceal work until required information has been recorded on drawings.

D. Contract Drawings: Legibly mark to record actual construction to include the following:

1. Depths or heights of various elements in relation to datum.

2. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements or benchmarks.

3. Location of internal appurtenances concealed in construction referenced to visible and accessible features of the work.

4. Field changes of dimensions and details.

5. Changes made by Change Order or Field Order clearly identified as such.

6. Details not on original Contract Drawings.

E. Specifications and Addenda: Legibly mark up each Section and record the following:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.

2. Changes made by Change Order or Field Order clearly identified as such.

3. Other matters not originally specified.

F. Shop Drawings: Maintain as record documents and legibly annotate Drawings to record changes made after review.

1-05 SUBMITTAL

A. At completion of project, deliver record documents to the ENGINEER.

B. Accompany submittal with transmittal letter containing:

1. Date.
2. Project title and number.
3. CONTRACTOR'S name and address.
4. Title and number of each record document.
5. Certification that each document as submitted is complete and accurate.
6. Signature of CONTRACTOR, or his authorized representative.

C. Incomplete or illegible record documents will be returned to the CONTRACTOR for completion or correction.

END OF SECTION

SECTION J.7

CONTRACT CLOSEOUT

SECTION J.7

CONTRACT CLOSEOUT

1-01 REQUIREMENTS INCLUDED

A. Comply with requirements stated in conditions of the Contract and Specifications for administrative procedures in closing out the work.

B. CONTRACTOR shall submit all notices and certifications in a form acceptable to the ENGINEER.

1-02 SUBSTANTIAL COMPLETION

A. When CONTRACTOR considers the work is substantially complete, he shall submit to the ENGINEER:

1. Written notice that the work, or designated portion thereof, is substantially complete.

2. A list of items to be completed or corrected.

B. Within a reasonable time after receipt of such notice, an inspection will be made by the ENGINEER to determine the status of completion.

C. Should it be determined that the work is not substantially complete:

1. CONTRACTOR will be notified in writing, giving the reasons for such determination.

2. Contractor shall remedy the deficiencies in the work, and send a second written notice of substantial completion.

3. Work will be reinspected.

D. When the ENGINEER concurs that the work is substantially complete, he will:

1. Prepare a Certificate of Substantial Completion on an acceptable form accompanied by a list of items to be completed or corrected.

2. Submit the Certificate to OWNER and CONTRACTOR for their written acceptance of the responsibilities assigned to them in the Certificate.

1-03 FINAL INSPECTION

A. When CONTRACTOR considers the work is complete, he shall submit written certifications to the ENGINEER that:

1. Equipment and systems have been tested in the presence of the ENGINEER and OWNER'S representative and are fully operational.

2. Work has been completed in accordance with Contract documents and is ready for final inspection.

B. An inspection will be made by the ENGINEER to verify the status of completion with reasonable promptness after receipt of such certification.

C. Should work be considered incomplete or defective:

1. The ENGINEER will promptly notify the CONTRACTOR in writing, listing the incomplete or defective items of work.

2. CONTRACTOR shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the ENGINEER that the work is complete.

3. Work will be reinspected.

D. When the work is acceptable under the contract documents, the CONTRACTOR will be requested to deliver closeout submittals.

1-04 CONTRACTOR CLOSEOUT SUBMITTALS

A. Evidence of compliance with requirements of governing authorities:

1. Certificate of Inspection:

a. Mechanical: City and/or County
b. Electrical: City and/or County
c. General: City and/or County

B. Waivers and Liens Affidavit.

C. Surety Release.

D. Labor and Material Warranty.

E. Certification Statement that material incorporated into the project meets or exceeds specification requirements of the Contract.

F. Project record documents and drawings.

G. Operating and Maintenance Data, Instructions to OWNER'S Personnel: As specified in Contract Documents or ordered by the ENGINEER.

H. Spare Parts and Maintenance Materials: As specified in Contract Documents or ordered by the ENGINEER.

I. Receipt for keys, if any, to all locks, gates and doors.

1-05 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to ENGINEER.

B. Statement shall reflect all adjustments to the contract sum:

1. The original contract sum.

2. Additions or deductions resulting from:

a. Previous change orders.
b. Allowances.
c. Unit Prices.
d. Deductions for uncorrected work.
e. Deductions for liquidated damages.
f. Other adjustments.

3. Total contract sum, as adjusted.

4. Previous payments.

5. Sum remaining due.

C. Final Change Order will be prepared reflecting approved adjustments to the Contract sum which were not made by previous Change Orders.

1-06 FINAL APPLICATION FOR PAYMENT

A. CONTRACTOR shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

B. No final application for payment will be processed until the Project Record Documents and Drawings have been submitted and approved.

END OF SECTION

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SECTION J.8

SCHEDULE OF VALUES
LUMP SUM BID ITEMS

SECTION J.8

SCHEDULE OF VALUES
LUMP SUM BID ITEMS

1-01 The successful BIDDER, within five (5) days of the receipt of the "NOTICE OF AWARD", shall submit, a Schedule of Values for "lump sum bid items", for OWNER'S and ENGINEER'S review. The Schedule of Values shall be an itemized list that establishes the various quantities and value or cost of each major part or component of Lump Sum Items. It shall be used as the basis for preparing progress payment applications and for use as a basis for negotiations concerning additional work or credits which may arise during the construction.

1-02 PREPARATION

A. The Schedule shall be prepared in the form and supported by the data required herein.

B. The Schedule shall show a breakdown of costs for labor, materials, equipment, delivery, installation, overhead, profit and other costs used in preparation of the Bid.

C. Costs shall be in sufficient detail to indicate a separate amount for each major component of the item listed.

D. CONTRACTOR may include items for bonds, insurance, and temporary facilities. Bonds and insurance may be claimed on the first application for payment. Any remaining items will be included for payment at the same percentage rate as total percent of the lump sum item completion.

E. The Schedule shall be prepared on 8-1/2 inch by 11-inch white paper.

F. Use items listed as Lump Sum on the Bid Form as basis for Schedule format and identify each item with number and description as shown on Bid Form.

G. The sum of the individual values shown on the Schedule of Values for each item must equal the Total Price bid for that item on the Bid Form.

END OF SECTION

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SECTION K

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

RICE ROAD EXTENSION

CITY OF RIDGELAND

Table of Contents

NOTICE TO BIDDERS

SPECIAL PROVISIONS

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SECTION 904

NOTICE TO BIDDERS

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904- NOTICE TO BIDDERS NO. 1 **CODE: (IS)**

DATE: **05/03/2004**

SUBJECT: **Governing Specifications**

PROJECT: **Rice Road Extension, City of Ridgeland, Madison County, Mississippi**

The current (2004) Edition of the Standard Specifications for Road and Bridge Construction adopted by the Mississippi Transportation Commission is made a part hereof fully and completely as if it were attached hereto, except where superseded by special provisions, or amended by revisions of the Specifications contained herein. Copies of the specification book may be purchased from the MDOT Construction Division.

A reference in any contract document to controlling requirements in another portion of the contract documents shall be understood to apply equally to any revision or amendment thereof included in the contract.

In the event the plans or proposal contain references to the 1990 Edition of the Standard Specifications for Road and Bridge Construction, it is to be understood that such references shall mean the comparable provisions of the 2004 Edition of the Standard Specifications.

Contractor shall include, delete, or replace the following from the above referenced specifications:

1. Contractor shall disregard methods of payments in all Sections. Methods of payments shall be as listed in the bid schedule. Items that are not listed on the bid schedule but are shown within the Construction Drawings shall be considered as incidental items and should be absorbed in other pay items. This project does not include any fuel adjustments.

2. Contractor shall disregard any and all parts of Section 100 that is superseded by the bound front end documents.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904- NOTICE TO BIDDERS NO. 2 **CODE: (SP)**

DATE: **6/6/2016**

SUBJECT: **Designated Owner and Engineer**

Any reference in the Contract Documents to the State of Mississippi, Mississippi Department of Transportation, Mississippi Transportation Commission, or any official thereof, it shall be interpreted to mean the _City of Ridgeland, Mississippi the "Owner".

Any reference in the Standard Specifications to the Project Engineer, District Engineer, Chief Engineer, or Engineer it shall be interpreted to mean Waggoner Engineering, Inc., Jackson, Mississippi.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 3 **CODE: (SP)**

DATE: **01/17/2017**

SUBJECT: **Final Clean-Up**

Immediately prior to final inspection for release of maintenance, the Contractor shall pick up, load, transport and properly dispose of all litter from the entire highway right-of-way that is within the termini of the project.

Litter shall include, but not be limited to, solid wastes such a glass, paper products, tires, wood products, metal, synthetic materials and other miscellaneous debris.

Litter removal is considered incidental to other items of work and will not be measured for separate payment.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 3 **CODE: (SP)**

DATE: **01/17/2017**

SUBJECT: **Final Clean-Up**

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Litter removal is considered incidental to other items of work and will not be measured for separate payment.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904- NOTICE TO BIDDERS NO. 4 **CODE: (SP)**

DATE: **12/22/2020**

SUBJECT: **Environmental Reports**

PROJECT: **Rice Road Extension, City of Ridgeland, Madison County, Mississippi**

The following Environmental Reports have been completed by the Owner. Should additional materials or conditions be observed that require further investigation, please notify the Owner and Engineer immediately. Copies of these reports are available to be provided in a digital pdf format by request at the time of transfer of construction documents.

1. Phase I Environmental Report Dated April 20, 2011
2. Phase II Environmental Report Dated April 20, 2011
3. Environmental Assessment for HUD-Funded Proposals: Site Demolition, Clearing, Grading, and Temporary Surfacing Dated May 2012

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904- NOTICE TO BIDDERS NO. 8 **CODE: (SP)**

DATE: **3/5/2019**

SUBJECT: **Amendments to Special Provisions**

PROJECT: **Rice Road Extension, City of Ridgeland, Madison County, Mississippi**

This Notice to Bidders includes amendments to the special provisions for certain pay items. In the event there are any conflicts between the plans, specs, and NTB No.8, this notice to bidders will be the governing body.

The following pay items have amendments addressed in this NTB:

216-B001, SOLID SODDING, BERMUDA, SY
Solid sodding shall be Tifway 419 Hybrid Bermuda. Sod will be paid for at the contract unit price per square yard, which price shall be full compensation for all labor, equipment, materials, tools, ground preparation, fertilization, and all incidentals necessary to complete the work.

Solid sodding shall be placed within 14 days of completed sidewalk work per each separate area or the contractor will be responsible for installing temporary grassing at his own expense. If contractor does have to install temporary grassing and mulch, this shall be done in accordance with Pay Item No. 226-A001 - Temporary Grassing with the exception that the cost will be absorbed.

608-C001, DETECTABLE WARNING PANELS, SF
Details of detectable warnings are shown on MD-1, MISC. DETAILS – SIDEWALK & CURB RAMP WITH DETECTABLE WARNINGS in the plans. Detectable warning panels shall be engineered polymer removable cast in place tiles manufactured by Access Products, Armor-Tile, or approved equal. Size shall be 2' x 4'. Panels shall be dark gray (fed. color 36118). No surface applied (glue down) detectable warning panels will be allowed.

907-632-A007, SOLID STATE TRAFFIC CABINET ASSEMBLY, TYPE III CABINET, TYPE 1 CONTROLLER, EACH
Traffic signal controller firmware to be SEPAC 3.58 or higher. The controller shall be configured to communicate with all monitoring systems and detection platform in addition to the Iteris Vantage Velocity bluetooth detector or approved equal.

907-632-PP001, TRAFFIC SIGNAL REMOTE MONITORING SYSTEMS, PER PLANS, EACH
The controller shall be configured to work with all monitoring systems and detection platform. Remote monitoring system consist of different equipment and services. The web-based data service to view activity at the intersection and the signal performance measures to evaluate the data shall be Iteris Vantage Live! and Signal Performance Measures (SPM) or approved equal.

Both shall have a 5-year hosting data service. The traffic signal preemption/remote cabinet monitoring device shall be Applied Information AI-500-086 Glance Preempt & Priority Field Monitoring Unit series or approved equal. The monitoring unit shall be connected to the city fiber and shall be integrated into the city TMC. All set up and configuration for data engine server and cloud based storage services shall be included in the pay item. Training for this equipment and services shall be included under TMC training.

907-633-A001, UNINTERRUPTABLE POWER SUPPLY, EACH
Battery Back-Up System shall be Clary SP 2000LX with 8 batteries or approved equal. It shall require its own standalone cabinet and foundation separate from the traffic signal controller cabinet / foundation.

907-634, TRAFFIC SIGNAL EQUIPMENT POLE, EACH
All traffic signal mast arm poles shall be fluted shaft with decorative base and luminarie arms (Valmont Huntington series or approved equal). Luminaires shall be induction lighting. Everything required for a complete and working luminaire, included but not limited to, "retro kit", post mount arms, and acorn fixture shall be included in the cost of the pole (See 4. below). Equipment and services shall be provided by American Green Power or approved equal.

"RETRO KIT"

1. "Retro Kit" shall provide a magnetic induction light and ballast and all necessary mounting components to mount a rectangular bulb and ballast in an existing Sternberg Lighting Catalog No.G475 Post Top fixture.

2. The "Retro Kit" shall be manufactured from non-ferrous metals and must properly seal to maintain IP-65 rating of the existing fixture.

3. The CONTRACTOR shall demonstrate in writing during the submittal process the following MANUFACTURER specifications are met:
i. 100 Watt
ii. 120 to 277 volt self-regulating ballast
iii. 5000 Kelvin color
iv. Power Factor of .95 or greater
v. Rated Lamp Life of 100,000-hrs
vi. Minimum lumen Maintenance of 70% @ 80,000 hrs.
vii. Minimum CRI of 80
viii. Bulb height 10 ¼", width 5 ¾", depth 3 ¼", diameter 2 ¼"
ix. BSP3 LC Surge Protection, SG-277-TR standard.

4. The CONTRACTOR is responsible for providing all materials and labor necessary for providing a fully operational Sternberg, Hometown Series, retro-fitted induction street light including but not limited to new conductors, ground wiring, Sternberg Hometown Series twin TAPM, 48-inch, luminaire post-mount arm matching the existing signal pole material and finish, and a 100-watt "Retro-Kit" installed in a new Sternberg, Hometown Series, Catalog No.G475 acorn fixture.

907-643-A004, VIDEO VEHICLE DETECTION SENSOR, TYPE 1A, EACH
Video Detector shall be Iteris Vantage Next Camera connected to the Vantage Next Shelf-Mount Platform or approved equal.

907-643-E001, MULTI-SENSOR VEHICLE DETECTION SENSOR, EACH
Multi-Sensor Detector shall be Iteris Vantage Next Vector Hybrid compatible with the Next platform and connected to the Vantage Next Shelf-Mount Platform or approved equal.

907-650-A003, ON STREET VIDEO EQUIPMENT, PTZ TYPE, EACH
PTZ cameras shall be Cohu HD RISE 4220HD Series Dome or approved equal.

907-653-PP001, STREET NAME SIGN, PER PLANS, EACH
The street name signs shall be 2017 Ridgeland Metro mast arm standard street name signs. Details of street name signs are shown on TSD-11, STREET NAME SIGN DETAILS in the plans.

907-659-A001, TRAFFIC MANAGEMENT CENTER MODIFICATIONS, LS
Pay item is intended for contractor to integrate the two new intersections signal equipment, monitoring system devices, detectors and detector platform, and PTZ cameras into City of Ridgeland Traffic Management Center.

This integration includes assigning of IP addresses for all networkable equipment, networking them into the Ridgeland TMC and MDOT, and field verify path to TMC.

If connections fail, contractor will be required to test path of existing fiber line from intersection site to TMC until the problem is located. City of Ridgeland will be responsible for establishing a viable connection once the problem is located.

907-659-A001 listed in the Special Provision talks primarily about and MDOT TMC and does not apply to the pay item listed in this project. No Monitor System will be required.

907-659-C001, TRAFFIC MANAGEMENT CENTER MODIFICATIONS - TRAINING, LS
Training shall be provided covering the system architecture, operations, and maintenance of the TMC system, in particular the new equipment and services included in the remote monitoring systems pay items.

907-661-B002, FIBER OPTIC DROP CABLE, 12 SM, LF
Quantity for this cable is based from the new pull box adjacent to the existing MDOT pullbox to the new controller cabinet(s). This quantity includes slack, and splices. This quantity will be paid based on the actual linear foot distance run in the field.

SUBSTITUTIONS
In the event the contractor wishes to substitute any equipment listed above for an "or equal", the following requirements must be met:

SUBSTITUTION TIME REQUIREMENT

With the receipt of Bids, any substitutions requested by the Contractor will also be submitted. Substitutions will be reviewed within a minimum of ten (10) working days. If the substitutions are deemed acceptable, the contract will be awarded. Awarding the contract will be on the basis of materials and products described in the Drawings or specified in the Specifications with the consideration of possible substitute of "or equal" items. The submittal data shall include a comparison of cost of the specified product and the proposed substitution. When the cost comparison shows a reduction in cost of the equipment, the submittal shall also include a request by the Contractor for a change order to reduce the contract bid price offering the Owner an appropriate credit should the substitution be accepted.

SUBSTITUTION CLARIFICATION

Substitute Equipment and Suppliers by the Contractor must generally be deemed equivalent, provided the "equivalent" product is equivalent to or better than the product named and described in the Specifications in size, form, function, performance, reliability, quality and general configuration. Determination of equality in reference to the project design requirements will be made by the Owner. The Contractor must submit a written explanation as to why he wishes to request a substation and why it is equal.

SUBSTITUTION RESPONSIBILITY

Should any substitutions be made, the CONTRACTOR shall bear responsibility for the installation, coordination, and operation of the system as well as any Engineering and redesign costs, which may result from substitutions.

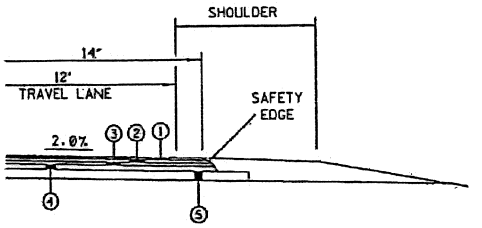
MISSISSIPPI DEPARTMENT OF TRANSPORTATION

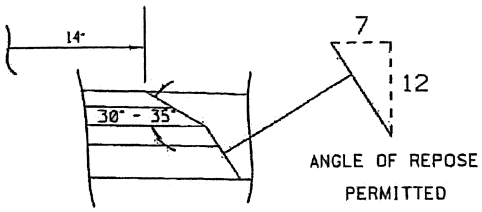
SECTION 904 - NOTICE TO BIDDERS NO. 13 **CODE: (IS)**

DATE: **03/01/2017**

SUBJECT: **Safety Edge**

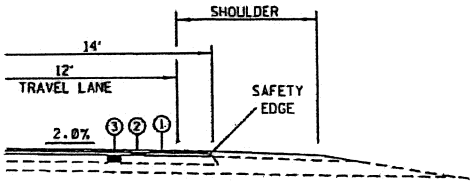
Bidders are hereby advised that the Shoulder Wedge (Safety Edge) specified in Section 401, Asphalt Pavements, shall only apply to the top two (2) lifts of asphalt. Open Graded Friction Courses (OGFC) are not to be considered a lift as it pertains to safety edge. Attached is a drawing showing the safety edge. Note that the shoulder dimensions in the bottom two drawings will be less than three feet (3').

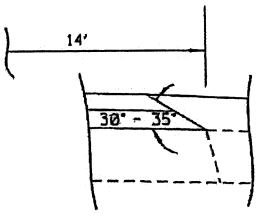




SAFETY EDGE REQ'D
TOP 2 LIFTS ONLY
(NOT A PAY ITEM)

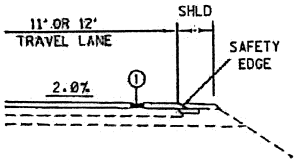
NEW CONSTRUCTION

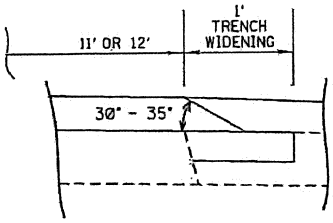




SAFETY EDGE REQ'D
TOP 2 LIFTS ONLY
(NOT A PAY ITEM)

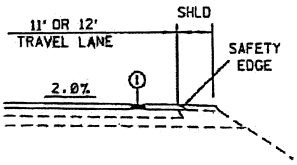
OVERLAY
14' PAVEMENT

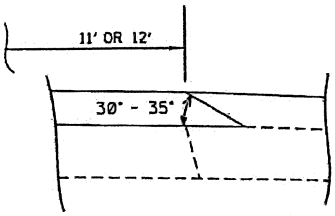




SAFETY EDGE REQ'D
(NOT A PAY ITEM)

OVERLAY
11' OR 12' PAVEMENT
WITH TRENCH WIDENING





SAFETY EDGE REQ'D
(NOT A PAY ITEM)

OVERLAY
11' OR 12' PAVEMENT
WITHOUT TRENCH WIDENING

SAFETY EDGE DETAILS **4/8/2011**

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 113 **CODE: (SP)**

DATE: **04/18/2017**

SUBJECT: **Tack Coat**

Bidders are advised that in addition to the products listed on the Department's APL as referenced in Subsection 401.03.1.2 on page 256, the Contractor may use one of the following as a tack coat.

- CSS-1
- CSS-1h
- SS-1
- SS-1h

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 445 **CODE: (SP)**

DATE: **10/10/2017**

SUBJECT: **Mississippi Agent or Qualified Nonresident Agent**

Bidders are hereby advised of the requirements of Subsections 102.08, 103.05.2, and 107.14.2.1 of the *2017 Standard Specifications for Road and Bridge Construction* as it refers to bonding agents. Proposal guaranties, bonds, and liability insurance policies must be signed by a **Mississippi Agent or Qualified Nonresident Agent.**

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 640 **CODE: (IS)**

DATE: **09/26/2005**

SUBJECT: **Fiber Reinforced Concrete**

Bidders are hereby advised that synthetic structural fibers meeting the requirements of Subsection 907-711.04 may be used in lieu of wire mesh in some items of construction. Substitution of fibers for wire mesh will be allowed in the construction of paved ditches, paved flumes, paved inlet apron, driveways, guard rail anchors and pile encasements. Substitution in any other items of work must be approved by the State Construction Engineer prior to use.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1405 **CODE: (IS)**

DATE: **03/15/2007**

SUBJECT: **ERRATA AND MODIFICATIONS TO THE 2004 STANDARD SPECIFICATIONS**

Page	Subsection	Change
101	201.01	In the second sentence of the first paragraph, change "salvable" to "salvageable".
107	202.04	In the fourth sentence of the fourth paragraph, change "yard" to "feet".
107	202.05	In the list of units measurements for 202-B, add "square foot".
132	211.03.4	In the second sentence of the second paragraph, change "planted" to "plated".
192	306.02.4	In the first line of the first paragraph, delete the word "be".
200	307.03.7	In the fourth sentence of the second paragraph, change "lime-fly ash" to "treated".
236	401.01	Change the header from "Section 403" to "Section 401".
242	401.02.3.2	In the first sentence of the third full paragraph, add "1/8" in the blank before the inch mark.
250	401.02.6.3	In the second sentence of the first paragraph on page 250, change "rutting over " " to "rutting over 1/8" ".
253	401.02.6.4.2	In the paragraph preceding the table, change "91.0" to "89.0".
259	401.03.1.4	In the first paragraph, change "92.0 percent" to "the specified percentage (92.0 or 93.0)".
269	403.03.2	In the table at the top of page 269, change the PI requirement from " = " to " $\leq$ ".

278	404.04	In the second sentence, change the subsection from "401.04" to "403.04".
283	409.02.2	Change "PG 64-22" to "PG 67-22".
294	413.02	In the first sentence of the second paragraph, change "707.02.1.3" to "Subsection 707.02.1.3".
340	511.04	In the second sentence of the second paragraph, change "412" to "512".
349	601.03.3	In the first sentence, change "804.03.2" to "804.03.5".
355	603.02	Change the subsection reference for Joint mortar from "707.03" to "714.11".
369	604.04	In the first sentence, change "601.04" to "Subsection 601.04".
427	619.04	Delete the second paragraph.
442	625.04	In the third paragraph, change "626.04" to "Subsection 626.04".
444	626.03.1.2	Delete the third sentence of the first paragraph.
464	631.02	Change the subsection reference for Water from "714.01.0" to "714.01.1".
570	682.03	Change the subsection number from "682-03" to "682.03".
575	683.10.4	Change the subsection number from "683.10.4" to "683.04".
575	683.10.5	Change the subsection number from "683.10.5" to "683.05".
596	701.02	In the table under the column titled "Cementations material required", change Class F, FA" to "Class F FA,".
603	702.11	In the first sentence, change "702.12" to "Subsection 702.12".
612	703.04.2	In the fifth paragraph, delete "Subsection 703.11 and".
616	703.07.2	In the Percentage By Weight Passing Square Mesh Sieves table, change the No. 10 requirement for Class 7 material from "30 - 10" to "30 - 100".

618	703.13.1	In the first sentence of the first paragraph, change "703.09" to "703.06".
618	703.13.2	In the first sentence, change "703.09" to "703.06".
671	712.06.2.2	In the first sentence, change "712.05.1" to "Subsection 712.05.1".
689	714.11.2	In the first sentence, change "412" to "512".
709	715.09.5	In the first sentence of the first paragraph, change "guage" to "gauge".
717	717.02.3.4	In the top line of the tension table, change "1 1/2" to "1 1/8" and change "1 1/8" to "1 1/2".
741	720.05.2.2	In the last sentence of this subsection, change "720.05.2.1" to "Subsection 720.05.2.1".
827	803.03.2.3.7.5.2	In the first sentence of the second paragraph, change "803.03.5.4" to "803.03.2.3.4".
833	803.03.2.6	In the first sentence, change "803.03.7" to "803.03.2.5".
854	804.02.11	In the last sentence of the first paragraph, change "automatically" to "automatic".
859	804.02.13.1.3	In the last sentence, change Subsection "804.02.12.1" to "804.02.12".
879	804.03.19.3.2	In the first sentence of the third paragraph, change "listed on of Approved" to "listed on the Approved".
879	804.03.19.3.2	In the last sentence of the last paragraph, change "804.03.19.3.1" to "Subsection 804.03.19.3.1".
962	814.02.3	In the first sentence, change "710.03" to "Subsection 710.03".
976	820.03.2.1	In the first sentence, change "803.02.6" to "803.03.1.7".
976	820.03.2.2	In the first sentence, change "803.03.9.6" to "803.03.1.9.2".
985	Index	Change the subsection reference for Petroleum Asphalt Cement from "702.5" to "702.05".

985	Index	Change the subsection reference for the Definition of Asphaltic Cement or Petroleum Asphalt from "700.2" to "700.02".
985	Index	Change the subsection reference for Automatic Batchers from "501.03.2.4" to "804.02.10.4".
986	Index	Delete "501.03.2" as a subsection reference for Batching Plant & Equipment.
988	Index	Change the subsection reference for the Central Mixed Concrete from "501.03.3.2" to "804.02.11".
988	Index	Change the subsection reference for the Concrete Batching Plant & Equipment from "501.03.2" to "804.02.11".
999	Index	Delete "501.03.3.3" as a subsection reference for Truck Mixers.
1001	Index	Change the subsection reference for Edge Drain Pipes from "605.3.5" to "605.03.5".
1002	Index	Change the subsection reference for Metal Posts from "713.05.2" to "712.05.2".
1007	Index	Change the subsection reference for Coarse Aggregate of Cement Concrete Table from "703.3" to "703.03".
1007	Index	Change the subsection reference for Composite Gradation for Mechanically Stabilized Courses Table from "703.8" to "703.08".
1009	Index	Delete "501.03.3.3" as a subsection reference for Truck Mixers and Truck Agitators.
1010	Index	Delete reference to "Working Day, Definition of".

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 2207 **CODE: (IS)**

DATE: **01/08/2020**

SUBJECT: **Reflective Sheeting for Signs**

Bidders are hereby advised that the retroreflective sign sheeting used for signs on this project shall be as listed below and shall meet the requirements of Subsection 721.06.

Temporary Construction Signs
Temporary traffic control (orange) sign sheeting shall be a minimum Type IX Fluorescent Orange sheeting as shown in Special Provision 907-721.

Permanent Signs
Permanent signs, except signs on traffic signal poles/mast arms, shall be as follows:

- Brown background sheeting on guide signs shall be a minimum Type VIII sheeting,
- Green and blue background sheeting on guide signs shall be a minimum Type IX sheeting, and
- All white, yellow, fluorescent yellow, and fluorescent yellow/green sheeting shall be Type XI sheeting.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 2689 LPA **CODE: (SP)**

DATE: **06/15/2017**

SUBJECT: **Asphalt Smoothness Requirement**

Bidders are advised that Subsection 403.03.2.1—Smoothness Tolerances for Mean Roughness Index (MRI) is removed from this project. Any incentive or disincentive for asphalt smoothness associated with (MRI) is also hereby eliminated from this project.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 2766 **CODE: (SP)**

DATE: **08/05/2020**

SUBJECT: **Material Transfer Device**

Bidders are advised that the use of a material transfer device as referenced in Subsection 401.03.9 of the Standard Specifications is not mandatory on this project(s). The Contractor may use a material transfer device if desired, but it is not required.

THE CITY OF RIDGELAND, MISSISSIPPI

NOTICE TO BIDDERS # 3781 LHDE

DATE: **8/04/2016**

SUBJECT: **STRUCTURE EXCAVATION**

PROJECT: **Rice Road Extension, City of Ridgeland, Madison County, Mississippi**

Bidders are hereby advised that excavation for conventionally installed conduits (pipe) will not be measured and paid for separately but shall be included in the price bid for each individual item. Excavation for conventionally installed box culverts and box bridges will be measured and paid for as set out in Section 206.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904- NOTICE TO BIDDERS NO. 4303 **CODE: (SP)**

DATE: **12/24/2020**

SUBJECT: **Bid Alternates**

PROJECT: **Rice Road Extension, City of Ridgeland, Madison County, Mississippi**

Bidders are hereby advised that this project contains bid alternates that could be used to determine the low bidder. Bidders are required to bid the base items and all alternates. The Owner reserves the right to award the base bid and all or none of alternatives.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 5545 **CODE: (SP)**

DATE: **05/19/2015**

SUBJECT: **Burn-in Period**

Bidders are advised that the contract time for this project has included the time required for a burn-in period for all electrical equipment on this project.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 7400 **CODE: (SP)**

DATE: **February 1, 2018**

SUBJECT: **Cooperation Between Contractors**

PROJECT: **Rice Road Extension, City of Ridgeland, Madison County, Mississippi**

The Bidder is advised that Ridgeland City Hall is currently under construction south of this project.

The Contractor shall cooperate in all respects and shall coordinate construction of all phases of work with the Contractor of the adjacent project.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 9000 **CODE (SP)**

DATE: **1/31/2018**

SUBJECT: **Haul Permit**

PROJECT: **Rice Road Extension, City of Ridgeland, Madison County, Mississippi**

A Permit for hauling on City of Ridgeland streets is required. Access from School Street and through the new City Hall property is not allowed.

Haul permit can be obtained from:

Mike McCollum
Ridgeland City Hall
304 Highway 51
Ridgeland, MS 39157
601-853-2017

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904- NOTICE TO BIDDERS NO. 9001 LPA **CODE: (SP)**

DATE: **January 21, 2021**

SUBJECT: **Materials Testing Allowance**

PROJECT: **Rice Road Extension**

This project includes a bid line item with a predetermined price that shall be utilized for certain materials testing associated with this project. Scope of work that shall be included in the Materials Testing Allowance is:

> "All earthwork (soil classification/gradation, atterberg limits, proctor, and density), lime-treated subgrade (proctor, and density), crushed limestone (gradation, dry unit weight determination, proctor, specific gravity, and density), concrete (mold cylinders, air content, slump test, coarse and fine aggregate gradation, coarse and fine aggregate specific gravity, and compressive strength tests), hot mix asphalt (cores and density) testing will be provided Burns Cooley Dennis, Inc. (BCD). BCD will be employed and paid for by the Contractor in the allowance amount listed on the Bid Form. The payment to the Contractor will be made monthly per the provided BCD invoice. All other testing and material certifications are the responsibility of the Contractor.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1241 **CODE: (IS)**

DATE: **11/27/2018**

SUBJECT: **Fuel and Material Adjustments**

Bidder's attention is brought to the last paragraph of Subsection 109.07 of the Standard Specifications which states that no fuel or material adjustment will be made after the completion of contract time. Any fuels consumed or materials incorporated into the work during the monthly estimate period falling wholly after the expiration of contract time will not be subject a fuel or material adjustment.

SECTION 907

SPECIAL PROVISIONS

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-608-2 **CODE: (SP)**

DATE: **11/12/2019**

SUBJECT: **Detectable Warning Panels**

Section 608, Concrete Sidewalks, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as hereby amended as follows.

907-608.02--Materials. Delete the fourth paragraph of Subsection 608.02 on page 414, and substitute the following.

Detectable warning panels for Americans with Disabilities Act (ADA) compliance shall meet the requirements of the plans, standard specifications, contract documents, and AASHTO M 333. The panels shall be precast, modular, or prefabricated.

907-608.04--Method of Measurement. Delete the first paragraph of Subsection 608.04 on page 416, and substitute the following.

Concrete sidewalks of the type specified will be measured for payment by the square yard. Transition slopes, turning space, and ramps necessary for detectable warning panels will be measured as concrete sidewalk.

907-608.05--Basis of Payment. Add the following to the list of pay items in Subsection 608.05 on page 416.

907-608-C: Detectable Warning Panels per square foot

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-608-D003 **CODE: (SP)**

DATE: **12/22/2020**

SUBJECT: **Stamped and Colored Concrete Sidewalk**

PROJECT: **Rice Road Extension, City of Ridgeland, Madison County, Mississippi**

Section 608, Concrete Sidewalks, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as amended by this special provision is applicable to Stamped and Colored Concrete Sidewalk Only.

907-608--Description. This work consists of furnishing all labor, materials, tools, tests, royalties, services and other incidentals as may be required for the good and proper completion of the colored and imprinted (stamped) concrete.

The locations for the concrete are generally limited to areas around and in concrete islands and crosswalks.

Quality Assurance. Installation shall be performed by an installer with at least one-year experience in the placement of stamped and stained concrete paving systems.

907-608.02--Materials. Colored concrete materials and imprinting tools shall meet the following requirements.

A. Acceptable Manufacturers shall be Bomanite Corporation, Solomon Colors, or approved equal.

B. Colors for stamped and stained concrete shall be selected by the Engineer from Standard or Designer color charts, or an approved manufacturer's color charts.

C. Curing and Finishing Material: Contractor shall utilize curing and finishing material recommended by the manufacturer. Curing materials or methods for unstained concrete shall not be used with stamped and stained concrete. The use of liquid curing materials for areas receiving staining will not be allowed.

D. Stamping: Tools for stamping shall be of high quality and shall provide uniform control of joint depth.

E. Stamping Pattern: The pattern to be used for all concrete stamping shall have a surface texture that is of the appearance of naturally worn European Fieldstone. The edges shall be irregular and corners rounded.

Once the color and the stamping tools have received approval from the Engineer, the Contractor shall provide a 4-foot square test panel, separate from proposed island and median end nose areas, to be

reviewed and approved by the Engineer. Engineer will evaluate color as compared to color chart and texture of broom finish.

Subsequent test panels may be required, if the finish, stamping quality, or color is unacceptable to the Engineer. The Contractor shall remove unaccepted test panels immediately from site. Accepted panel shall remain until all stamped and stained concrete islands and median end noses have been completed by the Contractor, at which time the Contractor shall then remove the acceptable test panel from the site.

