COOK COGGIN ENGINEERS, INC.
CONSULTANTS

SPECIFICATIONS

AND

EXECUTED CONTRACT DOCUMENTS

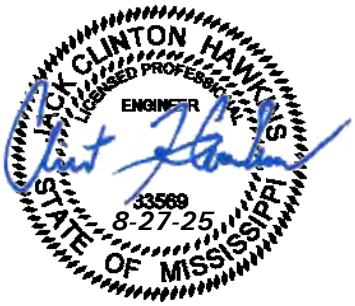
FOR

TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID

FOR

CITY OF TUPELO

LEE COUNTY, MISSISSIPPI



BID NO 2025-029 PW
CCE 3-08658

AUGUST 2025

703 Crossover Road ● Tupelo, MS 38801 ● (662) 842-7381 / FAX (662) 844-4564

SPECIFICATIONS

AND

CONTRACT DOCUMENTS

FOR

TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID

FOR

CITY OF TUPELO

LEE COUNTY, MISSISSIPPI

CITY OF TUPELO
Mayor Todd Jordan

Alder(wo)men:
Janet Gaston
Lynn Bryan
Travis Beard
Nettie Davis
Chad Mims
Rosie Jones
Bentley Nolan

Ben Logan, City Attorney
Kim Hanna, Chief Financial Officer
Don Lewis, Chief Operating Officer
Chris Lewis, Superintendent of Water & Sewer

COOK COGGIN ENGINEERS, INC.
703 Crossover Road
Tupelo Mississippi 38801

ASSEMBLY OF SPECIFICATIONS AND CONTRACT DOCUMENTS
TOWN CREEK EROSION CONTROL BRIDGE NO 206 REBID
CITY OF TUPELO
LEE COUNTY, MISSISSIPPI

CONTRACTS:

SPECIFICATIONS:

ADVERTISEMENT FOR BIDS

Separate and sealed bids or electronic bids for the construction of ***TOWN CREEK EROSION CONTROL BRIDGE NO 206 REBID, BID NO. 2025-029 PW*** will be received by the ***CITY OF TUPELO*** until ***10:00 A.M.*** on ***TUESDAY THE 23RD DAY OF SEPTEMBER, 2025*** and then at said office publicly opened and read aloud. Sealed bids will be received until the designated date and time at ***TUPELO CITY HALL, TAX OFFICE, ATTENTION: KIM HANNA, 71 EAST TROY STREET, TUPELO, MS 38804.*** Electronic bids will be received until the date and time via electronic online submission through www.cceplanroom.com.

This project consists of splicing steel piling (approx. 30 lin. ft.), adding concrete encasements, backfilling wash areas, grading slopes and ditches, constructing paved ditches, and adding riprap for slope stabilization under East Main Bridge over Town Creek.

The Contract Documents may be examined at the following locations: ***TUPELO CITY HALL, 71 EAST TROY STREET, TUPELO, MS 38804,*** and Cook Coggin Engineers, Inc., 703 Crossover Road, Tupelo, Mississippi 38801.

Registering for a free account at www.cceplanroom.com will enable bidders to view and/or order Contract Documents online. The only requirement for account registration is a valid email address. Questions regarding website registration or online orders shall be directed to Plan House Printing at (662) 407-0193.

Contract Documents are issued to potential Bidders from Plan House Printing and Graphics, 607 West Main Street, Tupelo, MS 38804. Bidders may opt to purchase Contract Documents online at www.cceplanroom.com. All payments for Bid Documents are non-refundable and shall be made payable to Plan House Printing and Graphics, 607 West Main Street, Tupelo, MS 38804.

Bids will be accepted only under the name of the Bidder to whom contract documents have been issued by Plan House Printing, on behalf of the Engineer, and whose name appears on the official list of Plan holders maintained by Plan House Printing.

Each bidder must deposit with this bid, security in the amount, form and subject to the conditions provided in the Information for Bidders.

No Bidder may withdraw his bid within 60 days after the actual date of the opening thereof.

Simultaneously with his delivery of the executed contract, the Contractor shall furnish surety bonds subject to the conditions provided in the Information for Bidders.

All applicable laws, ordinances and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout.

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.

A conditional or qualified Bid will not be accepted. Award will be made to the lowest or best responsible, responsive Bidder.

The Owner reserves the right to waive any informality or to reject any or all Bids.

CITY OF TUPELO
MAYOR TODD JORDAN

Publish: August 21, 28, 2025

INSTRUCTIONS FOR BIDDERS

Bids will be received by the Owner at the time and place designated in the Advertisement for Bids, and then at said office publicly opened and read aloud.

BIDDING As a condition precedent to the opening of a Bid, Bids, when submitted as a paper version shall be sealed in a plain envelope with the following listed information plainly written on the outside or face of the envelope.

(1) Addressee: Name of the Owner

(2) For: Name of the project and contract designation for which the Bid is submitted.

(3) Bid of: Name of Person or Firm submitting the Bid.

(4) Permanent Address of the Bidder: Post Office Box Number, or Street Address, and the City and State of the Bidder.

(5) Certification: Certificate of Responsibility Number as issued by the Mississippi State Board of Public Contractors or a statement signifying the Bid is not in excess of $50,000.00.

PAPER BIDS If a Bid is delivered by mail or commercial courier, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed as above.

ELECTRONIC BIDS **Electronic bidding ONLY applies when the ADVERTISEMENT FOR BIDS indicates Electronic Bidding,**

As a condition precedent to the opening of a Bid, Bids submitted electronically shall meet the same functional and documentary requirements (Bid Form, Bid Bond, documents, certifications, attachments, etc.) as above for Bids submitted in paper form. Unless provided for otherwise, Bids submitted electronically shall be scanned images of completely executed bid documents delivered to the Owner in Portable Document Format (PDF). Bids may be submitted electronically either as an assembly in a single bookmarked PDF file or as an ordered series of multiple PDF files. The first page of the PDF assembly, or the first PDF file in an ordered series of multiple file Bids, shall display the same information that is required to be written on the outside or face of the envelope for Bids submitted in paper form. Bids submitted electronically that are corrupt or have corrupted attachments will not be considered.

ALL BIDS (PAPER OR ELECTRONIC) The Bidder's contract designation as issued by the Mississippi State Board of Contractors must coincide with the type of project he is bidding.

Bids will be accepted only under the name of the Bidder to whom contract documents have been issued by the plan house designated on the advertisement for bids, on behalf of the Engineer, and whose name appears on the official list of Planholders maintained by the Owner.

No Bid will be opened, considered or accepted unless the above information is given as specified. Sufficient evidence that said Certificate of Responsibility has been issued and is in effect at the time receiving Bids must be submitted when required by the Owner.

All Bids must be made on the required Bid Form with all Addenda acknowledged. All blank spaces for Bid prices must be filled in, in ink or typewritten, and the Bid Form must be fully completed and executed when submitted. Only one copy of the Bid Form is required.

When a non-resident contractor submits a Bid for a Mississippi public project, he shall submit with the Bid a copy of his resident State's current law pertaining to such State's treatment of non-resident contractors as required by House Bill Number 850, Chapter Number 527, Laws of 1988. Bidders residing in the states having no contractor preference law shall so state in a letter on contractor's letterhead submitted with his Bid.

The Owner may waive any informalities or minor defects or reject any and all Bids. Any Bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified shall not be considered. No Bidder may withdraw a Bid within 60 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the Owner and the Bidder.

Each Bidder is responsible for inspecting the site and 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. Bidders must satisfy themselves of the accuracy of any estimated quantities on the Bid Form by examination of the site and a review of the drawings and specifications including Addenda. After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of Work or of the nature of the Work to be done.

The Owner shall provide to Bidders prior to Bidding, information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The Contract Documents contain the provisions required for the construction of the Project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve him from fulfilling any of the conditions of the contract.

Each Bid must be accompanied by a Bid Bond payable to the Owner for five percent of the

total amount of the Bid and have as a surety thereon a Surety company currently authorized and licensed in good standing to conduct business within the State. Bid Bonds shall be executed by a Mississippi agent or a qualified nonresident agent. The Mississippi agent or qualified nonresident agent shall be in good standing and currently licensed by the Insurance Commissioner of the State to represent Surety companies. A certified check may be used in lieu of a Bid Bond.

A conditional or qualified Bid will not be accepted.

AWARD If, at the time this contract is to be awarded, the lowest Bid submitted by a responsive Bidder does not exceed the amount of funds then estimated by the Owner as available to finance the contract, the contract will be awarded. If such Bid exceeds such amounts, the Owner may reject all Bids.

The award will be made based on the lowest and best bid for the base bid or for the base bid and any combination of alternate bids, as the Owner chooses.

The responsiveness of the Bidder will be determined by the completeness and regularity of the Bid, without excisions or special conditions and having no alternative Bids for any items unless provided for on the Bid Form. The responsibility of the Bidder will be determined by whether or not he maintains a permanent place of business, has adequate plant equipment to do the work properly and within the time limit that is established and has adequate financial status to meet his obligations contingent to the work.

A PERFORMANCE BOND and a PAYMENT BOND, each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety listed on the Treasury Department's most current list (Circular 570 as amended), approved by the OWNER, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or PAYMENT BONDS and PERFORMANCE BONDS must file with each BOND a certified and effective dated copy of their Power of Attorney.

The party to whom the contract is awarded will be required to execute the Agreement and obtain and submit the PERFORMANCE BOND, PAYMENT BOND and CERTIFICATES OF INSURANCE within ten (10) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary Agreement and BOND forms. In case of failure of the BIDDER to execute and submit the Agreement, the PERFORMANCE BOND, the PAYMENT BOND and CERTIFICATES OF INSURANCE the OWNER may at his option determine the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER.

The OWNER within ten (10) calendar days of receipt of acceptable PERFORMANCE BOND, PAYMENT BOND, CERTIFICATES OF INSURANCE and Agreement signed by the party to whom the Agreement was awarded, shall sign the Agreement and return to such party an executed duplicate of the Agreement, and issue a NOTICE TO PROCEED. Should the OWNER not execute the Agreement within such period, the BIDDER may by WRITTEN

NOTICE withdraw his signed Agreement without further liability on the part of either party. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER. Should there be reason(s) the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual agreement between the OWNER and CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) calendar day period or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

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 any 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 obligations of the Agreement and to complete the WORK contemplated therein.

THE CONTRACT Where all or part of the work is to be unit price work, the estimated item quantities set out in the Bid form are not guaranteed and are solely for the purpose of comparison of Bids; payment will be made on the actual quantity of each item installed and accepted. It is understood that the quantities of items may be increased and decreased for which payment will be made at the unit price Bid. It is also understood that the location of some work items may be changed from that shown on the drawings and such change in location shall be made at the unit price Bid for the various items of work involved.

Included in these documents is the "Prime Consultant/Contractors EEV Certification and Agreement". This document must be executed and made part of the contract after award. It does not have to be executed at the time of the bidding.

If multiple contracts are bid, each contract will be amended by strikethrough of non-applicable contract wording to clearly identify which contract is being awarded. The following sections will be amended in this manner: 00 51 00 Notice of Award, 00 52 13 Contract Agreement, 00 55 00 Notice to Proceed, 00 61 13.13 Performance Bond, 00 61 13.16 Payment Bond.

INTERPRETATIONS AND ADDENDA Should a Bidder find discrepancies in, or omissions from the specifications or other contract documents, or should he be in doubt as to the meaning of any part thereof, he should at once submit to COOK COGGIN ENGINEERS, INC., P.O. Box 1526, Tupelo, Mississippi 38802, a written request for an interpretation. No oral interpretation will be made to any Bidder as to the meaning of any of the Contract Documents, or no oral interpretation shall be effective to modify any of the provisions of the contract documents. The Engineers will make interpretations by duly issued Addenda which will be mailed or delivered to Bidders of record receiving copies of the Contract Documents; and neither the Owner nor the Engineers will be responsible for any other explanation or interpretation of the documents.

STORM WATER POLLUTION PREVENTION The Mississippi Department of

Environmental Quality (MDEQ) is the National Pollutant Discharge Elimination System (NPDES) permit authority for the State of Mississippi. Current regulations require NPDES stormwater construction discharge permit coverage for construction activities which disturb one or more acres of land, or less than one acre if part of a larger common plan of development or sale.

BID FORM

Proposal of W. G. Harrell Construction LLC.

(hereinafter called "Bidder"), organized and existing under the laws of the State of

Mississippi, doing business as W.G. Harrell Construction LLC.

* to ***CITY OF TUPELO*** (hereinafter called "Owner").

In compliance with your Advertisement for Bids, Bidder hereby proposes to perform all work for ***TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID, BID NO. 2025-029 PW*** in strict accordance with the Contract Documents, within the time set forth herein, and at the prices stated below.

By submission of this 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 arrived at 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 the date to be specified in the Notice to Proceed and to fully complete the project within 60 consecutive calendar days. Bidder further agrees to pay as liquidated damages, the sum of $500.00 for each consecutive calendar day thereafter as provided in Article 14 of the General Conditions, said amount to cover the cost of additional resident inspection and construction engineering.

Bidder acknowledges receipt of the following addendum:

N/A

*Insert "a corporation", "a partnership", or "an individual" as applicable.

Bidder agrees to perform all work described in the Contract Documents for the following unit prices or lump sum:

BID SCHEDULE

Each bid item unit price shall include all applicable taxes and fees.

Write/Type unit prices and bid prices, as clearly as possible, in number format.

Item No.	Item Description	Estimated Quantity	Unit	Bid Unit Price	Bid Price
TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID, BID NO. 2025-029PW					
ROADWAY					
1	Mobilization	1.0	LS	$ 53,000.00	$ 53,000.00
2	Clearing and Grubbing	1.0	LS	$ 40,000.00	$ 40,000.00
3	Unclassified Excavation (PM)	591.0	CY	$ 111.00	$ 65,601.00
4	Borrow Excavation (PM)	420.0	CY	$ 176.00	$ 73,920.00
5	Geotextile Fabric Stabilization (Type V) (AOS<0.43) (Non-Woven)	265.0	SY	$ 8.00	$ 2,120.00
6	Crushed Stone, (Size 3/4" & Down) (PM)	50.0	CY	$ 100.00	$ 5,000.00
7	Crushed Stone, (Size 3/4" & Down) (Remove & Relay) (PM)	25.0	CY	$ 100.00	$ 2,500.00
8	Maintenance of Traffic	1.0	LS	$ 5,000.00	$ 5,000.00
9	Additional Construction Signs	0.0	SF	$ 10.00	$ 0.00
EROSION CONTROL					
10	Solid Sod	1,145.0	SY	$ 10.00	$ 11,450.00
11	Portland Cement Concrete Paved Ditch	9.95	CY	$ 1500.00	$ 14,925.00
12	Temporary Silt Fence (Type I OR II) (AOS < 0.15-0.84)	950.0	LF	$ 10.00	$ 9,500.00
13	Wattles, 20"	350.0	LF	$ 10.00	$ 3,500.00
14	Loose RipRap, Size 300 LB.	1,507.0	TON	$ 123.00	$ 185,361.00
15	Geotextile Fabric Under Rip Rap (Type V) (AOS<0.43) (Non-Woven)	1,195.0	SY	$ 6.00	$ 7,170.00
BRIDGE ITEMS					
16	Bridge Concrete, Class "B"	2.0	CY	$ 2,500.00	$ 5,000.00
17	Reinforcement	40.0	LBS	$ 5.00	$ 200.00
18	Piling Splices	27.0	LF	$ 500.00	$ 13,500.00
19	Undersealing (Foam)	800.0	LBS	$ 17,120.00 21.40 WH	$ 17,120.00
				TOTAL BASE BID	$ 514,867.00

PROPOSED SUBCONTRACTORS

In accordance with General Condition 6.15.4, the Contractor shall not award to Subcontractors in excess of fifty (50%) percent of the contract value, without prior approval of the Owner.