907-608.03.4--Protection and Curing. Protection and curing materials and methods of application for stamped and stained concrete shall be in strict accordance with the approved manufacturer's written instructions. Copies of the manufacturer's written instructions shall be furnished to the Engineer prior to manufacture and placement of stamped and stained concrete.

907-608.04--Method of Measurement. Colored and Imprinted Concrete Median and Island Pavement of the type specified will be measured by the square foot or square yard. Test panels will not be measured for separate payment.

907-608.05--Basis of Payment. Colored and Imprinted Concrete Median and Island Pavement, measured as prescribed above, will be paid for at the contract unit price per square foot or square yard, which price shall be full compensation for all labor, tools, materials, equipment, test panels, placement of concrete, imprinting the concrete, and all incidental necessary to complete the work. Payment will

Payment will be made under:

907-608-D003: Colored and Imprinted Concrete Median and Island Pavement, Thickness	- per square foot or square yard

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-619-5 **CODE: (IS)**

DATE: **01/17/2018**

SUBJECT: **Traffic Control for Construction Zones**

Section 619, Traffic Control for Construction Zones, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-619.02--Materials.

907-619.02.8--Traffic Signals and Flashers. Delete Subsection 619.02.8.1 on pages 452 thru 455, and substitute the following.

907-619.02.8.1-Portable Traffic Signals. Portable traffic signals shall be trailer or pedestal mounted units that provide for easy, legal transportation and quick setup and deployment. Each unit shall be self-contained. The types of portable traffic signals are as follows.

- Type 1 portable traffic signal shall include two signal heads per trailer with one signal head mounted on an overhead mast arm that can be extended over the travel lane, and the other signal head shall be mounted on the vertical upright of the trailer.

- Type 2 portable traffic signal shall include one signal head that is mounted on the vertical upright of the pedestal/cart or trailer. Pedestal/Cart mounted shall be designated as Type 2A and Trailer mounted shall be designated as Type 2B. Type 2 portable traffic signals shall be tested to MASH Standards or NCHRP Test Level 3 crash testing requirements by an accredited independent test facility, with supporting documentation available upon request.

- Type 3 portable traffic signal shall be the same as Type 1 mentioned above but with enhanced capabilities as mentioned in each applicable section below.

The portable traffic signals shall be MUTCD Compliant and utilize standard ITE signal heads, and adhere to the ITE Specifications and Standards for Vehicle Traffic Control Signal Heads, Light Emitting Diode (LED) Circular Signal Supplement. The units shall be battery powered with a solar charging system, and be equipped with an onboard battery charger capable of being used with a 120V AC power source. Portable traffic signals shall be able to communicate with other portable signals via 900 MHz or other accepted wireless communications. If wireless connectivity is not feasible, hardwired connectivity shall be an acceptable alternative, as approved by the Engineer. Portable Traffic Signals shall include all the major components listed below or be able to perform the functions of these components. The major components of the unit shall include, but are not limited to, the trailer or pedestal/cart, telescoping mast arm (on Type 1 and 3), signal head(s) and back plates, traffic signal controller with operating software, solar charging system with batteries, input and output devices, vehicle detection, flasher units,

conflict monitor, relays, communications system and other equipment required for the safe operation and installation of the unit.

907-619.02.8.1.1--Signal Heads. The signal heads and all applicable components of the portable traffic signal shall meet the physical display and operational requirements of conventional traffic signals as specific in the Manual on Uniform Traffic Control Devices (MUTCD). The signal heads shall be cast aluminum or polycarbonate and shall meet the requirements laid out in the Mississippi Standard Specification for traffic signal heads and associated MDOT material specifications for traffic signal heads. The signal heads shall accommodate standard 12-inch LED indications meeting the ITE Specification "Vehicle Traffic Control Signal Heads" and ITE Specifications and Standards for Vehicle Traffic Control Signal Heads, Light Emitting Diode (LED) Circular Signal Supplement.

For Type 1, Type 2 and Type 3 portable traffic signals, the signal heads shall have the ability to be rotated 180 degrees to face in the opposite direction and shall have the ability to rotate and lock in approximately 10 degree increments to position the signal head for the optimum visibility to motorists.

For Type 1 portable traffic signals, each unit shall contain two signal heads with one signal head mounted on an overhead mast arm that can be extended over the travel lane with a minimum clearance of 17 feet measured from the bottom of the signal head unit to the road surface. The lower signal head shall be mounted to the vertical upright of the trailer at a minimum height of eight feet (8') from the bottom of the signal head unit to the road surface.

For Type 2 portable traffic signals, the signal head shall be mounted to the vertical upright of the trailer at a minimum height of eight feet (8') from the bottom of the signal head unit to the road surface.

For Type 3 portable traffic signals, each unit shall be the same as Type 1 mentioned above but with enhanced capabilities as mentioned below.

907-619.02.8.1.2--Controller and Operating Requirements. The portable traffic signal (Types 1, 2, and 3) shall include a solid state Controller Unit (CU) that is in compliance with NEMA TS 5 Performance Standard. The CU shall have an easy to read front panel backlit display for viewing and programming the configuration settings and CU status. The CU shall be capable of operating the portable traffic signal system in a fixed time, traffic actuated or manual control mode. Multiple portable traffic signals shall have the capability to be interconnected to form a portable traffic signal system. Each portable traffic signal within a connected system shall have the capability to serve as either the master or remote signal. Each portable traffic signal shall include a Conflict Monitor Unit (CMU), or Malfunction Management Unit (MMU) to ensure phase conflicts do not exist during operation.

For Type 1 and Type 2 portable traffic signals, a minimum of five (5) automatic time-of-day timing plans within a 24-hour period should be available in fixed time mode. The CU should have the ability to control a minimum of four (4) traffic phases with programmable cycle time adjustments and user adjustable red, amber, minimum green and maximum green times. The CU

shall have the capability of programming green and red times from 1 to 999 seconds and yellow times up to 15 seconds in one-second increments. The CU shall also have the capability of facilitating standby modes of red, red flash and yellow flash.

For Type 3 portable traffic signals, a minimum of ten (10) automatic time-of-day timing plans within a 24-hour period should be available in fixed time mode. The CU should have the ability to control a minimum of 16 traffic phases with programmable cycle time adjustments and user adjustable red, amber, minimum green and maximum green times. The CU shall have the capability of programming green and red times from 1 to 999 seconds and yellow times up to 15 seconds in one-second increments. The CU shall also have the capability of facilitating standby modes of red, red flash and yellow flash.

The system shall also have the ability to operate in vehicle actuation mode when vehicle detection components are used. The operating system shall have the capability to allow the Portable Traffic Signal to be connected to and controlled by a standard NEMA controller.

The system shall have the capability to be controlled remotely using a hardwired or wireless remote. The wireless radio remote shall be capable of communicating at a clear line of site distance up to ¼ mile from the master.

The CU shall have the capability of interfacing with a Remote Monitoring System (RMS) capable of reporting signal location, battery voltage, and system faults. The RMS shall include a password-protected web site, viewable via an internet connection. In the event of a system fault, the RMS shall provide specific information concerning the cause of the system fault (example: "red lamp on signal number 1 out"). The RMS shall immediately contact previously designated individuals via SMS text messaging or email, upon a fault event.

The active timing program operating the PTS system shall be available and viewable through the RMS website at all times. The RMS shall maintain a history of the operating system in each signal including total operating hours, alerts, and the location of the PTS trailer.

907-619.02.8.1.3--Wireless Communications. The portable traffic signals shall communicate with other portable traffic signals within the signal system via license-free wireless 900 MHZ radio link communications as specified in Subsection 662.02.2 of the radio Interconnect System specification. The radio units shall maintain communications at a minimum distance of one (1) mile. The radio system shall conform to the applicable Federal Communications Commission requirements and all applicable state and local requirements.

The portable traffic signals shall be in direct communication at all times either by wireless or hardwire connection to provide for the required conflict monitoring / malfunction management system.

907-619.02.8.1.4--Power Requirements. Each Portable Traffic Signal shall be equipped with a power source consisting of a solar collection array, solar controller and/or charging unit and batteries sufficient to operate the signal system. The number and size of batteries shall be sufficient to operate the Type 1 and Type 3 signals for a minimum of 30 days and Type 2A

signals for minimum of five (5) days, and Type 2B signals for minimum of 15 days without additional charging or assist from the solar array. An on-board battery charger shall be compatible with both the solar array and with a 120V AC power source.

For Type 1 signals, the solar panel array shall provide for a minimum of 440 watts of solar collection capability.

For Type 2A signals, the solar panel array shall provide for a minimum of 90 watts of solar collection capability.

For Type 2B signals, the solar panel array shall provide for a minimum of 110 watts of solar collection capability.

For Type 3 signals, the solar panel array shall provide for a minimum of 480 watts of solar collection capability and shall include a tilt and rotate system to optimally position the panels.

All instrumentation for the electrical system and battery compartment shall be contained in a lockable weatherproof enclosure. Solar panels shall be secured to the mounting brackets for theft prevention.

907-619.02.8.1.5--Trailer and Lift System. The trailer or pedestal/cart and all mounted components shall conform to the wind loading requirements as follows: 100 mph minimum for Type 1 portable traffic signals, 55 mph minimum for Type 2A portable traffic signals, 75 mph minimum for Type 2B portable traffic signals, and 90 mph minimum for Type 3 portable traffic signals as described in the AASHTO *Standard Specifications for Highway Signs, Luminaries and Traffic Signals*, as specified in the plans including all interims and updates. At the request of the Engineer, proof of conformance to these wind load ratings shall be verified by a third-party. No additional loose ballast shall be used to meet these wind load requirements. The trailer shall be made of structural steel and shall include four (4) leveling/stabilizer jacks capable of lifting the trailer a minimum of six inches (6").

The trailer or pedestal shall be equipped with a mechanical, hydraulic or electric lift system sufficient for one person to be able to raise and lower the vertical upright and/or horizontal mast arm to and from the operating position.

For Type 1, 2B, and Type 3 signals, the trailer shall be equipped to provide legal and safe transport on the public highway system at speeds up to 55 mph.

All exterior metal surfaces, except signal heads and back plates, shall be powder-coat painted highway safety orange.

907-619.02.9--Impact Attenuators. Delete the sentence in the first paragraph of Subsection 619.02.9 on page 455, and substitute the following.

Impact attenuators must be listed on the Department's APL.

907-619.02.11--Snap-Back Delineators. Delete the sentence in the paragraph of Subsection 619.02.11 on page 456, and substitute the following.

Snap-back delineators shall be selected from the list of surface mounted flexible delineator posts as shown on the Department's APL.

907-619.02.14--Changeable Message Sign.

907-619.02.14.5--PCMS Controller and Storage Cabinets. Delete the fifth sentence in the first paragraph of Subsection 619.02.14.5 on pages 462 and 463, and substitute the following.

The controller cabinet shall be illuminated.

907-619.05--Basis of Payment. Add the following to the list of pay items ending on page 480.

907-619-E3: Changeable Message Sign ***** - per each

907-619-H2: Traffic Signal, Portable, Type ___ - per each

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-631-1 **CODE: (IS)**

DATE: **11/15/2017**

SUBJECT: **Traffic Signal Systems - General**

Section 631, Traffic Signal Systems - General, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-631.02--Materials.

907-631.02.4--Operations. Delete the second paragraph in Subsection 631.02.4 on page 513 and substitute the following.

The Contractor shall conduct the work at all times in such a manner as to ensure the least possible inconvenience to the traveling public, and to property owners on the streets, alleys, and other public places where the construction will take place.

907-631.02.5--Electrical Service. Delete the first paragraph in Subsection 631.02.5 on page 515 and substitute the following.

It shall be the Contractor's responsibility to make the necessary arrangements with the local power company to provide the electrical service for any new installation. The Contractor shall pay for, at no cost to the Department, all deposits, hook-up charges, or other service fees required by the power company for the establishment of new service. The cost of all such fees shall be considered incidental and absorbed within existing pay items. The Department or the local agency will be responsible for payment of the monthly service bill for the new power service installation. It shall be the responsibility of the Contractor to swap the electrical service account over to the Department or local agency.

907-631.03--Construction Requirements.

907-631.03.2--Electrical Service Equipment. Delete the paragraphs of Subsection 631.03.2 on pages 515 and 516, and substitute the following.

The power supply assembly shall consist of all equipment mounted in a Power Service Pedestal as described in Subsection 722.13 or as otherwise shown in the plans. The configuration and installation of the equipment mounted on the assembly shall meet the safety requirements and approval of the utility company or municipality furnishing power for operation.

When required, service poles shall be provided by the Contractor and consist of wood poles with required pole line hardware, conduit, ground rods, guy wires and anchors and all other accessories and appurtenances mounted on the pole, except those items furnished by the utility company or

municipality, or as specified separately in the contract or plans. Costs of service poles shall be included in other items bids.

Main disconnect switches shall be separately housed on the power supply assembly. Circuit breaker cabinets and meters shall not be installed on the street or walk side of the pole or pedestal.

907-631.03.3--Performance Tests. Delete the second sentence of Subsection 631.03.3 on page 516.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

CODE: (IS)

SPECIAL PROVISION NO. 907-632-1

DATE: **11/15/2017**

SUBJECT: **Traffic Signal Cabinet Assemblies**

Section 632, Traffic Signal Cabinet Assemblies, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

Delete Section 632 on pages 517 thru 538, and substitute the following.

SECTION 907-632 - TRAFFIC SIGNAL CABINET ASSEMBLIES

907-632.01--Description. This work consists of furnishing, assembling, configuring and installing all component materials and software required to form completed traffic signal controller assemblies, closed loop master controller assemblies and signal system installation of the types specified, in conformity with these specifications, to ensure fully operational traffic signal installations as shown on the plans.

907-632.02--Materials.

907-632.02.1--Cabinet Assembly. Cabinet Assemblies shall meet the NEMA 3R requirements and be constructed principally of 0.125-inch thick, 5052-H32 aluminum. The aluminum shall have a mill finish per NEMA TS 2 7.7.3. Intermittent welds may be used for construction and any un-welded cabinet seams shall be sealed with clear RTV silicone. All external fasteners shall be stainless steel and no holes will be allowed in top of cabinet.

The door handles shall be stainless steel or cast aluminum. Door hinges shall be of the continuous type with a stainless steel hinge pin. Rivets are not be used to attach the hinge. The main door stop rod shall be constructed using stainless steel. The door stop mechanism shall be adjustable and capable of being securely latched in multiple opened positions including 90 degrees and a maximum of 120 degrees. The brackets attaching the stop rod to the door and cabinet shall be aluminum and welded in place. The main door cylinder lock shall be a #2 key type lock. Two (2) traffic industry standard No. 2 keys shall be provided with each cabinet and shall be made using heavy duty key blanks.

Extruded aluminum channels permanently attached to the right and left cabinet sides shall be provided for attaching adjustable shelving and mounting of other component panels. The cabinet shall have two (2) shelves installed. Both shelves shall be provided with the front edge pre-drilled with 0.25-inch holes located twelve (12) inches apart.

907-632.02.2--Physical Features.

907-632.02.2.1--Pull Out Drawer. A pull out drawer shall be installed and centered under the

bottom shelf. The drawer shall be made of 0.080-inch thick, 5052-H32 aluminum and come out on full extension drawer slides. The pull out drawer shall provide an approximate 16-inch x 14-inch working area and have the ability to bear a constant 25 pound burden. There shall be a compartment for document storage. The lid shall be hinged at the rear, to gain access to the storage area. The drawer will be used to store documents as well as support a notebook computer. The drawer slides shall be of the full extension ball bearing type. Dimensions of the drawer shall be large enough to support a notebook computer and a drawer of sufficient size to hold at least two (2) copies of the cabinet drawings and other related cabinet documentation. The surface of the lid shall have a non-slip surface.

907-632.02.2.2--Cabinet Lighting. Cabinets shall be provided with a minimum of two (2) white light LED modules. One (1) lighting module shall be installed along the front top section of the cabinet and the second lighting module shall be installed underneath the bottom cabinet shelf in such a location as to provide direct lighting of the load bay area of the cabinet but must not interfere with the cabinet drawer operation.

Both LED lighting modules shall be controlled by a NEMA rated, commercial quality, pushbutton door switch. The cabinet lighting shall turn on when the cabinet main door is opened and shall turn off when the main door is closed or an ON/OFF NEMA rated, commercial quality, toggle switch mounted on the inside cabinet door service panel shall be provided to turn both LED lighting modules on or off.

907-632.02.2.3--Police Panel Switches. Police panel switches shall be provided with all controller cabinets. All switches shall be hard wired and labeled as to their function.

NORMAL-FLASH: When this switch is in the FLASH position, all signal indications shall transfer to the flashing mode. AC power shall be removed from the load switches when the signal indications transfer to the flashing mode.

The controller unit shall operate in accordance with appropriate specifications during the flashing mode. When the switch is placed in the NORMAL position, transfer from the flash mode to normal operation shall be made in accordance with uniform code flash requirements.

SIGNAL ON-OFF: AC power shall be removed from the signal heads and the intersection will become dark when this switch is in the OFF position.

MANUAL CONTROL ON-OFF: When this switch is in the ON position, a logic ground shall be applied to the manual control enable input of the controller unit.

INTERVAL ADVANCE INPUT JACK: A manual jack shall be installed on the police panel. The jack shall inter-mate with a 3-circuit, ¼-inch diameter phone plug. The tip and ring (middle) circuits of the jack shall be connected to the logic ground and the interval advance inputs of the controller unit. When the manual hand cord is plugged into the jack and the pushbutton is pressed, logic ground shall be connected to the interval advance input of the controller unit.

When specified in the contract documents, an interval advance cord shall be provided. The cord

shall have a minimum length of three (3) feet. It shall have a ¼-inch diameter, three circuit plug connected to one end and a manual pushbutton enclosed in a hand-held enclosure at the other end. A complete cycle (push-release) of the manual pushbutton shall terminate the controller unit interval which is active except the vehicular yellow and red clearance intervals. Cycling the push-button during the vehicular yellow or all red clearance intervals shall not terminate the timing of those intervals.

907-632.02.2.4--Service Panel Switches. Service panel switches shall be hard wired and clearly labeled to identify as to their functions. Service panel switches shall be mounted on the service panel located on the inside of the main cabinet door. Alternate switch locations may be described in the plans or contract documents but final switch design and location shall be approved by the Engineer prior to cabinet fabrication.

NORMAL-FLASH: When this switch is in the FLASH position, all signal indications shall transfer to the flashing mode. AC power shall be removed from the load switches when the signal indications transfer to the flashing mode.

The controller unit shall operate in accordance with appropriate specifications during the flashing mode. When the switch is placed in the NORMAL position transfer from the flash mode to normal operation shall be made in accordance with uniform code flash requirements.

CONTROLLER ON-OFF: When this switch is in the OFF position, AC power shall be removed from the controller. When this switch is returned to the ON position, the controller unit shall perform normal start up functions and resume normal operation in accordance with the applicable specification.

STOP TIME-RUN-NORMAL: A 3-position manual switch shall be provided which places the controller into Stop Time mode manually or through remote input.

VEHICLE DETECTORS: A 3-position switch shall be provided for each vehicle and pedestrian detector circuit. All switches shall be located on a panel mounted on the inside of the main cabinet door. The switch panel shall be labeled CALL SWITCH. Labeling of phase number and intended function (vehicles or pedestrian calls) shall be provided for each switch.

The vehicle detector switch functions are defined as follows:

Locked Call	Call is continually placed into the controller unit.
Off (center)	Vehicle detector is connected to the controller unit vehicle detector input, i.e. normal detector operation.
Momentary Call	Call is continuous as long as the switch is manually held in this position.

907-632.02.2.5--Police and Service Panel Locations. The police and service panels shall be constructed of 5052-H32 0.125-inch thick aluminum.

The police panel shall be located behind the police door which is enclosed within the main door.

The police door shall be hinged and provided with a neoprene gasket seal. Access to any portion or equipment contained behind the main cabinet door shall not be accessible through any part of the police panel. The police panel shall be of appropriate dimensions to accommodate all switch or devices described within this specification, the plans or contract document. The police door shall be provided with a treasury #2 key type lock and two (2) keys for the police door lock shall be provided with each cabinet.

The service panel shall be mounted on the inside portion of the main cabinet door, adjacent to the back side of the police panel or on the left hand side of the cabinet.

907-632.02.2.6--Cabinet Ventilation. Cabinets shall be vented to allow dissipation of the heat generated by the equipment contained within. All cabinets shall have a thermostatically controlled exhaust fan located at the top of the cabinet that is capable of 100 cubic feet per minute air displacement. The thermostat shall be mounted on the inside top of the cabinet and shall have a nominal temperature range from 80°F to 170°F.

The intake vent shall be louvered or equivalent design to prevent rain infiltration. The vent area will be located along the bottom portion of the cabinet door. A 16-inch x 12-inch x 1-inch disposable pleated air filter shall be provided on the inside portion of the cabinet and shall fully cover the vent area.

907-632.02.2.7--Air Filter Assembly. Air filters shall be one piece and shall be held firmly in place against the cabinet door in order to prevent dust from bypassing the perimeter of the filter and shall fully cover the vent area. Wing nuts or thumbscrews are preferred. Air filter shall be a 16-inch x 12-inch x 1-inch disposable pleated filter.

907-632.02.2.8--Cabinet Sizes.

907-632.02.2.8.1--Type I Cabinet. A Type I cabinet, 51"H x 30"W x 18"D, may be used for both pole and base mounted cabinets that require a maximum eight (8) position load bay. Pole mounted cabinets do not require rear access.

907-632.02.2.8.2—Type II Cabinet. A Type II cabinet, 51"H x 36"W x 18"D, may be used for both pole and base mounted cabinets that require a maximum twelve (12) position load bay. Pole mounted cabinets do not require rear access.

907-632.02.2.8.3--Type III Cabinet. A Type III cabinet, 56"H x 44"W x 27"D, shall be used for base mount installations and shall require a sixteen (16) position load bay and rear access door.

907-632.02.2.8.4--Type IV Cabinet. A Type IV dual chamber cabinet, 56"H x 57"W x 29"D, shall be used for base mount installations and shall require a sixteen (16) position load bay, rear access door, and external generator plug. When called for in the plans, a UPS shall be housed inside this cabinet.

907-632.02.2.8.5--Type V Cabinet. A Type V cabinet, 77"H x 44"W x 27"D, shall be used for base mount installations and shall require a sixteen (16) position load bay and rear access door.

907-632.02.3--Power Distribution Panel. The power panel shall be wired to provide the necessary power to all equipment. It shall be manufactured from 0.125-inch thick, 5052- H32 aluminum. The power panel shall house the following components: Main Breaker, Auxiliary Breakers, and Terminal Block. The panel shall be of such design so as to allow a technician to easily access the main and auxiliary breakers.

A 3-position terminal block with a removable insulated cover accepting up to AWG #4 stranded wire shall be supplied for accepting only the incoming power lines. This terminal block shall be in advance of and supply only the 30-amp main breaker, 10-amp and 5-amp Auxiliary breakers, AC neutral buss and earth ground buss.

907-632.02.3.1--Ground and Neutral Busbars. Cabinet grounding shall meet the requirements set forth in Subsection 722.09 for grounding and ground rods. A solid copper ground busbar shall be mounted on the side of the cabinet wall adjacent to the power panel for the connection of chassis ground wires. If more than one (1) ground busbar is used in a cabinet, a minimum of an AWG #6 copper wire shall be used to bond them.

The copper ground busbar shall have a minimum of thirteen (13) connector points, each capable of securing at least one (1) AWG #6 conductor.

A solid copper neutral busbar shall be mounted on the side of the cabinet wall adjacent to the power panel for the connection of AC neutral wires.

The copper neutral busbar shall have a minimum of thirteen (13) connector points, each capable of securing at least one (1) AWG #6 conductor.

907-632.02.3.2--Terminal Strips. Conductors shall be terminated on terminal strips with insulated terminal lugs. When two (2) or more conductors are terminated on field wiring terminal strip screws, a terminal ring lug shall be used for termination of those conductors. The voltage and current rating of terminal strips shall be greater than the voltage and current rating of the wire which is terminated on the terminal strip.

907-632.02.3.3--Cabinet Receptacles. A 3-wire 115 Volt AC (15A) Ground Fault Circuit Interrupt (GFCI) duplex receptacle shall be provided in the cabinet for maintenance use. It shall be securely mounted near the bottom right side of the cabinet and easily accessible.

Two (2) 3-wire 115 Volt AC (15A) non-GFCI protected outlets shall be installed, one on each side of the cabinet. These two (2) outlets are used for communication or other auxiliary equipment.

907-632.02.3.4--Operating Line Voltage. All equipment shall be designed to operate from a 120 volt, 60 cycle AC supply. Operation shall be satisfactory at voltages from 105 volts to 130 volts. All operating voltages into and out of the controller shall be NEMA level DC voltages except for the controller AC power source (Connector A, Pin p – AC-Control and Pin U – AC Common).

907-632.02.3.5--Circuit Breakers. Circuit breakers shall meet the requirements set forth in

Subsection 722.07. A 30-amp main breaker, with a minimum of 10,000 amp interrupting capacity, shall be provided for all cabinets to supply power to the controller, MMU, signals, and rack power supply.

Two (2) auxiliary breakers shall be provided. The first breaker, 10-amp, shall supply power to the fan, light, GFCI utility receptacle and two (2) auxiliary standard receptacles. The second breaker, 5-amp, shall be installed to supply power for the Controller Unit and MMU2. The above circuit breakers line side shall be jumpered together and will be fed from an external main circuit. A third 5-amp breaker shall be required if an ITS camera panel is called for in the plans.

907-632.02.3.6--Main Line Arrestors. Surge protection shall be provided that meets the requirements set forth in Subsection 722.12. A main line arrestor shall be provided to reduce the effects of voltage transients on the AC power line. It shall be installed after the circuit breaker. The main line arrestor shall be sufficient to protect all equipment and devices as per the plans and the following minimum specifications.

- Multi-stage Hybrid Design
- Series induction filtering
- Thermally protected Metal Oxide Varistors (TMOV's)
- Operating Voltage: 120 VAC
- Clamping Voltage: 395 VAC
- Operating Current: 15 A
- Peak Surge Current: 50 kA/Mode, 100 kA/Phase
- Operating Frequency: 47-63Hz
- EMI Attenuation: 40 dB Typ
- SPD Technology: TMOV's w/ W-C Filter
- Modes of Protection: L-N, L-G, N-G
- Status Indication: Power On & TMOV's Functional
- Connection Type: ¼-20 Stainless Steel Stud
- Operating Temperature: -40°F to +185°F

907-632.02.3.7--Solid State Main Line Relay (SSR). A normally-open, 75-amp, hybrid SSR shall be provided on the power distribution panel. The relay shall include a LED indicator to verify circuit power.

907-632.02.4--Terminal Facilities Board. The Terminal Facility shall be a hardwired load bay for NEMA TS 2 Type 1 actuated controllers. The load bay shall include either eight (8), twelve (12) or sixteen (16) load switch positions, as specified by the plans, and shall be centered along the back of the cabinet below the bottom shelf.

All wires terminated behind the backboard, as well as any additional panels, shall be soldered. No pressure or solderless connectors shall be used, unless they are soldered to the wire and tab after connection.

907-632.02.4.1--Load Switches and Flashers. Solid State Load Switches, compatible with low

wattage LED signals, shall be provided for the sequence called for on the plans. The load switch sockets shall be wired for triple-signal load switches conforming to NEMA TS 1-1994 and NEMA TS 2-2003 requirements.

The flasher socket shall be wired for and provided with a Type 3, two (2) circuit Solid State Flasher conforming to NEMA TS 1-1994 and NEMA TS 2-2003 requirements. It shall be possible to flash either the amber or red indication on any load switch outputs. It shall be possible to easily change the flash indication from the front side of the panel using readily available tools such as a screwdriver. A nominal flash rate of 50 to 60 FPM shall be provided. Flash rate shall be stable when used with generators or inverters.

Support(s) shall be provided to support the Flasher and Load Switches at some point approximately half of the total length from the panel surface. Sufficient area beneath the Load Switch or Flasher shall be clear in order to allow for free flow of air across the Load Switches or Flasher. Load Switches and Flashers must be provided with LED indicator lights on the side facing the cabinet door.

907-632.02.4.2--Flash Transfer Relay. All flash transfer relays, as a minimum, shall meet NEMA TS 1 requirements. The number of relays that shall be supplied with each cabinet shall accommodate the number of signal phases as indicated in the project plans. The coil of the flash transfer relay must be de-energized for flash operation.

907-632.02.5--Cabinet Wiring. Controller cabinets shall be wired in accordance with the signal phasing plans. If phases are indicated as omitted for future use, or if phases are not shown to be used in the plans, the cabinet shall be wired for use of the phases shown as future or unused. Load Switches shall not be provided for future or unused phases.

Wiring in the cabinets shall conform to the requirements of the National Electrical Code (NEC) and all of these specifications. All conductors in the cabinet shall be stranded copper. All wiring shall be laced. All wiring shall be in accordance as specified by Section 636 and Subsection 722.03 for Electric Cable and IMSA Specification 19 and/or 20 for Signal Wiring.

Connector harnesses for controller, conflict monitor, vehicle detectors, and accessory equipment (including NEMA defined Card Rack with power supply and pre-wired optical detection slots) shall be provided and wired into the cabinet circuitry. Connecting cables for controller and conflict monitor harnesses shall be sleeved in a braided mesh. All wires shall be securely terminated on terminal strips. The lay of the interconnect cable between the components must be such that when the door is closed, it does not press against the cables or force the cables against the various components inside the cabinets.

All communication wiring shall be bundled and routed independently of all other wiring. All live conductors shall be covered with suitable insulating material. All equipment grounds shall run directly and independently to the grounding bus.

All wires shall be cut and terminated as close as possible to the proper length before assembly. Consideration of equipment location adjustments must be made when determining appropriate

wire lengths. Excessive lengths of wire or cable shall not be allowed. All line voltage conductors used in controller cabinet shall conform to the following color code:

AC Neutral: White
AC Hot: Black
Safety Ground: Green

907-632.02.5.1--Signal Terminal Arrestor Grounding Bar. A field terminal arrestor grounding bar shall be provided along the back portion of the cabinet for the installation of signal arrestors. This bar shall be attached using an AWG #10 stranded copper to the earth ground circuitry.

907-632.02.5.2--Signal Terminal Arrestors. The field terminal arrestor shall be a three (3) circuit protective device intended for use on traffic control load relay outputs. The arrestor shall be furnished with three (3) leads and a grounding stud which will be used to attach the arrestor to the grounding bar. The field terminal arrestor shall meet the following minimum specifications:

- Operating Voltage: 120 VAC
- Clamping Voltage: 475 VAC
- Peak Surge Current: 10 kA
- Operating Frequency: 47 – 63 Hz
- SPD Technology: MOV's
- Connection Type: Wire Leads
- Lead Wire: 14 AWG 12" Length
- Ground Stud: 10 x 32 5/8" Length
- Operating Temperature: -40°F to +185°F

907-632.02.6--Accessory Components.

907-632.02.6.1--Traffic Actuated Controller Unit. The fully actuated controller unit shall, at a minimum, meet the requirements of both NEMA TS 1–1989 and NEMA TS 2-2003 requirements for actuated controller units. The controller shall be of the TS 2 Type 2 configuration. The controller shall be provided with the multiple communication interface devices or properties as defined below.

- 10 Base-T Ethernet with front panel RJ-45 connector
- IEEE defined MAC address
- EIA-232 port
- External Serial Fiber options for both single and multi-mode (optional as per plans)
- External FSK 1200 bps modem (optional as per plans)
- D connector with 37 pin configuration for TS 1 compatibility
- USB port for signal controller database upload/download to the controller flash
- Controller
- ECOMM Compatible

The controller unit must have an alphanumeric backlit LCD display with a minimum of sixteen

(16) lines at 40 characters per line. The controller must be air-cooled with sufficient ventilation openings and capable of operating between -30°F and 165°F. The controller unit must be provided with a time-of-day clock, automatic daylight savings time adjustment and a power supply for maintaining SRAM during a power outage. The controller unit shall be capable of being used in a Closed-Loop System and must be capable of operating in the role of master controller in a Closed Loop System. The controller unit firmware shall be fully compatible with the Department's existing Traffic Signal Management Software. The Contractor shall ensure all controller firmware versions are compatible with the existing Traffic Signal Management Software that the Regional Department staff currently utilizes prior to submitting the controller for approval. The Contractor shall notify the Department if any special controller configuration or firmware is needed prior to submitting the controller for approval based on project requirements.

Where Flashing Yellow Arrow (FYA) operations are being used, all traffic signal controller firmware shall be capable of delaying the onset of the flashing yellow arrow.

All operator entered data shall be stored and backed up on to a flash memory device provided with the controller unit at no cost. This flash memory device shall require no battery to support value storage. No internal components of circuitry shall require battery support. The database shall be able to be backed up to a USB drive via the USB drive on the controller.

Traffic Actuated Controllers shall be of the Type shown on the plans. Type 1 Controllers shall have a Linux based processor and a minimum of one (1) USB port. Type 2 Controllers shall have the same features as Type 1 Controllers with the addition of an ATC backplane.

Type 3 Controllers shall have all features of the Type 2 Controller with the addition of the ATC module. All three (3) types of actuated controllers shall have Master controller capability, and if required shall be designated with 'M' in the plans.

907-632.02.6.2--Closed Loop Master Controller Unit. When called for in the plans, this work also consists of furnishing, installing and configuring the equipment, software and accessories necessary to connect one (1) traffic Closed-Loop Master Controller to its corresponding central or portable PC-based Traffic Computer Facility Control System via a communications connection. The communications or network connection device will be either existing or provided by the Contractor.

907-632.02.6.2.1--General. The Master shall monitor intersections in the system, display status and operational state and provide traffic flow data from intersection vehicle detectors. The Master shall include all communications equipment and software necessary to provide reporting to a remote terminal as well as upload/download of all local intersection data and provide timing synchronization. Communications to local controllers from the Master and from the Master to the central-office computer facility shall be by FSK, 900 MHz Radio, Broadband Radio, Serial Fiber, Ethernet, Fiber, Cell Modem or Leased Line, as indicated in the plans. The Master shall be able to run on the same controller simultaneously operating the intersection, with the local signal control software, on any given controller unit.

907-632.02.6.2.2--System Configuration. The system architecture shall be designed to minimize

the effect of equipment failures on system operation and performance. The system consists of four (4) principal elements:

- Local System Intersection Controllers
- Communication (Telemetry Links)
- On-Street Master(s)
- Central-Office Computer Software

907-632.02.6.2.3--Local System Intersection Controller. The local system intersection controllers connected to the Master controller unit shall be capable of controlling a fully actuated two (2) to sixteen (16) phase intersection and shall meet or exceed NEMA TS 1-1989 and TS 2-2003 standards for fully actuated traffic control units. The local controller shall have internal communication capability with direct access to the data memory. The local system controller shall be capable of processing controller and detector data and provide all necessary intersection control functions. The local system intersection controller shall meet the requirements of the Traffic Actuated Controller Unit.

907-632.02.6.2.4--Communications (Telemetry) Links. The communications links for the "Closed-Loop" System shall perform the following functions:

- Provide the medium (radio/fiber/hardwire/etc.) for two-way communications between the On-Street Master and the local intersection controllers.
- Provide the medium for two-way communication between the On-Street Master and the central-office computer facility.
- Error checking shall be included in both mediums to assure transmission and reception of valid data.

907-632.02.6.2.5--On-Street Master. The On-Street Master may be located at an intersection and connected via the communication network to at least 32 local intersection controllers. The Master shall be capable of implementing Traffic Responsive Control, Time Base Control, Manual Control or Remote Control modes of operation.

Analysis of sampling sensor data from at least 64 system detectors and corresponding selection of the best Traffic Responsive timing pattern shall be provided by the On-Street Master during the Traffic Responsive mode of operation.

Automatic and continuous monitoring of system activity shall be provided by the On-Street Master to include both Master and intersection alarm conditions.

System parameter entry shall be provided via the On-Street Master including all Master and local intersection assignment and group parameters. Master parameters shall include:

- System coordination setup and pattern data entry by group
- System time base event scheduler
- System traffic responsive computational and pattern selection setup by group
- Intersection system group and detector assignments

The On-Street Master shall provide comprehensive system report generation including, as a minimum: system, intersection, detector and failure status and history reports in addition to system performance reporting.

A RS-232C interface shall be provided on the On-Street Master to allow for printing of reports or for interconnecting to a remote central site.

To enhance overall system operation and increase system management flexibility, the On- Street Master shall also support two-way dial-up communications to a central office computer for control, monitoring, data collection and for timing pattern updating purposes, all from a remote central office location. Continuous, seven (7) days/week - 24 hours/day, system monitoring shall be enhanced by the On-Street Master's capability to automatically dial-up the central office computer upon detection of user defined critical alarm conditions.

907-632.02.6.2.6--System Functional Requirements.

907-632.02.6.2.6.1--Operator Interface. In order to provide ease in programming and operation, the system shall provide a simplified user-friendly menu format at each local, master and central office facility. No special programming skills shall be required for the user to fully access and operate this control and monitoring system at any level.

All programming, both of the local intersection controllers and the On-Street Master(s) shall be via a front panel keyboard and display, driven by English Language menus. All data change entries will be automatically verified against established ranges prior to acceptance to prevent programming data errors. Data access shall be controlled by user- definable access controls.

907-632.02.6.2.6.2--System Traffic Control. The system shall have the capability of controlling a minimum of sixteen (16) vehicle phases and eight (8) pedestrian phases. The system shall have the capability of implementing a minimum of four (4) timing rings, fifteen (15) alternate sequences, and sixteen (16) offsets.

The system shall provide the capability of selecting any of the following operational modes on a group basis:

- Traffic Responsive
- Time Base (Time-of-Day/Day-of-Week)
- Remote (External Command)
- Manual (Operator Entry)

The system shall be capable of implementing system FLASH and system FREE operation. The system shall have the capability to command, on/off based on time, up to eight (8) independent special functions.

907-632.02.6.2.6.3--Detectors. The system shall have the capability of accepting and processing data from at least 632 system detectors for Traffic Responsive program selection.

907-632.02.6.2.6.4--Pattern Selection. In addition to providing Manual and Remote program selection capability, the Master shall provide for Traffic Responsive and Time Base modes of operation for timing pattern selection.

907-632.02.6.2.6.4.1--Traffic Responsive Mode. Traffic plan selection in the Traffic Responsive mode shall be user-enabled and supplied with the controller, per the plans and specifications. The pattern selection shall be based on sampling detector volume and occupancy analysis by the On-Street Master.

907-632.02.6.2.6.4.2--Time Base Mode. The system shall provide the capability of implementing time-of-day, day-of-week and week-of-year control for each of the two (2) groups using an internal time clock referenced to the 60-Hz AC power line frequency for its time base. The Time Base mode shall contain automatic adjustment for leap year and daylight savings time changes.

The system Time Base mode shall provide, as a minimum, 100 events each capable of requesting any of the 48 traffic control patterns along with Traffic Responsive override enable or auxiliary events consisting of enable/disable any of up to four (4) system-wide special functions and setting sample and log interval time periods.

907-632.02.6.2.6.5--System Control Priority. The system coordination control (program-in-effect) for each group shall be selected on a priority basis. The priority from highest to lowest shall be as follows:

- Manual Control Entry
- External Control (Remote Command)
- Time Base Control (Time-of-Day/Day-of-Week) (Traffic Responsive control will prevail whenever Traffic Responsive Override Enable is active and the selected cycle length is greater than that being commanded by Time Base)
- Traffic Responsive Control

907-632.02.6.2.6.6--Measures of Effectiveness. The system shall have the capability to report selected Measures of Effectiveness (MOE's) on an intersection basis. MOE calculations shall be made on all phases by the local system intersection controller and as a minimum shall include measures such as: volume, number of stops, delays and green utilization. These measures shall be calculated on the basis of the active timing plan. Alternate ways of reporting MOE'S may be approved on a case-by-case review.

907-632.02.6.2.6.7--Uploading and Downloading. The system shall provide, for any selected local system intersection controller, the capability of uploading and downloading any or all, new or modified local intersection parameters from the central-office computer and the Department Central Traffic Signal Management Software, and shall include, as a minimum, all: Phase Timing and Unit Data; Coordination Data, Time Base Data; Preemption Data, System Communication Parameters, System Traffic Responsive Data, and any other System Data residing at the intersection such as Detector Diagnostic Values, Report Parameters and Speed Parameters.

During either uploading or downloading operations, normal traffic control operations shall not be suspended. All data shall be continually accessible and may be displayed at the On- Street Master or the central office computer.

907-632.02.6.2.6.8--System Monitoring and Diagnostics. The system shall automatically and continually monitor system activity and log/report occurrences of Master and intersection alarm conditions. All alarm condition events shall include at the intersection, (Master and central-office computer) an alpha-numeric description of the event as well as the time and date of occurrence.

As a minimum, monitored master alarms conditions shall include:

- Insufficient or Improper Data
- Failed Computational Channels
- Failed System Detectors
- Intersection Communication Failure
- Failed Controllers
- Minimum of six (6) special user defined alarms for user application flexibility
- Monitored intersection alarms conditions shall include as a minimum:
- Cycle Faults and Failures
- Coordination Failures
- Voltage Monitor
- Conflict, Local and Remote Flash Conditions
- Preempt
- Local Free
- Minimum of six (6) special user defined alarms for additional user flexibility.

When the Master detects a critical alarm condition, as defined by the user, it shall automatically dial-up the central office computer and report the condition. On a BUSY or NO ANSWER, the system may be programmed, at user option, to alert a secondary computer.

The system shall also automatically and continually monitor, verify and attempt to correct Sync Pulse, Time Base Clock and Pattern-In-Effect. The system shall provide capabilities to perform diagnostics on system and local detectors, communications and intersection operations. When a fault has been detected, an indication shall be provided. It shall be possible to isolate the fault to the failed unit from controls and indicators available on the Master unit. Auxiliary equipment such as a data terminal or CRT shall not be required to identify the failure.

907-632.02.6.2.6.9--Real Time Display. The Master shall provide for any selected local system intersection controller, real-time status information on its front panel. Real-time intersection status information shall include simultaneous display of: vehicle and pedestrian signal and detector status by phase, overlap signal status and cars waiting count by phase. Real-time controller status information shall include simultaneous display of: two (2) Ring Active timers, On/Next, Call/Recall and Hold/Omit Status by phase, Coordination, Preempt and Stop Time Status.

907-632.02.6.2.6.10--System Management. The system, without hardware changes but with its

ability to directly modify Master and intersection parameters, shall provide the user system configuration and operational controls of the following functions: add/delete controllers and system detectors, enable Traffic Responsive mode, assign intersections to groups, assign system detectors to computational channels and channels to pattern select routines, and assign special and/or standard detectors as system detectors for use with computational channels or to track activity.

907-632.02.6.2.6.11--System Logging and Reports. The system shall automatically and continually process system data and log/report on occurrence of changes in intersection status, system detector status, communications status, controller status and local detector status in addition to system program changes, Traffic Responsive computations, measures of effectiveness and performance.

907-632.02.6.2.6.12--Security. The On-Street Master shall provide for a user-specified security code entry before any data may be altered. In order to view any parameter, security code entry shall not be required. Security access shall be automatically rescinded approximately ten (10) minutes after either access was gained or the last parameter change was entered. The Master and local controller shall have the ability via keyboard to disable security code requirements, allowing for perpetual access without requiring hardware changes.

907-632.02.6.2.7--Design Characteristics. The On-Street Master shall be designed to operate in either an office or field environment and shall be suitably housed in a separate enclosure or in a local intersection cabinet. The Master shall be designed to meet the following electrical and mechanical requirements:

907-632.02.6.2.7.1--Programming and Security. Operator programmable data entry shall be accomplished through panel keyboard(s). The Master shall prevent the alteration of keyboard set variables prior to the user having entered a specific access code through the keyboard. The Master shall maintain user-programmable variables in non-volatile memory with a battery-backed RAM to assure continued efficient system operation.

907-632.02.6.2.7.2--Test and Repair. To enhance maintenance and trouble-shooting activities, On-Street Masters shall include resident diagnostics as a standard. No extender- cards, special tools or PROMs shall be necessary to fully maintain these components. The Master unit design shall ensure that all printed circuit boards be readily accessible for maintenance testing purposes. All fuses, connectors and controls shall be accessible from the front of the Master unit.

907-632.02.6.2.8--Traffic Signal System Software. All Traffic Signal System Software shall be compatible with the latest version of the Department's existing Master and local controllers and existing Traffic Signal Management Software for the Department region.

907-632.02.6.2.8.1--Traffic Signal Closed Loop Software. The Traffic Signal Closed-Loop Software shall provide the ability to manage Master and local controller databases including the uploading and downloading of data parameters. The software shall provide status information and provide reporting capabilities for Master and local controller data, alarms and logs.

907-632.02.6.2.8.2--Traffic Signal System Workstation Software. The Traffic Signal System Workstation shall provide the ability to manage Master and local controller databases including the uploading and downloading of data parameters. The software shall provide status information and provide reporting capabilities for Master and local controller data, alarms and logs.

The Traffic Signal System Workstation Software shall also be capable of operating as a network-connected user workstation to existing centralized signal systems and their associated databases.

When disconnected from the centralized signal system, the software shall be capable of running as a standalone system similar to the Closed-Loop Software. Under this mode, the software shall provide management, report and status functions for Master and local controllers. Under Standalone Mode of operation the software shall allow for its own database(s) for data management without the need for connecting to a centralized signal system database.

907-632.02.6.2.9--Services. Technical services shall be provided, as required, to assist in installation and initial setup of the Closed-Loop Master System and its sub-components. Technical assistance with database migration and/or setup, as well as the development of graphics (such as master maps and local intersection depictions) and the assignment of associated attributes such as detectors, phasing, signals, etc., shall be provided as required. Additionally, training shall be provided on a basic or advanced target user level, as required.

907-632.02.6.3--Malfunction Management Unit (MMU2). The Malfunction Management Unit (MMU2) shall be a shelf-mountable, sixteen (16) channel, solid-state, IP addressable MMU. The MMU2 shall accomplish the detection of, and response to, improper and conflicting signals and improper operating voltages in a traffic signal controller assembly, including support for four (4) section Flashing Yellow Arrow (FYA) left turn displays. The MMU2 shall be capable of running a minimum of twelve (12) different modes of FYA operation.

The MMU2 shall meet or exceed Section 4 requirements of the NEMA Standards Publication No. TS 2-2003 including NEMA TS 2 Amendment #4-2012 and provide downward compatibility to NEMA Standards Publication No. TS 1-1989: Type 12 Operation, in addition to those specifications set forth in this document.

The MMU2 shall include a graphics based Liquid Crystal Display (LCD) to view the current monitor status and navigate the unit's menus. An RJ-45 Ethernet Port shall be provided for communications.

A built-in Diagnostic Wizard shall be provided that displays detailed diagnostic information regarding the fault being analyzed. This mode shall provide a concise view of the signal states involved in the fault, pinpoint faulty signal inputs and provide guidance on how the technician should isolate the cause of the malfunction. The Diagnostic Wizard shall be automatically invoked when the MMU2 is in the fault mode and the HELP button is pressed. It shall also be automatically invoked when the MMU2 is in the Previous Fail (PF) event log display and the HELP button is pressed.

A built-in Setup Mode shall be provided that automatically configures the Dual Indication Enable, Field Check Enable, Red Fail Enable and Minimum Yellow Plus Red Clearance Enable parameters from user input consisting only of channel assignment and class (vehicle, ped, pp-turn, FYA, etc.) responses.

The MMU2 shall be capable of operating in the Type 12 mode with SDLC communications enabled on Port 1. The Channel Status display shall operate in the Type 12 configuration and provide the Field Check function for up to four (4) Pedestrian Walk inputs.

In the interest of reliability and repair ability, printed circuit board mounted MS connectors shall not be acceptable. Internal MS harness wire shall be a minimum of nineteen (19) strand AWG 22 wire.

907-632.02.6.4--NEMA defined Card Rack and Power Supply. A minimum of one (1) NEMA compliant detector card rack with five (5) slot positions (first slot for power supply and four (4) available slots) shall be provided in each cabinet. The detector rack shall be installed on the bottom shelf of the cabinet. The power supply for the NEMA defined card slots shall be provided as a 175W minimum with four (4) independent regulated channels of 24 VDC each rated at 0.75 amps over the full NEMA operating temperature range of -30°F to +165°F. The output should be regulated to 24 VDC +/- 15%. Each of the four (4) outputs shall be independently fused, each with a separate LED for displaying output and fuse status for each of the four (4) outputs. Each of the four (4) outputs shall be protected against voltage transients by a minimum 1500 watt suppressor. All card racks shall be wired for the type detection shown in the plan sheets.

Card Guides shall be provided on the top and bottom of the card rack for each connector position.

907-632.02.6.5--In-Cabinet Network.

907-632.02.6.5.1--Communications Arrestor. The Controller Cabinet network shall consist of an SDLC connection between the Controller Unit and MMU2. Surge suppression for this network shall meet the requirements set forth in Subsection 722.12 and the following minimum requirements below:

- Operating Voltage: 5 VDC
- Clamping Voltage: 8 VDC
- Operating Current: 1.5 A
- Peak Surge Current: 47 A (10x1000 µs)
- Frequency Range: 0 to 20 MHz
- Insertion Loss: < 0.1 dB at 20 MHz
- SPD Technology: SAD
- Connection Type: DB-15
- Operating Temperature: -40°F to +185°F

907-632.02.6.6--System Communications.

907-632.02.6.6.1--Traffic Signal Ethernet Switch. When specified in the plans or contract

documents, a traffic signal Ethernet switch shall be installed in the cabinet assembly. It shall meet the requirements for the type specified in Section 907-663. Ethernet patch cables of sufficient length shall be provided for all supplied Ethernet ready cabinet components. The switch and all components shall be connected and configured.

907-632.02.6.6.2--Fiber Optic Patch Panel. When specified in the plans or contract documents, fiber optic attenuator patch cords shall be installed in the cabinet assembly as specified in Section 907-661.

907-632.02.6.6.3--Wireless Communications. When specified in the plans or contract documents, wireless communication components shall be installed in the cabinet assembly and shall be as specified in Section 907-662.

907-632.02.6.6.4--Serial Port Server or Terminal Server. When specified in the plans or contract documents, serial port servers shall be installed in the cabinet assembly and shall be as specified in Subsection 907-663.02.2.

907-632.02.6.6.5--GPS Clock. This work includes furnishing a Global Positioning System (GPS) Synchronization clock that can be used to sync the internal clocks in traffic signal controllers when coordination is desired, but communication is not necessary. The GPS Clock System shall provide GPS based time and date synchronization to provide coordination of traffic controllers to a common time base. The system shall process GPS Time data using a tamper/vandal resistant GPS antenna and correct for Time Zone, Daylight Savings Time, Leap Years, and GPS Leap Seconds. The processed time information shall be sent to the traffic controller in the native format for the respective controller. A contact closure synchronization pulse with variable pulse width shall be available for a once per day update. If the GPS antenna is blocked for up to one (1) hour prior to scheduled time of synchronization, the system shall synchronize the traffic controllers with less than 0.4 seconds variance from the accuracy provided under normal operation with GPS satellites in view.

- The GPS Clock shall also meet the following minimum specifications:
- Input Voltage: 9-24 VDC
- Current Draw: 150 mA (max) at 12 VDC: 125 mA (max) at 24 VDC
- Contact Closure: 750 mA at 30 VDC
- Temperature Rating: -29.4°F to +167°F

GPS unit shall be mounted to the traffic signal controller cabinet as per the manufacturer's recommendation. Any and all holes created in the cabinet for the purpose of mounting the GPS unit shall be sealed to the satisfaction of the Engineer at no direct pay.

907-632.02.6.6.6--Power-Over-Ethernet Arrestor. Surge suppression that meets the requirements set forth in Subsection 722.12 shall be provided. In addition, the following minimum specifications shall be supplied for loads that require Power-Over-Ethernet with isolated shielded or non-shielded cable:

- Operating Voltage: 48 VDC
- Clamping Voltage: 68 VDC
- Operating Current: 0.75 A per Pin Continuous
- Peak Surge Current: 10 kA
- Insertion Loss: < 0.1 dB
- SPD Technology: GDT, SAD, with series PTC
- Modes of Protection: All Lines (1-8) Protected (L-L) and (L-G): Signal High- Low; High-Ground; Low-Ground
- Transmission Speeds: 10BaseT; 100BaseT; 1000BaseT
- Connection Type: RJ-45
- Operating Temperature: -40°F to +185°F

907-632.02.7--Detector Panel. A vehicle detector harness shall be provided to connect the detector panel to the card rack. The detector panel shall accept the connection of sixteen (16) field loop inputs and four (4) pedestrian detector inputs.

907-632.02.7.1--Detector Input Arrestors. Field Loop and Pedestrian input arrestors shall meet the requirements set forth in Subsection 722.12. Field loop arrestors shall have differential and common mode protection and be provided with the following minimum specifications:

- Operating Voltage: 75 VDC
- Clamping Voltage: 130 VDC
- Peak Surge Current: 250 A
- SPD Technology: Silicon Break-Over
- Operating Temperature: -40°F to +185°F

Pedestrian input arrestors shall be a four (4) circuit device provided with the following minimum specifications:

- Operating Voltage: 30 VDC
- Clamping Voltage: 36 VDC
- Operating Current: 0.15 A
- Peak Surge Current: 10 kA (8 x 20 μs)
- Frequency Range: 0 to 20 MHz
- Insertion Loss: < 0.1 dB at 20 MHz
- SPD Technology: GDT, SAD, with Series PTC
- Connection Type: Terminal Block with compression lugs; Terminals accept up to
- 10 AWG
- Operating Temperature: -40°F to +185°F

907-632.02.8--System Detectors. The controller shall have the ability to receive input data from up to eight (8) special system detectors in addition to the normal actuated controller unit phase detectors. The user shall have the option to assign any of the phase detectors as "system detectors".

907-632.02.9--Preemption. The cabinet shall be completely wired to accept and service calls from preemption phase selector modules, associated optical detector units and GPS units. Optical detector units and GPS unit cabinet components shall be as specified in Section 639. Provision for two (2) standard card modules shall be accommodated in a separate card rack for preemption. The preemption card rack shall provide a minimum of eight (8) channels.

Provisions shall also be made in the cabinet to accommodate Railroad Preemption when specified in the plans or contract documents. Railroad Preemption shall meet the requirements set forth in Section 639. While it is not necessary that a Railroad Preemption interface board be provided with the cabinet, the cabinet and back panel shall be designed so that a Railroad Preemption interface panel that uses a relay to isolate the track switch from the controller cabinet circuitry can be installed. Preempt 1 and 2, in the case of gate down preemption, shall be reserved for Railroad Preemptions; all subsequent preemptions shall be reserved for Emergency Vehicle, Fire Station, or Police Preemption.

907-632.02.10--Uninterruptable Power Supply. When specified in the plans or contract documents an Uninterruptable Power Supply (UPS) System shall be installed in the cabinet assembly. The UPS shall be installed in the cabinet and meet the requirements set forth in Section 633.

907-632.02.11--Power Service Pedestal. A Power Service Pedestal shall be provided as described in Section 631.03.2.

907-632.03--Construction Requirements.

907-632.03.1--Mounting. Traffic Signal Cabinet Assemblies shall be wall or pole mounted, base mounted on a concrete cabinet pad, or base mounted using a composite enclosure as specified below and as shown in the plans.

Power Service Pedestal shall be base mounted on a concrete cabinet pad or on a composite enclosure as specified below and as shown in the plans.

907-632.03.1.1--Wall or Pole Mounted. Wall or pole mount hardware shall be provided for mounting cabinets in specific installations as indicated in the design plans. Wall or pole mounted cabinets shall be manufactured with rigid tabs, rigid brackets or other acceptable configuration for attachment of the cabinet to the wall or pole support. Rigid attachment devices must allow for field alignment of cabinet to the wall or pole support.

907-632.03.1.2--Concrete Cabinet Pad. Concrete foundations shall be constructed of Class B concrete in specific installations as indicated in the design plans.

Cabinets for installation on a concrete base shall be manufactured with rigid tabs, rigid brackets or other acceptable configuration for attachment of the cabinet bottom to its flat support structure. Rigid attachment devices must allow for field alignment of cabinet with the support base. Concrete base construction details shall be provided in the design plan drawings.

907-632.03.1.3--Composite Enclosure. Cabinets for installation on a composite enclosure base shall be manufactured with rigid tabs, rigid brackets or other acceptable configuration for attachment of the cabinet bottom to its' flat support structure. Rigid attachment devices must allow for field alignment of cabinet with the composite enclosure. Composite enclosure attachment details shall be provided as shown in the plans.

907-632.03.2--Documentation. Documentation packages shall be delivered for each unit at the same time as the equipment to which it pertains.

A minimum of two (2) sets of complete schematic drawings and equipment documentation shall be supplied with each cabinet. The first copy shall be placed in a clear re-sealable print pouch of sufficient size to accommodate one (1) complete set of folded cabinet prints and placed in the pull-out drawer of the cabinet and the second copy shall be provided to the Department. Comprehensive controller data shall be included as part of the cabinet documentation package and shall be placed in the cabinet drawer pouch. Digital copies of all cabinet documentation shall be provided to the Department before final acceptance.

The documentation packages shall contain a schematic wiring diagram of the controller cabinet assembly and all auxiliary equipment. The schematic wiring diagram, including a symbols legend, shall show in detail all integrated circuits, transistors, resistors, capacitors, inductors as well as switches and indicators. All parts shown shall be easily identified on both in the cabinet and on the schematic diagram. Model numbers shall be used on schematic diagram when available.

A complete physical description of the signal cabinet assembly shall be provided to include at least the physical dimensions of the unit, weight, temperature ratings, voltage requirements, power requirements, material of construction, and complete performance specifications.

A complete set of operation guides, user manuals, and performance specifications shall be provided.

Detailed programming instructions, preventative maintenance requirements, and troubleshooting procedures shall also be provided for the controllers. These documents shall fully cover all programming procedures and programmable options capable of being made to the controllers and associated traffic control equipment. Instructions for modifications within the range of the capabilities of the unit such as changes in phases or sequences and programming matrix boards shall be included.

An intersection diagram shall be provided on the cabinet door showing geometric configuration, lane use assignments, controller cabinet and signal pole locations, vehicle and pedestrian signal head locations, vehicle and pedestrian detector zone locations, ring-barrier phasing diagram, and detector channel assignments. The intersection diagram shall be labeled with, at a minimum, a North Arrow, main street name(s), side street name(s), signal pole numbers, vehicle and pedestrian head type(s), detector zone designations, volume density and phase recall requirements, flash sequence. All field wires within the cabinet shall be labeled to coincide with those shown on the intersection diagram.

907-632.04--Method of Measurement. Traffic Signal Cabinet Assembly will be measured as a unit per each.

Remove and Replace Existing Traffic Signal Cabinet Assembly will be measured as unit per each.

Modify Existing Traffic Signal Cabinet will be measured as a unit per each.

Solid State Traffic Actuated Controller, of the type specified in the project plans, will be measured as a unit per each.

Signal Software License, of the type specified in the project plans, will be measured as a unit per each.

Malfunction Management Unit, of the type specified in the project plans, will be measured as a unit per each.

Card Rack, of the type specified in the project plans, will be measured as a unit per each.

GPS Clock, as specified in the project plans, will be measured as a unit per each.

Power Service Pedestal, as specified in the project plans, will be measured as a unit per each.

All pay items shall be inclusive of all materials, work, system integration, testing and incidentals necessary for a complete and operable unit in place and accepted. All removal, turn on, and acceptance of equipment, devices, traffic signals, and traffic signal assemblies shall follow Section 631 - Traffic Signal Systems-General prior to payment.

907-632.05--Basis of Payment. Traffic Signal Cabinet Assembly, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for furnishing, installing, configuring, wiring, testing, and mounting foundation construction, cabinets, relays, terminals, circuit breakers, modules, coordination and time base control programs, connectors wiring, overlap equipment, load switches, power cables, power supplies, controller mechanism and housing, MMU2, mounting material, all other materials, and all equipment, labor, tools, and incidentals necessary to complete the work.

Remove and Replace Existing Traffic Signal Cabinet Assembly, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for furnishing, installing, configuring, wiring, testing, cabinets, relays, terminals, circuit breakers, modules, coordination and time base control programs, connectors wiring, overlap equipment, load switches, power cables, power supplies, controller mechanism and housing, MMU2, mounting material, all other materials, removal, disposal, transfer, storage, and/or resetting of components that are existing, all other components included in the traffic signal cabinet, and all equipment, labor, tools, and incidentals necessary to complete the work.

Modify Existing Traffic Signal Cabinet, measured as prescribed above, will be paid for at the

contract unit price per each, which price shall be full compensation for furnishing, installing, configuring, and mounting all components, wiring, and devices; rewiring, reconfiguring, removal, disposal, transfer, storage, and/or resetting of existing components and devices, installing or changing coordination and time base control programs in the traffic signal cabinet assemblies, testing, final cleanup, all equipment, labor, tools, and incidentals necessary to complete the work.

Solid State Traffic Actuated Controller, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of the controller mechanism(s) and housing(s), all power cables, power supplies, wiring, factory and manufacturing inspection, attachment hardware, testing, storage, packaging, shipping, warranty, and all work, equipment, and appurtenances, and all incidentals necessary to provide a fully functional traffic controller ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the traffic controller.

Signal Software Licenses, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of furnishing, installing and configuring the Signal Software, all power cables, power supplies, wiring, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, appurtenances, and all incidentals necessary to provide fully functional Signal Software ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the Signal Software.

Malfunction Management Unit, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of furnishing, installing and configuring the Malfunction Management Unit (MMU2), all power cables, power supplies, wiring, attachment hardware, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, and all work, equipment, and appurtenances, and all incidentals necessary to provide a fully functional Malfunction Management Unit (MMU2) ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the Malfunction Management Unit (MMU2).

Card Rack, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of furnishing, installing and configuring the Card Rack, all power cables, power supplies, wiring, attachment hardware, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, and all work, equipment, and appurtenances, and all incidentals necessary to provide a fully functional Card Rack ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the Card Rack.

GPS Clock, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of furnishing, installing and configuring the Global

Positioning System (GPS) Clock(s), all power cables, power supplies, wiring, attachment hardware, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, and all incidentals necessary to provide a fully functional GPS Clock ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the GPS Clock.

Power Service Pedestal, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for furnishing, installing, configuring, wiring, testing, and mounting foundation construction, cabinets, circuit breakers, connectors wiring, mounting material, all other materials, and all equipment, labor, tools, and incidentals necessary to complete the work.

Payment will be made under:

907-632-A:	Solid State Traffic Signal Cabinet Assembly, Type __ Cabinet, Type __ Controller	- per each
907-632-B:	Remove and Replace Existing Traffic Signal Cabinet Assembly, Type __ Cabinet, Type __ Controller	- per each
907-632-C:	Modify Existing Traffic Signal Cabinet Assembly	- per each
907-632-D:	Solid State Traffic Actuated Controller, Type ____	- per each
907-632-E:	Single-user Workstation Signal Software License	- per each
907-632-F:	Single-user Server Signal Software License	- per each
907-632-G:	Malfunction Management Unit	- per each
907-632-H:	Card Rack, ___ Position	- per each
907-632-I:	GPS Clock	- per each
907-632-J:	Power Service Pedestal	- per each

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-633-1 **CODE: (IS)**

DATE: **11/15/2017**

SUBJECT: **Uninterruptable Power Supply**

Section 633, Uninterruptable Power Supply, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-633.02--Materials.

907-633.02.1--Electronics Module. Delete the fourth bullet in Subsection 633.02.1 on page 538, and substitute the following.

- Local and remote communication capabilities.

907-633.02.4--UPS Operation. Delete the fourth subparagraph of Subsection 633.02.4.1 on page 539, and substitute the following.

4) The UPS system shall be capable of providing continuous, fully conditioned and regulated sinusoidal (AC) power to selected devices such as signal controllers, modems, communication hubs, National Transportation Communications for ITS Protocol (NTCIP) adapters and video equipment, for a minimum of 8 continuous hours.

907-633.02.4.3--Electric Specifications.

907-633.02.4.3.1--Input Specifications. Change the value of the Input Voltage Range in the Table in Subsection 633.02.4.3.1 on page 540, from "75 VAC to 155 VAC (without drawing energy from batteries)" to "75 VAC to 150 VAC (without drawing energy from batteries)."

Delete Subsection 633.02.4.4 on page 540, and substitute the following.

907-633.02.4.4--Blank.

907-633.03--Construction Requirement. Delete the first sentence of the second paragraph of Subsection 633.03 on page 541, and substitute the following.

Field tests shall be performed with various devices as noted in design plans to verify that each device operates optimally.

907-633.05--Basis of Payment. Delete the pay item listed on page 541, and substitute the following.

907-633-A: Uninterruptable Power Supply - per each

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

CODE: (IS)

SPECIAL PROVISION NO. 907-634-3

DATE: **01/08/2020**

SUBJECT: **Traffic Signal and ITS Equipment Poles**

Section 634, Traffic Signal and ITS Equipment Poles, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-634.02--Materials.

907-634.02.1--Poles. Delete the bullets for Type X poles in Subsection 634.02.1 on page 542 and substitute the following.

- Type X -- Aluminum Pole for Detectors

After Type XI poles in Subsection 634.02.1 on page 542, add the following.

- Type XII -- ITS Extension Poles

907-634.02.1.1--Traffic Signal Poles. Delete the first, third, fourth, and fifth bullets in Subsection 634.02.1.1 on pages 542 and 543, and substitute the following.

- Self-supporting straight or upswept mast arm(s), in accordance with Plan details. Where possible, the mast arms shall match the adjacent signal poles in the area unless otherwise stated;
- Tag installed on shaft side opposite the mainline highway and located approximately 48 inches above the top of the Baseplate;
- Minimum nominal size of four (4) inches wide by 26 inches tall reinforced hand-hole with included terminal block(s);
- A ½-inch coarse thread grounding stud shall be located on the interior side of the pole hand-hole opening;

907-634.02.1.2--Galvanized Steel Poles for Cameras. Delete the second paragraph of Subsection 634.02.1.2 on page 543, and substitute the following.

Unless specified otherwise in the plans, poles shall be designed in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals,* as specified in the plans, including all interims and updates. Design life shall be 50 years for all poles. The design wind speed for all parts of the structure shall meet the wind requirements set forth in the latest edition of the AASHTO Wind Map, as stated in Subsection 722.02.3. The pole shall meet the design wind loading with all equipment installed.

Delete the fourth bullet in Subsection 634.02.1.2 on page 544, and substitute the following.

- Top of pole deflection shall not exceed one (1) inch deflection from center due to 30 mph (non-gust) winds or the maximum deflection allowed by Subsection 722.02.3, whichever is more restrictive, for 80-foot poles.

907-634.02.1.3--Galvanized Steel Poles for Detectors. Delete the second paragraph of Subsection 634.02.1.3 on page 546, and substitute the following.

Unless specified otherwise in the plans, poles shall be designed in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals*, as specified in the plans, including all interims and updates. Design life shall be 50 years for all poles. The design wind speed for all parts of the structure shall meet the wind requirements set forth in the latest edition of the AASHTO Wind Map, as stated in Subsection 722.02.3.

Delete the last two sentences of the fifth paragraph of Subsection 634.02.1.3 on page 546, and substitute the following.

Design wind loading shall be as indicated in Subsection 722.02.3 unless otherwise noted in the plans. The pole shall meet design wind loading with all equipment installed.

907-634.02.1.4--Aluminum Poles for Detectors. Delete the second paragraph of Subsection 634.02.1.4 on page 547, and substitute the following.

Unless specified otherwise in the plans, poles shall be designed in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals*, as specified in the plans, including all interims and updates. Design life shall be 50 years for all poles. The design wind speed for all parts of the structure shall meet the wind requirements set forth in the latest edition of the AASHTO Wind Map, as stated in Subsection 722.02.3. The pole shall meet design wind loading with detector(s) installed.

907-634.02.1.5--Structure-Mounted ITS Equipment Poles. Delete the second paragraph of Subsection 634.02.1.5 on page 548, and substitute the following.

Unless specified otherwise in the plans, poles shall be designed in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals*, as specified in the plans, including all interims and updates. Design life shall be 50 years for all poles. The design wind speed for all parts of the structure shall meet the wind requirements set forth in the latest edition of the AASHTO Wind Map, as stated in Subsection 722.02.3. For projects that are in areas with higher wind standards, the higher standard is required. The pole shall meet design wind loading with all equipment installed.

Delete the second bullet in Subsection 634.02.1.5 on page 548, and substitute the following.

- Consideration shall be given for all possible loading combinations including ice and wind loads, as stated in Subsection 722.02.

After Subsection 634.02.1.8 on page 549, add the following.

907-634.02.1.9--ITS Extension Poles. ITS extension poles are used to provide ITS devices a mounting location with a vertical or horizontal clearance away from an existing pole or structure to which they are to be attached. As such, extension poles and the mounting and attachment hardware shall be of a material that will not cause galvanic corrosion with existing or proposed equipment. If possible, the extension poles shall be similar in color to the base pole or structure, unless otherwise directed. They shall meet the requirements of the base pole, the plans, and Subsection 722.02. Design considerations shall be given to the additional loading being subjected to the base pole or structure.

907-634.02.2--Camera Lowering Device. The lowering device system shall be designed to support, raise, and lower a standard CCTV camera, lens, housing, PTZ mechanism, cabling, connectors, and other supporting field components. The camera connector box shall be cast ZA-12 (12% Al and 88% Zn) and have a minimum weight that ensures stability of the camera during raising and lowering operation. The camera connector box shall have fully gasketed doors to prevent water intrusion. The bottom of the camera connector box shall be equipped with a condensation/moisture exit system. The camera connector block shall be molded in thermoset, weather-resistant, synthetic rubber designed to handle harsh environments.

Electrical contacts must also be designed to handle harsh environments. There shall be a locking mechanism between the fixed and movable components. For the movable components, a latching mechanism shall be provided to hold the device in place (when latched all weight shall be removed from the lowering cable) and to raise or lower the assembly using the lowering tool and lowering cable. The suspension contact unit housing shall be weatherproof with a gasket to isolate the interior from dust and moisture.

All pulleys shall have sealed, self-lubricated bearings, oil tight bronze bearings, or sintered bronze bushings. The lowering cable shall be a minimum 1/8-inch diameter stainless steel aircraft cable. Internal wireways shall prevent the stainless steel lifting cable from contacting power or video cabling. The only cable permitted to move is the lifting cable, all other cables must remain stable and secure during lowering and raising operations.

The lowering tool shall consist of a lightweight metal frame and winch assembly, a quick release cable connector, an adjustable safety clutch, and a variable speed industrial duty electric drill motor. This tool shall be able to access the lifting cable through a pole hand hole, shall support itself and the load during lowering, and shall provide a means to prevent freewheeling when loaded. This tool shall have a reduction gear to reduce the manual effort required during lifting operations. In addition, this tool shall be provided with an adapter for operating the lowering device with a portable drill using a clutch mechanism. The portable lowering tool shall be included as part of the installed system. The lowering device shall include customized adapter brackets to install cylindrical type PTZ CCTV cameras that have a mounting base below the camera assembly and is require to be installed in an upright position.

907-634.03--Construction Requirements.