Subcontractor	Address	Work to be Subcontracted	Amount
Bulldog Construction	126 Weisenberger Rod Madison, MS 39110	Undersealing	$ 9400.00

All of the above prices shall include all labor, materials, taxes, overhead, profit, bonds, insurance, and other costs necessary to cover the finished work of the several kinds called for.

Bidder acknowledges that (1) each unit price provided includes an amount considered by the Bidder to be adequate to cover the Contractor's overhead and profit for each separately identified item, (2) estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, (3) up to a ten percent reduction in the quantities for unit priced items may be applied to establish a construction contract amount that is within the funds available for construction and (4) final payment for all unit priced bid items will be based on actual quantities, determined as set forth in the Contract Documents.

IT IS UNDERSTOOD THAT THE CONTRACT WILL BE AWARDED BASED ON THE TOTAL BASE BID OR ON THE BASE BID AND ANY COMBINATION OF ALTERNATE BIDS AS THE OWNER CHOOSES.

UNIT PRICED ITEMS INCLUDED IN ANY ALTERNATE BIDS THAT HAVE THE SAME ITEM NUMBER AND ITEM DESCRIPTION AS FOR THE BASE BID SHALL BE OFFERED AT THE SAME UNIT PRICE IN ANY ALTERNATE BID AS OFFERED IN THE BASE BID.

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding.

The Bidder agrees that this Bid shall be good and may not be withdrawn for a period of 60 calendar days after the scheduled closing time for receiving bids.

Upon receipt of written notice of the acceptance of this Bid, Bidder will execute the formal contract attached within 10 calendar days and deliver a Surety Bond or Bonds as required

by Article 5 of the General Conditions.

The bid security attached in the sum of 5% of total bid

_____ Dollars,

($_____) (5% of the Total Bid) is to become the property of the Owner in the event the contract and bond are not executed within the time set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Bidder hereby certifies that he is a:

__X__ Resident Contractor
(See Information for Bidders)

_____ Non-Resident Contractor

Respectfully submitted this the 23 day of September, 2025

By Warren Harrell Title President

Company W.G. Harrell Construction LLC.

Address 498 Hwy 30 East Booneville, MS 38829

Phone 662-507-5976

Employer Identification No. 83-0784207

Email Address warren@wghellc.com

SEAL (If bid is by a corporation.)

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, **W.G. Harrell Construction, LLC** as Principal, and **Westfield Insurance Company, P.O. Box 5001, Westfield Center, OH 44251-5001** as Surety, are hereby held and firmly bound unto ***CITY OF TUPELO***, as owner in the penal sum of **Five Percent of Amount Bid (5%)** for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed, this **23rd** day of **September**, 20**25**.

The condition of the above obligation is such that whereas the Principal has submitted to ***CITY OF TUPELO*** a certain Bid, attached hereto and hereby made a part hereof to enter into contract in writing, for the ***TOWN CREEK EROSION CONTROL BRIDGE NO 206 REBID, BID 2025-029PW.***

NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, 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 remain in force and 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 presents to be signed by their proper officers, the day and year first set forth above.

W.G. Harrell Construction, LLC

_____ (L.S.)

Principal

Westfield Insurance Company

Surety

WESTFIELD INSURANCE COMPANY SEAL SEAL

By: _____

Michael A. McDaniel, Attorney-in-Fact

COUNTERSIGNATURE

By: _____

Jenna B. Allen, MS Resident Agent

General
Power
of Attorney

CERTIFIED COPY

POWER NO. 4113612 01

Westfield Insurance Co.
Westfield National Insurance Co.
Ohio Farmers Insurance Co.
Westfield Center, Ohio

Know All Men by These Presents, That WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY, corporations, hereinafter referred to individually as a "Company" and collectively as "Companies," duly organized and existing under the laws of the State of Ohio, and having its principal office in Westfield Center, Medina County, Ohio, do by these presents make, constitute and appoint
MICHAEL A. MCDANIEL, RICHARD H. WHITLEY, JOINTLY OR SEVERALLY

of **MEMPHIS** and State of **TN** its true and lawful Attorney(s)-in-Fact, with full power and authority hereby conferred in its name, place and stead, to execute, acknowledge and deliver **any and all bonds, recognizances, undertakings, or other instruments or contracts of suretyship.**

LIMITATION: THIS POWER OF ATTORNEY CANNOT BE USED TO EXECUTE NOTE GUARANTEE, MORTGAGE DEFICIENCY, MORTGAGE GUARANTEE, OR BANK DEPOSITORY BONDS.
and to bind any of the Companies thereby as fully and to the same extent as if such bonds were signed by the President, sealed with the corporate seal of the applicable Company and duly attested by its Secretary, hereby ratifying and confirming all that the said Attorney(s)-in-Fact may do in the premises. Said appointment is made under and by authority of the following resolution adopted by the Board of Directors of each of the WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY:

"Be It Resolved, that the President, any Senior Executive, any Secretary or any Fidelity & Surety Operations Executive or other Executive shall be and is hereby vested with full power and authority to appoint any one or more suitable persons as Attorney(s)-in-Fact to represent and act for and on behalf of the Company subject to the following provisions:

The Attorney-in-Fact. may be given full power and authority for and in the name of and on behalf of the Company, to execute, acknowledge and deliver, any and all bonds, recognizances, contracts, agreements of indemnity and other conditional or obligatory undertakings and any and all notices and documents canceling or terminating the Company's liability thereunder, and any such instruments so executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed by the President and sealed and attested by the Corporate Secretary."

"Be it Further Resolved, that the signature of any such designated person and the seal of the Company heretofore or hereafter affixed to any power of attorney or any certificate relating thereto by facsimile, and any power of attorney or certificate bearing facsimile signatures or facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached." (Each adopted at a meeting held on February 8, 2000)

In Witness Whereof, WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY have caused these presents to be signed by their **Senior Executive** and their corporate seals to be hereto affixed this **19th** day of **OCTOBER** A.D., **2009**.

Corporate Seals Affixed

WESTFIELD INSURANCE COMPANY
WESTFIELD NATIONAL INSURANCE COMPANY
OHIO FARMERS INSURANCE COMPANY

By: Richard L. Kinnaird, Jr.
Richard L. Kinnaird, Jr., *Senior Executive*

State of Ohio
County of Medina ss.:

On this **19th** day of **OCTOBER** A.D., **2009**, before me personally came **Richard L. Kinnaird, Jr.** to me known, who, being by me duly sworn, did depose and say, that he resides in **Medina, Ohio;** that he is **Senior Executive** of WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY, the companies described in and which executed the above instrument; that he knows the seals of said Companies; that the seals affixed to said instrument are such corporate seals; that they were so affixed by order of the Boards of Directors of said Companies; and that he signed his name thereto by like order.

Notarial Seal Affixed

William J. Kahelin
William J. Kahelin, Attorney at Law, *Notary Public*
My Commission Does Not Expire (Sec. 147.03 Ohio Revised Code)

State of Ohio
County of Medina ss.:

I, **Frank A. Carrino**, Secretary of WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY, do hereby certify that the above and foregoing is a true and correct copy of a Power of Attorney, executed by said Companies, which is still in full force and effect; and furthermore, the resolutions of the Boards of Directors, set out in the Power of Attorney are in full force and effect.

In Witness Whereof, I have hereunto set my hand and affixed the seals of said Companies at Westfield Center, Ohio, this **23rd** day of **September** A.D., **2025**.

Frank A. Carrino
Frank A. Carrino, *Secretary*

Consultant Service Unit - Rev. 11/13/08

PRIME CONSULTANT / CONTRACTOR EEV CERTIFICATION AND AGREEMENT

Project No: TOWN CREEK EROSION CONTROL BRIDGE NO. 206

Termini: CITY OF TUPELO

Prime Consultant: ***W.G. HARRELL CONSTRUCTION, LLC***

By executing this Certification and Agreement, the undersigned verifies its compliance with the Mississippi Employment Protection Act, Section 71-11-3 of the Mississippi Code of 1972, as amended, and any rules or regulations promulgated by Mississippi Transportation Commission [MTC], Department of Employment Security, State Tax Commission, Secretary of State, Department of Human Services in accordance with the Mississippi Administrative Procedures Law (Section 25-43-1 et seq., Mississippi Code of 1972, as amended), stating affirmatively that the individual, firm, or corporation which is contracting with MTC has registered with and is participating in a federal work authorization program* operated by the United States Department of Homeland Security to electronically verify information of newly hired employees pursuant to the Immigration Reform and Control Act of 1986, Pub.L. 99-603, 100 Stat 3359, as amended. The undersigned agrees to inform the MTC if the undersigned is no longer registered or participating in the program.

The undersigned agrees that, should it employ or contract with any subconsultant(s) and/or subcontractor(s) in connection with the performance of this Contract, the undersigned will secure from such subconsultant(s) and/or subcontractor(s) verification of compliance with the Mississippi Employment Protection Act. The undersigned further agrees to maintain records of such compliance and provide a copy of each such verification to MTC, if requested, for the benefit of the MTC or this Contract.

2443147
EEV* Company Identification Number [Required]

The undersigned certifies that the above information is complete, true and correct to the best of my knowledge and belief. The undersigned acknowledges that any violation may be subject to the cancellation of the contract, ineligibility for any state or public contract for up to three (3) years, the loss of any license, permit, certificate or other document granted by any agency, department or government entity for the right to do business in Mississippi for up to one (1) year, or both, any and all additional costs incurred because of the contract cancellation or the loss of any license or permit, and may be subject to additional felony prosecution for knowingly or recklessly accepting employment for compensation from an unauthorized alien as defined by 8 U.S.C §1324a(h)(3), said action punishable by imprisonment for not less than one (1) year nor more than five (5) years, a fine of not less than One Thousand Dollars ($1,000.00) nor more than Ten Thousand Dollars ($10,000.00), or both, in addition to such prosecution and penalties as provided by Federal law.

BY: _____ September 24, 2025
Authorized Officer or Agent — Date

Warren Harrell — President
Printed Name of Authorized Officer or Agent — Title of Authorized Officer or Agent of Contractor / Consultant

SWORN TO AND SUBSCRIBED before me on this the 1st day of October, 2025.

Kaylee Brumley
NOTARY PUBLIC
My Commission Expires: May 9, 2028

STATE OF MISSISSIPPI KAYLEE BRUMLEY NOTARY PUBLIC Prentiss County My Commission Expires May 9, 2028 COMMISSION NUMBER 4[illegible]

* As of the effective date of the Mississippi Employment Protection Act, the applicable federal work authorization program is E-Verify™ operated by the U.S. Citizenship and Immigration Services of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration.

NOTICE OF AWARD

DATE: September 24, 2025

TO: ***W.G. HARRELL CONSTRUCTION, LLC***
498 HWY. 30 EAST
BOONEVILLE, MS 38829

PROJECT DESCRIPTION: ***TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID***

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated September 23, 2025.

You are hereby notified that your BID has been accepted for items in the amount of $**514,867.00**------.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance Bond, Payment Bond, and Certificates of Insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER. Dated this 24th day of September 2025.

CITY OF TUPELO
Owner

By _____

Title Mayor Todd Jordan

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

By *W.G. HARRELL CONSTRUCTION, LLC*

this 24th day of September, 2025.

By _____

Title Warren Harrell, President

CONTRACT AGREEMENT

This Agreement, made this the 24th day of September, 2025, by and between ***W.G. HARRELL CONSTRUCTION, LLC*** hereinafter called the Contractor, and the ***CITY OF TUPELO***, hereinafter called the Owner.

WITNESSETH:

That the Contractor and Owner for the consideration hereinafter named agree as follows:

Article 1 SCOPE OF WORK

The Contractor shall furnish all materials for the construction of ***TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID*** for the Owner, all in the manner provided for in the Specifications and Contract Documents, dated ***AUGUST 2025*** and Construction Plans entitled ***TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID*** Sheets 1 through 26, dated ***AUGUST 2025***, which are fully incorporated herein as if hereto attached or herein repeated.

Article 2 THE CONTRACT SUM

The Owner shall pay the Contractor for the complete performance of this Contract a total amount of Five Hundred and Fourteen Thousand, Eight Hundred and Sixty-Seven 00/100---------- Dollars ($514,867.00------) being the amount of the accepted proposal for ***TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID*** subject to proper additions and/or deductions at the lump sum and/or unit price as stated in the proposal or otherwise provided for by Modification, the corrected amount referred to being full compensation for furnishing, installing and connecting all of the items of materials, labor and equipment necessary for the Work and the completion of the Project in full accordance with the Plans and Specifications and Contract Documents.

Payment therefore to be made in accordance with applicable specifications, provided: That the Engineers have certified to the Owner that all of the work has been completed and that payment is due therefore and provided further that the Contractor has submitted evidence satisfactory to the Owner and all payrolls, materials bills and other indebtedness, labor and materials liens connected with the work have been paid.

Article 3 TIME OF COMPLETION

The Contractor shall commence work at the time stated in the Notice to Proceed issued by the Owner and shall complete the work within 60 consecutive calendar days from and including the starting date stated in said notice unless this period is extended by Modification by the Owner and the Engineers, due to delays beyond the control of the Contractor and/or extensions to the Contract.

It is mutually agreed between the parties hereto that time is the essence of this contract; and in the event construction of the work is not completed within the time specified herein, it is agreed that from the compensation otherwise to be paid to the Contractor, the Owner may retain the sum of $500.00 per day for each calendar day thereafter that the work remains uncompleted, which sum shall represent the actual damages which the Owner will have sustained per day by failure of the Contractor to complete the work within the time stipulated; and this sum is not a penalty, being the stipulated damage the Owner will have sustained in event of such default by the Contractor.

Article 4. ADDITIONAL SURETY

It is further mutually agreed between the parties hereto that if, at any time after the execution of this agreement and the Surety Bond hereto attached for its faithful performance, the Owner shall deem the surety or sureties upon such bond to be unsatisfactory, or if for any reason such bond, in the opinion of the Owner, ceases to be adequate to cover the performance of the work, the Contractor, at his expense, within five days after receipt of the notice from the Owner to do so, shall furnish additional bond or bonds in such form and amount, not in excess of the original amount, and with surety or sureties as shall be satisfactory to the Owner.

Article 5 ROYALTIES AND PATENTS

It is further mutually agreed between the parties hereto that the contract price of the Contractor shall include payment by the Contractor of all royalties and license fees, if any; and the Contractor shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof.

Article 6 DAMAGE TO PERSONS AND PROPERTY

It is further mutually agreed that the Contractor shall indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against any and all liability of every nature, kind and character which may be incurred in connection with the performance or fulfillment of the Work or such other liability resulting from negligence or otherwise on the part of the Contractor, including but not limited to injury to persons and damage to properties, and the structures and improvements thereon, adjacent to the Project, and shall indemnify and hold harmless the Owner from all costs and damages, including attorney's fees, which may be suffered by reason of the failure to fully and completely perform under the Contract Documents and shall fully reimburse Owner for all expenditures of every kind, character and description, including attorney's fees, which may be incurred by Owner in making good any and every default which may exist on the part of the Contractor in connection with its performance under the Contract Documents.

Article 7. GENERAL CONDITIONS

The Contractor has read, understands and accepts the General Conditions and Special Conditions as set forth in the Specifications and Contract Documents.

In witness whereof, the parties hereto have executed this Agreement on the day and year first mentioned in 3 counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original contract.