907-634.03.1--Foundations. Delete the last sentence of the fourth paragraph of Subsection 632.03.1 on page 550, and substitute the following.

Where foundations are constructed in areas where the pavement edge elevation and shoulder edge elevation differ more than twelve (12) inches, taller foundations may be used but must be approved by the Engineer.

907-634.04--Method of Measurement. After the last sentence of the fourth paragraph of Subsection 634.04 on page 552, add the following.

Field conditions may require taller foundations than specified in the plans. In which case, the addition concrete will be paid for at the contract bid price per cubic yard for pole foundations.

After the sixth paragraph of Subsection 634.04 on page 553, add the following.

ITS extension poles of the type specified will be measured as a unit quantity per each.

Delete the last paragraph in Subsection 634.04 on page 553 and substitute the following.

Wooden poles will be measured as a unit quantity per each.

Camera lowering device will be measured as a unit quantity per each.

907-634.05--Basis of Payment. After the fourth paragraph of Subsection 634.05 on page 553, add the following.

Camera lowering device and camera lowering tool, as described above, shall be paid for at the contract unit price per each. This price shall be full compensation for all materials, design, installation, equipment, tools, labor and incidentals associated with providing and installing the camera lowering device and the camera lowering tool.

After the sixth paragraph of Subsection 634.05 on page 553, add the following.

ITS extension poles, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for furnishing all materials, for installing the extension pole, mounting attachments as necessary, adjusting the pole to meet specific project needs, and for all equipment, tools, labor, and incidentals necessary to complete the work.

After the last paragraph of Subsection 634.05 on page 554, add the following.

Sizing poles and their appurtenances to field conditions is the Contractor's responsibility. No separate payment will be made for designing to meet project specifications and field conditions.

Delete the pay items listed on page 554, and substitute the following.

907-634-A: Traffic Signal Equipment Pole, Type __, __' Shaft, __' Arm * - per each

907-634-B:	Traffic Signal Equipment Pole Shaft Extension, ___' **	- per each
907-634-C:	Pole Foundations, Class ___ Concrete	- per cubic yard
907-634-D:	Slip Casing, ___" Diameter	- per linear foot
907-634-E:	Camera Pole with Foundation, ___' Pole	- per each
907-634-F:	Detector Pole with Foundation, ___' Pole	- per each
907-634-G:	Traffic Signal Equipment Pole Mast Arm Extension, ___' **	- per each
907-634-H:	ITS Equipment Pole, Structure Mounted, ___' Pole	- per each
907-634-I:	Wood Pole, Class ___ Height ____'	- per each
907-634-J	ITS Extension Pole, _____' **	- per each
907-634-K:	Camera Lowering Device	- per each

* Multiple Arms may be indicated
** Additional information may be indicated

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

CODE: (IS)

SPECIAL PROVISION NO. 907-636-2

DATE: **11/15/2017**

SUBJECT: **Electrical Cable**

Section 636, Electrical Cable, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-636.01--Description. Delete the last sentence of the last paragraph in Subsection 636.01 on page 555 and substitute the following.

It shall include excavating, laying, placing tracer cable or tape, backfilling, replacing sod, aerial supports and/or pull-through conduits, as applicable; and transformer enclosures and/or terminal boxes when not placed under other items of the contract.

907-636.02--Materials. After the paragraph of Subsection 636.02 on page 555, add the following.

907-636.02.1--ITS Ground Mounted Meter Enclosure.

907-636.02.1.1--Meter Base. Meter bases shall be NEMA Type 3R with a minimum rating of 100 amps and shall meet the requirements of the local utility. The meter base shall be provided with ampere rating of meter sockets based on sockets being wired with insulated wire rated at least 167°F. The meter base shall be designed for underground service.

Meter bases shall be 4-terminal, 600 volt, single phase, 3-wire furnished with the following:

(a) Line, load and neutral terminals accepting #8 to 2/0 AWG copper/aluminum wire,
(b) Ringed or ringless type, with or without bypass,
(c) Made of galvanized steel,
(d) Listed as meeting UL Standard UL-414, and
(e) Underground service entrance as specified.

The meter bases shall have electrostatically applied dry powder paint finish, light gray in color, with a minimum thickness of 2.4 mils.

A 1-inch watertight hub for threaded rigid conduit shall be furnished with meter base.

907-636.02.1.2--Disconnect. External electrical service disconnects shall be furnished with a single pole 50-amp inverse time circuit breaker with at least 10,000 RMS symmetrical amperes short circuit current rating in a lockable in open or closed position in accordance with National Electric Code (NEC) and be a NEMA 3R Type enclosure. The disconnect shall be listed as meeting UL Standard UL-489 and marked as being suitable for use as service equipment.

The disconnect enclosure shall be fabricated from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. Ground bus and neutral bus shall be provided with at least four terminals with minimum wire capacity range of number 14 through number 4.

For 480V service, a local utility approved, lockable, non-fused disconnect switch on the supply side of the meter base shall be furnished, installed, and labeled as "Utility Disconnect". A separate load side disconnect with overcurrent protection shall be provided within two feet (2') of the meter.

907-636.02.1.3--Ground Mounted – Pedestal – Service Panel. The pedestal shall be of NEMA Type 3R rainproof construction and shall be UL Listed as "Enclosed Industrial Control Equipment" (UL 508A). External construction shall comply with UL50 requirements and shall be of G90 galvanized steel with light green #14672 Federal Specification 595 polyurethane industrial grade powder paint.

Hinges shall be stainless steel and of the continuous piano hinge type.

The pedestal mounting bolts shall not be externally accessible. The pedestal shall be able to be embedded in concrete or use anchor bolts for mounting on concrete base. Either pedestal mounting base or anchor bolt kit shall be used for installation.

The service pedestal should have three separate isolated sections for metering equipment, utility termination and customer equipment.

The metering section shall be pad-lockable and sealable and have a hinged swing hood with an integral hinged polycarbonate sealable window for access to demand meters. Meter socket type shall meet the requirements of the serving utility.

The utility termination section shall be pad-lockable and sealable and shall have a stainless steel handle provided on a lift-off cover. Sufficient clearance shall be provided for a 4-inch diameter conduit for utility cables entrance. Utility landing lugs shall be UL listed and shall accommodate conductor sizes between AWG #6 – 350 kcmil.

The customer compartment door shall be hinged on the left hand side. A stainless pad-lockable hasp shall be provided to secure customer compartment. A door keeper shall be provided to keep the door in an open position. A print pocket shall be provided on the inside of the door in a weatherproof sleeve. Required UL labeling shall be located on the inside of the customer door. Distribution and control equipment shall be behind an internal dead-front door with a quarter-turn securing latch and be hinged to open more than 90 degrees. The dead-front door shall be hinged on the same side as the customer section door. All distribution and control equipment shall be factory wired using 600-volt wire sized to NEC and UL requirements.

The service pedestal shall be rated for operation at 10K minimum amps interrupting capacity (AIC). The provided documentation shall list circuit breaker combinations and those to be used for de-rated operation for series ratings. Circuit breakers shall be permanently labeled with engraved name plates.

The serving utility shall be contacted for necessary requirements before ordering or installing equipment.

907-636.02.2--ITS Ground Mounted Transformer Enclosure.

907-636.02.2.1--Disconnect. The disconnect shall meet the requirements of Subsection 907-636.01.2.

907-636.02.2.2--Ground Mounted - Pedestal – Service Panel. The ground mounted - pedestal – service panel shall meet the requirements of Subsection 907-636.01.3. In addition, the transformer shall be rated to match the requirement of the primary service and the types of load served as specified in the plans. The transformer unit shall be installed inside the enclosure and meet all applicable codes. Each transformer shall be furnished as one complete unit and wiring of multiple transformers to meet the required ratings at each enclosure location is not allowed. Step-up and Step-down transformers shall be designed specifically for each application. Reverse feeding of step-up and step-down transformers is not allowed. All transformers shall be designed for outdoor installation and rated 600 VAC and below.

907-636.04--Method of Measurement. Delete the first paragraph of Subsection 636.04 on page 557, and substitute the following.

Electric cable of the type specified, constructed as specified on the plans, will be measured by the linear foot. Measurement will be computed horizontally along the conduit, messenger cable or mast arm and vertically along the pole. Measurement in underground conduit is only in the horizontal plane and no additional quantity shall be added for conduit depth or change in elevation of the conduit. No extra length will be allowed for cable inside signal heads, drip loops, or sag in aerial supported cable. Tracer tape, when required in the plans, used with tracer cable will not be measured for separate payment but shall be included in the contract price for Tracer Cable. The terminals for the measurements of lengths will be considered specifically as the center of the pull boxes, poles, signal heads or controller cabinets.

After the first paragraph of Subsection 636.04 on page 557, add the following.

ITS Ground Mounted Enclosures, complete in place and accepted, will be measured as a unit quantity per each for a complete and operable unit in accordance with the contract provisions.

907-636.05--Basis of Payment. After the first paragraph of Subsection 636.05 on page 557, add the following.

ITS Ground mounted enclosures, measured as prescribed above, will be required wherever ground mounted meter enclosures or step-up or step-down transformers are noted as required in the plans. The enclosures shall be paid for at the contract unit price bid per each; which price shall be full compensation for any transformers (as described in the plans), foundation construction, cabinets, pedestals, meter bases, disconnects, relays, terminals, circuit breakers, sockets, hubs, buses, connectors, mounting material, all other materials for constructing, installing, connecting, testing

and final cleanup; and for all equipment, labor, tools and incidentals necessary to complete the work in accordance with the contract documents.

In the first sentence of the second paragraph of Subsection 636.05 on page 557, change "relaid" to "re-laid".

Delete the list of pay items on pages 557 and 558, and substitute the following.

907-636-A:	Electric Cable, Direct Burial, Type, AWG ___, ___ Conductor	- per linear foot
907-636-B:	Electric Cable, Underground in Conduit, Type, AWG ___, ___ Conductor	- per linear foot
907-636-C:	Electric Cable, Aerial Supported, Type, AWG ___, ___ Conductor	- per linear foot
907-636-D:	Electric Cable, Aerial Supported in Conduit, Type, AWG ___, ___ Conductor	- per linear foot
907-636-E:	Electric Cable, Underground in Conduit, Tracer Cable	- per linear foot
907-636-F:	Electric Cable, Repair	- per linear foot
907-636-G:	Underground Cable and Conduit, Removed	- per linear foot
907-636-H:	Underground Cable and Conduit, Removed and Re-laid	- per linear foot
907-636-I:	ITS Ground Mounted * Enclosure	- per each

* Indicates Meter or Transformer Enclosure Type

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-637-2 **CODE: (IS)**

DATE: **11/15/2017**

SUBJECT: **Traffic Signal Conduit and Pull Boxes**

Section 637, Traffic Signal Conduit and Pull Boxes, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-637.02--Materials.

907-637.02.1--Pull Box / Enclosures. Delete the first sentence of the second paragraph of Subsection 637.02.1 on page 558, and substitute the following.

For grade level pull boxes and enclosures only, Tier 22 (22,500-pound design load, 33,750-pound test load) enclosures with minimum size dimensions as shown in the detail drawings on the plans shall be installed for use in traffic signal construction. Enclosure boxes shall be open bottom.

Delete the fourth sentence of the second paragraph of Subsection 637.02.1 on page 558.

907-637.03--Construction Requirements.

907-637.03.1--Pull box/Enclosures. Delete the sixth sentence of the first paragraph of Subsection 637.03.1 on page 559, and substitute the following.

Enclosures located in soil or sodded areas shall be installed with a supporting poured concrete collar or approved composite collar assembly, as shown by details on the plans.

907-637.03.2.1--Conduit Duct Bank. Delete the first sentence of subparagraph a) under Bored or drilled conduit in Subsection 637.03.2.1 on page 560, and substitute the following.

All conduits under railroad tracks shall be horizontal directional bored or drilled at a minimum of ten (10) feet below the railroad bed, or as required by the Railroad Company.

Delete Subsections 637.03.2.4 and 637.03.2.5 on pages 561 & 562, and substitute the following.

907-637.03.2.4--Blank.

907-637.03.2.5--Blank.

907-637.04--Method of Measurement. Delete subparagraphs a) and b) in Subsection 637.04 on page 563, and substitute the following.

a) From center to center of pull box and/or foundation.

b) Any above ground vertical conduit runs, as indicated in the plans. Measurement in underground conduit is only in the horizontal plane and no additional quantity shall be added for conduit depth or change in elevation of the conduit.

907-637.05--Basis of Payment. Delete the fourth and fifth paragraphs of Subsection 637.05 on page 564, and substitute the following.

Duct Plugs and Sealant will be included in the cost of the conduit and will not be measured separately.

Delete the pay items listed on page 564 and substitute the following.

907-637-A:	Pull Box Enclosure, Type	- per each
907-637-B:	Pull Box Enclosure, Structure Mounted, Type	- per each
907-637-C:	Traffic Signal Conduit, Underground, Type, Size	- per linear foot
907-637-D:	Traffic Signal Conduit, Underground Drilled or Jacked, Type, Size	- per linear foot
907-637-E:	Traffic Signal Conduit, Structural Conduit, Type, Size	- per linear foot
907-637-F:	Traffic Signal Conduit, Aerial Supported, Type, No, Size	- per linear foot
907-637-G:	Traffic Signal Conduit, Underground Encased in Concrete, Type, Size	- per linear foot
907-637-H:	Traffic Signal Conduit Bank, Underground, Type, No., Size	- per linear foot
907-637-I:	Traffic Signal Conduit Bank, Underground Drilled or Jacked, Type, No., Size	- per linear foot
907-637-J:	Traffic Signal Conduit Bank, Structural Conduit, Type, No., Size	- per linear foot
907-637-K:	Traffic Signal Conduit Bank, Aerial Supported, Type, Size and Number	- per linear foot

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

CODE: (IS)

SPECIAL PROVISION NO. 907-643-1

DATE: **11/15/2017**

SUBJECT: **Video Vehicle Detection**

Section 643, Video Vehicle Detection System, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

Delete Section 643 on pages 601 thru 628, and substitute the following.

SECTION 907-643 - VIDEO VEHICLE DETECTION

907-643.01--Description. This section specifies the minimum requirements for Video Vehicle Detection (VVD) and Multi-Sensor Vehicle Detection (MSVD) furnished and installed in accordance with the design(s) for the location(s) designated on the project plans, in any related notice to bidders, or as directed. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, test, and operate VVD and/or MSVD.

Type 1 Video Vehicle Detection will provide presence or pulse detection of vehicles, bicycles, and pedestrians for Traffic Signal Controller inputs. There are two variations of Type 1 Video Vehicle Detection: Type 1A – camera with independent video detection processor, Type 1B – a single integrated camera with video detection processor. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the Video Vehicle Detection equipment, complete and ready for service.

Type 2 Video Vehicle Detection will provide presence or pulse detection of vehicles, bicycles, and pedestrians for Traffic Signal Controller inputs. Type 2 Video Vehicle Detection shall be designed to be span wire mounted. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the Video Vehicle Detection equipment, complete and ready for service.

The Multi-Sensor Vehicle Detection (MSVD) will provide detection of vehicles on a roadway using a Multi-Sensor Detection for Traffic Signal Controller inputs. The Multi-Sensor shall utilize two (2) different sensors of different technologies, video imaging and radar, to detect and track vehicles. The module shall process information from both video imaging and radar sensors simultaneously in real-time. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the Multi-Sensor Vehicle Detection equipment, complete and ready for service.

907-643.02--Materials.

907-643.02.1--Materials Type 1 Video Vehicle Detection. The Type 1 Video Vehicle Detection shall consist of power supply, video camera, mounting brackets, and lightning protection as

recommended by the manufacturer, video detection processors/extension modules capable of processing the number of camera and phase combination video sources shown on the project plans or in the purchase order. In addition, Type 1B Video Vehicle Detector shall consist of a single integrated camera with video detection processor, a cabinet interface which mounts in a standard detector rack or as a standalone shelf mount unit.

907-643.02.1.1--Functional Requirements for Type 1 Video Vehicle Detection. The Type 1 Video Vehicle Detection configuration shall utilize video processors with one or more video inputs and one (1) video output, responding to specific site applications, camera locations and detection zones shown on the project plans. Video processors or interface modules shall be provided which plug directly into NEMA TS 1 and TS 2 detector racks without adapters. Extension modules which allow detection zones from one camera to be routed to other card slots shall also be provided if required. The system shall be Ethernet compatible with an RJ45 port. The Type 1 Video Vehicle Detection shall be able to detect vehicles and bicycles in multiple lanes using only the video image.

907-643.02.1.2--Interface Type 1 Video Vehicle Detection. The following interfaces shall be provided:

1) Video inputs that accept RS 170 (NTSC) signals from an external video source. A BNC type interface connector shall be provided and located on the front of the video processing unit.
2) A LED indicator to indicate the presence of the video signal. The LED shall illuminate upon valid video synchronization and turn off when the presence of a valid video signal is removed.
3) One (1) video output per processor module. The video output shall be RS 170 compliant and shall pass through the input video signal. The video output shall have the capability to show text and graphical overlays to aid in system setup. The overlays shall display real-time actuation of detection zones upon vehicle detection or presence. Control of the overlays and video switching shall also be provided through the serial communications port. The video output interface connector shall be BNC or RCA type. If RCA connector is used, an RCA to BNC adapter shall be provided.
4) A serial communications port on the front panel. The serial port shall be compliant with RS-232 or RS-422 electrical interfaces and shall use a DB9 or RJ45 type connector. The serial communications interface shall allow the user to remotely configure the system and/or to extract calculated vehicle/roadway information.
5) Interface software. The interface protocol shall support multi-drop or point-to- multipoint communications. Each video detection sensor shall have the capability to be individually IP addressable either built in or with third party video server units.
6) Open collector contact closure outputs meeting NEMA TS-2 requirements. The open collector output will be used for vehicle detection indicators as well as discrete outputs for alarm conditions.
7) LED status indicators on the front panel. The LED's shall illuminate when a contact closure output occurs. Provide one output LED for each contact closure output.
8) A mouse compatible port (PS-2 or USB) on the front panel of the video processing unit. The mouse port shall be used as part of the system setup and configuration.

9) A Cabinet Interface shall be provided that is specifically designed to mount in a standard NEMA TS 1 and TS 2 detector rack without adapters or rewiring, or as a stand-alone shelf mount unit. The Interface shall operate in a temperature range from -31°F to +165°F and a humidity range from 0% to 95% relative humidity. The Cabinet Interface shall be powered by 100v to 240v AC, 50 or 60Hz. The front of the Interface shall include LED detection indications for each channel of detection. One BNC video output and detector test switches that allow the user to place calls on each channel

907-643.02.1.3--Functionality Type 1 Video Vehicle Detection. Detection zones shall be programmed via an on-board menu displayed on a video monitor and a pointing device connected to the video detection processor. The menu shall facilitate placement of detection zones and setting of zone parameters or to view system parameters. The video detection processor shall detect vehicles, bicycles, and pedestrians in real time as they travel across each detection zone. The video detection processor shall have an RS-232 (DB9 or RJ45) port for communications with an external computer. The video detection processor port shall be multi-drop capable.

It shall be possible to upload and save all configuration data including loop placement and save the file on a computer. It shall be possible to download a configuration file from a computer to the detection device.

The video detection processor shall accept new detection patterns from an external computer through the RS-232 port when the external computer uses the correct communications protocol for downloading detection patterns.

A Windows™ based software designed for local and remote connection shall be provided for video capture, real-time detection indication and detection zone modification capability. The video detection processor shall send its detection patterns to an external computer through the RS-232 port.

The video detection processor shall default to a safe condition, such as minimum recall, fixed recall or a constant call on each active detection channel, in the event of unacceptable interference with the video signal, low visibility conditions, or power failure.

The system shall be capable of automatically detecting a low-visibility condition such as fog and respond by placing all defined detection zones in a constant call mode. The system shall automatically revert to normal detection mode when the low-visibility condition no longer exists.

907-643.02.1.4--Detection. Type 1A shall have a minimum of 24 detection zones per camera input shall be possible, and each detection zone shall be capable of being sized to suit the site and the desired vehicle detection area. Type 1B shall have a minimum of 8 detection zones per camera input shall be possible, and each detection zone shall be capable of being sized to suit the site and the desired vehicle detection area.

A single detection zone shall be able to replace multiple inductive loops and the detection zones shall be OR'ed as the default or may be AND'ed together to indicate vehicle presence on a single phase of traffic movement.

Placement of detection zones shall be done by using only a pointing device, and a Graphical Interface built into the video detection processor and displayed on a video monitor, to draw the detection zones on the video image from each video camera. Detection zones created in this manner shall be compatible with the PC-based software provided with the system.

The video detection processor shall support bicycle type zones where the zone can differentiate between motorized vehicles and bicycles, producing a call for one but not the other. Bicycle zones shall only output when a bicycle is detected. The video detection processor shall provide the ability to assign a separate output channel for bicycle zones to allow traffic controllers to implement special bicycle timing for applications where the traffic controller has separate bicycle detection inputs. Bicycle zones shall have the ability to have extensions assigned to individual bicycle zones for applications where the traffic controller does not have bicycle specific detection inputs.

For Type 1A, six (6) additional count zones for bicycles shall be provided to accumulate bicycle counts at user specified intervals.

The video detection processor's memory shall be non-volatile to prevent data loss during power outages.

When a vehicle is detected crossing a detection zone, the corners or entire zone of the detection zone shall flash/change color on the video overlay display to confirm the detection of the vehicle. It shall be possible to record the operation of the unit in real time with the detection zones operating.

Detection shall be at least 98% accurate in all weather conditions, with slight degradation acceptable under adverse weather conditions (e.g. rain, snow, or fog) which reduce visibility.

The video detection processor shall maintain normal operation of existing detection zones when one (1) zone is being added or modified.

The video detection processor shall output a constant call on any detector channel corresponding to a zone being modified and shall resume normal operation upon completion.

Detection zones shall be directional to reduce false detections from objects traveling in directions other than the desired direction of travel in the detection area.

The video detection processor shall process the video input from each camera using a microprocessor at 30 frames per second at one volt, peak to peak, 75 ohms, or EIA 170 NTSC video standard.

The video detection processor shall output minimum recall, fixed recall or constant call for each enabled detector output channel if a loss of video signal occurs. The recall behavior shall be user selectable for each output. The video detection processor shall output a constant call during the background "learning" period.

Detection zone outputs shall be configurable to allow the selection of presence, pulse, extend, and delay outputs. Timing parameters of pulse extend, and delay outputs shall be user definable between 0.1 to 25.0 seconds in increments of 0.1 seconds.

Type 1A shall have up to six (6) detection zones per camera view that have the capability to count the number of vehicles detected, measure classification and speed. The data values shall be internally stored within the processor module for later retrieval through the RS-232 port. The data collection interval shall be user definable in periods of 5, 15, 30, or 60 minutes or by intersection cycle. Real-time data shall be retrieved from the PC-based software provided with the system.

907-643.02.1.5--Camera. Type 1A cameras shall be completely compatible with the video detection processor and shall be certified by the manufacturer to ensure proper system operation.

Type 1B shall be a single integrated camera with built in video detection processor.

The Video Vehicle Detection shall produce accurate detector outputs under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera shall produce a useable video image shall be the minimum range from nighttime to daytime, but not less than the range 0.009 to 930 foot-candles.

The camera shall use a color CCD sensing element with resolution of not less than 470 lines horizontal and 400 lines vertical.

The camera shall include mechanisms to compensate for changing of lighting by using an electronic shutter and/or auto-iris lens.

The camera shall include a variable focal length lens with factory preset focus that requires no field adjustment. Zooming of the camera lens to suit the site geometry by means of a portable interface device designed for that purpose. The horizontal field of view shall be adjustable. Camera configuration shall be customized for each approach based on field site conditions and the project plans.

The camera electronics shall include automatic gain control (AGC) to produce a satisfactory image at night.

The camera shall be housed in a weather-tight sealed enclosure. The housing shall be field rotatable to allow proper alignment between the camera and the traveled road surface.

The camera enclosure shall be equipped with a sunshield. The sunshield shall include a provision for water diversion to prevent water from flowing in the camera's field of view.

The camera enclosure shall include a thermostatically controlled heater to assure proper operation of the lens shutter at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure. The heater shall directly heat the glass lens and require less than five (5) watts over the temperature range.

Power consumption of the camera shall be 15 watts or less under all conditions.

The camera enclosure shall be equipped with separate, weather-tight connections for power and setup video cables at the rear of the enclosure. These connections shall allow diagnostic testing and viewing of video at the camera while the camera is installed on a mast arm or pole using a lens adjustment module furnished under this bid item.

The video signal output by the camera shall in accordance with NTSC standards.

All necessary mounting brackets shall be mounted to pole shafts, mast arms, or other structures to mount cameras as indicated on the project plans. Mounting brackets shall result in a fixed-position mounting. Mounting Brackets shall be included at no additional cost.

907-643.02.1.6--Video Cable. The cable provided shall be as recommended by the manufacturer for optimal video detection performance. The power and video cable may be installed under the same outer jacket. The cable and installation tools shall be approved by the supplier and manufacturer's instructions must be followed to ensure proper connection.

907-643.02.1.7--Power Cable. The cable provided shall be as recommended by the manufacturer for optimal video detection performance.

Camera power cable shall be suitable for installation in conduit and in exposed sunlight environment, and UL listed.

The power and video cable may be installed under the same outer jacket. The cable and installation tools shall be approved by the supplier and manufacturer's instructions must be followed to ensure proper connection.

907-643.02.1.8--Surge Protection. Surge protection devices shall be provided for all new or added video detection devices as recommended by the manufacturer.

Video and/or Power cable shall be protected with an inline surge suppressor as recommended by the manufacturer or a panel mounted surge suppressor as recommended by the manufacturer or approved equal, installed and grounded per manufacturer's recommendations.

907-643.02.1.9--Physical and Environmental Specifications. Physical and Environmental Specifications shall be as follows.

Video Vehicle Detection Processor: The video vehicle detection processor shall operate reliably in a typical roadside traffic cabinet environment. Internal cabinet equipment and a video vehicle detection processor shall be provided that meets the environmental requirements of NEMA TS-2-2003 Section 2. If the processor is located in the sensor, it shall meet the same requirements.

Video Camera Sensor: The operating ambient temperature range shall be -30°F to 140°F. Additionally, a heater shall be included to prevent the formation of ice and condensation in cold weather. The heater shall not interfere with the operation of the video camera sensor electronics,

or cause interference with the video signal.

Vibration: Vibrations shall meet the requirements of NEMA TS 2-2003 Section 2.1.9. Shock: Shock shall meet the requirements of NEMA TS 2-2003 Section 2.1.10.

Acoustic Noise: A video camera sensor and enclosure shall be provided that can withstand 150 dB for 30 minutes continuously, with no reduction in function or accuracy.

907-643.02.2--Materials Type 2 Video Vehicle Detection. The Type 2 Video Vehicle Detection shall be span wire mounted and consist of power supply, video camera, mounting brackets, and lightning protection as recommended by the manufacturer, video detection processors/extension modules capable of processing the number of camera and phase combination video sources shown on the project plans or in the purchase order

907-643.02.2.1--Functional Requirements for Type 2 Video Vehicle Detection. The Type 2 Video Vehicle Detection configuration shall utilize video processors with one or more video inputs and one (1) video output, responding to specific site applications, camera locations and detection zones shown on the project plans. Video processors or interface modules shall be provided which plug directly into NEMA TS 1 and TS 2 detector racks without adapters. Extension modules which allow detection zones from one camera to be routed to other card slots shall also be provided if required. The system shall be Ethernet compatible with an RJ45 port. The Type 2 Video Vehicle Detection shall be able to detect vehicles and bicycles in multiple lanes using only the video image.

907-643.02.2.2--Interface Type 2 Video Vehicle Detection. The following interfaces shall be provided:

1) Video inputs that accept RS 170 (NTSC) signals from an external video source. A BNC type interface connector shall be provided and located on the front of the video processing unit.
2) A LED indicator to indicate the presence of the video signal. The LED shall illuminate upon valid video synchronization and turn off when the presence of a valid video signal is removed.
3) One (1) video output per processor module. The video output shall be RS 170 compliant and shall pass through the input video signal. The video output shall have the capability to show text and graphical overlays to aid in system setup. The overlays shall display real-time actuation of detection zones upon vehicle detection or presence. Control of the overlays and video switching shall also be provided through the serial communications port. The video output interface connector shall be BNC or RCA type. If RCA connector is used, an RCA to BNC adapter shall be provided.
4) A serial communications port on the front panel. The serial port shall be compliant with RS-232 or RS-422 electrical interfaces and shall use a DB9 or RJ45 type connector. The serial communications interface shall allow the user to remotely configure the system and/or to extract calculated vehicle/roadway information.
5) Interface software. The interface protocol shall support multi-drop or point-to- multipoint communications. Each video detection sensor shall have the capability to be individually IP addressable either built in or with third party video server units.

6) Open collector contact closure outputs meeting NEMA TS 2 requirements. The open collector output will be used for vehicle detection indicators as well as discrete outputs for alarm conditions.
7) LED status indicators on the front panel. The LED's shall illuminate when a contact closure output occurs. Provide one output LED for each contact closure output.
8) A mouse compatible port (PS-2 or USB) on the front panel of the video processing unit. The mouse port shall be used as part of the system setup and configuration.
9) A Cabinet Interface shall be provided that is specifically designed to mount in a standard NEMA TS 1 and TS 2 detector rack without adapters or rewiring, or as a stand-alone shelf mount unit. The Interface shall operate in a temperature range from -31°F to +165°F and a humidity range from 0% to 95% relative humidity. The Cabinet Interface shall be powered by 100v to 240v AC, 50 or 60Hz. The front of the Interface shall include LED detection indications for each channel of detection. One BNC video output and detector test switches that allow the user to place calls on each channel

907-643.02.2.3--Functionality Type 2 Video Vehicle Detection. Detection zones shall be programmed via an on-board menu displayed on a video monitor and a pointing device connected to the video detection processor. The menu shall facilitate placement of detection zones and setting of zone parameters or to view system parameters. The video detection processor shall detect vehicles, bicycles, and pedestrians in real time as they travel across each detection zone. The video detection processor shall have an RS-232 (DB9 or RJ45) port for communications with an external computer. The video detection processor port shall be multi-drop capable.

It shall be possible to upload and save all configuration data including loop placement and save the file on a computer. It shall be possible to download a configuration file from a computer to the detection device.

The video detection processor shall accept new detection patterns from an external computer through the RS-232 port when the external computer uses the correct communications protocol for downloading detection patterns.

A Windows™ based software designed for local and remote connection shall be provided for video capture, real-time detection indication and detection zone modification capability. The video detection processor shall send its detection patterns to an external computer through the RS-232 port.

The video detection processor shall default to a safe condition, such as minimum recall, fixed recall or a constant call on each active detection channel, in the event of unacceptable interference with the video signal, low visibility conditions, or power failure.

The system shall be capable of automatically detecting a low-visibility condition such as fog and respond by placing all defined detection zones in a constant call mode. The system shall automatically revert to normal detection mode when the low-visibility condition no longer exists.

907-643.02.2.3.1--Functionality for Type 2 Video Vehicle Detection. The Video Detection Processor (VDP) for the Type 2 Video Vehicle Detection shall employ Dynamic Zone

Stabilization to provide motion tracking and compensation for swaying camera sensors mounted on dual or single span wires. The VDP shall include software that discriminately detects the presence of vehicles and bicycles in single or multiple lanes using only the video image. The VDP shall compensate for swaying motions by tracking the position of the stop bar for the approaching vehicle or bicycle movement. The VDP shall compensate for low frequency (cable sag) motion due to temperature changes during the day. The VDP shall compensate for moderate frequency motion induced by winds. The VDP shall compensate for up to ±5 degrees of tilt from vertical without any adverse detection false calls or dropped calls.

907-643.02.2.4--Detection. Type 2 shall have a minimum of 24 detection zones per camera input shall be possible, and each detection zone shall be capable of being sized to suit the site and the desired vehicle detection area. .

A single detection zone shall be able to replace multiple inductive loops and the detection zones shall be OR'ed as the default or may be AND'ed together to indicate vehicle presence on a single phase of traffic movement.

Placement of detection zones shall be done by using only a pointing device, and a Graphical Interface built into the video detection processor and displayed on a video monitor, to draw the detection zones on the video image from each video camera. Detection zones created in this manner shall be compatible with the PC-based software provided with the system.

The video detection processor shall support bicycle type zones where the zone can differentiate between motorized vehicles and bicycles, producing a call for one but not the other. Bicycle zones shall only output when a bicycle is detected. The video detection processor shall provide the ability to assign a separate output channel for bicycle zones to allow traffic controllers to implement special bicycle timing for applications where the traffic controller has separate bicycle detection inputs. Bicycle zones shall have the ability to have extensions assigned to individual bicycle ones for applications where the traffic controller does not have bicycle specific detection inputs.

Six (6) additional count zones for bicycles shall be provided to accumulate bicycle counts at user specified intervals.

The video detection processor's memory shall be non-volatile to prevent data loss during power outages.

When a vehicle is detected crossing a detection zone, the corners or entire zone of the detection zone shall flash/change color on the video overlay display to confirm the detection of the vehicle. It shall be possible to record the operation of the unit in real time with the detection zones operating.

Detection shall be at least 98% accurate in all weather conditions, with slight degradation acceptable under adverse weather conditions (e.g. rain, snow, or fog) which reduce visibility.

The video detection processor shall maintain normal operation of existing detection zones when one (1) zone is being added or modified.

The video detection processor shall output a constant call on any detector channel corresponding to a zone being modified and shall resume normal operation upon completion.

Detection zones shall be directional to reduce false detections from objects traveling in directions other than the desired direction of travel in the detection area.

The video detection processor shall process the video input from each camera using a microprocessor at 30 frames per second at one volt, peak to peak, 75 ohms, or EIA 170 NTSC video standard.

The video detection processor shall output minimum recall, fixed recall or constant call for each enabled detector output channel if a loss of video signal occurs. The recall behavior shall be user selectable for each output. The video detection processor shall output a constant call during the background "learning" period.

Detection zone outputs shall be configurable to allow the selection of presence, pulse, extend, and delay outputs. Timing parameters of pulse extend, and delay outputs shall be user definable between 0.1 to 25.0 seconds in increments of 0.1 seconds.

The processor shall have up to six (6) detection zones per camera view shall have the capability to count the number of vehicles detected, measure classification and speed. The data values shall be internally stored within the processor module for later retrieval through the RS-232 port. The data collection interval shall be user definable in periods of 5, 15, 30, or 60 minutes or by intersection cycle. Real-time data shall be retrieved from the PC-based software provided with the system.

907-643.02.2.5--Camera. Type 2 cameras shall be completely compatible with the video detection processor and shall be certified by the manufacturer to ensure proper system operation.

The Video Vehicle Detection shall produce accurate detector outputs under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera shall produce a useable video image shall be the minimum range from nighttime to daytime, but not less than the range 0.009 to 930 foot-candles.

The camera shall use a color CCD sensing element with resolution of not less than 470 lines horizontal and 400 lines vertical.

The camera shall include mechanisms to compensate for changing of lighting by using an electronic shutter and/or auto-iris lens.

The camera shall include a variable focal length lens with factory preset focus that requires no field adjustment. Zooming of the camera lens to suit the site geometry by means of a portable interface device designed for that purpose. The horizontal field of view shall be adjustable. Camera configuration shall be customized for each approach based on field site conditions and the project plans.

The camera electronics shall include automatic gain control (AGC) to produce a satisfactory image at night.

The camera shall be housed in a weather-tight sealed enclosure. The housing shall be field rotatable to allow proper alignment between the camera and the traveled road surface.

The camera enclosure shall be equipped with a sunshield. The sunshield shall include a provision for water diversion to prevent water from flowing in the camera's field of view.

The camera enclosure shall include a thermostatically controlled heater to assure proper operation of the lens shutter at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure. The heater shall directly heat the glass lens and require less than five (5) watts over the temperature range.

Power consumption of the camera shall be 15 watts or less under all conditions.

The camera enclosure shall be equipped with separate, weather-tight connections for power and setup video cables at the rear of the enclosure. These connections shall allow diagnostic testing and viewing of video at the camera while the camera is installed on a mast arm or pole using a lens adjustment module furnished under this bid item.

The video signal output by the camera shall in accordance with NTSC standards.

All necessary mounting brackets shall be mounted to pole shafts, mast arms, or other structures to mount cameras as indicated on the project plans. Mounting brackets shall result in a fixed-position mounting. Mounting Brackets shall be included at no additional cost.

907-643.02.2.6--Video Cable. The cable provided shall be as recommended by the manufacturer for optimal video detection performance. The power and video cable may be installed under the same outer jacket. The cable and installation tools shall be approved by the supplier and manufacturer's instructions must be followed to ensure proper connection.

907-643.02.2.7--Power Cable. The cable provided shall be as recommended by the manufacturer for optimal video detection performance.

Camera power cable shall be suitable for installation in conduit and in exposed sunlight environment, and UL listed.

The power and video cable may be installed under the same outer jacket. The cable and installation tools shall be approved by the supplier and manufacturer's instructions must be followed to ensure proper connection.

907-643.02.2.8--Surge Protection. Surge protection devices shall be provided for all new or added video detection devices as recommended by the manufacturer.

Video and/or Power cable shall be protected with an inline surge suppressor as recommended by the manufacturer or a panel mounted surge suppressor as recommended by the manufacturer or approved equal, installed and grounded per manufacturer's recommendations.

907-643.02.2.9--Physical and Environmental Specifications. Physical and Environmental Specifications shall be as follows.

Video Vehicle Detection Processor: The video vehicle detection processor shall operate reliably in a typical roadside traffic cabinet environment. Internal cabinet equipment and a video vehicle detection processor shall be provided that meets the environmental requirements of NEMA TS 2-2003 Section 2. If the processor is located in the sensor, it shall meet the same requirements.

Video Camera Sensor: The operating ambient temperature range shall be -30°F to 140°F. Additionally, a heater shall be included to prevent the formation of ice and condensation in cold weather. Do not allow the heater to interfere with the operation of the video camera sensor electronics, or cause interference with the video signal.

Vibration: Vibrations shall meet the requirements of NEMA TS 2-2003 section 2.1.9. Shock: Shock shall meet the requirements of NEMA TS 2-2003 section 2.1 .10.

Acoustic Noise: A video camera sensor and enclosure shall be provided that can withstand 150 dB for 30 minutes continuously, with no reduction in function or accuracy.

907-643.02.3--Materials Multi-Sensor Vehicle Detection.

907-643.02.3.1--General. The Multi-Sensor Vehicle Detector shall utilize two (2) different sensors of different technologies, video imaging and radar, to detect and track licensed and unlicensed vehicles at distances up to 600 feet. The detector shall fuse vehicle information from the two sensors to provide highly accurate and precise detection for special or advanced applications.

The Multi-Sensor Vehicle Detector shall use a primary detector rack mounted processor to interface with the traffic control cabinet. The module shall process information from both video imaging and radar sensors simultaneously in real-time.

907-643.02.3.2--Detector Configuration. The proposed MSVD shall be available in various configurations to allow maximum deployment flexibility. Each configuration shall have an identical user interface for system setup and configuration. The communications protocol to each configuration shall be identical and shall be hardware platform independent.

The detector shall include software that detects vehicles in multiple lanes. Video imaging detection zones shall be defined using only an on-board video menu and a pointing device to place the zones on a video image. Up to 24 video detection zones per camera view shall be available. Two (2) additional trigger zones for the radar sensor shall be available and be configurable by using the same system setup menu on the DP. A separate computer shall not be required to program the detection zones. A pre-programmed setup tool is required to align and input radar

information and set the camera field of view (zoom and focus).

907-643.02.3.3--Multi-Sensor Vehicle Detection Hardware. The MSVD hardware shall consist of the following four (4) elements:

1) Video Imaging Camera Sensor
2) Radar Sensor
3) Sensor Data Combiner
4) Detection Processor

907-643.02.3.3.1--Video Imaging Camera Sensor. The video imaging camera sensor shall meet the following minimum requirements:

- To accommodate deployment flexibility, the MSVD camera sensor shall be compatible with the Data Processor platforms. The MSVD camera sensor shall be supplied by the MSVD manufacturer.
- The advanced camera enclosure shall utilize technology for the heating element of the front glass. The transparent coating shall not impact the visual acuity and shall be close to optically clear.
- Cable terminations at the data combiner for video and power shall not require crimping or special tools.
- The camera sensor shall allow the user to set the focus and field of view via Wi-Fi connectivity.
- The camera shall produce a useable video image of vehicles under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera shall produce a useable video image shall be the minimum range from nighttime to daytime, but not less than the range 1.0 lux to10,000 lux.
- The camera electronics shall include automatic gain control (AGC) to produce a satisfactory image at night.
- The imager luminance signal to noise ratio (S/N) shall be more than 50 dB with the automatic gain control (AGC) disabled.
- The imager shall employ three (3) dimensional dynamic noise reduction (3D-DNR) to remove unwanted image noise.
- The camera image shall employ wide dynamic range (WDR) technology to compensate for wide dynamic outdoor lighting conditions. The dynamic range shall be greater than 100 dB.
- The camera shall be digital signal processor (DSP) based and shall use a CCD sensing element and shall output color video with resolution of not less than 550 TV lines.
- The camera sensor shall include an electronic shutter control based upon average scene luminance and shall be equipped with an auto-iris lens that operates in tandem with the electronic shutter. The electronic shutter shall operate between the range of 1/1 to 1/10,000th second.
- The camera sensor shall utilize automatic white balance.
- The camera sensor shall include a variable focal length lens with variable focus that can be adjusted, without opening up the camera housing, to suit the site geometry by means of a portable interface device designed for that purpose and manufactured by the detection system supplier.

- The horizontal field of view shall be adjustable. This camera configuration may be used for the majority of detection approaches in order to minimize the setup time and spares required by the user. The lens shall be a minimum 10X zoom lens with a variable focal length.
- The lens shall also have an auto-focus feature with a manual override to facilitate ease of setup.
- The camera shall incorporate the use of preset positioning that store zoom and focus positioning information. The camera shall have the capability to recall the previously stored preset upon application of power.
- The camera shall be housed in a weather-tight sealed enclosure conforming to IP-67 specifications. The housing shall allow the camera to be rotated to allow proper alignment between the camera and the traveled road surface.
- The camera enclosure shall be equipped with a sunshield. The sunshield shall include a provision for water diversion to prevent water from flowing in the camera's field of view.
- The camera enclosure shall be designed so that the pan, tilt and rotation of the camera assembly can be accomplished independently without affecting the other settings.
- The camera enclosure shall include a proportionally controlled heater design that maximizes heat transfer to the lens. The output power of the heater shall vary with temperature, to assure proper operation of the lens functions at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure.
- The glass face on the front of the enclosure shall have an anti-reflective coating to minimize light and image reflections.
- When mounted outdoors in the enclosure, the camera shall operate in a temperature range from -29°F to +165°F and a humidity range from 0% RH to 100% RH.
- Measurement of satisfactory video shall be based upon DP system operation.
- The camera sensor shall acquire its power from the sensor data combiner.
- Recommended camera placement height shall be 18 to 33 feet above the roadway, and over the traveled way on which vehicles are to be detected. For optimum detection the camera should be centered above the traveled roadway. The camera shall view approaching vehicles at a distance not to exceed 350 feet for reliable detection (height to distance ratio of 10:100). Camera placement and field of view (FOV) shall be unobstructed and as noted in the installation documentation provided by the supplier.
- The video signal shall be fully isolated from the camera enclosure and power cabling.
- A weather-proof protective cover shall be provided to protect all terminations at the camera.

907-643.02.3.3.2--Radar Sensor. The radar sensor shall meet the following minimum requirements:

- The radar sensor shall operate in the 24 GHz frequency band.
- The radar detection range shall be 600 feet minimum, ±5%.
- The radar sensor shall be able to track up to 20 independent objects simultaneously.
- Object speed detection shall be within a range of zero (0) to 150 mph ±1.0 mph.
- The radar sensor shall be able to detect vehicles in one (1) to four (4) traffic lanes.
- The radar sensor shall be housed in a weather-tight sealed enclosure conforming to IP-67 specifications. The housing shall allow the radar to be adjusted to allow proper alignment between the sensor and the traveled road surface.

- When mounted outdoors in the enclosure, the radar shall operate in a temperature range from -29°F to +165°F and a humidity range from 0% RH to 100% RH.
- The radar sensor shall communicate with the sensor data combiner.
- The radar sensor shall acquire its power from the sensor data combiner.
- Data and power cables between the radar sensor and sensor data combiner shall be fully isolated from the sensor enclosure.

907-643.02.3.3.3--Multi-Sensor Vehicle Detection Assembly. Multi-Sensor Vehicle Detection Assembly shall meet the following requirements:

- Both camera and radar sensors shall be housed in an overall, single enclosure assembly.
- The maximum power consumption for the Multi-Sensor Vehicle Detection Assembly shall be less than ten (10) watts typical, 20 watts peak.

907-643.02.3.3.4--Sensor Data Combiner. The sensor data combiner (if required) shall meet the following minimum requirements:

- A sensor data combiner that combines sensor information from both video and radar sensors shall be employed.
- Sensor data combiner shall supply primary power to each sensor unit.
- Sensor data combiner shall facilitate digital communications between the sensor data combiner and each of the sensor units.
- Sensor data combiner shall get its primary power from an AC power source using industry standard 3-conductor cabling.
- Sensor data combiner shall communicate with the detection processor using a single coax cable. Both video imaging and radar data shall use the single coax cable.
- The sensor data combiner shall also employ industry standard Wi-Fi connectivity for remote sensor system setup using a mobile programming device such as anetbook or tablet computer. Video camera and radar sensor shall be able to be configured independently.
- Sensor data signal shall be fully isolated from the mechanical enclosure and power cabling.
- Cable terminations at the sensor data combiner shall not require crimping tools.
- The Sensor Data Combiner shall be housed in a weather-tight sealed enclosure conforming to IP-67 specifications.

907-643.02.3.3.5--Detection Processor. The detection processor shall meet the following minimum requirements:

- Each sensor input shall accept RS170 (NTSC) or CCIR (PAL) signals from an external video source. The interface connector shall be BNC type and shall be located on the front of the processing unit. The sensor input shall have the capability to be terminated into 75-ohms or high impedance (Hi-Z) using dip switches or software control from the user menu. The sensor input shall also facilitate the data from the radar sensor.
- A LED indicator shall be provided to indicate the presence of the sensor signal. The LED shall illuminate upon valid sensor synchronization and turn off when the presence of a valid

sensor signal is removed.

- One (1) video output shall be provided. The video output shall be RS170 or CCIR compliant and shall pass through the input video signal. For multi-channel video input configurations, a momentary push-button shall be provided on the front panel to cycle through each input video channel. In the absence of a valid sensor signal, the channel shall be skipped and the next valid sensor signal shall be switched. The real time video output shall have the capability to show text and graphical overlays to aid in system setup. The video output interface connector shall be positive locking BNC type. Friction type (e.g. RCA type) connectors shall not be allowed.
- A communications port shall be provided on the front panel. The communications interface shall allow the user to remotely configure the system and/or to extract calculated vehicle/roadway information. The interface protocol shall be documented or interface software shall be provided. Each MSVD shall have the capability to be addressable. The DP shall support data rates of 1200 bps to 230,400 bps, inclusive.
- Open collector (contact closure) outputs shall be provided. Four (4) open collector outputs shall be provided for the single or dual channel rack-mount configuration. Additionally, the DP shall allow the use of extension modules to provide up to 24 open collector contact closures per camera input. Each open collector output shall be capable of sinking 30 mA at 24 VDC. Open collector outputs will be used for vehicle detection indicators as well as discrete outputs for alarm conditions. The DP outputs shall be compatible with industry standard detector racks assignments.
- Logic inputs such as delay/extend or delay inhibit shall be supported through the appropriate detector rack connector pin or front panel connector in the case of the I/O module. For DPs and extension modules, four (4) inputs shall be supported via detector rack interface. The I/O module shall accommodate eight (8) inputs through a 15-pin "D" connector.
- Detection status LEDs shall be provided on the front panel. The LEDs shall illuminate when a contact closure output occurs. The front panel of the DP shall have detector test switches to allow the user to manually place calls on each DP output channel. The test switch shall be able to place either a constant call or a momentary call depending on the position of the switch.
- A USB mouse port shall be provided on the front panel of the rack mount detection processing unit. The mouse port shall not require special mouse software drivers. The mouse port shall be used as part of system setup and configuration.
- Extension modules (if required) shall be connected to the DP by an 8-wire twisted- pair cable with modular RJ45 connectors. DP and EM communications shall be accommodated by methods using differential signals to reject electrically coupled noise.
- Extension modules (EM) shall be available to eliminate the need of rewiring the detector rack, by enabling the user to plug an extension module into the appropriate slot in the detector rack to provide additional open collector outputs. The extension module shall be available in both two (2) and four (4)-channel configurations. The DP and EM shall be specifically designed to mount in a standard detector rack, using the edge connector to obtain power, provide contact closure outputs and accept logic inputs (e.g. delay/extend). No adapters shall be required to mount the DP or EM in a standard detector rack. Detector rack rewiring shall not be required.
- The DP shall utilize non-volatile memory technology to store on-board firmware and

operational data.

- The DP shall enable the loading of modified or enhanced software through the EIA232 or USB port (using a USB thumb drive) and without modifying the DP hardware.
- The DP and EM shall be powered by 12 or 24 volts DC. DP and EM modules shall automatically compensate for either 12 or 24 VDC operation. DP power consumption shall not exceed 7.5 watts. The EM power consumption shall not exceed three (3) watts.
- The DP shall operate satisfactorily in a temperature range from -40°F to +165°F and a humidity range from zero (0) %RH to 95 %RH, non-condensing as set forth in NEMA specifications.
- A video surge suppresser shall be provided for each sensor input. The surge suppresser shall be appropriately grounded to the cabinet ground rod using AWG 14 minimum.

907-643.02.3.4--Detection Software. The detection software shall meet the following general system functions:

- Detection zones shall be programmed via an on board menu displayed on a video monitor and a pointing device connected to the DP. The menu shall facilitate placement of detection zones and setting of zone parameters or to view system parameters. A separate computer shall not be required for programming detection zones or to view system operation.
- The DP shall store up to three (3) different detection zone patterns in non-volatile memory. The DP can switch to any one of the three (3) different detection patterns within one (1) second of user request via menu selection with the pointing device. Each configuration shall be uniquely labeled and able to be edited by the user for identification. The currently active configuration indicator shall be displayed on the monitor.
- The DP shall detect vehicles in real time as they travel across each detection zone.
- The DP shall accept new detection patterns from an external computer through a communications port when the external computer uses the correct communications protocol for downloading detection patterns. A Windows™ based software designed for local or remote connection and providing video capture, real-time detection indication and detection zone modification capability shall be provided with the system.
- The DP system shall have the capability to automatically switch to any one of the stored configurations based on the time of day which shall be programmable by the user.
- The DP shall send its detection patterns to an external computer through the communications port when requested when the external computer uses the appropriate communications protocol for uploading detection patterns.
- The DP shall default to a safe condition, such as a constant call on each active detection channel, in the event of unacceptable interference or loss of the sensor signal.
- The system shall be capable of automatically detecting a low-visibility condition such as fog and respond by placing all effected detection zones in a constant call mode. A user-selected alarm output shall be active during the low-visibility condition that can be used to modify the controller operation if connected to the appropriate controller input modifier(s). The system shall automatically revert to normal detection mode when the low-visibility condition no longer exists.
- Up to 24 detection zones per camera input shall be supported and each detection zone can be sized to suit the site and the desired vehicle detection region.
- The DP shall support two (2) independent trigger points for radar outputs for dilemma

zone applications.

- The DP shall provide up to 24 open collector output channels per sensor input using one or more extension modules.
- A single detection zone shall be able to replace multiple inductive loops and the detection zones shall be OR'ed as the default or may be AND'ed together to indicate vehicle presence on a single approach of traffic movement.
- Placement of detection zones shall be done by using only a pointing device, and a graphical interface built into the DP and displayed on a video monitor or laptop computer to draw the detection zones on the video image from each video camera.
- When a vehicle is detected within a detection zone, a visual indication of the detection shall activate on the video overlay display to confirm the detection of the vehicle for the zone.
- Detection shall be at least 98% accurate in good weather conditions, with slight degradation possible under adverse weather conditions (e.g. rain, snow, or fog) which reduce visibility. Detection accuracy is dependent upon site geometry, camera placement, camera quality and detection zone location, and these accuracy levels do not include allowances for occlusion or poor video due to camera location or quality.
- The DP shall provide dynamic zone reconfiguration (DZR). DZR enables normal operation of existing detection zones when one zone is being added or modified during the setup process. The new zone configuration shall not go into effect until the configuration is saved by the operator.
- Detection zone setup shall not require site specific information such as latitude and longitude to be entered into the system.
- The DP shall process the video input from each camera at 30 frames per second. Multiple camera processors shall process all video inputs simultaneously.
- The DP shall output a constant call during the background learning period of no more than three (3) minutes.
- Detection zone outputs shall be configurable to allow the selection of presence, pulse, extend, and delay outputs. Timing parameters of pulse, extend, and delay outputs shall be user definable between 0.1 to 25.0 seconds.
- Up to six (6) video detection zones per sensor input shall have the capability to count the number of vehicles detected. The count value shall be internally stored for later retrieval through the communications port.
- In addition to the count type zone, the DP shall be able to calculate and/or acquire average speed and lane occupancy using both video and radar sensors. These values shall be stored in non-volatile memory for later retrieval.
- The DP shall have an "advance" zone type where detection outputs to the traffic controller are compensated for angular occlusion and distance.
- The user shall have the ability to enable or disable the display of the phase information on the video output.
- The DP shall have the capability to change the characteristics of a detection zone based on external inputs such as signal phase. Each detection zone shall be able to switch from one zone type (i.e. presence, extension, pulse, etc.) to another zone type based on the signal state. For example, a zone may be a "count" zone when the phase is green but change to a "presence" zone type when the phase is not green. Another application would be zone type

of "extension" when the signal phase is green and then "delay" when red.

- The DP shall aid the user in drawing additional detection zones by automatically drawing and placing zones at appropriate locations with only a single click of the mouse. When the user wishes to modify the location of a zone, the DP shall allow the user move a single zone, multiple zones or all zones simultaneously.
- On-screen zone identifiers shall be modifiable by the user. The user shall be allowed to select channel output assignments, zone type, input status, zone labels or zone numbers to be the identifier.
- For multiple camera input DPs, the user shall have the ability to enable automatic video output switching. The dwell time for each sensor input shall be user programmable.
- For the radar sensor zones the output can be triggered by presence of a vehicle only or by presence of a vehicle above a speed defined by the user.

907-643.02.3.5--Multi-Sensor Cable. The cable to be used between the Multi-Sensor Vehicle Detection Assembly and the DP in the traffic cabinet shall be per manufacturer's specifications. This cable shall be suitable for installation in conduit or overhead with appropriate span wire. BNC plug connectors shall be used where applicable. The cable, BNC connector, and crimping tool shall be approved by the supplier of the MSVD, and the manufacturer's instructions must be followed to ensure proper connection.

907-643.02.3.6--Power Cable. The power cabling shall be per manufacturer's specifications. The cabling shall comply with the National Electric Code, as well as local electrical codes.

907-643.03--Construction Requirements. The Construction and testing requirements for Type 1, Type 2, and Multi-Sensor Vehicle Detection are the same.

907-643.03.1--General Requirements. The Contractor shall perform the following:

1) Install all sensors, system processors and associated enclosures and equipment at the locations specified in the plans, in any related notice to bidders, per manufacturer's recommendations, or as directed.
2) Install all cabinet-mounted equipment in the intersection equipment cabinet or as specified in the plans.
3) Cabling from all sensors shall be installed in accordance with the manufacturer's recommendations.
4) Make all necessary adjustments and modifications to the total VVD/MSVD prior to requesting inspection for system/device acceptance.
5) Mount the sensors as per manufacturer's recommendations or as shown in the plans.
6) Mount the sensors so as to view approaching traffic unless otherwise directed.
7) Optimize the sensors location and zone of detection as directed by the Engineer, or authorized designee.
8) Adjust the sensor zoom lens to match the width of the road/detection area, and minimize lane vehicle occlusion.
9) Fasten all other cabinet components, with hex-head or Phillips-head machine screws insulated with nuts (with locking washer or insert) or into tapped and threaded holes. Do not use self-tapping or self-threading fasteners.

10) Provide electrical cables for video, communications signaling and power supply between the cabinet and the VVD/MSVD image sensor cameras as recommended by the manufacturer, and as required for a fully functional System.

907-643.03.2--Contractor Training. Installation of the Video Vehicle Detection shall be as recommended by the manufacturer and performed by a Contractor trained and certified by the supplier. Where time does not reasonably permit training of the installing Contractor, a supplier factory representative shall supervise and assist a Contractor during installation of the Video Vehicle Detection.

Installation of the Multi-Sensor Vehicle Detection shall be as recommended by the supplier and performed by a Contractor with factory-certified installers and documented in installation materials provided by the supplier. Proof of factory certification shall be provided.

907-643.03.3--Blank.

907-643.03.4--Warranty. The Video Vehicle Detection shall be warranted to be free of manufacturer defects in materials and workmanship for a period of three (3) years from the date of final acceptance. Equipment covered by the manufacturer's warranties shall have the registration of that component placed in the Department's name prior to final inspection. The Contractor is responsible for ensuring that the vendors and/or manufacturers supplying the components and providing the equipment warranties recognize the Department as the original purchaser and owner/end user of the components from new. During the warranty period, the supplier shall repair or replace with new or refurbished material, at no additional cost to the State, any product containing a warranty defect, provided the product is returned postage-paid by the Department to the supplier's factory or authorized warranty site. Products repaired or replaced under warranty by the supplier shall be returned prepaid by the supplier.

The Multi-Sensor Vehicle Detector shall be warranted to be free of manufacturer defects in materials and workmanship for a period of three years (3) from the date of final acceptance.

During the warranty period, technical support shall be available from the supplier via telephone within four (4) hours of the time a call is made by the Department, and this support shall be available from factory certified personnel. During the warranty period, updates and corrections to Control Unit Software shall be made available to the Department by the supplier at no additional cost.

907-643.03.5--MDOT Employee Training. When called for in the Plans, the Contractor shall submit to the Project Engineer for approval a detailed Training Plan including course agendas, detailed description of functions to be demonstrated and a schedule. The Contractor must also submit the Trainer's qualifications to the Project Engineer for approval prior to scheduling any training. The training must include both classroom style training and hands-on training in the field of the maintenance and troubleshooting procedures required for each component. The training should also consist of a hands-on demonstration of all software configuration and functionality where applicable.

The supplier of the detection system shall, at a minimum, provide a 16-hour operations and maintenance training class with suitable documentation for up to eight (8) persons selected by the Department. The operations and maintenance class shall be scheduled at a mutually acceptable time and location.

907-643.03.6--Maintenance and Technical Support. The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the detection system. Spare parts shall be available for delivery within 30 days of placement of an acceptable order at the supplier's then current pricing and terms of sale of said spare parts.

The suppliers shall maintain an ongoing program of technical support for the detection system. This technical support shall be available via telephone or via personnel sent to the installation site upon placement of an acceptable order at the supplier's then current pricing and terms of sale of said technical support services.

The installation or training support shall be provided by a factory-authorized representative and shall be a minimum IMSA-Level II Certified Traffic Signal Technician.

All product documentation shall be written in the English language.

907-643.04--Method of Measurement. Video Vehicle Detection Sensor of the type specified will be measured as a unit per each.

Video Vehicle Detection Cable and/or Power Cable will be measured by the linear foot, measured horizontally along the conduit, messenger cable or mast arm and vertically along the pole.

Video Vehicle Detection Training will be measured as a lump sum after the completion of all training.

Multi-Sensor Vehicle Detection of the type specified will be measured as a unit per each.

Multi-Sensor Detection Cable and/or Power Cable will be measured by the linear foot, measured horizontally along the conduit, messenger cable or mast arm and vertically along the pole.

907-643.05--Basis of Payment. Video Vehicle Detection Sensor, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for installation, system integration, documentation, system software, and testing of a complete video detection sensor site including video camera sensor/processor, the sensor environmental enclosure, attachment hardware and brackets, completion of all testing requirements and all work, equipment and appurtenances as required to provide and install a complete video detection system. The price bid shall also include all system documentation including: shop drawings, operations and maintenance manuals, wiring diagrams, block diagrams and other materials necessary to document the operation of the Video Vehicle Detection Sensor. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Video Vehicle Detection Cable and/or Power Cable will be paid at the contract unit price per linear

foot, which price shall be full compensation for all labor, materials, equipment tools, furnishing, installing, system integration, connections, testing, and all incidentals necessary to complete the work.

Video Vehicle Detection Training, measured as prescribed above, will be paid for at the contract unit lump sum price, which price shall be full compensation for all training costs.

Multi-Sensor Vehicle Detection Sensor, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for installation, system integration, documentation, and testing of a complete Multi-Sensor Vehicle Detection Sensor site including video imaging camera sensor, radar sensor, sensor data combiner, detection processor, system software, the sensor environment enclosure, attachment hardware and brackets, completion of all testing requirements and all work, equipment and appurtenances as required to provide and install a complete Multi-Sensor Vehicle Detection Sensor. The price bid shall also include all system documentation including: shop drawings, operations and maintenance manuals, wiring diagrams, block diagrams and other materials necessary to document the operation of the multi-sensor detection system. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Multi-Sensor Detection Cable and/or Power Cable will be paid at the contract unit price per linear foot, which price shall be full compensation for all labor, materials, equipment tools, furnishing, installing, system integration, connections, testing, and all incidentals necessary to complete the work.

Payment will be made under:

907-643-A:	Video Vehicle Detection Sensor, Type ___	- per each
907-643-B:	Video Vehicle Detection Cable	- linear foot
907-643-C:	Video Vehicle Detection Power Cable	- linear foot
907-643-D:	Video Vehicle Detection Training	- lump sum
907-643-E:	Multi-Sensor Vehicle Detection Sensor	- per each
907-643-F:	Multi-Sensor Vehicle Detection Cable	- linear foot
907-643-G:	Multi-Sensor Vehicle Detection Power Cable	- linear foot

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-645-1 **CODE: (IS)**

DATE: **11/15/2017**

SUBJECT: **Pedestrian Detection Assemblies**

Section 645, Pedestrian Detection Assemblies, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-645.02--Materials.

907-645.02.1--Standard Pedestrian Pushbutton Detector. Before the first sentence of the paragraph in Subsection 645.02.1 on page 629, add the following.

The Standard Pedestrian Pushbutton Detector shall meet the latest ADA Compliant Specifications.

907-645.02.1.2--Pushbutton. Delete the second sentence of the paragraph in Subsection 645.02.1.2 on page 629, and substitute the following.

The switch, when activated, shall give an audible (i.e., click) and visual indication of actuation. The visual indication shall remain illuminated until the pedestrian's WALK indication is displayed.

907-645.02.5--Environmental. Delete the paragraph in Subsection 645.02.5 on page 631, and substitute the following.

Ensure equipment performs all required functions during and after being subjected to the environmental testing procedures described in NEMA TS 2, Sections 2.2.7, 2.2.8, and 2.2.9.

907-645.05--Basis of Payment. Add the "907" prefix to the list of pay items on page 631.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-650-1 **CODE: (SP)**

DATE: **01/17/2017**

SUBJECT: **On-Street Video Equipment**

Section 907-650, On-Street Video Equipment, is hereby added to and made part of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows.

SECTION 907-650 - ON-STREET VIDEO EQUIPMENT

907-650.01--Description. This work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, test, train, and operate CCTV Camera Systems. CCTV Camera System shall be provided to provide TMC personnel with live streaming video of the roadway network via CCTV Camera Systems. CCTV Camera Systems include both fixed and PTZ cameras.

907-650.02--Materials. All materials furnished, assembled, fabricated or installed shall be new, corrosion resistant.

Support equipment for the CCTV Camera Systems shall be provided in a Type B ITS Equipment Cabinet as described in Section 660.

The CCTV Camera System shall comply with the following minimum materials specifications:

907-650.02.1--General Capabilities and Performance Requirements. Overall CCTV Camera System capabilities and performance requirements include the following:

1) CCTV PTZ Cameras shall be placed and installed at fixed locations to provide full coverage of the mainline travel lanes and shoulders.
2) CCTV Fixed Cameras shall be placed and installed at fixed locations to provide coverage of the mainline travel lanes. The cameras shall be provided with a varifocal lens which shall be adjusted by the Contractor for the desired view of the mainline. At major intersections fixed cameras shall also be adjusted to the desired view of the surface streets. The Contractor shall record the adjusted views and submit to the MDOT ITS Engineer or his designee for approval and the MDOT Project Engineer. This recording shall be in a format playable with Windows Media Player or pre approved by MDOT ITS Engineer.
3) The CCTV Camera System components shall be compatible with each other and be of rugged design and suitable for reliable operation when mounted in their fixed locations.
4) The PTZ and the Fixed cameras shall be provided as either Ethernet IP-based or Analog as indicated in either project plan sheets or Notice to Bidders or should be assumed Ethernet IP if description isn't provided.
5) The CCTV Camera System shall be capable of attended and unattended, continuous 24 hours per day operation at fixed sites.

6) The Contractor shall ensure that the installed equipment provides unobstructed video of the roadway, traffic, and other current conditions around a roadside CCTV field site; that it responds to camera control signals from an operator of the system; and that the video images can be transmitted to remote locations interfaced to the system for observation.
7) PTZ and IP based cameras shall be capable of being remotely controlled and programmed.
8) All PTZ enclosures shall be provided with the ability to be pressurized for environmental protection.
9) PTZ Dome type cameras shall be mounted together with the zoom lens and integrated into the pan and tilt device within the dome enclosure forming a totally integrated, easily removable assembly.
10) All cameras shall include a high quality integrated camera/lens combination.
11) The camera shall also be equipped with an auto-iris lens capability compatible with the zoom lens supplied.
12) Iris capability shall include a provision for manual override via software.
13) The PTZ camera shall be capable of auto-focus during zoom-in or zoom-out, with provisions for override via software.
14) Overexposure protection shall be provided - the camera shall not be degraded or damaged under normal reasonable operating conditions.
15) The capability for local control of pan, tilt and zoom functions shall be provided at the roadside cabinet using vendor-supplied software installed on a laptop computer.
16) All IP Based CCTV cameras shall support the NTCIP 1205 v1.08 or later version if backward compatible communication protocol.

907-650.02.2--Analog Camera Unit. The minimum Camera Unit requirements include:

1) The camera unit shall incorporate solid-state design and provide digital signal processing (DSP) capable of providing clear and low-bloom color video pictures during daylight hours and monochrome video at night when the roadway is illuminated with minimal roadway lighting.
2) The Analog Camera shall be fully compliant with all aspects of the National Television Standards Committee (NTSC) specification, and produce NTSC compatible video.
3) The Analog camera shall operate over wide dynamic light conditions ranging from low light/dusk to full sunlight having day (color)/night (monochrome) switchover and iris control, with user-selectable manual and automatic control capabilities.
4) The camera unit shall be equipped with a low light level sensor to automatically switch the camera to Black and White mode.
5) The camera unit shall be equipped with an override capability to allow the camera to be manually switched via software to turn off the automatic low light level sensor switch feature for Color or Monochrome operation.
6) Image sensor: 1/3 inch charge-coupled device (CCD) employing digital video signal processing (DSP) technology with a minimum Effective Picture Elements of 768 horizontal x 494 vertical pixels.
7) The camera unit shall include integrated image stabilization.
8) Sensitivity: The camera shall maintain usable video under both day and nighttime lighting conditions.

9) Video output synchronization shall be 2 to 1 interlace and will observe the NTSC (color) and EIA RS-170 (black and white) standards.
10) Resolution: 470 lines horizontal and 350 TV lines vertical, NTSC equivalent.
11) Signal-to-noise ratio: 48 dB, minimum with AGC off, un-weighted, and 4.5MHz filter.
12) Video Signal Format: National Television Standards Committee (NTSC) composite video output of 1 $Volt_{p-p}$ at 75 ohms, unbalanced.

907-650.02.3--Internet Protocol IP Camera Unit. IP cameras shall provide the same functionality as the analog camera units specified in subsection 907-650.02.2, in addition to the following minimum requirements:

1) Power over Ethernet or 24 VAC Power Input.
2) Open Architecture.
3) Shall utilize H.264 (Video Coding Experts Group (VCEG)/Moving Picture Experts Group)Video Compression Technology types as directed by the Intelligent Transportation Systems Program Manager
4) Standard Definition (SD) Units Shall be capable of 2 simultaneous H.264 video streams.
    a. The primary stream shall provide 480p at 30 fps and the ability to be reduced to D1 resolution at 30 fps.
    b. The secondary stream shall provide a minimum CIF resolution 30fps.
5) High Definition Units (HD) Shall be capable of 2 simultaneous H.264 video streams.
    a. The primary stream shall provide 720p at 30 fps at a minimum and the ability to be reduced to D1 resolution at 30 fps.
    b. The secondary stream shall provide a minimum CIF resolution 30fps.
6) Image sensor: 1/3 inch charge-coupled device (CCD)
7) Shall be capable to take video snapshots in JPEG format and transfer image via FTP.
8) IP encoded streams and Video Compression Technology shall be compatible with the existing video streaming servers and decoders for the www.mdottraffic.com WEB site or as approved by the Intelligent Transportation Systems Program Manager.
9) Internet Protocols: TCP, UDP (Unicast, Multicast IGMP V2), UPnP, DNS, DHCP, RTP, NTP
10) Support Real Time Streaming Protocol (RTSP)
11) Multilevel Password Protection.
12) EDR (Extended Dynamic Range).
13) C/CS Lens Mount.
14) Backlight Compensation.
15) Low Profile Top/Bottom Mount.
16) BNC Service Connector. Tap shall be installed inside cabinet.

907-650.02.4--PTZ Camera Lens. The minimum camera lens requirements include:

1) The camera lens shall have a minimum F-Stop of 1.4 to 1.6.
2) Optical and Digital Zoom:
    a. Shall provide an optical zoom of 35X for analog dome cameras.
    b. Shall provide a minimum optical zoom of 18X and a minimum digital zoom of 6X for IP PTZ cameras.

3) Zoom Control: The zoom magnification shall be fully controllable via the remote PTZ mechanism. The time to pass through the full range of movement of Iris, Zoom and Focus shall in no case exceed 10 seconds.
4) Iris and Focus: Support automatic iris and focus control with manual override capability. The iris shall be in a closed position when there is no power.
5) White or Color Balance: Support automatic or set to yield optical results under various outdoor lighting conditions.
6) Shutter Speed: Support automatic or set to yield optimal results under low lighting conditions without blooming or smearing, auto-iris on. Provide electronic shutter that is selectable in steps.
7) The lens shall be equipped for continuous remote control of zoom, focus and iris.
8) Mechanical or electrical means shall be provided to protect motors from overrunning in extreme positions.
9) The zoom lens shall be an integrated camera/lens combination.
10) Vibration or ambient temperature changes shall not affect the automatic iris function, focus mechanism and zoom mechanism.
11) The lens shall be optically clear, impact resistant and acrylic. The acrylic lens shall not yellow and shall not introduce appreciable light loss or geometric distortion over a 10-year service life when exposed to the environment.
12) The zoom mechanism shall be designed for maintenance-free operations. All gearing and bearings shall be self-lubricating with lubrication and gearing tolerances compatible with the environmental specifications contained herein.