OWNER: ***CITY OF TUPELO***

By _____

Title Mayor Todd Jordan

ATTEST: _____

Title _____

CONTRACTOR: ***W.G. HARRELL CONSTRUCTION, LLC***

By _____

Title Warren Harrell, President

ATTEST: _____

Title Project Manager

NOTICE TO PROCEED

TO: ***W.G. HARRELL CONSTRUCTION, LLC*** DATE: _____
498 HWY. 30 EAST, BOONEVILLE, MS 38829

Project: ***TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID***

You are hereby notified to commence WORK in accordance with the Agreement dated September 24, 20 25, on or before _____, 20___, and you are to complete the WORK within 60 consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 20___.

CITY OF TUPELO
Owner

By _____

Title Mayor Todd Jordan

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged

By ***W.G. HARRELL CONSTRUCTION, LLC***

this ____ day of _____,20___.

By _____

Title Warren Harrell, President

Bond No. 503511P

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

W.G. HARRELL CONSTRUCTION, LLC
(Name of Contractor)

498 HWY. 30 EAST, BOONEVILLE, MS 38829
(Address of Contractor)

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

Principal, and **Westfield Insurance Company**
(Name of Surety)

P.O. Box 5001, Westfield Center, OH 44251-5001
(Address of Surety)

hereinafter called Surety, and held and firmly bound unto

CITY OF TUPELO
(Name of Owner)

71 EAST TROY STREET, TUPELO, MS 38804
(Address of Owner)

hereinafter called OWNER, in the penal sum of Five Hundred and Fourteen Thousand,

Eight Hundred and Sixty-Seven 00/100----- Dollars ($ 514,867.00----)
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 24th day of September , 20 25, a copy of which is hereto attached and made a part hereof for the construction of:

TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID

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 all 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 agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed there under or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on the BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the 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 be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 3 (Number) counterparts, each one of which shall be deemed an original, this the 24th day of September, 2025.

ATTEST:

(Principal) Secretary

(SEAL)

(Address)

W.G. HARRELL CONSTRUCTION, LLC
Principal

BY
Warren Harrell, President

498 HWY. 30 EAST, BOONEVILLE, MS 38829
(Address)

Westfield Insurance Company
(Surety)

ATTEST:

(SEAL)

(Witness to Surety) **Stacy Wright, Bond Manager**

5860 Ridgeway Center Pkwy, Ste 300
(Address)

Memphis, TN 38120

BY
Attorney-in-Fact **Michael A. McDaniel, Attorney-in-Fact**

P.O. Box 382007
(Address)

Germantown, TN 38183-2007

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.

COUNTERSIGNATURE

By:
Jenna B. Allen, MS Resident Agent

Bond No. 503511P

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

W.G. HARRELL CONSTRUCTION, LLC
(Name of Contractor)

498 HWY. 30 EAST, BOONEVILLE, MS 38829
(Address of Contractor)

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

Principal, and **Westfield Insurance Company**
(Name of Surety)

P.O. Box 5001, Westfield Center, OH 44251-5001
(Address of Surety)

hereinafter called Surety, and held and firmly bound unto

CITY OF TUPELO
(Name of Owner)

71 EAST TROY STREET, TUPELO, MS 38804
(Address of Owner)

hereinafter called OWNER, in the penal sum of Five Hundred and Fourteen Thousand, Eight Hundred and Sixty-Seven 00/100---------- Dollars ($ 514,867.00-----) 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 24th day of September, 2025, a copy of which is hereto attached and made a part hereof for the construction of:

TOWN CREEK EROSION CONTROL BRIDGE NO. 206 REBID

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due to 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 agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed there under or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on the BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the 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 be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 3 (Number) counterparts, each one of which shall be deemed an original, this the 24th day of September, 2025.

ATTEST:

(Principal) Secretary

(SEAL)

W.G. HARRELL CONSTRUCTION, LLC
Principal

BY
Warren Harrell, President

498 HWY. 30 EAST, BOONEVILLE, MS 38829
(Address)

Westfield Insurance Company
(Surety)

ATTEST
(SEAL)

(Witness to Surety) **Stacy Wright, Bond Manager**

5860 Ridgeway Center Pkwy, Ste 300
(Address)

Memphis, TN 38120

BY
Attorney-in-Fact **Michael A. McDaniel, Attorney-in-Fact**

P.O. Box 382007
(Address)

Germantown, TN 38183-2007

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.

COUNTERSIGNATURE

By:
Jenna B. Allen, MS Resident Agent

General
Power
of Attorney

CERTIFIED COPY

POWER NO. **4113612 01**

Westfield Insurance Co.
Westfield National Insurance Co.
Ohio Farmers Insurance Co.

Westfield Center, Ohio

Know All Men by These Presents, That WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY, corporations, hereinafter referred to individually as a "Company" and collectively as "Companies," duly organized and existing under the laws of the State of Ohio, and having its principal office in Westfield Center, Medina County, Ohio, do by these presents make, constitute and appoint

MICHAEL A. MCDANIEL, RICHARD H. WHITLEY, JOINTLY OR SEVERALLY

of **MEMPHIS** and State of **TN** its true and lawful Attorney(s)-in-Fact, with full power and authority hereby conferred in its name, place and stead, to execute, acknowledge and deliver **any and all bonds, recognizances, undertakings, or other instruments or contracts of suretyship**.

LIMITATION: THIS POWER OF ATTORNEY CANNOT BE USED TO EXECUTE NOTE GUARANTEE, MORTGAGE DEFICIENCY, MORTGAGE GUARANTEE, OR BANK DEPOSITORY BONDS.

and to bind any of the Companies thereby as fully and to the same extent as if such bonds were signed by the President, sealed with the corporate seal of the applicable Company and duly attested by its Secretary, hereby ratifying and confirming all that the said Attorney(s)-in-Fact may do in the premises. Said appointment is made under and by authority of the following resolution adopted by the Board of Directors of each of the WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY:

"Be It Resolved, that the President, any Senior Executive, any Secretary or any Fidelity & Surety Operations Executive or other Executive shall be and is hereby vested with full power and authority to appoint any one or more suitable persons as Attorney(s)-in-Fact to represent and act for and on behalf of the Company subject to the following provisions:

The Attorney-in-Fact. may be given full power and authority for and in the name of and on behalf of the Company, to execute, acknowledge and deliver, any and all bonds, recognizances, contracts, agreements of indemnity and other conditional or obligatory undertakings and any and all notices and documents canceling or terminating the Company's liability thereunder, and any such instruments so executed by any such Attorney-in-Fact shall be as binding upon the Company as if signed by the President and sealed and attested by the Corporate Secretary."

"Be it Further Resolved, that the signature of any such designated person and the seal of the Company heretofore or hereafter affixed to any power of attorney or any certificate relating thereto by facsimile, and any power of attorney or certificate bearing facsimile signatures or facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached." (Each adopted at a meeting held on February 8, 2000).

In Witness Whereof, WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY have caused these presents to be signed by their **Senior Executive** and their corporate seals to be hereto affixed this **19th** day of **OCTOBER** A.D., **2009** .

Corporate Seals Affixed

WESTFIELD INSURANCE COMPANY
WESTFIELD NATIONAL INSURANCE COMPANY
OHIO FARMERS INSURANCE COMPANY

By: **Richard L. Kinnaird, Jr.**, *Senior Executive*

State of Ohio
County of Medina ss.:

On this **19th** day of **OCTOBER** A.D., **2009** , before me personally came **Richard L. Kinnaird, Jr.** to me known, who, being by me duly sworn, did depose and say, that he resides in **Medina, Ohio;** that he is **Senior Executive** of WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY, the companies described in and which executed the above instrument; that he knows the seals of said Companies; that the seals affixed to said instrument are such corporate seals; that they were so affixed by order of the Boards of Directors of said Companies; and that he signed his name thereto by like order.

Notarial Seal Affixed

William J. Kahelin, Attorney at Law, *Notary Public*
My Commission Does Not Expire (Sec. 147.03 Ohio Revised Code)

State of Ohio
County of Medina ss.:

I, **Frank A. Carrino,** Secretary of WESTFIELD INSURANCE COMPANY, WESTFIELD NATIONAL INSURANCE COMPANY and OHIO FARMERS INSURANCE COMPANY, do hereby certify that the above and foregoing is a true and correct copy of a Power of Attorney, executed by said Companies, which is still in full force and effect; and furthermore, the resolutions of the Boards of Directors, set out in the Power of Attorney are in full force and effect.

In Witness Whereof, I have hereunto set my hand and affixed the seals of said Companies at Westfield Center, Ohio, this **24th** day of **September** A.D., **2025** .

Frank A. Carrino, *Secretary*

BPOAC2 (combined) (06-02)

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/06/2025

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER McDaniel-Whitley, Inc. P.O. Box 382007 Memphis TN 38183-2007	**CONTACT NAME:** Sofia Gibson **PHONE (A/C, No, Ext):** (901) 881-6464 **FAX (A/C, No):** (901) 881-6467 **E-MAIL ADDRESS:** sgibson@mcwins.com
INSURED WG Harrell Construction, LLC 600 James Otis Smith Dr Walnut MS 38683	**INSURER(S) AFFORDING COVERAGE** — **NAIC #** **INSURER A :** National Trust Insurance Company — 20141 **INSURER B :** Brierfield Insurance Company — 10993 **INSURER C :** FCCI Insurance Company — 10178 **INSURER D :** Mid Continent Casulty **INSURER E :** **INSURER F :**

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC [ ] OTHER:	Y	Y	CPP10009505701	09/06/2025	09/06/2026	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 100,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
B	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [ ] HIRED AUTOS ONLY [ ] NON-OWNED AUTOS ONLY	Y	Y	CA10009505601	09/06/2025	09/06/2026	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
C	[X] UMBRELLA LIAB [X] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [X] RETENTION $ 10,000	Y		UMB10009505901	09/06/2025	09/06/2026	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: N If yes, describe under DESCRIPTION OF OPERATIONS below	N / A	Y	WC010009505801	09/06/2025	09/06/2026	[X] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
D	OCP			04OCP002009025	10/06/2025	10/06/2026	Aggregate Limit Each Occurence	2,000,000 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Project: Town Creek Erosion Control Bridge No. 206 Rebid
City of Tupelo, Cook Coggins Engineers, Inc, and Owner(s) are listed as Additional Insured as respects to General Liability – ongoing & completed operations and Auto Liability per written contract subject to company terms and conditions. Coverage is primary and non-contributory as required by written contract. A Waiver of Subrogation applies in favor of the Additional Insureds as respects to General Liability, Auto Liability, and Workers Compensation per written contract where allowed by law. Umbrella follows form over General Liability, Auto Liability & Workers Compensation.

CERTIFICATE HOLDER

Cook Coggins Engineers, Inc.
703 Crossover Road
Tupelo MS 38801

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

McKenzie Hill

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/06/2025

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Sofia Gibson	
McDaniel-Whitley, Inc. P.O. Box 382007 Memphis TN 38183-2007	PHONE (A/C, No, Ext): (901) 881-6464	FAX (A/C, No): (901) 881-6467
	E-MAIL ADDRESS: sgibson@mcwins.com	

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
WG Harrell Construction, LLC 600 James Otis Smith Dr Walnut MS 38683	INSURER A : National Trust Insurance Company	20141
	INSURER B : Brierfield Insurance Company	10993
	INSURER C : FCCI Insurance Company	10178
	INSURER D : The Hanover Insurance Company	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC [ ] OTHER:	Y	Y	CPP10009505701	09/06/2025	09/06/2026	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 100,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
B	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [ ] HIRED AUTOS ONLY [ ] NON-OWNED AUTOS ONLY	Y	Y	CA10009505601	09/06/2025	09/06/2026	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
C	[X] UMBRELLA LIAB [X] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [X] RETENTION $ 10,000	Y		UMB10009505901	09/06/2025	09/06/2026	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: N If yes, describe under DESCRIPTION OF OPERATIONS below	N / A	Y	WC010009505801	09/06/2025	09/06/2026	[X] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
D	Builders Risk			IH5M17493200	10/06/2025	10/06/2026	Limit Deductible	514,867 2,500

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Project: Town Creek Erosion Control Bridge No. 206 Rebid
City of Tupelo, Cook Coggins Engineers, Inc, and Owner(s) are listed as Additional Insured as respects to General Liability – ongoing & completed operations and Auto Liability per written contract subject to company terms and conditions. Coverage is primary and non-contributory as required by written contract. A Waiver of Subrogation applies in favor of the Additional Insureds as respects to General Liability, Auto Liability, and Workers Compensation per written contract where allowed by law. Umbrella follows form over General Liability, Auto Liability & Workers Compensation.

CERTIFICATE HOLDER

Cook Coggins Engineers, Inc.
703 Crossover Road
Tupelo MS 38801

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

McKenzie Hill

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, ***BEN LOGAN***, the duly authorized and acting legal representative of the ***CITY OF TUPELO***, do hereby certify as follows:

I have examined the attached contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements are adequate and have 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 agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

_____ Date: _____

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	
INSURED	INSURER A :	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
	☐ ☐ CLAIMS-MADE ☐ OCCUR						MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
							GENERAL AGGREGATE	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$
	☐ POLICY ☐ PRO-JECT ☐ LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	☐ **UMBRELLA LIAB** ☐ OCCUR						EACH OCCURRENCE	$
	☐ **EXCESS LIAB** ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						☐ WC STATU-TORY LIMITS ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ **(Mandatory in NH)**	N / A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

INDEX TO GENERAL CONDITIONS

GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

Acceptance: Acceptance by the Engineer of the Work as being in substantial conformance with the Contract Documents and recommendation to the Owner for final inspection.

Final Acceptance: Acceptance by the Owner of the Work as being fully complete in accordance with the Contract Documents (subject to waiver of claims) and final payment made.

Agreement: The written agreement between the Owner and the Contractor covering the Work to be performed; the Contract Documents are attached to and made a part of the Agreement. Also designated as the Contract.

Addenda: Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, Drawings and Specifications, by additions, deletions, clarifications or corrections.

Application for Payment: The form furnished by the Engineer which is to be used by the Contractor in requesting progress payments and an affidavit of the Contractor that progress payments heretofore received from the Owner on account of the Work have been applied by the Contractor to discharge in full all of the Contractor's obligations stated in prior Applications for Payment.

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

Bidder: Any person, firm or corporation submitting a Bid for the Work.

Bonds: Bid, Performance and Payment bonds and other instruments of security, furnished by the Contractor and his surety in accordance with the Contract Documents and in accordance with the law of the place of the project.

Change Order: A written order to the Contractor signed by the Owner authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time issued after execution of the Agreement.

Contract Documents: The Contract Agreement, Addenda, Information for Bidders, Bid, Bonds, Notice of Award, these General Conditions, Supplementary General Conditions, Specifications, Drawings and Modifications, and Notice to Proceed.

Contract Price: The total moneys payable to the Contractor under the Contract Documents.

Contract Time: The number of calendar or working days stated in the Agreement for the completion of the Work.

Contracting Officer: The individual who is authorized to sign the Contract Documents on behalf of the Owner's governing body.

Contractor: The person, firm or corporation with whom the Owner has executed the Agreement.

Day: A calendar day of twenty-four hours measured from midnight to the next midnight.

Drawings: The construction plans which show the character and scope of the Work to be performed and which have been prepared or approved by the Engineer and are referred to in the Contract Documents.

Engineer: The person, firm or corporation named as such in the Contract Documents.

Modification: (a) A written amendment of the Contract Documents signed by both parties, (b) a Change Order, (c) a written clarification or interpretation issued by the Engineer in accordance with paragraph 9.3 or (d) a written order for a minor change or alteration in the Work issued by the Engineer pursuant to paragraph 10.2. A Modification may only be issued after execution of the Agreement.

Notice to Proceed: A written notice given by Owner to Contractor (with a copy to Engineer) fixing the date on which the Contract Time will commence to run and on which Contractor shall start to perform his obligations under the Contract Documents.

Owner: The public body or authority, corporation, association, partnership, or individual for whom the Work is to be performed.