907-650.02.5--Character Generator. The minimum character generator requirements include:

1) The capability of generating and superimposing lines of English language text on the video image/stream shall be provided.
2) A minimum of 20 characters per line that are between 10 and 30 horizontal TV lines in height shall be provided.
3) Control (enable, disable and edit) of this feature shall be available remotely and at the field site using a laptop computer.
4) The text messages shall be stored in non-volatile memory.
5) Characters shall be white with a black border to ensure legibility in varied scenes.
6) The following minimum text insertion requirements shall be provided with the ability to individually turn each one on or off:
   a. Camera ID
   b. Sector Message
   c. Alarm Messages
   d. Pan/Tilt Azimuth/Elevation
   e. Compass Direction in 8 discreet zones

907-650.02.6--PTZ Enclosure. The minimum PTZ enclosure requirements include:

1) Sealed, pressurized dome enclosure that provides complete protection for the camera and lens assembly from moisture and airborne contaminants.

2) Environmental resistant and tamper proof meeting NEMA 4X or IP-67 rating requirements.
3) The dome enclosure shall be constructed in such a way that unrestricted camera views can be obtained at all camera and lens positions.
4) Dome environmental control shall be provided by nitrogen pressurization with a Schrader Valve for pressurization and purging. The enclosure shall be designed to be pressurized to the manufactures recommended level .with dry nitrogen. The notation "CAUTION – PRESSURIZED" shall be printed on the rear plate of the enclosure and shall be clearly visible and readable.
5) An alarm shall be displayed under low-pressure conditions and displayed on the camera video. The low-pressure alarm shall be on/off selectable by the operator at the TMC.
6) The PTZ dome enclosure shall consist of a two-piece (upper and lower half) dome.
7) A harness and cables shall be provided with each enclosure to extend the video, power and data from the CCTV Camera System to the field cabinet. No harness shall be exposed. All entry points shall have gaskets to prevent moisture entry. A sealed connector shall be at the top of the dome.
8) The dome enclosure shall assist in preventing lens fogging and effectively reduce internal temperatures.
9) The enclosure shall minimize glare and provide overexposure protection for the camera when pointed directly at the sun.
10) The enclosure shall be equipped with a heater, a defroster and a thermostat.
11) The camera equipment inside the dome enclosure shall meet all its specified requirements when operating under the following conditions:
    a. Ambient Temperatures: From -40°C to +65°C (-40°F to +149°F). A heater/blower shall be used to maintain internal dome temperatures within the manufacturer required operating temperatures for their equipment.
    b. Relative Humidity: 5% and 95%, non-condensing.
12) Total weight of CCTV cameras (including the housing, sunshield, and all internal components shall be less than 18 pounds.
13) At a minimum, dome enclosures shall be secured with a mounting plate/attachment designed to withstand a 90mph sustained wind speed with a 30% gust factor. For projects that are in areas with higher wind standards, the higher standard is required.

907-650.02.7--Pan and Tilt Unit (PTU). The minimum pan and tilt unit requirements include:

1) The motorized, remotely controlled Pan/Tilt unit shall be mounted within the dome enclosure. The unit shall be integrated with the CCTV control system.
2) For dome enclosed units, the unit shall provide a minimum continuous tilt (vertical) movement of 90 degrees from horizontal and continuous pan (horizontal) movement of 360 degrees.Tilt speed shall be variable from zero up to 40 degrees per second, minimum, and the pan speed shall be variable from zero up to 80 degrees per second, minimum.
3) For separately housed tilt motor units (non-Dome Cameras), the unit shall provide a minimum continuous tilt (vertical) movement of +90° to -90° degrees from horizontal and continuous pan (horizontal) movement of 360 degrees.Tilt speed shall be variable from zero up to 34 degrees per second, minimum, and the pan speed shall be variable from zero up to 80 degrees per second, minimum.

4) The unit shall be capable of simultaneous pan, tilt movements and zoom on one camera
5) Drive motors shall be capable of instantaneous reversing, be corrosion resistant, not require lubrication, and have overload protection.
6) Braking shall be provided in both pan and tilt movements to enable fast stop and reversal and to prevent drifting.
7) The viewing limits shall be set by a minimum of eight (8) discreet privacy zones that are software selectable.

907-650.02.8--Camera Control Receiver – Driver. The minimum camera control receiver-driver requirements include:

1) The camera control receiver shall provide a single point interface for control, power and video communications.
2) The camera control receiver-driver shall be included within the dome enclosure and control the camera, pan/tilt and lens functions at each CCTV site.
3) The unit shall provide alphanumeric generation for on-screen titles.
4) The unit shall provide the ability to display diagnostic information on the screen in response to user commands.
5) The diagnostic information shall include current pan, tilt, zoom and focus positions, and error codes for power, communication, position and memory problems.
6) The capability for programmed tours shall be provided.
7) The camera control receiver shall use non-volatile memory to store the required information for presets, camera ID and sector text.
8) Presets shall meet the following requirements:
   a. A minimum of 64 presets shall be supported. Each preset shall consist of pan, tilt, zoom and focus positions.
   b. The Contractor shall develop and install ten (10) presets for each camera. The Contractor shall submit the preset locations to the MDOT ITS Engineer for review and approval.
9) Protocols: CCTV cameras shall support at a minimum the Pelco D and the NTCIP 1205 v1.08 communication protocol. No camera control receiver-driver shall use non-published protocols. The Contractor shall provide protocol documentation.
10) Communications Interface: The communications interface shall support communications compliant with RS- 232,and/or 485 (user selectable), or shall provide a network interface port.
11) Serial communications interface shall be compatible with the Video Encoder serial port as defined in Section 907-662 .
12) Standard interface connectors shall be provided.
13) The local video input and output connections shall be the BNC type for analog cameras. IP Based Cameras should stream video over the Ethernet connection but include a BNC type connection for local testing, configuration, and calibration.
14) Connector(s) shall also be used for connecting the control outputs from the control receiver-driver unit to the camera, lens and pan/tilt mechanisms.

907-650.02.9--Fixed Camera Lens. The fixed camera lens shall meet the following minimum requirements.

1) Type ..... Varifocal
2) Format Size ..... 1/3 Inch
3) Mount Type ..... CS
4) Focal Length 5-50
5) Zoom Ratio ..... 1.4 -360
6) Relative Aperture (F) 1.6-360
7) Iris ..... Auto (Direct Drive)
8) Focus ..... Manual
9) Zoom ..... Manual
10) Minimum Object Distance ..... 0.5 m
11) Back Focal Length ..... 10.05 mm
12) The camera lens shall have a minimum F-Stop of 1.4 to 1.6.
13) Shall provide a varifocal zoom of 5-50 mm.
14) Iris: Support automatic iris control with manual override capability. The iris shall be in a closed position when there is no power.
15) White or Color Balance: Support automatic or set to yield optical results under various outdoor lighting conditions.
16) Shutter Speed: Support automatic or set to yield optimal results under low lighting conditions without blooming or smearing, auto-iris on. Provide electronic shutter that is selectable in steps.
17) Vibration or ambient temperature change shall not affect the automatic iris function, focus mechanism or zoom mechanism.
18) The lens shall be optically clear, impact resistant and acrylic. The acrylic lens shall not yellow and shall not introduce appreciable light loss or geometric distortion over a 10-year service life when exposed to the environment.

907-650.02.10--Fixed Camera Enclosure. The fixed camera lens shall meet the following minimum requirements.

1) Designed for Outdoor Applications
2) Maintenance access for servicing
3) Environmental resistant and tamper proof meeting NEMA 4X or IP-66 rating requirements.
4) A harness and cables shall be provided with each enclosure to extend the video, power and data from the CCTV Camera System to the field cabinet. No harness shall be exposed. All entry points shall have gaskets to prevent moisture
5) The enclosure shall minimize glare and provide overexposure protection for the camera when pointed directly at the sun.
6) The enclosure shall be equipped with a heater, a defroster and a thermostat.
7) The camera equipment inside the enclosure shall meet all its specified requirements when operating under the following conditions:

a. Ambient Temperatures: -10°C to +50°C (14°F to +122°F). A heater/blower shall be used to maintain internal temperatures within the manufacturer required operating temperatures for their equipment.
b. Relative Humidity: 5% and 95%, non-condensing.

8) Total weight of CCTV cameras (including the housing, sunshield, and all internal components shall be less than 18 pounds.
9) The enclosure shall be secured with a mounting plate/attachment designed to withstand a 90mph sustained wind speed with a 30% gust factor. For projects that are in areas with higher wind standards, the higher standard is required.

907-650.02.11--Electrical. The minimum electrical requirements include:

1) The CCTV Camera System shall be furnished with any and all equipment required for a fully functional system, including all appropriate power and communications cables as defined by the manufacturer.
2) The power cables shall be sized to meet the applicable National Electrical Code (NEC) requirements.
3) Total power consumption shall not exceed 125 watts.
4) All devices supplied as system components shall accept, as a primary power source, 120 volts of alternating current (VAC) at an input of 60 hertz. Any device that requires source input other than 120 VAC at 60 hertz, such as cameras, PTUs, receiver/drives and dome heaters/blowers that operate at 24 volts or other, shall be furnished with the appropriate means of conversion.
5) IP fixed cameras shall receive Power over Ethernet (POE) with appropriate cabling.

907-650.02.12--Coaxial Cabling. The minimum coaxial interconnect cable requirements include:

1) The coaxial cable from the CCTV Camera System to the equipment cabinet shall be Belden 8281 or approved equivalent.
2) RG 59/U, 20AWG, bare copper conductor, polyethylene insulation.
3) 98% tinned copper, double braid shield, black polyethylene jacket.
4) Characteristic Impedance: 75 ohms (Ω), nominal.
5) Capacitance (conductor to shield): 21pF/ft; Inductance: 0.131uH/ft, nominal.

907-650.02.13--Surge Protection. All CCTV Camera System electrical interconnects shall be protected from voltage surges caused by lightning and external electromagnetic fields. The minimum surge protection requirements include:

1) Surge protectors shall be furnished for all non-dielectric cable and conductors (video, data/signal and device/assembly power) between the CCTV Camera System and the equipment cabinet.
2) The surge protectors shall have leads that are kept to a minimum length as recommended by the surge device manufacturer.
3) All surge protection devices shall be designed to meet the temperature and humidity requirements expected in this type of outdoor application.

4) All Surge protectors shall be U.L. listed (UL 1449, UL 497, 497A, 497B, etc., as appropriate) and bonded to the same single-point ground point.
5) Coaxial Cable Surge protectors for coaxial cable shall meet/provide the following functionality:
   a. Attenuation: 0.1dB @10 MHz, typical
   b. Input/Output Impedance: 75 ohms nominal
   c. Operating Voltage of the surge protector shall match characteristics of the ITS device/assembly
   d. Peak Surge Current: 5,000-amperes for an 8x20 microsecond waveform
   e. Response Time: 1 nanosecond or less
6) Low Voltage/Signal Cable Surge protectors for data/signal/control cable shall meet/provide the following functionality:
   a. Peak Surge Current: 10,000-amperes for an 8x20 microsecond waveform
   b. Response Time: 1 nanosecond or less
   c. Life Expectancy: Capable of surviving at a minimum of 25 occurrences at 2000-amperes
7) CCTV power surge protectors for power from equipment cabinet power distribution to the CCTV Camera System shall meet/provide the following functionality:
   a. Frequency: DC to 10MHz
   b. Clamping Voltage: < 30VAC (rms) or 42VDC
   c. Insertion Loss: < 0.2dB
   d. Input/Output Impedance: 75 ohms, typical
   e. Peak Surge Current: 3000-amperes
   f. Response Time: 1 nanosecond or less
8) Surge protection for the IP Fixed cameras shall include provisioning for the Power over ETHERNET (POE) cabling and voltages.

907-650.03--Installation Requirements. All equipment shall be installed according to the manufacturer's recommendations, the Plans and as follows:

1) The Contractor shall provide the MDOT with a written inventory of items received and the condition in which they were received. Inventory shall be inclusive of make, model, and serial numbers, MAC address, and installation GPS coordinates. All equipment shall be installed according to the manufacturer's recommendations or as directed by the MDOT.
2) Materials and associated accessories/adapters shall not be applied contrary to the manufacturer's recommendations and standard practices.
3) Shall include all materials needed to permanently mount the CCTV camera to the support structure as indicated in the plans.
4) Furnish and install power, video, and data cables, and any and all ancillary equipment required to provide a complete and fully operational CCTV system site.
5) Verify all wiring meets NEC requirements where applicable.
6) All above requirements apply to both new CCTV sites as well as sites where an existing CCTV is being replaced.
7) Any new, additional or updated drivers required for the existing ATMS software to communicate and control new CCTV installed by the Contractor shall be the responsibility of the Contractor.

907-650-03.1--CCTV Test Requirements. The Contractor shall conduct a Project Testing Program. All costs associated with the Project Testing Program shall be included in overall contract prices; no separate payment will be made for any testing.

1) The Contractor is responsible for planning, coordinating, conducting and documenting all aspects of the Project Testing Program. The Project Engineer, ITS Engineer, and/or their designee(s) are only responsible for attending and observing each test, and reviewing and approving the Contractor's test results documentation. The ITS Engineer, Project Engineer and/or their designee(s) reserve the right to attend and observe all tests. The Contractor is required to perform the final project acceptance test with the MDOT ITS Engineer or his designee present.
2) Each test shall fully demonstrate that the equipment being tested is clearly and definitely in full compliance with all project requirements. Test procedures shall be submitted and approved for each test as part of the project submittals. Test procedures shall include every action necessary to fully demonstrate that the equipment being tested is clearly and definitively in full compliance with all project requirements. Test procedures shall cross-reference to these Technical Specifications or the Project Plans. Test procedures shall contain documentation regarding the equipment configurations and programming.
3) No testing shall be scheduled until approval of all project submittals and approval of the test procedures for the given test.
4) The Contractor shall provide all ancillary equipment and materials as required in the approved test procedures.
5) The Contractor shall request in writing the Project Engineer's approval for each test occurrence a minimum of 14 days prior to the requested test date. Test requests shall include the test to be performed and the equipment to be tested. The Project Engineer reserves the right to reschedule test request if needed.
6) All tests shall be documented in writing by the Contractor in accordance with the test procedure and submitted to the Project Engineer within seven (7) days of the test. Any given test session is considered incomplete until the Project Engineer has approved the documentation for that test session.
7) All tests deemed by the Project Engineer to be unsatisfactorily completed shall be repeated by the Contractor. In the written request for each test occurrence that is a repeat of a previous test, the Contractor shall summarize the diagnosis and correction of each aspect of the previous test that was deemed unsatisfactory. The test procedures for a repeated test occurrence shall meet all the requirements of the original test procedures, including review and approval by the Project Engineer and ITS Program Manager or his designee.
8) The satisfactory completion of any test shall not relieve the Contractor of responsibility to provide a completely acceptable and operating system that meets all requirements of this project.
9) Standalone Acceptance Test (SAT). The Contractor shall perform a complete SAT on all equipment and materials associated with the field device site, including but not limited to electrical service, conduit, pull boxes, communication links (fiber, leased copper, wireless), control cables, poles, etc. An SAT shall be conducted at every field device site. Where applicable, a SAT shall be conducted for a fully installed and completed connection to the designated Traffic Management Center (TMC) or central data/video collection site.

10) The SAT shall demonstrate that all equipment and materials are in full compliance with all project requirements and fully functional as installed and in final configuration. The SAT shall also demonstrate full compliance with all operational and performance requirements of the project. All SATs will include a visual inspection of the cabinet and all construction elements at the site to ensure they are compliant with the specifications.

907-662.03.2--Warranty. Minimum warranty requirements are as follows:

1) All warranties and guarantees shall be assigned to the Mississippi Department of Transportation.
2) The warranty shall be a **minimum of one (1) year warranty** per CCTV and all other installed and/or attached appurtenances.
3) The one year warranty period begins upon final acceptance of the video subsystem.
4) During the warranty period, the Contractor shall repair or replace with new or refurbished material, at no additional cost to the State, any product containing a warranty defect, provided the product is returned postage-paid by the Department to the manufacturer's factory or authorized warranty site.
5) Products repaired or replaced under warranty by the manufacturer shall be returned prepaid by the manufacturer.
6) During the warranty period, technical support shall be available from the Contractor via telephone within **four (4) hours** of the time a call is made by the Department, and this support shall be available from factory certified personnel.
7) During the warranty period, **updates and corrections to hardware**, software and firmware shall be made available to the Department by the Contractor at no additional cost.

907-662.03.3--MDOT Employee Training. Minimum Training requirements are as follows:

1) The Contractor shall provide a camera system training plan that includes a schedule, documentation to be provided, identified trainer, and location at a minimum to MDOT Project Manager. The camera system training plan must be accepted by the MDOT Project Manager and ITS Engineer and training must be completed before burn in period may start.
2) The training shall be approved two (2) weeks ahead of the scheduled date.
3) For provided devices that MDOT already has the same make and model existing in the system:
    1. One (1) day of on site device operation, maintenance, and configuration training for up to 10 individuals.
    2. One (1) day of on site system training at TMC for up to 10 people, that is separate from above training and specifically for software control of integrated devices.
4) For provided devices that MDOT does not have the same make and model existing in the system:
    1. Three (3) days of on site device operation, maintenance, and configuration training for up to 10 individuals.
    2. Three (3) days of on site system training at TMC for up to 10 people, that is separate from above training and specifically for software control of integrated devices.

907-650.04--Method of Measurement. On-Street Video Equipment will be measured per each camera installation.

907-650.05--Basis of Payment. On-Street Video Equipment, measured as prescribed above, will be paid for at the contract unit price bid per each, which price shall be full compensation for furnishing all materials inclusive of camera unit, housing, pan/tilt drive, receiver/driver, software driver, mounting hardware, any necessary enclosures, items necessary to mount the camera unit from a mast arm pole, steel strain pole, pole extension pipe, etc., for all installing, connecting, cutting, pulling and testing and for all equipment, tools, labor, and incidentals necessary to complete the work.

Required cabinet facilities, including transformer and/or disconnects, will not be measured for separate payment.

Progress payments for the On-Street Video System will be paid as follows:

1) 50% of the contract unit price upon delivery of equipment and approval of any bench and/or pre-installation test results, as prescribed in Project Testing Program;

2) An additional 40% of the contract unit price upon approval of Stand Alone Acceptance Test results; and

3) Final 10% of the contract unit price upon Final Project Acceptance.

Payment will be made under:

907-650-A: On-Street Video Equipment Type _____ - per each

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-653-1 **CODE: (IS)**

DATE: **11/15/2017**

SUBJECT: **Traffic and Street Name Signs**

Section 653, Traffic and Street Name Signs, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-653.02--Materials.

907-653.02.1--Reflective Sheeting. Delete the paragraph in Subsection 653.02.1 on page 637, and substitute the following.

Reflective sheeting for traffic and street name signs shall be Type XI retroreflective and of the color as specified in the plans.

907-653.04--Method of Measurement. Delete the sentence in the paragraph of Subsection 653.04 on page 638, and substitute the following.

Traffic sign and street name sign will be measured by the square foot, which measurement being inclusive of aluminum sign blank, applied reflective sheeting, mounting brackets and banding materials and begin inclusive of all materials, work and services necessary for a properly constructed sign.

907-653.05--Basis of Payment. Delete the pay items listed on page 638, and substitute the following.

907-653-A: Traffic Sign - per square foot

907-653-B: Street Name Sign - per square foot

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-659-1 **CODE: (SP)**

DATE: **01/17/2017**

SUBJECT: **Traffic Management Center (TMC) Modifications**

Section 907-659, Traffic Management Center (TMC) Modifications, is hereby added to and made part of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows.

SECTION 907-659 - TRAFFIC MANAGEMENT CENTER (TMC) MODIFICATIONS

907-659.01--Description. The MDOT Statewide Traffic Management Center (TMC) is located in the Traffic Engineering Division in the MDOT Shop Complex at 2567 North West Street, Jackson, Mississippi. Regional and City Traffic Management Centers may be located statewide. The following is a list of existing/planned centers and their addresses:

City of Jackson TMC – 300 North State Street, Jackson, Mississippi (basement)
Northwest Regional Combined TMC – 8791 Northwest Drive, Southaven, Mississippi (Police Department)
City of Ridgeland TOC – 304 Hwy 51, Ridgeland, Mississippi (City Hall)
Oxford Combined TMC – 715 Mollybarr Road, Oxford, Mississippi (Oxford Police Department)
Hattiesburg Regional TMC/EOC – 6356 Hwy 49N, Hattiesburg, Mississippi (MDOT District 6 Headquarters)
Batesville Regional TMC/EOC – 150 Hwy 51N, Batesville, Mississippi (MDOT District 2 Headquarters)
Natchez Combined TMC – 233 Devereaux Drive, Natchez, Mississippi (Police Department)
Gulf Regional TMC – 16499 Hwy 49, Saucier, Mississippi (MDOT Lyman Project Office)

Additional Traffic Management Centers may be added as needed.

907-659.02--Blank.

907-659.03--Construction and Operation Requirements.

907-659-03.1--TMC Modifications. The MDOT TMC modifications required to integrate and operate the traffic systems and devices shall be provided. These include, but are not limited to, expanding the central video management system, interconnecting the appropriate number of video interfaces to the TMC video management systems, expanding the MSTraffic backbone network through radio communications, wireless communications, T1 lines or fiber communications, expanding the TACTICS signal system, or upgrading existing signal systems, expanding or modifying existing adaptive control signal software systems (i.e. SCOOT, ACS Lite, etc.), expanding the Automated Traffic Management System (ATMS), and integrating all the existing

computing facilities. All TMC modifications must meet U.S. Department of Transportation Intelligent Transportation System (ITS) Standards, Policies, and Architectures as well as MDOTs applicable Statewide or Regional Architecture.

907-659.03.2--TMC Modifications - Monitor Systems. Roadway traffic monitor locations shall provide local control functions related to traffic slowdowns and other congestion monitors as defined by MDOT Traffic Engineering. Additionally, the traffic monitor systems shall provide on-line data for use by the existing MDOT ATMS for engineering, operations, planning, incident, and mstraffic.com purposes. This data shall include, but is not limited to, per vehicle data raw data which shall be transmitted to and stored and managed by the ATMS. The traffic monitor systems shall be capable of utilizing both or either loop, microloop, radar, and/or video detection information. The system shall provide a consistent communication and management system regardless of detection methods used. All Traffic Monitoring Systems must meet U.S. Department of Transportation Intelligent Transportation System (ITS) Standards, Policies, and Architectures as well as MDOT's applicable Statewide or Regional Architecture.

907-659.03.3--TMC Modifications – Installation Requirements. All equipment shall be installed according to the manufacturer's recommendations, the Plans and as follows:

1) Any new, additional or updated drivers required for the existing ATMS software to communicate and control new devices installed by Contractor shall be the responsibility of the Contractor.
2) Installation of all equipment and software shall be included. The Contractor must provide the MDOT ITS Manager with an Installation Schedule. The Installation Schedule must be approved by the State Traffic Engineer.
3) All equipment and software must be fully functional and pass a Final Inspection by the ITS Manager and Project Engineer before being accepted by MDOT.

907-659.03.4--MDOT Employee Training. Training shall be provided covering the system architecture, operations, and maintenance of the TMC systems. If training requirements include travel on the part of training participants then the cost of the travel shall be included.

907-659.04--Method of Measurement. Traffic Management Center Modifications and Traffic Management Center Modifications – Monitor Systems, complete in place, tested and accepted, will be measured per each intersection or on a lump sum basis. Traffic Management Center Modifications – Training will be measured on a lump sum basis.

907-659.05--Basis of Payment. Traffic Management Center Modifications, Traffic Management Center Modifications – Monitor Systems, and Traffic Management Center Modifications - Training, measured as prescribed above, will be paid for at the contract unit price per each or contract lump sum price, which price shall be full compensation for furnishing all materials for all installing, connecting, cutting, pulling and testing and for all equipment, tools, labor and incidentals necessary to complete the work.

Payment will be made under:

907-659-A: Traffic Management Center Modifications	- per each or lump sum
907-659-B: Traffic Management Center Modifications – Monitor Systems	- per each or lump sum
907-659-C: Traffic Management Center Modifications – Training	- lump sum

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-661-1 **CODE: (SP)**

DATE: **01/17/2017**

SUBJECT: **Fiber Optic Cable**

Section 907-661, Fiber Optic Cable, is hereby added to and made a part of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows.

SECTION 907-661 – FIBER OPTIC CABLE (OSP)

907-661.01--Description. The work shall consist of the construction of the infrastructure required to install, replace, or upgrade fiber optic cable. The infrastructure shall include all necessary conduits, pull boxes, pole line hardware, building entries, risers and fiber cable to make a complete system.

907-661.02--Materials.

907-661.02.1--Single Mode Fiber Optic Cable (FO Cable). The Contractor shall provide 72-count fiber optic cable that meets the following requirements:

- All-dielectric, outside plant, loose tube cable with central strength/anti-buckling member
- Dry water blocking materials and construction
- Reverse oscillating "SZ" stranded buffer tube construction
- High tensile strength yarn
- Medium density polyethylene outer jacket
- 72-fiber cable with six (6) active buffer tubes and 12 individual stranded fibers per buffer tube
- Cable construction design that allows no more than six (6) buffer tube positions
- Maximum diameter 0.48 inches
- Maximum weight 0.07 pounds per foot.

The Contractor shall provide a cable in accordance with the Plans and contract documents. This cable shall be designated as a trunk cable.

The Contractor shall ensure that the cable can withstand a maximum pulling tension of 600 pounds (lbf) during installation and 180 pounds (lbf) installed long term (at rest).

The cable shall have a shipping, storage and operating temperature range of -22°F to +158°F and installation temperature range of -22°F to +140°F.

The Contractor shall provide cable with outer jacket marking using the following template.

Manufacturer's Name - "Optical Cable" - Month/Year of Manufacture - Telephone Handset

Symbol - "MDOT" - "72F SM"

The Contractor shall include in the outer jacket marking the cable sequential length in accordance with the following:

- In English units every two (2) feet
- Within -0/+1% of the actual length of the cable
- In contrasting color to the cable jacket
- Marking font height no less than 0.10 inch
- On any single length of cable on a reel, the sequential length markings do not run through "00000"

907-661.02.2--Single Mode Fiber Optic Cable Indoor/Outdoor Riser Rated. The Contractor shall provide fiber optic plenum rated cable that meets the following requirements when called for on the Plans:

- All-dielectric, inside plant, loose tube central core cable
- High tensile strength yarn surrounding the central tube core
- Dry water blocking materials and construction
- 72-fiber cable with six (6) active buffer tubes and 12 individual stranded fibers per buffer tube
- The Contractor shall provide a cable in accordance with the Plans and contract documents. This cable shall be designated as the building entry cable.

The Contractor shall ensure that the cable can withstand a maximum pulling tension of 300 pounds (lbf) during installation.

The cable shall have a shipping, storage and operating temperature range of -22°F to +158°F and an installation temperature range of 14°F to 140°C shall be provided.

The Contractor shall provide cable with outer jacket marking using the following template.

Manufacturer's Name - "Optical Cable" - Month/Year of Manufacture - Telephone Handset Symbol - "MDOT" - "72F SM"

The Contractor shall include in the outer jacket marking the cable sequential length in accordance with the following:

- English units every two (2) feet.
- Within -0/+1% of the actual length of the cable
- Contrasting color to the cable jacket
- Marking font height no less than 0.10 inch
- The sequential length markings do not run through "00000" on any single length of cable on a reel

907-661.02.3--Single Mode Fiber Optic Drop Cable (FO Drop Cable). The Contractor shall

provide 12-count Single Mode Fiber, Pre-Terminated Drop Cable Assemblies. These assemblies shall be employed when connecting a camera, traffic controller, DMS or other device to the main cable.

Assemblies shall be factory assembled and terminated on one end with ceramic ferrule, LC compatible, heat cured epoxy connectors with an operational temperature of -40°F to +158°F. Each connector shall have a minimum of a 1-inch strain relief boot.

Insertion loss for each connector shall not exceed 0.30 dB.

Return loss for single mode connectors shall be greater than 45 dB.

Each assembly shall be fully tested and those test results placed on a test tag for each assembly.

Each assembly shall be individually packaged within a box or reel, with the submitted manufacturer's part number marked on the outside of the package.

Individual 250-µm coated fibers shall be up-jacketed to 1/8-inch using fan-out tubing. This tubing shall contain a 900-µm Teflon inner tube, aramid yarn strength members and an outer jacket.

The fan-out tubing shall be secured to the cable in a hard epoxy plug transition. Length of the individual legs shall be a minimum of three feet with the length difference between the shortest and longest legs of the assembly being no more than two inches.

The 12-Fiber, Pre-terminated Drop Cable Assemblies provided shall meet the following minimum requirements:

- All-dielectric, outside plant, loose tube central core cable shall be used
- High tensile strength yarn surrounding the central tube core
- Dry water blocking materials and construction
- Twelve (12) individual stranded fibers contained within the central tube core
- The Contractor shall provide a cable in accordance with the Plans and contract documents. This cable shall be designated as the drop cable.

The Contractor shall ensure that the cable can withstand a maximum pulling tension of 300 pounds (lbf) during installation.

The cable shall have a shipping, storage and operating temperature range of -22°F to +158°F and an installation temperature range of 14°F to 140°F.

The Contractor shall provide cable with outer jacket marking using the following template.

Manufacturer's Name - "Optical Cable" - Month/Year of Manufacture - Telephone Handset Symbol - "MDOT" - "12F SM"

The Contractor shall include in the outer jacket marking the cable sequential length in accordance

with the following:

- English units every two (2) feet
- Within -0/+1% of the actual length of the cable
- Contrasting color to the cable jacket
- Marking font height no less than 0.10 inch
- The sequential length markings do not run through "00000" on any single length of cable on a reel

907-661.02.4--Multimode Fiber Optic Drop Cable (MM FO Drop Cable). The Contractor shall provide 12-count Multimode Fiber, Pre-Terminated Drop Cable Assemblies. These assemblies shall be employed when connecting a camera, traffic controller, DMS or other device to the main cable.

Cable Assembly shall be rated for outdoor environment and have operational temperature of -40°F to +158°F. Each connector shall have a minimum of a 1-inch strain relief boot. The Cable Assembly shall also be pre-terminated on one end.

Insertion loss for each connector shall not exceed 0.30 dB.

Fiber loss shall not exceed 3dB/km for 850 nm and 1 dB/km for 1300 nm.

Each assembly shall be fully tested and those test results placed on a test tag for each assembly.

Each assembly shall be individually packaged within a box or reel, with the submitted manufacturer's part number marked on the outside of the package.

The fan-out tubing shall be secured to the cable in a hard epoxy plug transition. Length of the individual legs shall be a minimum of three feet with the length difference between the shortest and longest legs of the assembly being no more than two inches.

The 12-Fiber, Pre-terminated Drop Cable Assemblies provided shall meet the following minimum requirements:

- All-dielectric, outside plant, loose tube central core cable
- High tensile strength yarn surrounding the central tube core
- Dry water blocking materials and construction
- Twelve (12) individual stranded fibers contained within the central tube core
- The Contractor shall provide a cable in accordance with the Plans and contract documents. This cable shall be designated as the drop cable.

The Contractor shall ensure that the cable can withstand a maximum pulling tension of 300 pounds (lbf) during installation.

The cable shall have a shipping, storage and operating temperature range of -22°F to +158°F and an installation temperature range of 14°F to 140°F.

The Contractor shall provide cable with outer jacket marking using the following template.

Manufacturer's Name - "Optical Cable" - Month/Year of Manufacture - Telephone Handset Symbol - "MDOT" - "12F MM"

The Contractor shall include in the outer jacket marking the cable sequential length in accordance with the following:

- English units every two (2) feet
- Within -0/+1% of the actual length of the cable
- Contrasting color to the cable jacket
- Marking font height no less than 0.10 inch
- The sequential length markings do not run through "00000" on any single length of cable on a reel

907-661.02.5--Plenum Rated Nonmetallic Corrugated Raceway. The Contractor shall provide plenum rated nonmetallic corrugated raceway inside buildings when cable is not in rigid conduit when called for on the plans.

The installation shall conform to NEC articles 770 and 800.

Raceway shall meet UL Standards 910 and 2024.

The Contractor shall provide 2-inch diameter raceway unless larger is called for in the plans.

The Contractor shall provide Fiber Optic Fusion Splice (FO Splice Fusion) for splicing of all fibers with a fully automatic portable fusion splicer that provides consistent low loss (max 0.10 dB) splices.

Splicer shall provide three-axis fiber core alignment using light injection and loss measurement techniques.

The fusing process shall be automatically controlled.

The splicer shall provide splice loss measurements on an integral display, as well as a magnified image of the fiber alignment.

The Contractor shall retain ownership of the fusion splicer.

907-661.02.6--Fiber Optic Connectors. The Contractor shall provide fiber optic connectors for all fiber optic infrastructures including but not limited to fiber optic termination cabinets, fiber optic drop panels, and fiber optic patch cords.

The Contractor shall provide only factory-installed keyed LC compatible connectors for all fiber optic infrastructures.

Field-installed connectors shall not be used.

Adapter couplers shall not be used to change connector types.

Ceramic ferule connectors, factory-installed, with a thermal-set heat-cured epoxy and machine polished mating face shall be used.

Connectors shall be installed as per manufacturer application and recommendations, including proper termination to the outer-tubing (900-micron tubing, 3-mm fan out tubing, etc.) required for the application.

Connectors rated for an operating temperature of -40°F to +167°F shall be used.

Simplex connectors for all male LC connectors shall be used and a latching cover for two male connectors being used in a duplex configuration shall be provided. Female couplers may be duplex but must allow simplex mating connectors.

Dust caps shall be provided for all exposed male connectors and female couplers at all times until permanent connector installation.

907-661.02.7--Fiber Optic Termination Cabinet (FO Termination Cabinet). Fiber optic termination cabinets shall be provided in communications hubs, field junctions, and the MDOT Traffic Management Center (TMC) as shown in the Plans for termination of 72-fiber outside plant (OSP) cable.

The Contractor shall provide wall/shelf mount 12-fiber distribution cabinet equipped with fiber optic connector modules in a 12-fiber configuration. These will be used in field equipment and communication cabinet locations.

Termination cabinets with cable management features included shall be provided.

The Contractor shall use termination cabinets that are fully compatible with all components of the fiber optic infrastructure as specified, including, but not limited to, fiber optic cable, fiber optic fusion splices and fiber optic connectors.

The Contractor shall provide rack-mount termination cabinets designed to fit standard 19-inch EIA equipment racks.

The Contractor shall provide all mounting hardware and supports to mount the termination cabinets in the locations shown in the Plans.

The Contractor shall provide fiber optic termination cabinets providing 72-fiber connectors and capable of storing 72 fusion splices in splice trays.

The Contractor shall provide termination cabinets that integrate the splice trays and connector

modules into one compartment within one cabinet, or houses the splice trays and connector modules in separate compartments integrated into one cabinet.

The maximum dimensions of a complete termination cabinet shall be 7-rack units, 12.25 inches high by 16 inches deep.

Fiber optic termination cabinets shall be fully enclosed metallic construction with a protective hinged front cover for the connector ports.

The cabinet shall have cable access on all sides of the enclosed area behind the connector port panel.

The Contractor shall provide sufficient splice trays for storing 72 fusion splices in 12 or 24-splice increments.

The Contractor shall provide termination cabinets with fiber optic connector modules in a 12 fiber configuration of six (6) rows of one (1) duplex connector couplers. Connector modules shall mount vertically in the termination cabinet front panel.