Project: The entire construction to be performed as provided in the Contract Documents.

Project Representative: An authorized representative of the Engineer assigned to observe the Work performed and materials furnished by the Contractor or such other person as may be appointed by the Owner as his representative.

Samples: Physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

Shop Drawings: All drawings, diagrams, illustrations, brochures, performance charts, schedules and other data which are prepared by the Contractor, a Subcontractor, manufacturer, supplier or distributor and which illustrate the equipment, material or some portion of the Work and as required by the Contract Documents.

Specifications: Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work. This will include general specifications and item (technical) specifications.

Standards: The following words, symbols, letters, or abbreviations shall be deemed to have the following meaning and shall refer to the latest current revision of said standard or specification applicable in effect of the date of opening bids:

AASHTO - American Association of State Highway and Transportation Officials
ACI - American Concrete Institute
AIA - American Insurance Association (formerly National Board of Fire Underwriters
ANSI - American National Standards Institute
ASME - American Society of Mechanical Engineers
ASTM - American Society for Testing Materials
AWWA - American Water Works Association
NEMA - National Electrical Manufacturer's Association
NEC - National Electrical Code

Subcontractor: An individual, firm or corporation having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the site.

Substantial Completion: The date as certified by written notice by the Engineer at which time the Work (or a specified part thereof) has progressed to the point where, in the opinion of the 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 purpose for which it is intended; or if there be no such certification, the date when final payment is due in accordance with paragraph 14.9. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion.

Supplier: Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.

Surety: The corporate body which is bound with the Contractor and which engages to be responsible for the Contractor and his acceptable performance of the Work.

Work: Any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by Contractor under the Contract Documents, including all labor, materials, equipment and other incidentals, and the furnishing thereof.

Written Notice: The term "Notice" as used herein shall mean and include all written notice required to obtain compliance with Contract requirements. Written notice shall be deemed to have been duly served if 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 to an authorized representative of such individual, firm or corporation, or if delivered at or sent by mail to the last business address known to him who gives the notice. Unless otherwise stated in writing, any notice to or demand upon the Owner under this Contract shall be delivered to the Owner through the Engineer.

ARTICLE 2 - PRELIMINARY MATTERS

Award:

2.1 The award of the Contract, if it is awarded, will be to the lowest or best responsible, responsive Bidder. No Notice of Award will be given until the Owner has concluded such investigations as he deems necessary to establish the responsibility, qualifications and financial ability of the Bidders to do the Work in accordance with the Contract Documents to the satisfaction of the Owner within the time prescribed. The Owner reserves the right to reject the Bid of any Bidder who does not pass such investigation to the Owner's satisfaction. In analyzing Bids, the Owner may take into consideration alternates and unit prices, if requested by the Bid forms.

Execution of Agreement:

2.2 At least three counterparts of the Agreement and such other Contract Documents as practicable will be executed and delivered by Contractor to the Owner within 10 days of receipt by the Contractor.

Forfeiture of Bid Security:

2.3 Failure of the successful Bidder to execute and deliver the Agreement and deliver the required Bonds as stipulated in paragraph 2.2 shall be just cause for the Owner to annul the Notice of Award and declare the Bid and any security therefore forfeited.

Contractor's Pre-Start Representations:

2.4 Contractor represents that he has familiarized himself with, and assumes full responsibility for having familiarized himself with, the nature and extent of the Contract Documents, Work, locality, easements and rights-of-way obtained, adjacent properties upon which easements have not been obtained, and with all local conditions and federal, state and local laws, ordinances, rules and regulations that may in any manner affect performance of the Work, and represents that he has correlated his study and observations with the requirements of the Contract Documents. Contractor also represents that he has studied the Drawings and Specifications and made such additional surveys and investigations as he deems necessary for the performance of the Work at the Contract Price in accordance with

the requirements of the Contract Documents and that he has correlated the results of all such data with the requirements of the Contract Documents.

Commencement of Contract Time:

2.5 The Contract Time will commence to run on the date stated in the Notice to Proceed.

Starting the Project:

2.6 Contractor shall start to perform his obligations under the Contract Documents on the date when the Contract Time commences to run.

Before Starting Construction:

2.7 Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. He shall at once report in writing to Engineer any conflict, error or discrepancy which he may discover.

Schedule of Completion:

2.8 Within 10 days after delivery of the Notice to Proceed by Owner to Contractor, Contractor shall submit to Engineer for review, an estimated progress schedule with earnings indicating the starting and completion dates of the various stages of the Work, and a preliminary schedule of Shop Drawing submissions. The Engineer shall approve this schedule or require revisions thereto within 14 days of its submittal.

2.9 After delivery of the executed Agreement by Owner to Contractor, but before starting the Work at the site, a preconstruction conference may be held to review the above schedules, to establish procedures for handling Shop Drawings and other submissions and for processing Applications for Payment, and to establish a working understanding between the parties as to the Project. Present at the conference will be the Owner or his representative, Engineer, Project Representatives, Contractor and his superintendent.

Qualification of Subcontractors Materialmen and Suppliers:

2.10 Within 14 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 30 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 days of receipt shall constitute an acceptance of such Subcontractor, person or organization. Acceptance of any such Subcontractor, person or organization shall not constitute a waiver of any right of the Owner or the Engineer to reject defective Work, material or equipment, or Work, material or equipment not in conformance with the requirements of the Contract Documents.

2.11 If, prior to the Notice of Award, the Owner or the Engineer has reasonable objection to and refuses to accept any Subcontractor, person or organization listed, the apparent low Bidder may, prior to Notice of Award may submit an acceptable substitute without an increase in his Bid price.

ARTICLE 3: CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS

3.1 It is the intent of the Engineer and Owner through the Specifications and Drawings to describe a complete Project to be constructed in accordance with the Contract Documents. The Contract Documents comprise the entire Agreement between the Owner and the Contractor. They may be altered only by a Modification.

3.2 The Contract Documents are complementary; what is called for by one is as binding as if called for by all. If Contractor finds a conflict, error or discrepancy in the Contract Documents, he shall call it to Engineer's attention in writing at once and before proceeding with the Work affected thereby. The various Contract Documents shall be given precedence, in case of conflict, error or discrepancy, as follows: Addenda, General Specifications, Item (Technical) Specifications, Drawings, Information for Bidders, Supplemental General Conditions, and General Conditions.

3.3 The words "furnish", "furnish and install", "install", and "provide" or words with similar meaning shall be interpreted, unless otherwise specifically stated, to mean "furnish and install complete in place and ready for service".

3.4 Miscellaneous items and accessories which are not mentioned, but which are essential to produce a complete and properly operating installation, or usable structure or plant, providing the indicated function, shall be furnished and installed without change in the Contract Price. Such miscellaneous items and accessories shall be of the same quality standards, including material, style, finish, strength, class, weight and other applicable characteristics, as specified for the major component of which the miscellaneous item or accessory is an essential part, and shall be approved by the Engineer before installation. The above requirement is not intended to include major components not covered by or inferable from the Drawings and Specifications.

3.5 The specifications division are not delineated by trade or by subcontract. Items specified under one division of the specifications shall be furnished, installed and connected as though recited in each division of the specifications.

3.6 The Work of all trades under this Contract shall be coordinated by the Contractor in such a manner as to obtain the best workmanship possible for the entire Project, and all components of the Work shall be installed or erected in accordance with the best practices of the particular trade.

3.7 The Contractor shall be responsible for making the construction of habitable structures under this Contract rainproof, and for making equipment and utility installations properly perform the specified function.

3.8 Manufacturer's literature, when referenced, shall be dated and numbered and is intended to establish the minimum requirements acceptable. Whenever reference is given to codes, or standard specifications or other data published by regulating agencies or accepted organizations, including but not limited to National Electrical Code, applicable State Building Code, Federal Specifications, ASTM Specifications, various institute specifications, and the like, it shall be understood that such reference is to the latest edition including addenda in effect on the date of Bid.

3.9 Brand names where used in the technical specifications, are intended to denote the standard of quality required for the particular material or product. The term "equal" or "equivalent", when used in connection with brand names, shall be interpreted to mean a material or product that is similar and equal in type, quality, size, capacity, composition, finish, color and other applicable characteristics to the material or product specified by trade name, and that is suitable for the same use and capable of performing the same function, in the opinion of the Engineer, as the material or product so specified. Proposed equivalent items must be approved by Engineer before they are purchased or incorporated in the Work. (When a brand name, catalog number, model number, or other identification, is used without the phrase "or equal", or "or equivalent", the Contractor shall use the brand specified.)

ARTICLE 4 - AVAILABILITY OF LANDS AND SUBSURFACE CONDITIONS

Availability of Lands:

4.1 The Owner will furnish, as indicated in Contract Documents, the lands upon which the Work is to be done and such other lands which are designated for the use of the Contractor. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the Owner, unless otherwise specified in the Contract Documents. Other access to such lands or rights-of-way for the Contractor's convenience other than as set forth in easements obtained by the Owner shall be the responsibility of the Contractor. The Contractor will provide for

additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2 The Owner will, upon request, furnish to the BIDDERS copies of all available boundary surveys.

Subsurface Conditions:

4.3 The Contractor acknowledges that he has investigated prior to bidding and satisfied himself as to the conditions affecting the Work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, river stages, tides, water tables or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the Work. The Contractor further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered from an investigation of the site. Failure by the Contractor to acquaint himself with the project site will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work.

ARTICLE 5 - BONDS AND INSURANCE

Performance and Payment Bonds and Certificates of Liability Insurance are NOT REQUIRED for MATERIALS ONLY contracts.

Bonds:

5.1 The Contractor shall within 10 days after the receipt of the Notice of Award furnish the Owner with a performance bond and payment bond in penal sums equal to the amount of the contract price, conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the contract documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the work provided by the contract documents. Such bonds shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the state in which the work is to be performed. The expense of these bonds shall be borne by the Contractor. If at any time a surety on any such bond is declared a bankrupt or loses its right to do business in the state in which the work is to be performed, the Contractor shall, within 10 days after notice from the Owner to do so, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments of the Contract price shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

Contractor's Liability Insurance:

5.2 At all times applicable to this Agreement, Contractor shall procure and maintain, at it's sole expense as a minimum the insurance as listed in 5.5 below. Owner does not represent that insurance coverage and limits listed will be adequate to protect Contractor or Contractor's interests. Insurance shall be obtained from companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. The Contractor shall submit to the Owner, prior to the commencement of the Work, a completed, duly executed and authorized Certificate of Insurance as evidence that the insurance requirements set forth are in full force and effect. Policies providing such coverage shall contain provisions that no cancellation or material changes in the policies shall become effective except on 15 days' advance written notice thereof to the Owner.

5.3 Contractor agrees to require that all policies of insurance which are in any way related to the Work and that are secured and maintained by Contractor or any Subcontractor or Sub-subcontractor will include clauses providing that each underwriter shall waive all of its rights of recovery, under subrogation or otherwise, against owner. Furthermore, Contractor waives and shall cause any Subcontractor or Sub-subcontractor to waive all rights of recovery against Owner, which Contractor or any Subcontractor or Sub-subcontractor may have or acquire because of deductible clauses in, or inadequacy of, limits of any policies of insurance maintained by Contractor. All such policies except for the Worker's Compensation and Employer's Liability insurance, and the Professional/Errors and Omissions coverage insurance, shall designate Owner and Engineer as additional insured/certificate holder.

5.4 Contractor shall cause any Subcontractor or Sub-subcontractor to obtain and maintain insurance consistent with the provisions of this Article and submit an appropriate Certificate of Insurance prior to commencement of any Work.

5.5 SCHEDULE OF INSURANCE

5.5.1 COMMERCIAL GENERAL LIABILITY INSURANCE

Commercial General Liability Insurance, endorsed to provide coverage for: Contractual Liability, particularly the applicable provisions of the indemnity sections of this Agreement; explosion, collapse or structural injury to property of others including underground utility facilities; and Contractor's Protective Liability (if subcontracting is authorized), and Products and Completed Operations (for a minimum of three years discovery period after acceptance of the Work.)

Each Occurrence	$1,000,000
General Aggregate	$1,000,000

5.5.2 COMMERCIAL AUTOMOBILE LIABILITY INSURANCE

Commercial Automobile Insurance which shall include coverage for all owned, non-owned and hired vehicles.

Combined Single Limit $1,000,000 Each Accident

5.5.3 UMBRELLA LIABILITY INSURANCE

Umbrella Liability Insurance with limits of at least $1,000,000 per occurrence for bodily injury or property damage in excess of the limits afforded for Commercial General Liability, Commercial Automobile Liability and Employer's Liability.

5.5.4 WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE

Contractor agrees to comply with Worker's Compensation laws of the state where the Work is performed and maintain a Worker's Compensation and Employer's Liability policy which shall cover all of Contractor's employees engaged in the Work. This policy shall be endorsed to provide: Other states endorsement, voluntary compensation coverage and occupational disease. If the Work is to be performed on or near navigable waters, the policy shall include United States Longshoreman's and Harbor Workers coverage.

Worker's Compensation – Statutory
Employer's Liability – $1,000,000 Each Accident
$1,000,000 Disease – Each Employee
$1,000,000 Disease – Policy Limit

5.5.5 BUILDERS RISK INSURANCE

The Contractor shall maintain property insurance to fully cover the insurable portion of the project for the benefit of the Owner.

5.5.6 PROFESSIONAL/ERRORS AND OMISSIONS COVERAGE

If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

Insurance shall provide a minimum of $1,000,000 of coverage per claim.

5.5.7 OWNER'S AND CONTRACTOR'S PROTECTIVE LIABILITY (OCP)

The Contractor shall maintain an OCP policy with the Owner as Named Insured, with the Engineer named as Additional Insured and Certificate Holder, in a combined single limit of not less than $1,000,000. This policy is to remain in effect until completion and acceptance of the entire project.

Cancellation

5.6 If any insurance should be cancelled or changed by the insurance company or should any insurance expire during the period of this Contract, the Contractor shall be responsible for securing other acceptable insurance to provide the coverage specified in this section to maintain continuous coverage during the life of this Contract.

Please refer to the "SAMPLE" CERTIFICATE OF LIABILITY INSURANCE form that precedes this section.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1 The Contractor will supervise and direct the Work. He will be solely responsible for the means, methods, techniques, sequences, procedures and safety of construction. The Contractor will employ and maintain on the Work a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site. The supervisor shall have full authority to act on behalf of the Contractor and all communications given to the supervisor shall be as binding as if given to the Contractor. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.

Labor, Materials and Equipment:

6.2 The Contractor will provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. He will at all times maintain good discipline and order at the site.

6.3 The Contractor will furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, local telephone, water and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of the Work.

6.4 All materials and equipment will be new, except as otherwise provided in the Contract Documents. When special makes or grades of material which are normally

packaged by the supplier or manufacturer are specified or approved, such materials shall be delivered to the site in their original packages or container with seals unbroken and labels intact.

6.5 All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator or processors, except as otherwise provided in the Contract Documents.

6.6 Stored Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the work. Stored materials and equipment to be incorporated in the work shall be located so as to facilitate prompt inspection.

6.7 Inspection and testing of all materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the Contract Documents.

6.7.1 The Owner shall provide all inspection and testing services not required by the Contract Documents. The Contractor shall provide at his expense the testing and inspection services required by the Contract Documents.

6.7.2 If the Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any work to specifically be inspected, tested, or approved by someone other than the Contractor, the Contractor will give them timely notice of readiness. The Contractor will then furnish the Engineer the required certificates of inspection, testing or approval.

6.7.3 Inspections, tests or approvals by the Engineer or others shall not relieve the Contractor from his obligations to perform the work in accordance with the requirements of the Contract Documents.

6.8 Plans are drawn and the Specifications are written naming certain brands of specialized equipment or products. Brand names so cited are cited for the purpose of establishing the quality desired.

6.8.1 The brands of items of equipment listed in these specifications are hereby designated to be the basic brands. Bidders shall submit a price for furnishing and installing the lowest quoted basic brand or approved alternate brand of each major product or equipment items in the base bid.

6.8.2 As the Owner is interested in obtaining the lowest practical cost and encouraging competition, a price may be offered based on any alternate brand which the bidder determines to be equal to the basic brand. Bidder shall clearly identify the alternate brand for each item proposed as an equal for the basic brand item on the Bid Form. The Owner will approve alternate brands offered by the Bidder provided the alternate item is determined by the Owner to be equal to

the basic item specified. If no basic or alternate brands are identified then the bid is presumed to be based on the basic brands.

Owner will evaluate alternate brands offered and may accept any, all or none of the items prior to executing the contract agreement.

6.8.3 A complete set of supporting data shall be submitted with the bid for each alternate item to support the claim that it is equal to basic brand. Sufficient data, including horsepower or energy requirements, performance, operation and maintenance, manpower and supply requirements shall be submitted in order for the Owner to evaluate the equality of the offered product or equipment. Any variance with the specifications shall be listed and failure to do so may be grounds for rejection of the alternate item. Bids submitted based on incorporating alternative products or equipment without providing the supporting data as set out will be deemed non-responsive.

6.8.4 Submittals shall include complete design calculations including the effect substituted equipment or materials will have on all affected system processes. If the proposed substituted equipment or materials will require a change in any buildings, structures, piping, controls, work, etc., the submittal shall include detailed sketches and specifications of the necessary changes. Submittals shall also include an up-to-date list of at least five present users of the proposed items including names, addresses, and present municipal users of the proposed items including names, addresses and telephone numbers. The submission of insufficient data to determine equality as set out herein shall be sufficient grounds for rejection of the alternate item and the bid being deemed non-responsive.

6.8.5 The cost of any change in structure, locations, connections, etc., necessary for any alternate brand accepted shall be borne by the Contractor, as well as the cost of revision of the Drawings and Specifications.

6.8.6 No alternate equipment or materials will be considered unless the Manufacturer offers documented proof that the alternate items have been in general usage in similar applications for at least the two preceding years.

6.8.7 Submittals will be compared for equality by evaluating the life cycle cost including cost of modifications and redesign, the compatibility of the item offered with other items, the service experience record of the manufacturers or suppliers in attending to requests for repairs/parts by Owner and reliability of offered items in performing intended functions. Where the offeror does not have a two year experience record, substitute items may be considered provided the offeror furnishes a five year bond which guarantees replacement of the item in the event of failure as judged by the Engineer, in an amount equal to purchase price plus the actual cost of removal and re-installation.

6.8.8 The determination as to whether or not such alternates are acceptable shall rest solely with the Owner.

6.8.9 Approval by the Owner of alternate equipment or materials shall in no way serve as a guarantee that the equipment or materials will meet the performance and construction requirements as specified herein, and shall not relieve the Contractor from any responsibility or requirements under the contract. It shall be the Contractor's responsibility to produce an efficient product.

6.8.10 Delay caused by obtaining approvals for alternate products, materials or equipment will not be considered justifiable grounds for an extension of Contract Time.

6.8.11 Should any work or materials, equipment or products not conform with requirements of the Contract Documents or become damaged during the progress of the Work, such Work or materials shall be removed and replaced, together with any work disarranged by such alterations, at any time before completion and acceptance of the Project. All such work shall be done at the expense of the Contractor.

6.8.12 No materials or supplies for the Work shall be purchased by the Contractor or by any Subcontractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest is retained by the Seller. The Contractor warrants that he has good title to all materials and supplies used by him in the Work.

Materials, Equipment, Products, and Substitutions:

6.9 Materials, equipment and products incorporated in the Work must be approved for use before being purchased by the Contractor. The Contractor shall submit to the Engineer a list of proposed materials, equipment or products, together with such samples as may be necessary for the Engineer to determine their acceptability and obtain the Engineer's approval. No request for payment for substitute materials, equipment or product will be approved until this list has been received and approved by the Owner.

Concerning Subcontractors:

6.10 The Contractor will not employ any Subcontractor, other person or organization of the types referred to in paragraph 2.11 (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 any Subcontractor against whom he has reasonable objection. The Contractor will not make any substitution for any Subcontractor who has been accepted by the Owner and the Engineer, unless the Engineer determines that there is good cause for doing so.

6.11 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 contractual relationship between Owner or Engineer and any Subcontractor or other person or organization having a direct contract with Contractor, nor shall it create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any Subcontractor or other person or organization, except as may otherwise be required by law. Owner or Engineer may furnish to any Subcontractor or other person or organization, to the extent practicable, evidence of amounts paid to Contractor on account of specific Work done in accordance with the Application of Payment.

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

6.13 The Contractor agrees to bind specifically every Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the Owner.

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

6.15 The Contractor shall be responsible for the coordination of the trades, Subcontractors and materialmen engaged upon his Work.

6.15.1 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 any subcontract that the Owner may exercise over the Contractor under any provisions of the Contract Documents.

6.15.2 The Owner or Engineer will not undertake to settle any differences between the Contractor and his Subcontractors or between Subcontractors.

6.15.3 Not withstanding 6.15.2 above, if in the opinion of the Engineer, any Subcontractor on the Project proves to be incompetent or otherwise unsatisfactory, he shall be replaced if and when directed in writing.

6.15.4 The Contractor shall not award work to Subcontractors in excess of fifty (50%) percent of the contract value, without prior approval of the Owner.

Patent Fees and Royalties:

6.16 The Contractor will pay all license fees and royalties and assume all costs incident to the use of any invention, design, process or device which is the subject of patent rights or copyrights held by others. He will indemnify and hold harmless the Owner and the Engineer and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorneys' fees) arising out of any infringement of such rights during or after completion of the Work, and shall defend all such claims in connection with any alleged infringement of such rights.

6.17 The Contractor shall be responsible for determining the application of patent rights and royalties on materials, appliances, articles or systems prior to bidding. However, the Contractor shall not be responsible for such determination on systems which do not involve purchase by him of materials, appliances and articles.

Permits:

6.18 The Contractor will secure and pay for all construction permits and licenses and will pay all governmental charges and inspection fees necessary for the prosecution of the Work. The Owner shall assist the Contractor, when necessary, in obtaining such permits and licenses.

Electric Power and Lighting:

6.19 Electrical power as required during construction shall be provided by the Contractor at the Contractor's expense. Lighting shall be provided by the Contractor in all spaces at all times where necessary for good and proper workmanship, for inspection or for safety. No temporary power shall be used off temporary lighting lines without specific approval of the Owner. The Contractor will also pay all public utility charges.

Laws and Regulations:

6.20 The Contractor will give all notices and comply with all laws, ordinances, rules and regulations applicable to the WORK. If the Contractor observes that the Specifications or Drawings are at variance therewith, the Contractor will give the Engineer prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate Modification. If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Engineer, the Contractor will bear all costs arising therefrom; however, it shall not be the Contractor's primary responsibility to make certain that the Drawings and Specifications are in accordance with such laws, ordinances, rules and regulations.

Taxes:

6.21 Cost of all sales and other taxes for which the Contractor is liable under the Contract shall be included in the Contract Price stated by the Contractor.

Record Drawings:

6.22 The Contractor will keep one record copy of all Specifications, Drawings, Addenda, Modifications, and Shop Drawings at the site.

6.22.1 The Engineer shall furnish the Contractor a set of Drawings and Specifications for the Contractor to record the details of and changes to the Work as the work progresses. The Contractor shall keep the Record Drawings current and shall not cover or conceal any Work until the required information has been recorded. Record Drawings are considered an integral part of the Work and the Work will not be deemed to be complete, on schedule or satisfactory until the Record Drawings are provided. The Contractor shall furnish Record Drawings to the Engineer prior to the submission of the final application for payment.

6.22.2 In addition to the location and limits of all unit priced and lump sum pay items, the following items shall be recorded on the Record Drawings:

1. Depths of various elements in relation to datum.
2. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
3. Location of internal appurtenances concealed in construction with reference to visible and accessible features of the work.
4. Field changes of dimension and detail.
5. Changes made by Modification.
6. Details not on original Contract Drawings.
7. Locations of plugged openings for future connections.

6.22.3 Specifications and Addenda shall be legibly marked up to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
2. Changes made by Modification.
3. Other pertinent matters not originally specified.

Safety and Protection:

6.23 The Contractor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to:

6.23.1 All employees on the Work and other persons who may be affected thereby,

6.23.2 All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and

6.23.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

6.24 The Contractor will designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Owner.

Emergencies:

6.25 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 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 by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

Shop Drawings, Samples and Other Submittals:

6.26 The Contractor shall submit to the Engineers, prior to the start of construction, detailed shop drawings and/or layouts of all manufactured or shop fabricated equipment, product samples and related information that he contemplates to furnish under this contract.

6.27 Shop Drawing / Sample Submittal Requirements

6.27.1 Shop drawings submitted to the Engineer shall bear the Contractor's stamp of approval certifying that they have been checked for conformance with the requirements of the contract documents. The Engineer will return any shop drawings submitted without this certification for re-submission. Shop drawings bearing the Contractor's certification which, in the Engineer's opinion are incomplete, contain numerous errors, have not been checked or only checked superficially, will be also be returned by the Engineer for re-submission.

6.27.2 Shop Drawings /Submittals must be complete, properly identified with the name of the project, dated, and each lot submitted must be accompanied by a letter of transmittal referring to the name of the project and to the

specification division and/or page number and referenced to the construction drawing number or sheet for identification of each item. Shop drawings for each type of work shall be numbered consecutively and the numbering system shall be retained throughout all revisions. The sequential numbering system shall be used as the basis for maintaining a log suitable to tracking the submittal process.

6.27.3 Shop Drawings/Submittals shall be provided both printed on paper and in digital format (PDF) on CD.

6.27.4 Paper for printed copies shall be on standard paper. Text shall be on 8-1/2 inches x 11-inches. Drawings shall not be larger than 11-inches x 17-inches and shall be neatly folded to standard size. Printed copies shall be organized with a table of contents and bound in sections as appropriate and the sections shall be identified using indexed tabs. Provide seven (7) printed copies of each. The Engineer will retain three (3) copies, two (2) copies for the Engineer's use in the field and one (1) copy for the Owner's use. The balance of the copies provided will be returned to the Contractor.

6.27.5 Digital files shall be in Portable Document Format (PDF) and provided on CD. Filenames for PDFs shall be numbered sequentially as above for the submittal tracking process. Text shall be formatted for printing on 8-1/2 inches x 11-inches. Drawings shall be formatted for printing on 11-inches x 17-inches sheets. PDFs shall include a table of contents and be bookmarked the same as for indexed printed copies. Provide two (2) CDs of each.

6.27.6 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 set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

6.28 Shop Drawings shall consist of drawings, diagrams, illustrations, schedules, performances charts, brochures and other data, prepared for a portion of the work. Shop Drawings shall indicate the model numbers, options, type, size, quantity, arrangement, location, mode of operation, component materials and/or material certification, utility connections, wiring and control diagrams, anchorages, supports, performance and test data, factory-applied coatings, and any other information necessary to insure satisfactory fabrication, installation and operation of the completed project. Shop Drawings shall establish the actual detail of manufactured or fabricated items, indicate proper relation to adjoining work, amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.

6.29 The Contractor will also submit to the Engineer for review, with such promptness as to cause no delay in Work, Samples required by the Contract Documents. Samples will have been checked by and stamped with the approval of

the Contractor, identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which intended.

6.30 The Contractor shall thoroughly check all shop drawings for completeness and for compliance with the Contract Documents and shall verify all dimensions and field conditions and shall coordinate the shop drawings with the requirements of all other work related thereto, as required thereto, as required for proper and complete installation of the work. At the time of each submission, the Contractor will in writing state that the shop drawings are in conformance with the Drawings and Specifications or will call the Engineer's attention to any deviations that the Shop Drawings or Sample may have from the requirements of the Contract Documents.

6.31 Where a shop drawing as submitted by the Contractor indicates a departure from the Contract which the Engineer deems to be a minor adjustment in the interest of the Owner not involving a change in contract price or extension of time, the Engineer may review and return the drawing but the Engineer’s review will be made with the understanding that it does not involve any change in the contract price or time and that it is subject generally to all contract stipulations and covenants.

6.32 The Engineer will review with reasonable promptness Shop Drawings and Samples, but his review shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The review of a separate item as such will not indicate review of the assembly in which the item functions. The Contractor will make any corrections required by the Engineer and will return the required number of corrected copies of Shop Drawings and resubmit new Samples until the review is satisfactory to the Engineer. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections called for by the Engineer on previous submissions. The Contractor's stamp of approval on any Shop Drawing or Sample shall constitute a representation to the Owner and the Engineer that the Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalogue numbers and similar data or he assumes full responsibility for doing so, and that he has reviewed or coordinated each Shop Drawing or Sample with the requirements of the Work and the Contract Documents.

6.33 In the event a third submittal of Shop Drawings is required, due to previous submittals of incomplete or incorrect Shop Drawings not in accordance with the Drawings and Specifications, the Contractor will be charged the cost incurred by the Engineer for the review of the third and all subsequent submittal reviews. The Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

6.34 If a shop drawing involves a change in structures, connections, etc., then the cost of changing structures, connections, etc., as well as plans and specifications to accommodate the item shall be borne by the Contractor. The Owner will impose a set-off against payments due to Contractor to secure reimbursement for such charges

unless the need for such change is beyond the control of Contractor.

6.35 No work requiring Shop Drawing or Sample submission shall be commenced until the submission has been reviewed by the Engineer. A copy of each Shop Drawing and each Sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.

6.36 The Engineer's review of Shop Drawings or Samples shall not relieve the Contractor from his responsibility for any deviations from the requirements of the Contract Documents nor shall any review by the Engineer relieve the Contractor from responsibility for errors or omissions in the Shop Drawings.

Cleaning Up:

6.37 Site. The Contractor shall clean up behind the Work as much as is reasonably possible as the Work progresses. Upon completion of the Work, and before acceptance of and final payment for the Project by the Owner, the Contractor shall remove all surplus and discarded materials, excavated material and rubbish from the roadways, sidewalks, parking areas, lawns and all adjacent property; shall clean his portion of Work involved in any building under this Contract, so that no further cleaning by the Owner is necessary prior to his occupancy; shall restore all property, both public and private, which has been disturbed or damaged during the prosecution of the Work to substantially the same condition as existed prior to the work; and shall leave the whole in a neat and presentable condition.

6.38 Structures. Clean-up operations shall consistently be carried on by the Contractor at all times to keep the premises free from accumulation of waste materials and rubbish. Upon completion of the Work he shall remove all rubbish, tools, scaffolding, surplus materials, etc., from the structure and shall leave his work "broom clean", or its equivalent, unless more exactly specified elsewhere in the Contract. The Contractor shall do the following special cleaning for all trades upon completion of the Work:

6.38.1 Remove putty stains and paint from and wash and polish all glass.

6.38.2 Remove all marks, stains, and other soil and dirt from finished concrete, painted, stained and decorated work.

6.38.3 Remove all temporary protections and clean and polish floors in buildings.

6.38.4 Clean and polish all hardware.

6.39 Withholding Payment. Cleaning up is considered to be an integral, important and necessary function of each item of work. Where work on unit price items are substantially complete but lack clean-up and/or corrections ordered by the Engineer, amounts shall be deducted from unit prices in partial payment estimates to amply

cover such clean-up and corrections. When the clean-up and/or corrections are performed, payment shall be made for amounts withheld.