Connector modules shall include clearly legible and permanent labeling of each of the 12 fiber connector couplers, and shall be labeled and identified as shown in the Plans.

The Contractor shall provide factory-assembled 12-fiber termination interconnect cables (pigtail cables) to be fusion spliced to the outside plant or indoor cable and connected to the rear of the connector modules.

Termination interconnect cables shall be all-dielectric, single jacketed cable with high tensile strength yarn surrounding 12 individual 900-micron fibers following EIA/TIA-598B color identification with factory-installed connectors.

The Contractor shall provide all incidental and ancillary materials including but not limited to grommets, cable strain relief and routing hardware, blank connector panels and labeling materials.

The cable shall be new (unused) and of current design and manufacture.

907-661.02.8--OSP Closures for Aerial, Pole Mount, Pedestal and Hand Hold Environments. OSP closures for aerial, pole mount, pedestal and hand hole shall be capable of accepting up to eight cables. The closures shall be capable of storing up to eight 90-inch lengths of expressed buffer tubes and up to 96 splices.

Assembly shall be accomplished without power supplies, torches, drill kits or any special tools. Re-entry shall require no additional materials.

Sealing shall be accomplished by enclosing the splices in a polypropylene case that is clamped together with a stainless steel latch and sealed with an O-ring.

Closure shall be capable of strand mounting with the addition of a strand mounting bracket.

Splice case shall be non-filled, non-encapsulate to prevent water intrusion, and shall allow re-entry without any special tools.

The closure shall be capable of preventing a 10-foot water head from intruding into the splice compartment for a period of seven (7) days.

It is the responsibility of the Contractor to ensure that the water immersion test has been performed by the manufacturer or an independent testing laboratory, and the appropriate documentation has been submitted to the Engineer.

907-661.02.9--OSP Closures for Drop Cable Splice Points. OSP closures for aerial, pole mount, pedestal and hand hold shall be capable of accepting the trunk cable and two drop cables. The closures shall be capable of storing up to eight 90-inch lengths of expressed buffer tubes and up to 48 splices.

Assembly shall be accomplished without power supplies, torches, drill kits or any special tools. Re-entry shall require no additional materials.

Sealing shall be accomplished by enclosing the splices in a polypropylene case that is clamped together with a stainless steel latch and sealed with an O-ring.

Closure shall be capable of strand mounting with the addition of a strand mounting bracket.

Splice case shall be non-filled, non-encapsulate to prevent water intrusion, and shall allow re-entry without any special tools.

The closure shall be capable of preventing a 10-foot water head from intruding into the splice compartment for a period of seven days.

It is the responsibility of the Contractor to ensure that the water immersion test has been performed by the manufacturer or an independent testing laboratory, and the appropriate documentation has been submitted to the Engineer.

907-661.02.10--Patch Cords and Jumper Cables. Any patch cords or jumper cables required to connect the new fiber and equipment at existing locations shall be considered incidental and shall be included in the cost of pay items Fiber Optic Cable and Fiber Optic Drop Cable.

Any patch cords used for system configuration shall be compatible with fiber types and connectors specified herein.

Single-mode patch cords shall be yellow in color.

Jacketing material shall conform to the appropriate NEC requirement for the environment in which installed.

All cordage shall incorporate a 900-µm buffered fiber, aramid yarn strength members and an outer jacket.

Patch cords may be simplex or duplex, depending on the application.

Attenuation shall be less than 1.0 dB/km @ 1310 nm, 0.75 dB/km @ 1550 and have a total attenuation of less than 0.5 dB.

The Contractor shall be responsible to determine and provide attenuators with the proper attenuation to not exceed the optical budgets of the equipment connected by patch cables.

907-661.02.11 Cable Labels. The Contractor shall provide cable labels that meet the following requirements:

- Self-coiling wrap-around type
- PVC or equivalent plastic material with UV and fungus inhibitors
- Base materials and graphics/printing inks/materials designed for underground outside plant use including solvent resistance, abrasion resistance and water absorption
- Minimum size of 2.5 inches wide by 2.5 inches long
- Minimum thickness of 0.010 inches
- Orange label body with pre-printed text in bold black block-style font with minimum text height of 0.375 inches
- The Contractor shall pre-print the following text legibly on labels used for all fiber optic trunk cables:

  Caution Fiber Optic Cable Mississippi Department of Transportation (601) 359-1454

- The Contractor shall pre-print the following text legibly on labels used or all fiber optic drop cables (FO Drop Cable):

  Caution Fiber Optic Drop Cable Mississippi Department of Transportation (601) 359-1454

- On all cable labels, the Contractor shall print the text specified above twice on the label with the text of the second image inverted. The end result shall be text which "reads correctly" when the label is coiled onto a cable.

907-661.02.12--Cable Markers. The Contractor shall provide low profile soil cable markers which meet the following requirements:

- 3.5 inches in diameter
- UV stabilized for Maximum fade resistance
- Durable and abrasion resistant
- Lawn mower resistant
- Orange in color

- Printed Legend:

  Fiber Optic Cable
  Mississippi Department of Transportation
  Traffic Engineering Division (601)359-1454

The Contractor shall install cable markers with a 13-inch nylon stake every 500 feet along the fiber run.

907-661.02.13--Conduit Detection Wire. Conduit detection wire shall be #10 AWG stranded copper, orange-insulated, THHN -THWN conductor.

The Contractor shall furnish and install a detection wire surge protection system. The Contractor shall ensure that detection wires are attached to a surge protection system designed to dissipate high transient voltages or other electrical surges.

The Contractor shall ensure that the detection wire surge protection system is grounded to a driven rod within 10 feet of the system using AWG #6 single conductor wire. Grounding must be done through a stand alone system not connected to power or ITS device grounding.

The Contractor shall ensure that the surge protection system normally allows signals generated by locate system to pass through the protection system without going to ground.

907-661.02.14--Project Submittal Program Requirements. The Contractor shall provide project submittals for all fiber optic infrastructures. The project submittals for fiber optic infrastructure shall include all items in this provision and any additional requirements included in any Notice to Bidders.

The Contractor shall provide project submittals including manufacturer recommended operations, maintenance and calibration procedures for the following equipment:

- Fiber optic installation and testing tools
- Fusion splicers
- Cable pulling strain dynamometers and breakaway links
- Cable air jetting/blowing systems
- OTDRs
- Optical attenuation testers (light sources and power meters)

The Contractor shall submit documentation and proof of manufacturer recommended operator training and certification for the following equipment:

- Fusion splicers
- Cable air jetting/blowing systems
- OTDRs
- Optical attenuation testers (light sources and power meters)

907-661.03--Construction Requirements. All equipment shall be installed according to the manufacturer's recommendations, the Plans and as follows.

907-661.03.1--General Requirements. The Contractor shall install all fiber optic infrastructures according to the manufacturer's recommended procedures and specifications.

The Contractor shall provide all necessary interconnections, services and adjustments required for a complete and operable data transmission system.

The Contractor shall install all fiber truck, drop, and patch cables such that attenuation shall be less than 1.0 dB/km @ 1310 nm, 0.75 dB/km @ 1550.

All pole attachments, service loops and conduit risers shall be placed to minimize the possibility of damage as well as to facilitate future expansion or modernization.

The cable shall be installed in continuous runs as indicated on the plans. Splices shall be allowed only at drop points or reel end points specified in the plans.

At drop locations only, those fibers necessary to complete the communication path shall be spliced. Other fibers in the cable(s) shall be left undisturbed, with a minimum of five feet of buffer tube coiled inside the closure.

Sufficient slack shall be left at each drop point to enable access of the cable components and splicing to occur on the ground. This is typical two times the pole height plus 15 feet.

For aerial installations, the following minimum slack requirements shall apply:

- For aerial slack storage at splice points, a radius controlling device, commonly referred to as a SNO-SHOE, shall be used for securing resulting cable slack at aerial splice points and shall be mounted directly to the strand.
- For aerial cable runs exceeding 6-pole spans between splice points as indicated on the plans, two opposing SNO-SHOES shall be placed on the span 50 feet apart to provide for a 100-foot service loop for future drops and for slack for repair and pole relocations.

For aerial supported installations, the slack requirements shall be the same as in the underground conduit runs. The slack will be coiled in the structure-mounted pull boxes.

Drop cable shall be routed to the controller cabinets via conduit risers as illustrated in the plans. The cable entrance shall be sealed with a duct plug designed for fiber optic cable to prevent water ingress.

The minimum requirement for fiber protection outside a fiber optic enclosure in ALL cases shall be 1/8-inch fan-out tubing, containing a hollow 900-µm tube, aramid strength members and an outer jacket, and shall be secured to the cable sheath.

The minimum requirement for fiber protection inside wall mount or rack mount fiber enclosure

shall be 900-µm buffering, intrinsic to the cable in the case of tight buffered fibers, or in the case of 250-µm coated fibers, a fan-out body and 900-µm tubing secured to the buffer tube(s).

During installation, even if the tension specifications for the cable are not exceeded, the first ten feet shall be discarded.

Warning tape shall be placed 12 inches above the cable not to deviate ±18 inches from the centerline of the optical cable. Warning tape shall be at least two inches wide and colored orange.

907-661.03.2--Cable Shipping and Delivery. The cable shall be packaged on reels for shipment. Each package shall contain only one continuous length of cable. The packaging shall be constructed as to prevent damage to the cable during shipping and handling.

Both ends of the cable shall be sealed to prevent the ingress of moisture.

A weatherproof reel tag shall be attached to each reel identifying the reel and cable so that it can be used by the manufacturer to trace the manufacturing history of the cable and the fiber. A cable data sheet shall be included with each reel containing the following information:

- Manufacturer name
- Cable part number
- Factory order number
- Cable length.
- Factory measured attenuation of each fiber

The Contractor shall cover the cable with a protective and thermal wrap.

The outer end of the cable shall be securely fastened to the reel head so as to prevent the cable from becoming loose in transit. The inner end of the cable shall be projected a minimum of 6.5 feet into a slot in the side of the reel, or into housing on the inner slot of the drum, in such a manner as to make it available for testing.

Each reel shall be plainly marked to indicate the direction in which it is to be rolled to prevent loosening of the cable on the reel.

907-661.03.3--Cable Handling and Installation. The Contractor shall not exceed the maximum recommended pulling tension during installation as specified by the cable manufacturer.

The Contractor shall continuously monitor pulling tensions with calibrated measuring devices, such as a strain dynamometer.

The Contractor shall ensure that the depth of the cable is a minimum of 36 inches unless shown otherwise in plans.

All pulled installations shall be protected with calibrated breakaway links.

The Contractor shall ensure that the minimum recommended bend radius is not exceeded during installation as specified by the cable manufacturer. Unless the manufacturer's recommendations are more stringent, the following guidelines shall be used for minimum bend radius:

- 20 X Cable Diameter Short Term - During Installation
- 10 X Cable Diameter Long Term - Installed

Before cable installation, the cable reels and reel stands shall be carefully inspected for imperfections or faults such as nails that might cause damage to the cable as it is unreeled.

All necessary precautions shall be taken to protect reeled cable from vandals or other sources of possible damage while unattended. Any damage to reeled cable or the reel itself shall necessitate replacement of the entire cable section at no additional cost to the State.

Whenever unreeled cable is placed on the pavement or surface above a pull box, the Contractor shall provide means of preventing vehicular or pedestrian traffic through the area in accordance with the safe maintenance of traffic provisions.

The cable shall be kept continuous throughout the pull. Cable breaks and reel end splices are permitted only in Type 5 pull boxes and occur at a minimum of 10,000 feet.

Where a cable ends in an underground fiber optic closure, all unused fibers and buffer tubes shall be secured and stored in splice trays in preparation for future reel end splicing and continuation.

907-661.03.4--Cable Storage. The Contractor shall properly store all cable to minimize susceptibility to damage. The proper bend radius shall be maintained, both short and long term, during cable storage.

Storage coils shall be neat in even length coils, with no cross over or tangling.

Storage coils of different cables shall be kept completely separate except when the cables terminate in the same splice closure.

Storage coils shall be secured to cable racking hardware with tie wraps, Velcro straps, or non-metallic cable straps with locking/buckling mechanism. No adhesive or self-adhering tapes, metal wires and straps, or rope/cord shall be used to secure coils.

Unless otherwise noted on the plans, the following are the requirements for cable storage for underground applications:

Trunk cable in Type 4 pull box ..... 25 feet
Trunk cable in Type 5 pull box ..... 200 feet
Drop cable in Type 4 pull box ..... 10 feet
Drop cable in Type 5 pull box, not terminated in a splice closure 10 feet
Drop cable in Type 5 pull box, terminated in a splice closure with the trunk cable ..... 100 feet

Trunk cable end in Type 5 pull box ..... 200 feet
Drop cable terminated in same splice closure as trunk cable end 200 feet

The Contractor shall label each pull box with a numbered disk obtained from the Traffic Engineering Division. The disk shall be installed in accordance with the manufactures specification on the lid of each pull box. Numbers shall be noted on the As-Built plans for each pull box.

No slack cable shall be stored inside the communications hub building or Control Center.

907-661.03.5--Cable Labels. Cable labels shall be installed on all trunk and drop fiber optic cables. The installed cable shall be cleaned of all dirt and grease before applying any label.

The Contractor shall label all cables in or at every location where the cable is exposed outside of a conduit, innerduct or pole using the cable IDs for trunk cables or the device number for drop cables.

As a minimum, cable labels shall be installed in the following locations:

- Within 12 inches of every cable entry to a pull box, equipment cabinet, communications hub, or the TMC
- Within 12 inches of the exterior entry point of every fiber optic splice closure, termination cabinet and drop panel
- Every 30 feet for the entire length of cable in any storage coil in pull boxes
- Within one (1) foot of every pole attachment
- On every riser
- On every splice enclosure

907-661.03.6--Conduit Detection Wire. The Contractor shall install one conduit detection wire in all conduit banks. Conduit detection wire is required in all conduit banks installed by any installation method, including trenching, directional boring or plowing.

Only one conduit detection wire is required per installed conduit bank regardless of the number of conduits installed in that segment. Conduit detection wire shall be installed inside the conduit.

Conduit detection wire is not required for structure mounted conduit, except where underground segments of structure mounted conduit are greater than 20 feet in length.

The conduit detection wire shall be continuous and unspliced between pull boxes and shall enter the pull boxes at the same location as the conduit with which it is installed, entering under the lower edge of the pull box.

Four (4) feet of conduit detection wire shall be coiled and secured in each pull box or vault.

When two or more detection wires are in any pull box, the Contractor shall mechanically splice all detection wire together.

Conduit detection wire is required in drop cable conduits.

A detection wire surge protection system shall be furnished and installed. Detection wires shall be attached to surge protection systems designed to dissipate high transient voltages or other electrical surges. The detection wire surge protection system shall be grounded to a driven rod within 10 feet of the system using AWG #6 single conductor wire. Grounding shall be done through a stand alone system not connected to power or ITS device grounding. The surge protection system shall normally allow signals generated by locate system to pass through the protection system without going to ground.

907-661.03.7--Splicing into Existing Fiber Optic Cable. At some locations, the Contractor may be required to splice new drop cable into existing fiber optic cable at existing pull boxes. The Contractor is responsible to protect all existing fiber during this work. No separate payment shall be made for splicing into the existing fiber. The cost for all fiber optic work and equipment shall be included in the bid price for pay items Fiber Optic Cable and Fiber Optic Drop Cable.

The Contractor must notify the Project Engineer in writing no less than 10 days in advance of doing any work to existing fiber optic cable. Before any work can begin the Contractor must have obtain approval from the Project Engineer.

907-661.03.8--Replace Fiber Optic Cable. In locations specified in the Plans, the Contractor shall be required to remove and replace existing fiber optic cable with new fiber optic cable. The new fiber optic cable shall be an equivalent cable having the same cable type, assembly, connectors, size, construction, buffer tube construction, temperature characteristics, tensile strength, and optical characteristics. The cable type and mode shall be the same unless specified as otherwise in the Plans or contract documents. The new cable shall be a compatible replacement having equivalent or improved link characteristics. The Contractor shall install the cable as per manufacturer application and recommendations and adhere to the Installation Requirements and Testing specifications as stated herein. No separate payment will be made for this work. The cost for pulling new fiber optic cable for cable replacement, and splicing/terminating all fibers shall be included in the cost of the pay item Replace Fiber Optic Cable.

907-661.03.9--Replace Fiber Optic Drop Cable. In locations specified in the Plans, the Contractor shall be required to remove and replace existing fiber optic drop cable with new fiber optic drop cable. The new fiber optic drop cable shall be an equivalent cable having the same cable type, assembly, connectors, size, construction, buffer tube construction, temperature characteristics, tensile strength, and optical characteristics. The cable type and mode shall be the same unless specified as otherwise in the Plans or Notice to Bidders. The new cable shall be a compatible replacement having equivalent or improved link characteristics. The Contractor is required to install the cable as per manufacturer application and recommendations and adhere to the Installation Requirements and Testing specifications as stated herein. No separate payment will be made for this work. The cost for pulling new fiber optic drop cable for cable replacement, and splicing/terminating all fibers shall be included in the cost of pay item Replace Fiber Optic Drop Cable.

907-661.03.10--Upgrade Fiber Optic Cable. In locations specified in the Plans, the Contractor shall be required to upgrade existing fiber optic cable to new cable that adheres to the respective cable specification and requirements. The cable type and mode shall be the same unless specified as otherwise in the Plans or contract documents. The cable upgrade shall be treated as a new cable installation and adhere to all corresponding specifications and requirements stated herein. No separate payment will be made for this work. The cost for pulling new fiber optic to upgrade existing cable, and splicing/terminating all fibers shall be included in the cost of pay item Replace Fiber Optic Cable, Aerial.

907-661.03.11--Fiber Optic Connections at Existing Communication Nodes. In some locations, the Contractor shall be required to pull new fiber optic cable into an existing communications huts. No separate payment will be made for this work. The cost for pulling the fiber into the hut, providing and installing the termination equipment, and terminating all the fibers shall be included in the cost of pay items Fiber Optic Cable and Fiber Optic Drop Cable.

907-661.03.12--Drop and Insert Applications. The signal from the TMC to local controllers, cameras, and/or dynamic message signs will be conveyed via the backbone and branch cables.

The appropriate closure, as set out in Subsection 907-661.02.8, shall be used.

A 12-port fiber distribution cabinet and appropriate jumper shall be installed within the cabinet at locations approved by the Engineer.

At each device, the applicable fibers will be routed in and out of the equipment cabinet using a pre-terminated drop cable.

Only fibers required for the drop and insert shall be cut, no other fibers in the cable shall be cut without the approval of the Engineer.

The fibers shall be connected to the transmission equipment via LC/LC fiber optic patch cables.

The drop cable shall be routed in a position that will allow access to all installed components without movement of the cable.

In traffic signal control boxes the drop cable shall be routed up the left rear corner to a shelf mounted fiber optic termination cabinet.

In ITS equipment or communication cabinets the cable shall be routed neatly allowing for service of all installed components.

907-661.03.13--Testing.

907-661.03.13.1--General Requirements. The project testing program for fiber optic infrastructure shall include but is not limited to the specific requirements in this subsection.

All test results shall confirm physical and performance compliance with this TSP including but

not limited to optical fibers and fusion splices. No event in any given fiber may exceed 0.10 dB. Any event measured above 0.10 dB shall be replaced or repaired at the event point.

The Contractor shall provide the tentative date, time and location of fiber optic infrastructure testing no less than seven (7) days in advance of the test. The Contractor shall provide confirmed date, time and location of fiber optic infrastructure testing no less than 48 hours before conducting the test.

The Contractor shall provide test results documentation in electronic format (3 copies) and printed format (3 copies). Electronic formats shall be readable in Microsoft Excel or other approved application. Printed copies shall be bound and organized by cable segment.

- Two sets are for the Traffic Engineering ITS Department
- One set are for the Engineer

All test results shall be provided in English units of measure of length.

All test results documentation shall be submitted to the Engineer within 14 days of completion of the tests.

The ITS Engineer, Project Engineer and/or their designee(s) are only responsible for attending and observing each test, and reviewing and approving the Contractor's test results documentation. The ITS Engineer, Project Engineer and/or their designee(s) reserve the right to attend and observe all tests. The Contractor shall perform the Pre-Installation test and the Standalone Acceptance test with the the Department ITS Engineer or their designee present.

907-661.03.13.2--Pre-Installation Test (PIT). The Contractor shall perform a PIT on all FO Cable prior to any cable removal from the shipping reels.

The Contractor shall perform a PIT on each cable reel delivered to the job site.

The PIT for FO Cable shall include but is not limited to:

- A visual inspection of each cable and reel
- An OTDR Test and documentation as required in the Standalone Acceptance Test (SAT) for three randomly selected fibers from each buffer tube

An Optical Attenuation Test is not required. However, if the Contractor decides to perform one of these tests for their own protection, it shall be documented and provided to the Engineer.

907-661.03.13.3--Standalone Acceptance Test (SAT). The Contractor shall perform an SAT on all fiber optic infrastructures on this project after field installation is complete, including but not limited to all splicing and terminations. All fiber in pull boxes shall be in its final position mounted to the racks prior to the start of testing.

An SAT for each fiber in each cable shall include OTDR Tests and Optical Attenuation Tests.

For the Attenuation Tests, all fibers in all FO Cables and FO Drop Cables shall be tested from termination point to termination point, including:

- Fibers from FO Termination Cabinet to FO Termination Cabinet
- Fibers from FO Termination Cabinet to FO Drop Panel
- Fibers from FO Drop Panel to FO Drop Panel
- Fibers from FO Termination Cabinet to the end of the cable run in the last FO closure

All test results shall confirm compliance with this TSP including but not limited to optical fibers and fusion splices. No event in any given fiber may exceed 0.10 dB. Any event measured above 0.10 dB shall be replaced or repaired at the event point.

Test documentation shall include but is not limited to:

- Cable & fiber identification
- Cable & fiber ID and location - Physical location (device ID and station number of FO Termination Cabinet, FO Drop Panel, or cable end FO closure), fiber number, and truck or drop cable ID for both the beginning and end point
- Operator name
- Engineer's representative
- Date & time
- Setup and test conditions parameters
- Wavelength
- Pulse width Optical Time Domain Reflectometer (OTDR)
- Refractory index (OTDR)
- Range (OTDR)
- Scale (OTDR)
- Ambient temperature
- Test results for OTDR test (each direction and averaged)
- Total fiber trace (miles)
- Splice loss/gain (dB)
- Events > 0.05 dB
- Measured length (cable marking)
- Total length (OTDR measurement)
- Test results for attenuation test (each direction and averaged)
- Measured cable length (cable marking)
- Total length (OTDR measurement from OTDR test)
- Number of splices (determined from as-builts)
- Total link attenuation

The OTDR Test shall be conducted using the standard operating procedure and recommended materials as defined by the manufacturer of the test equipment.

The Contractor shall use a factory patch cord ("launch cable") of a length equal to the "dead zone"

of the OTDR to connect the OTDR and the fiber under test.

Bi-directional OTDR tests shall be conducted and bi-directional averages calculated for each fiber.

All tests shall be conducted at 1310 and 1550 nm for single mode cable.

The Contractor shall conduct the Optical Attenuation Test using the standard operating procedure and recommended materials as defined by the manufacturer of the test equipment.

Bi-directional Optical Attenuation tests shall be conducted and bi-directional averages calculated for each fiber.

A continuity or tone test shall be performed after installation to confirm that a continuous run of conduit detection wire was installed between pull boxes or vaults.

The Contractor shall prepare a test plan, supply equipment, conduct the test and document the results.

The test plan shall be submitted at least 15 working days prior to the desired testing date.

Testing shall not begin until the Engineer has approved the test plan, and all tests shall be conducted in the presence of the Engineer. The Traffic Engineering ITS Department representative shall be notified of the testing dates and invited to observe all testing.

The Traffic Engineering ITS Department may perform additional testing of any and all infrastructure using their own equipment. The Contractor may observe this testing.

The burn in period cannot start until the Traffic Engineering ITS Department is satisfied with the installation.

907-661.03.14--Documentation - As-Built Plans. The Contractor shall provide GPS locations of all pull boxes, splices, termination equipment cabinets, DMS, CCTV, Detectors and all pole locations.

The Contractor shall record the sequential footage markers from the fiber optic trunk and drop cables for each GPS location.

The Contractor shall provide scanned PDF files of all plan sheets with pen and ink markups.

The Contractor shall also provide the Department with an electronic file containing all of the data and test reports required above in a format that is compatible with Microsoft Excel.

A copy of all documentation shall be provided to the the Department Traffic Engineering ITS Department and Project Office

The Contractor shall provide a site location inventory of ITS devices to include manufacturer

model, serial numbers, and quantity. It shall also include the following:

- OTN Nodes and OTN Cards
- Fiber modems
- Video Encoders and Decoders
- Cameras
- Dome Camera housings
- DMS Signs
- Any other serial numbered devices installed

All documentation timing will be due to the Department by the close of business on the Friday of the week following the installation.

907-661.03.15--MDOT Employee Training. Minimum training requirements are as follows:

After the installation is complete, the Contractor shall provide formal classroom training and "hands-on" operations training for proper operation and maintenance of the fiber optic plant. The training shall be provided for up to six personnel designated by the Engineer and shall be a minimum of one day in duration. The training shall cover as a minimum preventive maintenance, troubleshooting techniques, fault isolation and OTDR trace analysis. All training materials shall be provided by the Contractor.

A Training Plan shall be submitted within 90 days of the Notice-to-Proceed. Approval of the Plan shall be obtained from the Engineer and the Traffic Engineering ITS Department. A detailed explanation of the contents of the course and the time schedule of when the training shall be given shall be included in the Training Plan.

Prior to training, the Contractor shall submit resume and references of the training instructor(s) along with an outline of the training course in a Training Plan. Training instructor(s) shall be manufacturer-certified, experienced in the skill of training others. The training shall be conducted by a trainer with a minimum of four years of experience in training personnel on the operation and maintenance of fiber optic systems.

The Contractor shall furnish all handouts, manuals and product information for the training. The same models of equipment furnished for the project shall be used in the training. The Contractor shall furnish all media and test equipment needed to present the training. Training shall be conducted in the Jackson area.

907-661.04--Method of Measurement. Fiber optic cable of the type specified will be measured by the linear foot. The measurement will be made horizontally along the conduit, aerially along the messenger cable, or from the trunk line to the controller cabinet.

The cost for all fiber optic work, equipment and testing shall be included in the bid price for fiber optic cable.

All required cabinet facilities shall not be measured for separate payment. All standard or special

fiber optic modems, fan out boxes, connectors, termini nation cabinets, patch cords, raceways, splicing devices, splicing, detection wire, warning tape, above ground markers, backplane facilities, twisted pair communications cable interface devices, etc., and any other cabinet modifications required for the fiber optic system shall be included in the price bid for other items of work.

907-661.05--Basis of Payment. Fiber optic cable, measured as prescribed above, will be paid for at the contract unit price bid per linear foot, which price shall be full compensation for furnishing all materials, for all installing, connecting, cutting, pulling and testing and for all equipment, tools, labor and incidentals necessary to complete the work.

Payment will be made under:

907-661-A:	Fiber Optic Cable, *	- per linear foot
907-661-B:	Fiber Optic Drop Cable, *	- per linear foot
907-661-C:	Fiber Optic Cable, Aerial, *	- per linear foot
907-661-D:	Replace Fiber Optic Cable	- per linear foot
907-661-E:	Replace Fiber Optic Drop Cable	- per linear foot
907-661-F:	Replace Fiber Optic Cable, Aerial	- per linear foot
907-661-G:	Upgrade Fiber Optic Cable	- per linear foot

* Indicate the type of cable

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-663-3 **CODE: (SP)**

DATE: **08/02/2017**

SUBJECT: **Networking Equipment**

Section 907-663, Network Switch, is hereby added to and becomes part of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows.

SECTION 907-663 -- NETWORKING EQUIPMENT

907-663.01--Description. This section specifies the minimum requirements for providing networking communication equipment, including network switches, terminal servers, fiber optic modems, cell modems, and associated cabling, furnished and installed.

Type A, Type B, Type D, Type E, and Type F switches shall be environmentally hardened and rated for an operating temperature of 70 degrees celcius. These switches support Intelligent Transportation Elements deployed on arterial streets and the highway system. Elements include but are not limited to traffic signals, dynamic message signs, surveillance cameras, and vehicle detection systems. Type C switches will support the Intelligent Transportation System and be installed in the Traffic Management Center and Communications Huts which are environmentally controlled. Type C switches are not required to be hardened.

This Section also specifies the minimum requirements for stand alone and network switch module Terminal Servers, stand alone and network switch module cellular modems, and Category 6 cable. The Terminal Servers shall be hardened. The Terminal Server device, also commonly referred to as a Port Server device, will be used to communicate bi-directionally between IP-based Ethernet network systems and existing field devices that communicate or are controlled via a full-duplex serial interface. Cellular modems shall be used to communicate via cell to remote sites such as portable traffic signal sites, portable CMS, smart work zones or ITS site locations, or sites or devices, that need serial or Ethernet communication that can be provided over cellular service.

The Category 6 cable will be installed in conduit and cabinets between elements that are within 300 feet of each other to eliminate the need for two hardened switches. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the networking equipment.

907-663.02--Materials. Network Switches Type A, Type B, Type C, Type D, Type E, Terminal Servers, Cell Modems, and associated cabling will be placed in the field device cabinets and shall meet the following requirements:

907-663.02.1--Network Switch Requirements. The Type A, Type B, Type C, Type D, Type E and Type F Network switches shall adhere to the following minimum requirements.

1) Field switch optical ports shall meet the following:

a. The minimum optical budget between transmit and received ports shall be 18dB.
b. Shall include LC connector types.
c. Optical receiver maximum input power level shall not be exceeded.
d. Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Standard Specifications. It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
e. The Contractor shall be required to measure the optical power on each optical port to ensure that power entering the receiver is within the acceptable power budget of the optical port.
f. Optical interface equipment shall operate at 1310 nm.

2) Operate from 100 VAC to 200 VAC.
3) The field switches [this excludes Type C] shall operate between -34° to +74° Celsius, including power supply.
4) The field switches [this excludes Type C] shall operate from 10% to 90% non-condensing humidity.
5) Meet the IEEE 802.3 (10Mbps Ethernet) standard.
6) Meet the IEEE 802.3u (Fast Ethernet 100 Mbps) standard.
7) Meet the IEEE 802.3x (Full Duplex with Flow Control) standard.
8) Meet the IEEE 802.1p (Priority Queuing) standard.
9) Meet the IEEE 802.1Q (VLAN) standard per port for up to four VLAN's.
10) Meet the IEEE 802.1w (Rapid Spanning Tree Protocol) standard.
11) Meet the IEEE 802.3ad (Port Trunking) standard for a minimum of two groups of four ports.
12) The field switches shall meet IEEE 802.3D (Spanning Tree Protocol) standard.
13) Capable of mirroring any port to any other port within the switch.
14) Password manageable through:
    a. SNMP
    b. Telnet/CLI
    c. HTTP (Embedded Web Server) with Secure Sockets Layer (SSL)
15) Full implementation of SNMPv1 and SNMPv2c.
16) Full implementation of GVRP (Generic VLAN Registration Protocol).
17) Full implementation of IGMP and IGMP snooping.
18) Minimum MTBF of 100,000 hrs using Bellcore TS-332 standard.
19) Full implementation of RFC 783 (TFTP) to allow remote firmware upgrades.
20) UL approved.
21) The field switch shall provide status indicators as follows: 1) power on an off, 2) network status per port (transmit, receive, link, speed), and 3) status indicators shall be LED.
22) Unused ports (copper and optical) shall be covered with rubber or plastic dust caps/cover.

907-663.02.1.1--Type A Network Switch. Type A network switches shall adhere to the following minimum requirements.

1) Minimum of six 10/100/1000 Base-TX ports. Each port shall connect via RJ-45 connector.
2) Minimum of two 1000 Base Long Reach optical ports.
3) Full implementation of RMON I and RMON II.
4) Rack, shelf or DIN Rail mountable. If shelf mounted, the Contractor must furnish and install a shelf if shelf space is not available in the facility. Any shelf used shall be ventilated as per the Network Switch manufacturer recommendation.

5) All power transformers provided shall be "fastening mechanism" type. No plug-in types shall be permitted. All corded transformers shall be mountable with the ability to neatly secure power cords.

907-663.02.1.2--Type B Network Switch. Type B network switches shall adhere to the following minimum requirements.

1) Minimum of twelve 10/100/1000 Base-TX ports. Each port shall connect via RJ-45 connector.
2) Minimum of one 10/100/1000 Base-TX ports. Each port shall connect via RJ-45 connector.
3) Full implementation of RMON I and RMON II.
4) Minimum of two 1000 Base Long Reach optical ports.
5) Rack, shelf or DIN Rail mountable. If shelf mounted, the Contractor must furnish and install a shelf if shelf space is not available in the facility. Any shelf used shall be ventilated as per the Network Switch manufacturer recommendation.
6) All power transformers provided shall be "fastening mechanism" type. No plug-in types shall be permitted. All corded transformers shall be mountable with the ability to neatly secure power cords.

907-663.02.1.3--Type C Network Switch. Type C network switches shall be installed in the communication hubs and shall meet the following requirements:

1) Each switch shall be populated with modules including the following features and capabilities:
    i. Layer 2/3 switching and routing services
    ii. Minimum of 64Gbps/48Mpps module Bandwidth
    iii. Min of 8-GE uplink ports available per network switch assembly. The Contractor shall provide an uplink SFP optical module compatible with the interface for the uplink as indicated in the Location & Configuration of Communication Nodes notice to bidders for each uplink
    b. In one (or more)Fiber SFP-based module(s): a minimum of 48 1000Base-X (SFP-based) compatible access ports and a minimum of 8 1000Base-X (SFP-based) uplink ports. The Contractor shall provide whichever is greater between a min number of SFP optic modules to interface to the fiber as indicated in the plans and NTBs, or a min of 14 and shall meet the following minimum requirements:
    i. Optical budget of 18dB
    ii. Hot-swappable network modules
    iii. Same optical wavelength as Type A & B switches
    iv. Same optical transmitter power as Type A & B switches
    c. In one (or more) modules: 24 Ethernet 10/100/1000 RJ-45 ports
2) Optical receiver maximum input power level shall not be exceeded.
3) Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Mississippi Standard Specifications for Road and Bridge Construction. It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
4) 19" rack mountable.
5) Operate from 5° to 40° Celsius.

6) NEBS Level 3 compliant.
7) Operate from 10 to 80 non-condensing humidity
8) Designed as a chassis with easy to remove modules.
9) Chassis backplane shall be passive.
10) All modules shall be hot-swappable.
11) Meet the IEEE 802.1d (Virtual Bridge) standard.
12) Meet the IEEE 802.1x (authentication) standard.
13) Meet the requirements of :
    a. IEEE 802.3z
    b. IEEE 802.3ab
    c. GR-20-CORE: Generic requirements for Optical Fiber and Optical Fiber Cable
    d. GR-326-CORE: Generic Requirements for Singlemode
14) Full implementation of RIP protocol as outlined by RFCs: 1058, 1723, 1812
15) Full implementation of OSPF protocol as outlined by RFCs: 2178, 1583, 1587, 1745, 1765, 1850, 2154, 2328, 1850, 1997, 2385, 2439, 2842, 2918, 2370.
16) Capable of mirroring any port to any other port within the switch.
17) Password manageable through SSH (Secure Shell).
18) Full implementation of MLD (Multicast Listener Discovery).
19) Full implementation of IGMPv2.
20) Full implementation of PIM-SM and PIM-DM.
21) Comply with FCC 47 CRF Part 15 Class A emissions.
22) Bandwidth flow rate limiting policing support per port.
23) Full security implementation of
    a. Support SSH, 802.1x (rel 2)
    b. Access Control Lists (ACL's)
    c. RADIUS authentication
    d. TACACS+ authentication
24) Have redundant power supplies installed.
25) The power supply units shall be hot swappable.
26) Switch assembly shall have a minimum of 4 module slots.
27) Blank covers for all remaining slots.