6.40 General. In case of dispute, the Owner may remove the rubbish and charge the cost to the Contractor.

Public Convenience and Safety:

6.41 The Contractor shall, at all times, conduct the Work in such a manner as to insure the least practicable obstruction to public travel. The convenience of the general public and of the residents along and adjacent to the area of the Work shall be provided for in a satisfactory manner, consistent with the operation and local conditions. "Street Closed" signs shall be placed immediately adjacent to the Work, in a conspicuous position, at such locations as traffic demands. At any time that streets are required to be closed, the Contractor shall notify law enforcement agencies, fire departments, and parties operating emergency vehicles before the street is closed and again as soon as it is opened. Access to fire hydrants and other fire extinguishing equipment shall be provided and maintained at all times. The Contractor shall, at all times, maintain proper access to the dwellings and/or businesses located on the private properties adjacent to the Project as required by, and in compliance with, the utility and construction easements acquired from the owners of said properties.

Sanitary Provisions:

6.42 The Contractor shall furnish necessary toilet conveniences, secluded from public observation, for use of all personnel on the Work, whether or not in his employ. They shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the public authorities having jurisdiction. He shall commit no public nuisance. Temporary sanitary facilities shall be removed upon completion of the Work and the premises shall be left clean.

Indemnification:

6.43 The Contractor shall indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against any and all liability of every nature, kind and character which may be incurred in connection with the performance or fulfillment of the Work or such other liability resulting from negligence or otherwise on the part of the Contractor, including but not limited to injury to persons and damage to properties, and the structures and improvements thereon, adjacent to the Project, and shall indemnify and hold harmless the Owner and the Engineer from all costs and damages, including attorney's fees, which may be suffered by reason of the failure to fully and completely perform under the Contract Documents and shall fully reimburse Owner and the Engineer for all expenditures of every kind, character and description, including attorney's fees, which may be incurred by Owner and

Engineer in making good any and every default which may exist on the part of the Contractor in connection with its performance under the Contract Documents.

Responsibility for Connecting to Existing Work:

6.44 It shall be the express responsibility of the Contractor to connect his Work to each part of the existing work or work previously installed as required by the Drawings and Specifications to provide a complete installation.

Work in Street, Highway and Other Rights-of-Way:

6.45 Excavation, grading, fill, storm drainage, paving and any other construction or installations in rights-of-way of streets, highways, public carrier lines, utility lines (either aerial, surface or subsurface), etc., shall be done in accordance with requirements of the owners thereof. The Owner will be responsible for obtaining permits necessary for the work.

6.46 The Contractor, at his own expense, shall be required to maintain the streets and thoroughfares disturbed in a passable condition providing means of ingress and egress to persons residing and/or by the Work, conducting business thereon specifically, but not by way of limitation, the Contractor shall maintain proper access to the dwellings and/or businesses located on the property adjacent to the Project at all times during the Project as is provided in the utility and construction easements obtained from the owners of said adjacent property.

6.46.1 The Contractor shall provide additional earth backfill or additional surfacing materials for excavation and/or trenches in streets or thoroughfares, if and when the shrinkage sets in, and shall shape and re-shape and grade and re-grade as, in the opinion of the Engineer, is necessary to maintain all thoroughfares disturbed in good condition from the time of initial excavation to the date of final acceptance. In general, the Contractor shall not be required to construct or maintain detours, or to maintain streets disturbed beyond the date of final acceptance of the work.

6.46.2 The Contractor shall provide facilities on a 24 hour, 7 day basis for pulling out vehicles bogged down due to his operations.

6.46.3 At all times, while the work is in progress the Contractor shall take precautions for the protection of all public by placing and maintaining adequate flagmen, barricades, red flags and/or lights, at locations where streets and public thoroughfares have been disturbed by excavations.

Cooperation with Governmental Departments, Public Utilities, Etc.:

6.47 The Contractor shall be responsible for making all necessary arrangements with governmental departments, public utilities, public carriers, service companies and

corporations owning or controlling roadways, railways, water, sewer, gas, electrical, telephone, and telegraph facilities such as pavements, tracks, piping, wires, cables, conduits, poles, guys, etc., including incidental structures connected therewith, that are encountered in the Work in order that such items may be properly shored, supported and protected. The Contractor shall give all proper notices, shall comply with requirements of such parties in the performance of his Work, shall permit entrance of such parties on the Project in order that they may perform their necessary work, and shall pay all charges and fees made by such parties for this work.

6.47.1 The Contractor's attention is called to the fact that there may be delays on the Project due to work to be done by governmental departments, public utilities, and others in repairing or moving poles, conduits, etc. The Contractor shall cooperate with the above parties, in every way possible, so that the construction can be completed in the least possible time.

6.47.2 The Contractor shall have made himself familiar with all codes, laws, ordinances and regulations which in any manner affect those engaged or employed in the Work, or materials and equipment used in or upon the Work, or in any way affect the conduct of the Work, and no plea of misunderstanding will be considered on account of his ignorance thereof.

Public Convenience and Premises:

6.48 Contractor shall confine his apparatus, storage of materials, and operations of his workmen to limits indicated by law, ordinances, permits, and shall not unnecessarily encumber any part of site.

6.48.1 Contractor shall not overload or permit any part of any structure to be loaded with such weight as will endanger its safety, nor shall he subject any part of the Work to stresses or pressures that will endanger it.

6.48.2 Contractor shall arrange and cooperate with the Owner in routing and parking of automobiles of his employees, Subcontractors and other personnel, and in routing material delivery trucks and other vehicles to the Project site.

Protection of Existing Property Improvements:

6.49 Any existing surface or subsurface improvements, such as pavements, curbs, sidewalks, pipes or utilities, footings, or structures (including portions thereof), trees and shrubbery, not indicated on the Drawings or noted in the Specifications as being removed or altered shall be protected from damage during construction of the Project. Any such improvements damaged during construction of the Project shall be restored to a condition equal to that existing at time of award of Contract at the Contractor's expense.

6.49.1 The existence of, and location of some of the known utilities and obstructions are indicated on the plans but are not guaranteed. The Contractor shall, in addition to the requirements provided in Section 6.47, make sufficient investigation and inspections, at the site of the work, to enable him to determine the existence of and exact nature and location of all such drainage structures, underground and overhead obstructions, fences, and public and private utilities that will be disturbed in the prosecution of the work. The Contractor shall repair or replace such utilities and improvements which are damaged by his operations so as to function properly, at his own expense and in a manner and condition equal to that of such utilities and improvements prior to damage. Fences which must be crossed shall be repaired to an "as was" condition.

6.50 Fuel, Energy and Water. The Contractor shall furnish all fuels, electric power and other energies, water and other consumables used in the prosecution of the work including temporary heat to prevent injury from dampness and cold and testing and trial operations until in the opinion of the Engineer, the work or a part thereof, is Substantially Complete and in use by the Owner, at which time the Owner will begin paying power bills for that part. Arrangements shall be made in advance of need with the utilities involved.

6.51 Flood Protection. The Contractor shall assume complete responsibility for construction and protection of work and property from flood damage in flood prone areas.

ARTICLE 7 - WORK BY OTHERS

7.1 The Owner may perform additional work related to the Project by himself, or he may let other direct contracts therefor which shall contain General Conditions similar to these. The Contractor will afford the other contractors who are parties to such direct contracts (or the Owner, if he is performing the additional work himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of work, and shall properly connect and coordinate his Work with theirs.

7.2 If any part of the Contractor's work depends for proper execution or results upon the work of any such other contractor (or the Owner), the Contractor will promptly report to the Engineer in writing any defects or deficiencies in such work that render it unsuitable for such proper execution and results.

7.3 The Contractor will do all cutting, fitting, and patching of his Work that may be required to make its several parts come together properly and fit it to receive or be received by such other work. The Contractor will not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of the Engineer and of the other contractors whose work will be affected.

7.4 Cooperation is required in the use of site facilities and in the detailed execution of the Work. Each contractor shall coordinate his operations with those of the other contractors for the best interest of the Work in order to prevent delay in the execution thereof.

7.5 Each contractor shall keep himself informed of the progress of the work of other contractors. Should lack of progress or defective workmanship on the part of other Contractors interfere with his operations, the Contractor shall notify the Engineer immediately. Lack of such notice to the Engineer will be construed as acceptance by the Contractor of the status of the work of other contractors as being satisfactory for proper coordination of his own Work.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.1 The Owner will issue all communications to the Contractor through the Engineer.

8.2 The Owner shall have the right to take possession of and use any completed or partially completed portions of the Work, notwithstanding the fact that the time for completing the entire Work or any portion thereof may not have expired; but such taking possession and use shall not be deemed an acceptance of any Work not completed in accordance with the Contract Documents.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

9.1 The Engineer shall be the Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of the Engineer as the Owner's representative during construction are set forth in Articles 1 through 16 of these General Conditions and shall not be extended without written consent of the Owner and the Engineer.

9.1.1 Except as may be otherwise provided in this contract, all claims, counter-claims, disputes and other matters in question between the Owner and the Contractor arising out of or relating to this agreement or the breach thereof will be decided by mediation if the parties hereto mutually agree, or in a court of competent jurisdiction within the State in which the Project is located.

Visits to Site:

9.2 The Engineer will make periodic visits to the site to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. He will not be required to make

exhaustive or continuous on-site observations to check the quality or quantity of the Work. His efforts will be directed toward providing assurance for the Owner that the completed Project will conform to the requirements of the Contract Documents. On the basis of his on-site observations as an experienced and qualified design professional, he will keep the Owner informed of the progress of the Work and will endeavor to guard the Owner against defects and deficiencies in the Work of contractors.

9.2.1 The Engineer and his representatives will at all times have access to the work. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all of the work. The Contractor will provide proper facilities for such access and observation of the work and also for any inspection, or testing thereof.

Clarifications and Interpretations:

9.3 The Engineer will issue with reasonable promptness such written clarifications or interpretations of the Contract Documents (in the form of Drawings or otherwise) as he may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

9.4 Reference Points. The Engineer shall furnish and establish base lines for locating the principal component parts of the project together with a suitable number of bench marks adjacent to the project.

9.4.1 The Contractor shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense of replacement.

Rejecting Defective Work:

9.5 The Engineer will have authority to disapprove or reject Work which is "defective" (which term is hereinafter used to describe Work that is unsatisfactory, faulty or defective, or does not conform to the requirements of the Contract Documents or does not meet the requirements of any inspection, test or approval referred to, or has been damaged prior to final acceptance). He will also have authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed or completed.

9.5.1 If any work is covered, contrary to the instructions of the Engineer, it must, if requested by the Engineer, be uncovered for his observation and replaced at the Contractor's expense. If the Engineer considers it necessary or advisable that covered work be inspected or tested by others, the Contractor, at the Engineer's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the work in questions, furnishing all necessary labor, materials, tools, and equipment.

Project Representatives:

9.6 The Engineer will provide observation sufficient to ascertain if construction is in substantial compliance with the design intent of the Drawings and Specifications.

Decisions on Disagreements:

9.7 The Engineer will be the initial interpreter of the terms and conditions of the Contract Documents and the judge of the performance thereunder. In his capacity as interpreter and judge he will exercise his best efforts to insure faithful performance by both the Owner and the Contractor. He will not show partiality to either and shall not be liable for the result of any interpretation or decision rendered in good faith. Claims, disputes and other matters relating to the execution and progress of the Work or the interpretation of or performance under the Contract Documents shall be referred initially to the Engineer for a decision which he shall render in writing within a reasonable time.

Limitations on Engineer's Responsibilities

9.8 Neither the Engineer's authority to act under this Article 9 nor any decision made by him in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any of their agents or employees or any other person performing any of the work.

9.9 The Engineer will not be responsible for the construction means, methods, techniques, sequences or procedures, or the safety precautions and programs incident thereto, and the Engineer will not be responsible for the Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 The Engineer will not be responsible for the acts or omissions of the Contractor, or any Subcontractors, or any of their agents or employees, or any other person performing any of the Work.

9.11 The Engineers' construction engineering services do not include any administration of jobsite safety which is the sole responsibility of the Contractor. Any reference to safety in the Contract Documents shall not create any duty of jobsite safety administration or oversight by the Engineers.

ARTICLE 10 - CHANGES IN THE WORK

10.1 Without invalidating the Agreement, the Owner may, at any time or from time to time, order additions, deletions or revisions in the Work; these will be authorized by Change Orders. Upon receipt of a Change Order, the Contractor will proceed with

the Work involved. All such Work shall be executed under the applicable conditions of the Contract Documents. If any Change Order causes an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, an equitable adjustment will be made as provided in Article 11 or Article 12. A Change Order signed by the Contractor indicates his agreement therewith.

10.2 The Engineer may, in writing, authorize minor changes or alterations in the Work not involving extra cost and not inconsistent with the overall intent of the Contract Documents.

10.3 Additional Work performed by the Contractor without authorization of a Change Order will not entitle him to an increase in the Contract Price or an extension of the Contract Time, except in the case of an emergency as provided in paragraph 6.25.

10.4 The Owner will execute appropriate Change Orders prepared by the Engineer covering changes in the Work to be performed as provided in paragraph 10.1, and Work performed in an emergency as provided in paragraph 6.25 and any other claim of the Contractor for a change in the Contract Time or the Contract Price which is approved by the Engineer and the Owner.

10.5 It is the Contractor's responsibility to notify his surety of any changes affecting the general scope of the Work or change in the Contract Price and the amount of the applicable bonds shall be adjusted accordingly. The Contractor will furnish proof of such adjustment to the Owner if requested.

ARTICLE 11 - CHANGE OF CONTRACT PRICE

11.1 The Contract Price constitutes the total compensation payable to the Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by the Contractor shall be at his expense without changing the Contract Price.

11.2 The Owner may, at any time, without notice to the sureties, by written order designated or indicated to be a Change Order, make any change in the Work within the general scope of the contract, including but not limited to changes:

(1) in the specifications (including drawings and designs);
(2) in the method or manner of performance of the work;
(3) in the Owner-furnished facilities, equipment, materials, services, or site; or
(4) directing acceleration in the performance of the work.

11.2.1 Except as herein provided, no order, statement, or conduct of the Owner shall be treated as a Change Order under this clause or entitle the Contractor to an equitable adjustment hereunder.

11.2.2 No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

11.3 The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved.

11.3.2 By negotiated lump sum.

11.3.3 The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the work (hereinafter the "Cost of the Work") plus a fixed amount to be agreed upon to cover the cost of general overhead and profit (hereinafter the "Contractor's Fee").

11.4 The term Cost of the Work means the sum of all costs necessarily incurred and paid by the Contractor in the proper performance of the Work. 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 include only the following items and shall not include any of the costs itemized in paragraph 11.5:

11.4.1 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. 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 may 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, workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing work after regular working hours, on Sunday or legal holidays shall be included in the above to the extent authorized by Owner in writing.

11.4.2 Cost of all materials and equipment furnished and incorporated in the Work.

11.4.2.1 All trade discounts, rebates and refunds, and all returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

11.4.3 Payments made by Contractor to the Subcontractors for Work performed by Subcontractors. If required by Owner, the Contractor shall obtain competitive bids from Subcontractors acceptable to him and shall deliver such Bids to Owner who will then determine with the advice of Engineer, which Bids will be

accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of Work Plus a Fee, the Cost of Work shall be determined in accordance with paragraphs 11.4 and 11.5. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.5 The Term Cost of the Work shall not include any of the following:

11.5.1 Payroll costs and other compensation of Contractor's officers, executives principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, lawyers auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks and other personnel employed by Contractor whether at the site or in his principal or branch office for general administration of the Work and not specifically included in the schedule referred to in subparagraph 11.4.1 - all of which are to be considered administrative costs covered by the Contractor's Fee.

11.5.2 Expenses of Contractor's principal and branch offices other than his office at the site.

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

11.5.4 Cost of premiums for all bonds and for all insurance policies whether or not Contractor is required by the Contract Documents to purchase and maintain the same (except as otherwise provided in subparagraph 11.4.1).

11.5.5 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.

11.6 The Contractor's Fee which shall be allowed to Contractor for his overhead and profit shall be a mutually acceptable firm fixed price; or, if none can be agreed upon, a mutually acceptable fixed fee based on the estimate of the various portions of the Cost of the Work.

11.7 The amount of credit to be allowed by Contractor to Owner for any such change which results in a net decrease in cost, will be the amount of the actual net decrease. When both additions and credits are involved in any one change, the net shall be computed to include overhead and profit, identified separately, for both additions and credits.

11.8 Whenever the cost of any Work is to be determined pursuant to paragraphs 11.4 and 11.5, the Contractor will submit in a form prescribed by Engineer an itemized cost breakdown together with supporting data.

11.9 Claims For Delay Due To Change: No claim for delay damages will be allowed the Contractor on account of change orders executed by him. In support of this stipulation the following language will be set out on the face of each change order:

> "It is further understood and agreed that this modification constitutes payment in full on behalf of the Contractor and its Subcontractors and suppliers for all costs and markups directly or indirectly attributable to the change order herein, for all delays related thereto, and for performance of the changes within the time frame stated."

11.10 Allowances: It is understood that the Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such material men, suppliers or Subcontractors and for such sums within the limit of the allowances as the Engineer may approve. Upon final payment, the Contract Price shall be adjusted as required and an appropriate Change Order issued. The Contractor agrees that the original Contract Price includes such sums as he deems proper for costs and profit on account of cash allowances. No demand for additional cost or profit in connection therewith will be allowed.

11.10.1 These allowances shall cover the cost to the Contractor, less any applicable trade discount, of the materials and equipment required by the allowance delivered at the site, and all applicable taxes.

11.10.2 The Contractor's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Price and not in the allowance.

11.10.3 Whenever the cost, as described in 11.10.1 above, is more than or less than the allowance, the Contract Price shall be adjusted accordingly by Change Order.

ARTICLE 12 - CHANGE OF THE CONTRACT TIME

12.1 The Contract Time may be changed only by a Change Order. Any claim for an extension in the Contract Time shall be based on written notice delivered to Owner and Engineer within 10 days of the occurrence of the event giving rise to the claim. Notice of the extent of the claim with supporting data shall be delivered within 20 days of such occurrence unless Engineer allows an additional period of time to ascertain more accurate data. All claims for adjustment in the Contract Time shall be determined by Engineer if Owner and Contractor cannot otherwise agree. Any change

in the Contract Time resulting from any such claim shall be incorporated in a Change Order.

12.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of Contractor if he makes a claim therefor as provided in paragraph
12.1

12.3. Such delays may include, but not be restricted to, acts or neglect by any other contractor employed by Owner, fires, floods, labor disputes, epidemics, abnormal weather conditions, or acts of God.

12.4 No claim for delay shall be allowed because of failure to furnish Drawings until two weeks after written demand for such Drawings and not then unless such claim be reasonable.

ARTICLE 13 - GUARANTEE

13.1 The Contractor shall guarantee all materials and equipment furnished and work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants and guarantees for a period of one (1) year from the date of Substantial Completion of the system that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. Where equipment is required to have a longer guarantee time period by other section of these specifications, such longer guarantee time period shall govern. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other Work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Payment Bond and Performance Bond shall remain in full force and effect through the guarantee period.

13.2 Neither the final payment nor any provision in the Contract nor partial or entire use of the facilities by the Owner shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship.

ARTICLE 14 - PAYMENTS AND COMPLETION

Payments to Contractor:

14.1 At least 10 days before each progress payment falls due (but not more often than once a month), the Contractor will submit to the Engineer an Application for Payment filled out and signed by the Contractor covering the Work performed during the period covered by the Application for Payment and supported by such data as the Engineer may reasonably require. 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 in an approved location, the Application for Payment shall also be accompanied by such supporting data, satisfactory to the Owner, as will establish the Owner's title to the material and equipment and protect his interest therein, including applicable insurance. The Owner may retain 5 percent of the amount of each payment until the work is at least 50 percent complete, on schedule and satisfactory in the Engineer's opinion, at which time 50 percent of the retainage held to date shall be returned to the Contractor for distribution to the appropriate subcontractors and suppliers. Future retainage shall be withheld at the rate of 2-1/2 percent. On completion and acceptance of a part of the Work on which the priced is stated separately in the Contract Documents, payment may be made in full, including retainage percentages, less authorized deductions. The Owner may reinstate up to 5 percent withholding if the Owner determines, at his discretion, that the Contractor is not making satisfactory progress or there is other specific cause for such withholding.

Contractor's Warranty of Title:

14.2 The Contractor warrants and guarantees that title to all Work, materials and equipment covered by an Application for Payment, whether incorporated in the Project or not, will have passed to the Owner prior to the making of the Application for Payment, free and clear of all liens, claims, security interests and encumbrances (hereafter in these General Conditions referred to as "Liens"); and that no work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor or by any other person performing the Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

Approval of Payments:

14.3 The Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing his recommendation for payment and present the Application to the Owner, or return the Application to the Contractor indicating in writing his reasons for refusing to recommend payment. In the latter case, the Contractor may make the necessary corrections and resubmit the Application. The Owner will, within 21 days of presentation to him of an Application for Payment, pay the Contractor the amount recommended by the Engineer.

14.4 The Engineer's recommendation for payment requested in an Application for Payment shall constitute a representation by him to the Owner, based on the Engineer's on-site observations of the Work in progress as an experienced and

qualified design professional and on his review of the Application for Payment and the supporting data, that the Work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning Project upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents and any qualifications stated in his approval); and that the Contractor is entitled to payment of the amount requested. However, by recommending such payment the Engineer shall not thereby be deemed to have represented that he made exhaustive or continuous on-site observations to check the quality or the quantity of the Work, or that he has reviewed the means, methods, techniques, sequences, and procedures of construction or that he has made any examination to ascertain how or for what purpose the Contractor has used the moneys paid or to be paid to him on account of the Contract Price, or that title to any Work, materials, or equipment has passed to the Owner free and clear of any liens.

14.5 The Contractor shall make the following certifications on each request for payment (Partial Payment Estimate):

14.5.1 I hereby certify that the work covered by this request for payment has been completed in accordance with the Contract Documents and that the labor and materials listed hereon have been used in the construction of this work, or that all materials included in this request for payment and not yet incorporated into the construction are now on the site or stored at an approved location; and that payment received form the last request for payment has been used to make payments to all first tier Subcontractors and Suppliers except as listed below.

14.6 The Engineer may refuse to approve the whole or any part of any payment if, in his opinion, he is unable to make such representations to the Owner. He may also refuse to approve any such payment, or, because of subsequently discovered evidence or the results of subsequent inspection of tests, nullify any such payment previously approved, to such extent as may be necessary in his opinion to protect the Owner from loss because:

14.6.1 The Work is defective, or completed Work has been damaged requiring correction or replacement,

14.6.2 The Work for which payment is requested cannot be verified,

14.6.3 Claims or Liens have been filed or there is reasonable evidence indicating the probable filing thereof,

14.6.4 The Contract Price has been reduced because of Modifications,

14.6.5 The Owner has been required to correct defective Work or complete the Work in accordance with paragraph 13.1,

14.6.6 Of unsatisfactory prosecution of the Work, including failure to clean up as required.

14.6.7 Of persistent failure to cooperate with other contractors on the Project and persistent failure to carry out the Work in accordance with the Contract Documents.

14.6.8 Of liquidated damages payable by the Contractor, or

14.6.9 Of any other violation of, or failure to comply with, the provisions of the Contract Documents.

14.7 Prior to Substantial Completion, the Owner, with the approval of the Engineer and with the concurrence of the Contractor, may use any completed or substantially completed portions of the Work. Such use shall not constitute an acceptance of such portions of the Work.

14.8 The Owner shall have the right to enter the premises for the purpose of doing work not covered by the Contract Documents. This provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the Work, or the restoration of any damaged Work except such as may be caused by agents or employees of the Owner.

14.9 Upon completion and acceptance of the Work, the Engineer will issue a certificate that the work is in substantial conformance with Contract Documents, recommending Final Acceptance by the Owner and Final Payment. The entire balance found to be due the Contractor, including the retained percentages, but except such sums as may be lawfully retained by the Owner, shall be paid to the Contractor within 30 days of Final Acceptance of the Work.

14.10 The Contractor will indemnify and save the Owner and the Engineer harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the Work. The Contractor shall, at the Owner's request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the Contractor fails to do so the Owner may, after having notified the Contractor, either pay unpaid bills or withhold from the Contract Price a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the

Contractor, his Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Owner shall be considered as a payment made under the Contract Documents by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

14.11 The date of beginning and the time for completion of the work are essential conditions of the Contract Documents and the Work embraced shall be commenced on a date specified in the Notice to Proceed.

14.11.1 The Contractor will proceed with the work at such rate of progress to insure full completion for Acceptance within the Contract Time. It is expressly understood and agreed, by and between the Contractor and Owner, that the contract time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.

14.11.2 If the Contractor should fail to complete the work within the Contract Time, or extension of time granted by the Owner, the Contractor will pay to the Owner the amount for liquidated damages as specified in the bid for each calendar day or working day (as specified) that the Contractor shall be in default after the time stipulated in the contract documents.

14.11.3 The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due to the following, and the Contractor has promptly given written notice of such delay to the Owner or Engineer:

14.11.3.1 To any preference, priority or allocation order duly issued by Owner.

14.11.3.2 To unforeseeable causes beyond the control and without the fault or negligence of the contractor, including but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, abnormal floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

14.11.3.3 To any delays of Subcontractors occasioned by any of the causes specified in the above paragraphs.

14.11.4 Requests by the Contractor for time extensions due to abnormally bad weather shall also consider time gained due to abnormally good weather during the contract period.

Acceptance of Final Payment as Release:

14.12 The acceptance by the Contractor of final payment shall be and shall operate as a release to the Owner of all claims and all liability to the Contractor other than claims in stated amounts as may be specifically excepted by the Contractor for all things done or furnished in connection with this Work and for every act and neglect of the Owner and others relating to or arising out of this Work. Any payment, however, final or otherwise, shall not release the Contractor or his sureties from any obligations under the Contract Documents or the Payment Bond and Performance Bond.

Final payment to the Contractor by the Owner shall not be made until the Contractor has obtained written consent from the Surety.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

Owner May Suspend Work:

15.1 The Owner may suspend the Work or a portion thereof by notice in writing to the Contractor. The Contractor may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if he makes a claim therefor as provided in Articles 11 and 12, provided the Contractor does not concur in the work suspension.

15.1.1 Should the Owner be prevented or enjoined from proceeding with Work either before or after the start of construction by reason of any litigation or other reason beyond the control of the Owner, the Contractor shall not be entitled to make or assert claim for damage by reason of said delay; but time for completion of the work will be extended to such reasonable time as the Owner may determine to compensate for time lost by such delay with such determination to be set forth in writing.

Owner May Terminate:

15.2 If the Contractor is adjudged as bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the Contractor or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to Subcontractors or for labor, materials or equipment or he disregards laws, ordinances, rules, regulations, or orders of any public body having jurisdiction, or if he disregards the authority of the Engineer, or if he otherwise violates any provision of the Contract Documents, then the Owner may, without prejudice to any other right or remedy and after giving the Contractor and his surety 7 days' written notice, terminate the services of the Contractor and take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, and finish

the Work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor will pay the difference to the Owner. Such costs incurred by the Owner will be determined by the Engineer and incorporated in a Change Order.

15.3 Where the Contractor's services have been so terminated by the Owner, said termination shall not affect any rights of the Owner against the Contractor then existing or which may thereafter accrue. Any retention or payment of moneys by the Owner due the Contractor will not release the Contractor from liability.

15.4 Upon 7 days' written notice to the Contractor and the Engineer, the Owner may, without cause and without prejudice to any other right or remedy, elect to abandon the Project and terminate the Agreement. In such case, the Contractor shall be paid for all Work executed and any expense sustained plus a reasonable profit.

Removal of Equipment:

15.5 In the case of termination of this Contract before completion, for any cause whatever, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies from the property of the Owner. Should the Contractor not remove such equipment and supplies within 30 days, the Owner shall have the right to remove them at the expense of the Contractor. Equipment and supplies shall not be construed to include such items for which the Contractor has been paid in whole or in part.

ARTICLE 16 - MISCELLANEOUS

16.1 All Specifications, Drawings and copies thereof furnished by the Engineer shall remain his property. They shall not be used on another Project, and, with the exception of those sets which have been signed in connection with the execution of the Agreement, shall be returned to him on request upon completion of the Project.

16.2 The successful Bidder shall be furnished one (1) electronic set of construction plans and specifications for use in the work. Any other plans and specifications needed shall be supplied upon payment of the amount specified for specs/plans on our Cook Coggin Planroom (www.cceplanroom.com).

16.3 The duties and obligations imposed by these General Conditions, and other Conditions and the rights and remedies available hereunder, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon Contractor by paragraph 13.1 and the rights and remedies available to Owner and Engineer thereunder, shall be in addition to, and shall not be construed in any way as

a limitation of, any rights and remedies available to them which are otherwise imposed or available by law, by special guarantee or by other provisions of the Contract Documents.

16.4 Should the Owner or the Contractor suffer injury or damage to its person or property because of any error, omission or act of the other or of any of his employees or agents or others for whose acts he is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage.

16.5 The Contract Documents shall be governed by the law of the place of the Project.

16.6 Attorney Fees - In the event it shall be necessary for either party to retain legal counsel to resolve a dispute or to enforce any of its rights hereunder, the party prevailing upon resolution of such disputes or enforcements of such rights shall be entitled to recover payment of all reasonable attorney's fees, expenses and costs incurred therewith.

ARTICLE 17 - ARBITRATION

17.1 All claims, disputes and other matters in question arising out of, or related to, this Agreement or the breach thereof except for claims which have been waived by the making or acceptance of final payment, shall be decided by arbitration, if all parties mutually agree, in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining, or in a court of competent jurisdiction. This agreement so to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof. The arbitration decision must present findings of fact, conclusions of law, basis of award and rationale.

17.2 Notice of the request for arbitration shall be filed in writing with the other party to the Agreement and with the American Arbitration Association, if both parties mutually agree to arbitration, and a copy shall be filed with the ENGINEER. The request for arbitration shall be made within the 30-day period where applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

17.3 The CONTRACTOR will carry on the Work and maintain the progress schedule during any arbitration proceedings, unless otherwise agreed by him and the OWNER in writing.

Mandatory Addendum to
All City of Tupelo Contracts
August 2019

The City of Tupelo (TUPELO), despite any contrary provision contained in any contract to which TUPELO is a party, does not waive any rights, benefits, or prohibitions that may be provided under any law, statute(s), regulation(s), or policies. All provisions to the contrary in any contact to which TUPELO is a party are hereby null, void and deleted. Not intended to be an exhaustive list, the following are examples of such matters and shall be exceptions to any contrary provision(s) in any contract to which TUPELO is a party.

1. TUPELO does not indemnify or hold harmless any party.
   Miss. Const. Art. 4, § 100; Miss AG Op., Clark (June 7, 2002); Miss. AG Op., Chamberlin (Oct, 18, 2002).

2. TUPELO does not make any warranty.
   Miss. Const. Art. 4, § 100; Miss AG Op., Clark (June 7, 2002); Miss. AG Op., Chamberlin (Oct, 18, 2002).

3. TUPELO does not waive any claim; past, present, or future.
   Miss. Const. Art. 4, § 100; Miss AG Op; Clark (June 7, 2002); Miss. AG Op., Chamberlin (Oct, 18, 2002).