907-663.02.1.4--Type D Network Switch. Type D network switches shall be of chassis design. The switch shall be able to accept a minimum of four (4) different type modular cards and have Layer 2 switch and Layer 3 routing cababilities. The Type D network switch shall meet the minimum requirements specified below:

1) The switch shall be chassis designed with a minimum of four (4) module slots.
2) Each switch shall be able to accept the following type modules:
    a. Ethernet module:
        i. A minimum number of six (6) 10/100Base-TX compatible RJ45 ports.
        ii. The Contractor shall provide the minimum number of modules necessary to meet or exceed the required number of ports as indicated in the plans and NTBs.
        iii. Total required bandwidth shall per chassis shall not exceed 10 Gbps
    b. Fiber based modules:
        i. The module shall accept SFP type fiber modules

ii. The Contractor shall supply any necessary fiber modules that meet the requirements of speed, type of fiber, and link budget connection.
iii. The Contractor shall provide the minimum number of modules necessary to meet or exceed the required number of ports as indicated in the plans and NTB

c. WAN module:
   i. T1, DS3 or Metro Ethernet Interface (as per NTB or project plans)
      1) The Interface shall be T1, DS3 or Metro Ethernet
      2) The ports shall connect via RJ45 connector.
   ii. Cellular Iterface
      1) Contractor shall provide information to the Project Engineer to enable activation of the modem.
      2) Contractor shall get prior approval from the Projcet Engineer on selection of cellular radio type (HSPA/EVDO)

d. Terminal Server module:
   i. Module that meets Terminal Server requirements Subsection 663.02.6.

e. Power Supply module:
   i. The power module provided shall be "screw terminal block" type. No pluggable terminal block.
   ii. Input power: Same as Type A and Type B switches.
   iii. Power module shall be hot-swappable.
   iv. The Contractor shall supply the necessary amount of power supplies to meet power requirements for all cards installed and the chassis itself

3) Software license shall provided to match functionality of installed modules.
4) Shall be DIN or Panel mountable.
5) The swich shall provide layer 2 and 3 switching and routing services
6) Meet the IEEE 802.1d (Virtual Bridge) standard.
7) Meet the IEEE 802.1x (authentication) standard.
8) Password manageable through SSHv2 (Secure Shell).
9) Full implementation of VRRP.
10) Comply with FCC 47 CRF Part 15 Class A emissions.
11) Bandwidth flow rate limiting policing support per port.
12) Full security implementation of
    a. Support SSH2, 802.1x (rel 2)
    b. Access Control Lists (ACL's)
    c. RADIUS
13) Blank covers for all remaining slots.
14) Electronic surfaces shall be covered with conformal coating for additional environmental protection.

907-663.02.1.5--Type E Network Switch. Type E network switches will be installed in locations where multiple backbone fibers converge or high concentration of ports are needed for a field location but need a hardened switch and shall meet the following requirements:

1) Each switch shall be populated with redundant switch fabric modules that meet the following minimum requirements:
   a. Layer 2/3 switching and routing services
   b. 64Gbps/48Mpps module Bandwidth

c. Min of 2-GE uplinks available per card with a minimum capability to expand to 8. The Contractor shall provide an uplink SFP optical module compatible with the interface for the uplink as indicated in the Location & Configuration of Communication Nodes notice to bidders for each uplink.

2) Optical interfaces shall include 1000 Base-X (SFP-based module(s)) with a minimum of 8 ports. The Contractor shall provide whichever is greater between a min number of SFP optic modules to interface to the fiber as indicated in the plans and NTBs, or a min of six (6) and shall have a minimum Optical budget of 18dB and be the same optical wavelength as Type A & B switches.
   a. Optical receiver maximum input power level shall not be exceeded.
   b. Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Standard Specifications. It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
3) Include a minimum 8 Ethernet 10/100/1000 ports
4) 19" rack mountable.
5) Operate from -30° to +70° Celsius.
6) Operate from 10 to 90 non-condensing humidity
7) Chassis backplane shall be passive.
8) All modules shall be hot-swappable.
9) Meet the IEEE 802.1d (Virtual Bridge) standard.
10) Meet the IEEE 802.1x (authentication) standard.
11) Meet the requirements of :
   a. IEEE 802.3z
   b. IEEE 802.3ah
   c. GR-20-CORE: Generic requirements for Optical Fiber and Optical Fiber Cable
   d. GR-326-CORE: Generic Requirements for Singlemode
12) Full implementation of RIP protocol as outlined by RFCs: 1058, 1723, 1812
13) Full implementation of OSPF protocol as outlined by RFCs: 2178, 1583, 1587, 1745, 1765, 1850, 2154, 2328, 1850, 1997, 2385, 2439, 2842, 2918, 2370.
14) Capable of mirroring any port to any other port within the switch.
15) Password manageable through SSHv2 (Secure Shell).
16) Full implementation of GMRP (Generic Multicast Registration Protocol).
17) Full implementation of IGMPv2.
18) Full implementation of PIM-SM and PIM-DM.
19) Full implementation of DVMRPv3.
20) Full implementation of VRRP.
21) Comply with FCC 47 CRF Part 15 Class A emissions.
22) Bandwidth flow rate limiting policing support per port.
23) Full security implementation of
   a. Support SSH2, 802.1x (rel 2)
   b. Access Control Lists (ACL's)
   c. RADIUS
   d. TACACS
24) Have redundant power supplies installed.
25) Blank covers for all remaining slots.
26) Have options or modules to add a terminal server as specified in Subsection 663.02.2

27) Have options or modules to add a cellular interface as specified in Subsection 663.02.3

907-663.02.1.6--Type F Network Switch. Type F network switches will be layer 3 switches installed in field locations with wireless communications or access points and shall meet the following requirements:

1) Each switch shall be populated with switch modules that meet the following minimum requirements:
   a. Layer 2/3 switching and routing services
   b. 20Gbps Aggregate Bandwidth
   c. Min of 4-GE uplinks available per switch with a minimum of 2 being fiber ports. The Contractor shall provide an uplink SFP optical module compatible with the interface for the uplink as indicated in the Location & Configuration of Communication Nodes notice to bidders for each uplink.
   d. SD flash port for swappable Management Card configuration
   e. Supports High Density Power over Ethernet (PoE) for up to 8 devices
   f. Supports Cisco Common Industrial Protocol (CIP)
   g. Support of SCADA (Supervisory Control And Data Acquisition) connectivity.
   h. Can be supported with IP services.
   i. 5 year PID warranty
2) In addition to the uplink ports, interfaces ports shall include:
   a. 8 PoE 10/100/1000
   b. 4 SFP ports
      i. Optical receiver maximum input power level shall not be exceeded.
      ii. Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Mississippi Standard Specifications for Road and Bridge Construction. It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
3) Din Rail Mountable.
4) Operate from -40° to +70° Celsius.
5) Operate from 5 to 95 non-condensing humidity
6) Supports IEEE 802.1AE MACsec, Security Group Access Control Lists (SGACL)
7) Meet the IEEE 802.1d (Virtual Bridge) standard.
8) Meet the IEEE 802.1x (authentication) standard.
9) RIPng, OSPFv6, and EIGRPv6 support
10) Full implementation of GMRP (Generic Multicast Registration Protocol).
11) Full implementation of IGMPv2.
12) Full implementation of PIM-SM and PIM-DM.
13) Full implementation of DVMRPv3.
14) Full implementation of VRRP.
15) Supports Redundant DC input voltage
16) Power supplies with PoE support and 6-foot minimum power cord(s).

907-663.02.2--Terminal Server. Terminal server shall adhere to the following minimum requirements.

1) 10/100 Base-T Ethernet port connection

2) RJ-45/DB9 Serial port connection
3) RS-232/422/485 selectable serial connections
4) Baud rates up to 230 Kbps
5) Full Modem and hardware flow control
6) TCP/UDP Socket Services
7) UDP Multicast
8) Telnet and Reverse Telnet
9) Modem emulation
10) SNMP (Read/Write)
11) PPP
12) Port buffering
13) HTTP
14) Remote management
15) DHCP/RARP/ARP-Ping for IP address assignment
16) LED status for link and power
17) The Terminal Server shall support a minimum of Four (4) bi-directional serial communications over Ethernet 10/100 Base-TX.
18) Each Terminal Server shall have a minimum of four (4) EIA-232/422/485 serial interface ports. These ports shall be individually and independently configurable, directly or over the network, to EIA-232/422/485 mode of operation as defined by the EIA for data format, data rate and data structure (e.g., the number of bits, parity, stop bits, etc.). Each serial port shall support up to 230 Kbps.
19) Each serial port shall support IP addressing and socket number selection.
20) The equipment shall provide the capability to establish an IP connection directly from a workstation to any encoder IP address and socket number transport serial data.
21) Each Terminal Server shall have an Ethernet Interface (10/100Base-TX protocol, Full/Half-Duplex, Auto Sense (802.3), RJ-45).

907-663.02.3—Cell Modem. Cellular Modem, and associated equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance and meet the following requirements.

907-663.02.3.1--Functional Requirements. Cellular Modem, antenna, wiring assemble, configuration software, and installation necessary shall be provided and furnished for a working cellular wireless communication connection in accordance with plans and specifications and compatible with the requirements of the MDOT system, and the wireless service carrier used by MDOT. Unless otherwise indicated on the plans, all items that are required to complete the installation and ensure an operational system shall be supplied by the Contractor whether listed above or not. Items required but not listed above shall be at no direct pay. All components supplied by the Contractor are the responsibility of the Contractor. It shall be the responsibility of the Contractor to properly configure and deliver a working cellular communications system. It shall be the responsibility of the Contractor to determine the final configuration of all electrical connections. Cellular account setup shall be coordinated with MDOT Traffic Engineering Division. Warranty and cellular carrier account shall be transferred into MDOT's name upon acceptance of the project.

907-663.02.3.2--Cellular Modem System. The cellular modem shall adhere to the following

minimum requirements.

1) Model and Type provided shall be pre-approved on a MDOT cellular service carrier.
2) Highest available on a MDOT cellular service carrier of 4G, EVO, or higher service.
3) Minimum of one 10/100 Base-T RJ45 Ethernet port
4) Minimum of one RS-232 serial port
5) Minimum of one external antenna connector
6) GPS Data available
   a. Acquisition Time under 2 seconds
   b. Accuracy: under 5m 90% of time
   c. Tracking Sensitivity: -161 dBm
7) Device Configuration and Management Software via web interface.
8) Communications and Protocols supported:
   a. Network: TCP/IP, UDP/IP, DNS
   b. NAT and DHCP routing with VLAN, VRRP, and Static Routes configurable
   c. Includes TELNET, SMTP, SNMP, SMS sessions and services
   d. Serial: TCP/UDP PAD Mode, Modbus (ASCII,
   e. GPS: NMEA V3.0, TAIP, RAP
   f. Provides VPN security with up to five (5) tunnels
9) Provides event reporting for GPS/AVL, Network Parameters, Data Usage, Time, Power, and Device Temperature over SMS, SNMP, or Email, SNMP.
10) Input Voltage: 10 to 36 VDC
11) Operating Temperature of -30° to +70° Celsius

907-663.02.4--Category 6 Cable. Category 6 cable shall adhere to the following minimum requirements.

1) 4 Pair #24 AWG UTP Category 6 Cable
2) This item is paid for Category 6 cables installed between cabinets and does not apply to other patch cords installed inside cabinets or huts.
3) Supplied Category 6 cable shall be suitable for use outdoors in duct and as a minimum meet the following requirements:
4) Fully water blocked
5) Conforms to the National Electrical Code Article 800
6) UL 1581 certified
7) Voltage Rating 300 Volts or greater
8) Operating and installation temperature (-4°F to 140°F)
9) Bend Radius 10 x Cable OD or smaller
10) Recommended for 1000Base-T applications for a distance of 100 meters.

907-663.02.4.1--Category 6 Patch Cords. The Cat 6 Patch Cords shall be furnished and installed as needed to connect the Network Switches with other equipment. Cat 6 Patch Cords shall be considered an incidental component for this project and furnished and installed as needed to provide a functional system. Cat 6 Patch Cords shall meet the following minimum requirements:

1) All patch cords shall be from the same manufacturer.
2) Shall incorporate four (4) pair 24 AWG stranded PVC Category 6.

3) Shall be factory made; Contractor or vendor assembled patch cords are not permitted.
4) Shall be TIA/EIA 568-B.2-1 compliant. Patch Cords shall be compliant to T568B pin configuration (which ever is used).
5) Certified by the manufacturer for Category 6 performance criteria.
6) Length as needed. Excessive slack is not permitted.

907-663.02.5--Project Submittal Program Requirements. The Contractor shall provide project submittals for network switches including scheduling requirements. The project submittals for network switches, terminal servers, cellular modems, and fiber optic modems shall include but are not limited to the specific requirements in this subsection.

1) The Contractor shall submit detailed cut sheets which document compliance with all parameters required in this section. If a parameter is not covered in the cut sheet a signed statement from the manufacturer on letterhead shall be submitted as an attachment. Failure to address all requirements will result in rejection of the submittal.
2) The Contractor shall submit documentation and proof of manufacturer-recommended training and certification for the installation and configuration of network switches.
3) The Contractor shall submit technical specifications for the minimum transmitter port to receiver port optical attenuation required for the switches to function in accordance with this specification for the optical links shown on the plans.

907-663.03--Construction Requirements. All networking equipment shall be installed according to the manufacturer's recommendations, the Plans and as follows:

1) Network switches shall only be configured and installed by the switch manufacturer trained personnel.
2) Network switches shall be installed in accordance with manufacturer's guidelines and requirements.
3) The Contractor shall request from the Department, switch configuration information (such as IP address, VLAN Tag values, etc.) not more than 30 days after the switch submittals have been approved.
4) The Contractor shall provide as needed the necessary Cat 6 patch cords and fiber optic patch cords for a complete and functional installation.
5) Category 6 cable installed in conduit shall be installed and terminated per the manufacturers recommended procedures. Slack CAT-6 cable shall be provided in pullboxes as indicated in the plans.
6) The Contractor shall provide training for proper management of the equipment installed. This training should cover daily operation as well as maintenance and configuration of the switching equipment installed as part of this project and meet the requirements of Subsection 663.03.4 of this document.
7) The Contractor shall provide the MDOT with a written inventory of items received and the condition in which they were received. Inventory shall be inclusive of make, model, and serial numbers, MAC address, and installation GPS coordinates. All equipment shall be installed according to the manufacturer's recommendations or as directed by the MDOT.
8) Any new, additional or updated drivers required for the existing ATMS software to communicate and control new Networking Equipment installed by the Contractor shall be the responsibility of the Contractor.

907-663.03.1--Switch Configuration Requirements. The Contractor shall configure network switches as follows:

1) All 100 Base-TX ports shall be configured as follows:
   a. RSTP/STP – Off.
   b. Unused TX ports shall be disabled.
   c. Operating TX ports shall be programmed to filter only for the MAC address of the connected device.
2) All 1000 Base-FX ports shall be configured as follows:
   a. RSTP/STP – On.
   b. IGMP Snooping – On.
3) The Type D switch configuration shall be as outline in the Project plans and details.
4) All network switches shall be installed and configured with the same firmware configuration. The optimum settings shall be used consistently system-wide. Any locations that require different settings for optimum performance shall be approved by the Engineer.
5) The Switches shall be configured to enable multicasting and turn on multicast protocols.
6) The Contractor may submit an alternate switch configuration to the ITS Engineer for review and approval; The ITS Engineer will review alternate switch configuration documentation. The goal of the switch configuration is to reduce the network delay, as well as provide network redundancy.
7) The Contractor shall submit an electronic copy of all final and approved configurations of all switches to the Project engineer and to the ITS Engineer.

907-663.03.2--Testing. The Contractor shall conduct a Project Testing Program as required below. All costs associated with the Project Testing Program shall be included in the overall contract price; no separate payment will be made for any testing.

1) All test results shall confirm physical and performance compliance with these Special Provisions.
2) Each test shall fully demonstrate that the equipment being tested is clearly and definitely in full compliance with all project requirements.
3) Contractor shall submit all test results documentation to the Engineer for review within 14 calendar days of completion of the tests.
4) All tests deemed by the Project Engineer to be unsatisfactorily completed shall be repeated by the Contractor. In the written request for each test occurrence that is a repeat of a previous test, the Contractor shall summarize the diagnosis and correction of each aspect of the previous test. The Contractor shall summarize the diagnosis and correction of each aspect of the previous test that was deemed unsatisfactory. The test procedures for a repeated test occurrence shall meet all the requirements of the original test procedures, including review and approval by the Project Engineer and ITS Manager or designee.
5) The satisfactory completion of any test shall not relieve the Contractor of responsibility to provide a completely acceptable and operating system that meets all requirements of this project.

907-663.03.3--Documentation. As-built Plans showing switch configuration and connections shall be provided to the Project Engineer and ITS Engineer in electronic format.

The Contractor shall submit documentation and proof of measured optical power budgets to all optical links of all type switches. All equipment and software must be fully functional and pass a Final Inspection by the ITS Manager and Project Engineer before being accepted by the MDOT

907-663.03.4--Warranty. Minimum warranty requirements shall be as follows.

1) All warranties and guarantees shall be assigned to the Mississippi Department of Transportation.
2) The warranty shall be a minimum of one (1) year warranty unless otherwise stated.

907-663.03.5--MDOT Employee Training. After the installation is complete, the Contractor shall provide formal classroom training and "hands-on" operations training for proper operation and maintenance of the network switch. The training shall be provided for up to six personnel designated by the ITS Engineer and shall be a minimum of four hours in duration. The training shall cover as a minimum preventive maintenance, troubleshooting techniques, fault isolation and circuit analysis. All training materials shall be provided by the Contractor.

1) Prior to training, submit resume and references of instructor(s). Also submit an outline of the training course in a Training Plan. Submit the Training Plan within 90 days of Contract Notice to Proceed. Obtain approval of the Plan from the Engineer and the Traffic Engineering ITS Department. Explain in detail the contents of the course and the time schedule of when the training will be given.
2) Furnish all handouts, manuals and product information.
3) For the training, use the same models of equipment furnished for the project. Furnish all media and test equipment needed to present the training.
4) Training shall be conducted in the Jackson area.
5) Training instructor(s) shall be manufacturer-certified, experienced in the skill of training others.
6) The training shall be conducted by a trainer with a minimum of four years of experience in training personnel on the operation and maintenance of fiber optic systems.

907-663.04--Method of Measurement. Network Switches of the type specified, Terminal Server, and Cellular modem will be measured per each installation as specified in the Plans.

Category 6 Cable, Installed in Conduit, will be measured by the linear foot, obtained by accurate measurement of the runs including horizontally, vertically, aerially along the messenger cable, from the device to the device cabinet, and with liberal allowances made for slack in boxes, as indicated in the plans.

907-663.05--Basis of Payment. Network Switches, measured as prescribed above, will be paid for at the contract price per each installation, which price shall be inclusive of furnishing, installing, system integration and testing of a Network Switch including all chassis, modules, power cables, power supplies, software, license, fiber optic patch cords, fiber optic attenuator patch cords, Cat 6 patch cords, and all incidental components, attachment hardware, mounting shelf and hardware, testing and training requirements, and all work, equipment and appurtenances as required to provide a fully functional switch ready for use. Type C, Type D, and Type E Network Switch

module cards shall be specified per Project plans or NTBs for each site location. It shall also include all system documentation including: shop drawings, operations and maintenance manuals, wiring diagrams, block diagrams, and other material necessary to document the operation of the switch and network.

Terminal Server, measured as prescribed above, will be paid for at the contract price per each, which price shall be inclusive of furnishing, installing, system integration and testing of a Terminal Server including all incidental components, attachment hardware, mounting shelf and hardware, testing and training requirements, and all work, equipment and appurtenances as required to provide a fully functional Terminal Server ready for use.

Cellular modem, measured as prescribed above, will be paid for at the contract unit price per each, which price shall include the modem, antenna, reset timers, cabling, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, and all work, equipment, and appurtenances as required to effect the full operation and control of the cellular modem complete in place and ready for use.

Category 6 Cable, Installed in Conduit, measured as prescribed above shall be paid for at the contract price per the linear foot, which price shall include all incidentals necessary to complete the work.

Payment will be made under:

907-663-A:	Network Switch, Type __	- per each
907-663-B:	Terminal Server	- per each
907-663-C	Cellular Modem	- per each
907-663-D:	Category 6 Cable, Installed in Conduit	- per linear foot

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-701-2 **CODE: (IS)**

DATE: 01/08/2020

SUBJECT: Hydraulic Cement

Section 701, Hydraulic Cement, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-701.01--General. In the first sentence of the second paragraph of Subsection 701.01 on page 718, change "mills" to "plants."

In the second sentence of the sixth paragraph of Subsection 701.01 on pages 718 and 719, change "shall" to "will."

907-701.02--Portland Cement.

907-701.02.1-General.

907-701.02.1.2--Alkali Content. Delete the sentence in Subsection 701.02.1.2 on page 719, and substitute the following.

The Equivalent alkali content for all cement types in this Subsection shall not exceed 0.60%.

907-701.02.2--Replacement by Other Cementitious Materials. Delete the paragraph in Subsection 701.02.2 on page 719, and substitute the following.

The maximum replacement of cement by weight is 25% for fly ash or 50% for ground granulated blast furnace slag (GGBFS). Replacement contents below 20% for fly ash or 45% for GGBFS may be used, but will not be given any special considerations, such as the maximum acceptance temperature for portland cement concrete containing pozzolans in Subsection 804.02.13.1.5. Special considerations shall only apply for replacement of cement by fly ash or GGBFS.

Delete Subsection 701.02.2.1 on pages 719 and 720, and substitute the following.

907-701.02.2.1--Portland Cement Concrete Exposed to Soluble Sulfate Conditions or Seawater.

When portland cement concrete is exposed to moderate or severe soluble sulfate conditions, or to seawater, cement types and replacement of cement by Class F fly ash or GGBFS shall be as follows in Table 1. Class C fly ash shall not be used as a replacement for cement in any of the sulfate exposure conditions listed in Table 1.

Table 1- Cementitious Materials for Soluble Sulfate Conditions or Seawater

Sulfate Exposure	Water-soluble sulfate (SO_4) in soil, % by mass	Sulfate (SO_4) in water, ppm	Cementitious material required
Moderate and Seawater	0.10 - 0.20	150 - 1,500	Type I cement with one of the following replacements of cement by weight: 24.5 - 25.0% Class F fly ash, or 49.5 - 50.0% GGBFS or Type II*,** cement
Severe	0.20 - 2.00	1,500 - 10,000	Type I cement with a replacement by weight of 49.5 - 50.0% GGBFS, or Type II* cement with one of the following replacements of cement by weight: 24.5 - 25.0% Class F fly ash, or 49.5 - 50.0% GGBFS

* Type III cement conforming to AASHTO M85 with a maximum 8% tricalcium aluminate (C_3A) may be used in lieu of Type II cement as allowed in Subsection 701.02.1; this cement is given the designation "Type III(MS)."

** Class F fly ash or GGBFS may be added as a replacement for cement as allowed in Subsection 907-701.02.2.

Delete Subsection 701.02.2.2 on page 720, and substitute the following.

907-701.02.2.2--Portland Cement for Soil Stabilization Exposed to Soluble Sulfate Conditions or Seawater. When portland cement for use in soil stabilization is exposed to moderate or severe soluble sulfate conditions, or to seawater, cement types and replacement of cement by Class F fly ash or GGBFS shall meet the requirements of Subsection 701.02.2.1.

907-701.04--Blended Hydraulic Cement.

907-701.04.1--General. Delete Subsection 701.04.1.1 on page 720, and substitute the following.

907-701.04.1.1--Types of Blended Hydraulic Cement. Blended hydraulic cements (blended cements) shall be of the following types and conform to AASHTO M 240:

Type IL – Portland-limestone cement
Type IP – Portland-pozzolan cement
Type IS – Portland blast-furnace slag cement

Blended cement Types IL, IP, and IS meeting the "MS" sulfate resistance requirement listed in AASHTO M 240, Table 3 shall have the "(MS)" suffix added to the type designation.

907-701.04.1.2--Alkali Content. Delete the sentence in Subsection 701.04.1.2 on page 720, and substitute the following.

All blended cement types shall be made with clinker that would result in cement meeting the requirements of Subsection 701.02.1.2 when used in the production of AASHTO M 85, Type I or Type II cement.

907-701.04.2--Replacement by Other Cementitious Materials. Delete the paragraph in Subsection 701.04.2 on page 720, and substitute the following.

The maximum replacement of blended cement Type IL by weight is 35% for fly ash or 50% for GGBFS. Replacement contents below 20% for fly ash or 45% for GGBFS may be used, but will not be given any special considerations, such as the maximum acceptance temperature for blended cement concrete containing pozzolans in Subsection 804.02.13.1.5. Special considerations shall only apply for replacement of blended cement by fly ash or GGBFS.

No additional cementitious materials, such as portland cement, blended cement, fly ash, GGBFS, or others, shall be added to or as a replacement for blended cement Types IP and IS.

Delete Subsection 701.04.2.1 on pages 720 and 721, and substitute the following.

907-701.04.2.1--Blended Cement Concrete Exposed to Soluble Sulfate Conditions or Seawater. When blended cement concrete is exposed to moderate or severe soluble sulfate conditions, or to seawater, cement types and replacement of cement by Class F fly ash or GGBFS shall be as follows in Table 2. Class C fly ash shall not be used as a replacement for cement in any of the sulfate exposure conditions listed in Table 2.

Table 2- Cementitious Materials for Soluble Sulfate Conditions or Seawater

Sulfate Exposure	Water-soluble sulfate (SO_4) in soil, % by mass	Sulfate (SO_4) in water, ppm	Cementitious material required
Moderate and Seawater	0.10 - 0.20	150 - 1,500	Type IL (MS)* cement, Type IL cement with one of the following replacements of cement by weight: 24.5 - 35.0% Class F fly ash, or 49.5 - 50.0% GGBFS, Type IP (MS) cement, or Type IS (MS) cement
Severe	0.20 - 2.00	1,500 - 10,000	Type IL cement with a replacement of cement by weight of 49.5 - 50.0% GGBFS, or Type IL (MS) cement with one of following replacements of cement by weight: 24.5 - 35.0% Class F fly ash, or 49.5 - 50.0% GGBFS

* Class F fly ash or GGBFS may be added as a replacement for cement as allowed in Subsection 907-701.04.2.

Delete Subsection 701.04.2.2 on page 721, and substitute the following.

907-701.04.2.2--Blended Cement for Soil Stabilization Exposed to Soluble Sulfate Conditions or Seawater. When blended cement for use in soil stabilization is exposed to moderate or severe soluble sulfate conditions, or to seawater, cement types and replacement of cement by Class F fly ash or GGBFS shall meet the requirements of Subsection 701.04.2.1.

Delete Subsection 701.04.3 on page 721.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-702-4 **CODE: (IS)**

DATE: **09/11/2018**

SUBJECT: **Bituminous Materials**

Section 702, Bituminous Materials, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-702.04--Sampling. Delete the sentence in Subsection 702.04 on page 722, and substitute the following.

Sampling of bituminous materials shall be as set out in AASHTO R 66.

907-702.07--Emulsified Asphalt. Delete the last sentence in Subsection 702.07 on page 724, and substitute the following.

Asphalt for fog seal shall conform to the requirements of Subsection 907-702.12, Table V.

907-702.12--Tables. Delete Table V in Subsection 702.12 on page 729, and substitute the following.

TABLE V
SPECIFICATION FOR FOG SEAL

	LD-7		CHPF-1		
Test Requirements	**Min.**	**Max.**	**Min.**	**Max.**	**Test Method**
Viscosity, Saybolt Furol, @ 25°C, Sec.	10	100	-	100	AASHTO T 72
Storage Stability Test, 24 hr, %	-	1	-	1	AASHTO T 59
Settlement, 5 day, %	-	5	-	-	AASHTO T 59
Oil Distillate, %	-	1	-	-	AASHTO T 59
Sieve Test, % *	-	0.3	-	0.1	AASHTO T 59
Residue by Distillation, %	40	-	40	-	AASHTO T 59
Test on Residue from Distillation					
Penetration @ 25°C, 100g, 5 sec	-	20	40	90	AASHTO T 49
Softening Point, °C	65	-	-	-	ASTM D 36
Solubility in trichloroethylene, %	97.5	-	-	-	AASHTO T 44
Elastic Recovery @ 25°C, %	-	-	40	-	AASHTO T 301
Original DSR @ 82° (G*/Sinδ, 10 rad/sec)	1	-	-	-	AASHTO T 111

* The Sieve Test result is tested for reporting purposes only and may be waived if no application problems are present in the field.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-703-1 **CODE: (SP)**

DATE: **06/13/2018**

SUBJECT: **Gradation**

Section 703, Aggregates, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-703.03--Course Aggregates for Hydraulic Cement Concrete.

907-703.03.2--Detail Requirements.

907-703.03.2.4--Gradation. In the table in Subsection 703.03.2.4 on page 734, add 100 for the percent passing by weight on the 1½-inch sieve for Size No. 67 aggregates.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-708-3 **CODE: (IS)**

DATE: **01/08/2020**

SUBJECT: **Reinforced Concrete Pipe**

Section 708, Non-Metal Structures and Cattlepasses, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-708.02--Concrete Pipe.

907-708.02.3--Exceptions to AASHTO Standard Specifications. After Subsection 708.02.3.7 on page 760, add the following.

907-708.02.3.8--Lifting Device. In lieu of lift holes, the producer may cast an approved lifting device in the pipe during the manufacturing process. Should a lifting device be included with the pipe, the Contractor shall cut off or grind down the lifting device flush with the pipe surface after placement of the pipe. The area around the lifting device shall be coated with a sealer approved by the Engineer.

907-708.02.5--Reinforced Concrete Pipe. Delete the second paragraph in Subsection 708.02.5 on page 760, and substitute the following.

907-708.02.5.1--Class V Pipe With Diameter 54 Inches and Greater. Class V pipe with diameters of 54 inches and larger shall meet the requirements of AASHTO M 170 or M 242 as modified by Subsection 708.02 and herein.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-721-1 **CODE: (SP)**

DATE: **11/05/2019**

SUBJECT: **Materials for Signing**

Section 721, Materials for Signing, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

907-721.06--Reflective Sheeting.

907-720.06.2--Performance Requirements. Delete Table 4 and Table 5 in Subsection 721.06.2 on pages 860 & 861, and substitute the following.

MINIMUM COEFFICIENTS OF RETROREFLECTION
Candela per foot candle per square foot (cd/fc/ft^2)
Per ASTM Designation D4956

TABLE 4
Type IX Sheeting

Observation Angle	Entrance Angle	White	Yellow	Green	Red	Blue	Fluorescent Yellow/Green	Fluorescent Yellow	Fluorescent Orange
0.2°	-4.0°	380	285	38	76	17	300	230	115
0.2°	+30.0°	215	162	22	43	10	170	130	65
0.5°	-4.0°	240	180	24	48	11	190	145	72
0.5°	+30.0°	135	100	14	27	6.0	110	81	41
1.0°	-4.0°	80	60	8.0	16	3.6	64	48	24
1.0°	+30.0°	45	34	4.5	9.0	2.0	36	27	14

TABLE 5
Type XI Sheeting

Observation Angle	Entrance Angle	White	Yellow	Green	Red	Blue	Brown	Fluorescent Yellow/Green	Fluorescent Yellow	Fluorescent Orange
0.2°	-4.0°	580	435	58	87	26	17	460	350	175
0.2°	+30.0°	220	165	22	33	10	7.0	180	130	66
0.5°	-4.0°	420	315	42	63	19	13	340	250	125
0.5°	+30.0°	150	110	15	23	7.0	5.0	120	90	45
1.0°	-4.0°	120	90	12	18	5.0	4.0	96	72	36
1.0°	+30.0°	45	34	5.0	7.0	2.0	1.0	36	27	14

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-722-1 **CODE: (IS)**

DATE: **11/15/2017**

SUBJECT: **Materials for Traffic Signal Installation**

Section 722, Materials for Traffic Signal Installation, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follow.

907-722.02.3--Design Strength Requirements. Delete Subsection 722.02.3 on pages 864 thru 866, and substitute the following.

Unless specified otherwise in the plans, poles shall meet the requirements of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals,* as specified in the plans with all interim supplements. All components of the assemblies shall be designed to the following:

- Importance Factor: 1.0; 50 year mean recurrence interval
- Basic Wind Speed (3 second gust): As shown on the project plans
- Minimum Gust Effect Factor: 1.14
- Fatigue Category: II
- Ice Loading: As shown on the project plans
- Natural Wind Gust Pressure Loads: Included
- Truck Induced Gust Pressure Loads: Not included
- Galloping: Not included

907-722.02.5--Mast Arms for Traffic Signal and Equipment Poles. Delete the first four sentences of the third paragraph of Subsection 722.02.5 on page 867, and substitute the following.

Anchor base plates must meet the minimum requirements of ASTM A36 or ASTM A709 Grade 36 or ASTM A572 Grade 50 and must be welded to the shaft by either telescoped with two continuous arc welds or by back up ring using full penetration welds.. Flange plate shall telescope the large end of the arm and be welded by either two (2) continuous arc welds, one (1) being on the outside of the plate, adjacent to the shaft, and the other one (1) on the inside at the end of the tubular cross section or by back up ring using full penetration welds. The thru-bolt flange plate or tapped flange plate supporting the mast arm shall be welded to the pole near the top and supported side plate tangent to the pole and gusset plates both top and bottom. The thru-bolt or tapped flange plate must be sufficient to develop the full capacity of the connecting bolts.

907-722.03--Electric Cable. Delete the paragraphs for Loop Detector Wire and Loop Detector Lead-in Cable in Subsection 722.03 on page 869.

Delete the first sentence of "Communication Cable" in Subsection 722.03 on page 870, and substitute the following.

Communication cables shall be as per the manufacturer's recommendation.

907-722.05.4--Type III or Type IV Rigid Non-Metallic Conduit. After the last sentence of Subsection 722.05.4 on page 871, add the following.

Schedule 40 conduit shall be used unless otherwise noted in the plans.

Delete the title of Subsection 722.13.3 on page 876, and substitute the following.

907-722.13.3--Power Service Pedestal.

Delete the first paragraph of Subsection 722.13.3 on page 876, and substitute the following.

The pedestal shall be of NEMA Type 3R rainproof construction and shall be UL Listed as "Enclosed Industrial Control Equipment" (UL 508A). External construction shall comply with UL50 requirements and shall be unpainted aluminum.

Nominal size of the pedestal shall be 48"H x 16"W x 16"D.

Pedestal shall have a voltage rating or 120v/240v single phase with an Amperage rating of 800A.

After the first sentence of the seventh paragraph of Subsection 722.13.3 on page 876, add the following.

An outdoor rated heavy duty combination lock shall be provided to lock the customer compartment door.

907-722.14.1.3--Optical System. Delete the sixteenth paragraph of Subsection 722.14.1.3 on page 879, and substitute the following.

The signal module on-board circuitry shall include voltage surge protection to withstand high-repetition noise transients and low-repetition high-energy transients as stated in Section 2.1.6, NEMA Standard TS 2, 1992.

Delete the last sentence of the seventeenth paragraph of Subsection 722.14.1.3 on page 879, and substitute the following.

Load switches shall be compatible with NEMA TS 1 or later, or Model 170-1989 or later.

Delete Subsection 722.14.5 on page 882, and substitute the following.

907-722.14.5--Blank.

Delete Subsections 722.14.7 and 722.14.8 on page 882.