4. TUPELO does not waive its sovereign immunity. TUPELO shall only be responsible for liability resulting from the actions of its officers, agents, and employees acting within the course and scope of their official duties.
   Miss. Code Ann. § 11-46-1, et seq.

5. TUPELO does not waive its Constitutional Eleventh (11^{th}) Amendment immunity.
   U.S. Const. Amend. XI.

6. TUPELO does not agree to the application of laws of another state.
   U.S. Const. amend XI; Miss. Code Ann. 11-11-3; Miss. Code Ann. 11-45-1; *City of Jackson v. Wallace*, 196 So. 223 (1940)

7. TUPELO does not limit the tort liability of another party to the amount of the contract or to any other set amount.
   Miss. Const. Art. 4, § 100; Miss AG Op., Clark (June 7, 2002); Miss. AG Op., Chamberlin (Oct, 18, 2002); Miss. AG Op., Hathorn (May 28, 1992); Miss. AG Op., Davis (March 3, 1993).

8. TUPELO does not agree to waive warranties of merchantability, fitness for a particular purpose, or any common law warranties to which TUPELO is entitled.
   Miss. Const. Art 4, § 100; Miss Code Ann. § 75-2-719; Miss. AG Op., Clark (June 7, 2002); Miss. AG Op., Chamberlin (Oct, 18, 2002).

9. TUPELO does not agree that a party may represent, prosecute or defend legal actions in the name of TUPELO. (CITATION NEEDED.)

10. Provisions that limit the time for TUPELO to pursue legal actions are deleted and void.

    Miss. Const. Art. 4, § 104; Miss. Const. Art. 4, § 100; Miss Code Ann. § 15-1-5; Miss AG Op; Clark (June 7, 2002); Miss. AG Op., Chamberlin (Oct, 18, 2002).

11. TUPELO does not agree to submit to binding arbitration.

    Miss. AG Op., Clark (June 7, 2002); Miss. AG Op., Chamberlin (Oct. 18, 2002).

12. TUPELO will make payments for all amounts owed under a contract agreement in accordance with state law.

    Miss. Code Ann. § 31-7-305.

13. TUPELO advises for all contracts entered into, the provisions of the contract which will contain the commodities purchased or the personal or professional services provided, the price to be paid, and the term of the contract shall not be deemed to be a trade secret or confidential commercial or financial information, and shall be available for examination, copying or reproduction.

    Miss. Code § 25-61-9 (7).

14. TUPELO must comply with Mississippi public records law. Records furnished to public bodies by third parties which contain trade secrets or confidential commercial or financial information shall not be subject to inspection, examination, copying or reproduction until notice to said third parties has been given, but such records shall be released within a reasonable period of time unless the said third parties shall have obtained a court order protecting such records as confidential.

    Miss. Code § 25-61-9 (1).

15. Data processing software obtained by TUPELO under a licensing agreement that prohibits its disclosure and which software is a trade secret as defined in Miss. Code Section 75-26-3, and data processing software produced by a public body which is sensitive must not be subject to inspection, copying or reproduction under Mississippi public records law. "Sensitive" means only those portions of data processing software, including the specifications and documentation, used to: (a) Collect, process, store, and retrieve information which is exempt; (b) Control and direct access authorizations and security measures for automated systems; (c) Collect, process, store, and retrieve information disclosure of which would require a significant intrusion into the business of the public body.

16. TUPELO is prohibited from binding its successors in office to contracts, including leases, which result in taking away the successors' rights and powers conferred by law, unless there is specific statutory authority to enter into such contract. In the absence of specific statutory authority, such contracts are voidable by the successors in office.

MS AG Ops., Barton (January 8, 2014) and Barton (July 15, 2011)(both relying on Biloxi Firefighters Assoc. v. City of Biloxi, 810 So.2d 589 (Miss. 2002).

17. TUPELO does not have the power to grant to any person, firm or corporation any exclusive franchise or any exclusive right to use or occupy the streets, highways, bridges, or public places in such municipality for any purpose. TUPELO cannot grant, renew, or extend any such franchise, privilege or right, without compensation or for any longer period than twenty-five years.

Miss. Code Anno. 21-27-1

18. All contracts must be approved by the City Council of TUPELO, subject to the veto power of the Mayor of TUPELO.

MS AG Ops. 2012-00013

SUPPLEMENTAL GENERAL CONDITIONS

These Supplemental General Conditions shall take precedence over the General Conditions if there are conflicting statements between the two.

1. SPECIFICATIONS If referred to on the drawings or in the specifications, the "Mississippi Standard Specifications for State Aid Road and Bridge Construction", as issued by the "Office of State Aid Road Construction of the Mississippi Department of Transportation", Latest Edition, and any issued addenda, shall be made a part of these specifications as if attached hereto.

If referred to on the drawings or in the specifications, the "Mississippi Standard Specifications for Road and Bridge Construction", as issued by the "Mississippi Department of Transportation", Latest Edition, and any issued addenda, shall be made a part of these specifications as if attached hereto.

2. PAYMENTS TO SUBCONTRACTORS Each month, attached to the contractor's pay request, shall be certification verifying that payment has been made to his subcontractor's. Failure of the contractor to make payment to his subcontractors will result in a delay in payment to the contractor until this problem is remedied.

3. STORM WATER POLLUTION PREVENTION This item is addressed in the Instructions For Bidders section of these Contract Documents.

4. MAINTENANCE OF TRAFFIC It is the Contractor's responsibility to provide the required Maintenance of Traffic in and around the construction area for the protection of the public. Warning signs, barricades, cones, barrels, flagmen, etc., shall be used as needed and as required by the M.U.T.C.D., latest edition. There will be no separate payment for Maintenance of Traffic, as this is considered incidental to the work.

5. CONSTRUCTION STAKING Bench marks and control points are indicated on the plans. It is the responsibility of the Contractor to provide all construction staking required for the construction of this project in compliance with the plans and specifications.

WEATHER DELAYS

PART 1 GENERAL

1.1 EXTENSIONS OF CONTRACT TIME

A. If the basis exists for an extension of time, an extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for that month.

1.2 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

A. The Owner has reviewed weather data available from the National Oceanic and Atmospheric Administration and determined a Standard Baseline of average climatic range for the project area.

B. Standard Baseline shall be regarded as the normal and anticipatable number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the Work and is not eligible for extension of Contract Time.

C. Standard Baseline is as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12	10	8	8	8	7	7	5	6	6	8	12

1.3 ADVERSE WEATHER AND WEATHER DELAY DAYS

A. Adverse Weather is defined as the occurrence of one or more of the following conditions which prevents exterior construction activity or access to the site within twenty-four (24) hours:

1. precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure
2. temperatures which do not rise above 32 degrees F by 10:00 a.m.
3. standing snow in excess of one inch (1.00")

B. Adverse Weather may include, if appropriate, "dry-out" or "mud" days:

1. for rain days above the standard baseline;
2. only if there is a hindrance to site access or sitework, such as excavation, backfill, and footings and the Contractor has taken all reasonable accommodations to avoid such hindrance; and,
3. at a rate no greater than 1 make-up day for each day or consecutive days of precipitation beyond the standard baseline that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the Designer.

C. A Weather Delay Day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the contractor's scheduled work day, including a weekend day or holiday if the Contractor has scheduled construction activity that day and has provided the Engineer Written notice of his intent in advance. The Contractors written notice of intent for scheduling shall be provided to the Engineer a minimum of 14 calendar days prior to the proposed work in order to be eligible for consideration in weather delay days.

D. Contractor shall take into account that certain construction activities are more affected by adverse weather and seasonal conditions that other activities, and that “dry-out” or “mud” days are not eligible to be counted as a Weather Delay Day until the standard baseline is exceeded. Hence, the Contractor should allow for an appropriate number of additional days associated with the Standard Baseline days in which applicable construction activities are expected to be prevented and suspended.

1.4 DOCUMENTATION AND SUBMITTALS

A. WEATHER DELAY REPORT:

Use a copy of the following Weather Delay Report, indicating for each calendar month the days on which construction activity affecting the critical path of the Work was prevented by weather conditions. Mark the column for the general cause; and, under “Specifics”, indicate corresponding measurement of precipitation, temperature, wind, or other influencing factors, and the construction activity that was scheduled and delayed. At the end of the month, add up the number of days delay, subtract the baseline number given in Paragraph 1.02 (C.), and show the resulting claimable days. Submit a copy of the completed report with the next application for payment and with subsequent claim for time extension. Claims for time extension based upon weather delays will be denied if a submitted report does not corroborate the claim or if no report was submitted when it was required in accordance with this paragraph.

B. Submit daily jobsite work logs showing which and to what extent construction activities have been affected by weather on a monthly basis.

C. Submit actual weather data to support claim for time extension obtained from nearest NOAA weather station or other independently verified source approved by Designer at beginning of project.

D. Use Standard Baseline data provided in this Section when documenting actual delays due to weather in excess of the average climatic range.

E. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and submit in accordance with the procedures for Claims established in the General Conditions.

WEATHER DELAY REPORT

Project Number:		Month and Year Reported Below:
Project Name:		
Date	Weather Condition Causing Delay	Specifics – Identify work scheduled; Include measurement of precipitation, temperature, wind, etc.
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
	Total number of days this month with delay due to weather:	
	Standard Baseline number of days:	
	Total – Baseline = Claimable Days:	

MAINTENANCE OF TRAFFIC

1. SCOPE This work shall consist of maintaining two-way through and local traffic at all times, except as provided herein or in other contract documents. It shall consist of constructing, maintaining in good condition, and removing temporary structures, approach roads, and other facilities required for maintenance of traffic and the furnishing of temporary materials therefor, unless otherwise indicated in the contract.

This work shall include furnishing, erecting, maintaining in good condition, and removing all required construction signs, barricades, and temporary traffic stripe.

The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs, and other traffic control devices; shall provide qualified flagmen where necessary to direct the traffic; and shall take all necessary precautions for the protection of the work and the safety of the public. Roads or parts of the work closed to through traffic shall be protected by effective barricades and obstructions shall be illuminated during hours of darkness. Suitable warning signs shall be provided to properly control and direct traffic.

The Contractor shall erect warning signs in advance of all places on the project where operations may interfere with the use of road by traffic, and at all intermediate points where the new work crosses or coincides with existing traveled roads. Such warning signs shall be constructed and erected in accordance with the provisions of the contract.

All barricades, warning signs, lights, temporary signals, other protective devices, flagmen and signaling devices shall conform with the minimum requirements contained in the MUTCD and its revisions published by the U.S. Government Printing Office current at the time bids are received.

On all sections of a project which are coincident with an existing highway, road, or street and are open to traffic, the Contractor shall be fully responsible for the protection, maintenance, and replacement of all signs, route markers, traffic control signals, and other traffic service features existing on the work from the beginning of contract time or beginning of work, whichever occurs earlier, until final completion of the work.

2. CONSTRUCTION ZONE SAFETY PLAN* Included in the plans are sheets indicating construction signs, barricades, and traffic control during various phases of the work. The Contractor shall comply with the provisions of these plans. These plans represent minimum requirements and in no way does it relieve the Contractor of his responsibility for safe maintenance of traffic. The Contractor shall also comply with the "Manual on Uniform Traffic Control Devices" (MUTCD).

The Contractor shall have a competent full-time Traffic Safety Officer. The Traffic Safety Officer shall be thoroughly experienced in and qualified for maintenance of traffic safety control work. Prior to the start of work, a written summary of the Traffic Safety Officer's experience and qualifications shall be submitted to the Engineer.

The Contractor's Traffic Safety Officer's responsibility shall be maintenance of the effectiveness of the Traffic Control Plan. The Contractor's Traffic Safety Officer's duties shall include the following:

1. Understand the requirements of the MUTCD and contract provisions.
2. Be responsible for assuring compliance of the Contractor's maintenance and protection of traffic relative to the requirements of the contract provisions.
3. Be responsible for maintaining current documentation of deficiencies with respect to the Contractor's maintenance and protection of traffic operations.
4. Be responsible for maintaining documentation on how and when the deficiencies were corrected.
5. Hold Contractor's traffic safety meetings.
6. Be responsible for assuring that all deficiencies are corrected.
7. Be responsible for coordinating maintenance of traffic operations with the Engineer.
8. Be responsible for reviewing Contractor's equipment location storage and operation relative to traffic safety and operation as required by the contract provisions.
9. Be responsible for reviewing Contractor's material location storage and handling of materials relative to traffic safety and operations.
10 Be responsible for maintaining current documentation of deficiencies and corresponding corrections relative to equipment operation, equipment storage, and material handling and storage pertaining to traffic safety and operations.

The Contractor shall also provide a suitable traffic vehicle, adequately marked and equipped, for the exclusive use of the Traffic Safety Officer. The Engineer shall be furnished with the telephone numbers where the Contractor's Traffic Safety Office and a substitute, authorized to act in his absence, may be reached at all times when not on the project.

Within three weeks, the Contractor shall provide the Engineer with a copy of each accident report for those accidents occurring within the limits of the project. In the event no accident report is available, the Contractor shall jointly attempt to describe the accident from sources or information that may be available. In the event corrective action is indicated, the Contractor shall proceed immediately with same.

3. MATERIALS The Contractor shall provide all materials and labor for the construction and maintenance of detours required for the maintenance of traffic. The cost for this is to be included in the maintenance of traffic pay item. The excavation for the obliteration of the portion of the detour road to be removed will not be paid for separately but shall be included in the maintenance of traffic pay item.

4. PUBLIC CONVENIENCE AND SAFETY The Contractor shall at all times so conduct his work as to assure the least possible obstruction to traffic. The safety and convenience of the general public and the residents along the road and the protection of persons and property shall be provided for by the Contractor.

All work performed by the Contractor on grade separation structures, such as overpasses or underpasses of existing highways, roads or streets, shall be done in a manner that will create the least practicable interference with the public use of the facility. The Contractor shall use all reasonable care and precaution to avoid accidents, damage, or unnecessary delay or interference with traffic, and, if necessary, in conjunction with this work the Contractor shall provide, without additional compensation, competent flagmen to insure the maximum public safety.

5. SAFETY EQUIPMENT All aggregate spreaders, rollers, sweepers, and other slow moving equipment shall be equipped with slow moving vehicle emblems and high intensity amber flashing lights.

6. LAWS TO BE OBSERVED The Contractor shall keep fully informed of all Federal and State laws, all local laws, ordinances, safety codes, regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. He shall at all times observe and comply with all such laws, ordinances, safety codes, regulations, orders, and decrees; and shall protect and indemnify the Owner and the Engineers and their representatives against any claim or liability arising from or based on the violation of any such law, ordinance, safety code, regulation, order, or decree, whether by himself or his employees.

7. GENERAL All detours shall be constructed and maintained in such a manner that they will adequately carry the traffic required.

Requirements for temporary traffic facilities shown on the plans, or set forth in these specifications, shall be understood to be the minimum requirements anticipated and may not be adequate for the Contractor to discharge his responsibility for maintenance of traffic.

Traffic lanes shall be kept free of dust, and when deemed necessary they shall be sprinkled with water, or some other dust palliative shall be applied.

Unless otherwise specified, temporary structures and roads shall be sufficiently strong to safely carry the load permitted on the road under construction. Structures shall be provided with suitable curbs, rails, or other devices as required for the protection of traffic. Unless otherwise specified, walkways when required for pedestrians shall have a clear width of at least four feet and shall be protected from vehicular traffic in the manner

specified or directed.

Unless otherwise specified, the Contractor shall remove all temporary detours, satisfactorily dispose of all surplus materials, grade, finish, and dress the disturbed areas to the required section, and complete all work incidental thereto prior to final acceptance.

On widening or widening and overlaying projects, the Contractor shall limit the base widening, pavement removal, undercutting, and patching operations to the lengths that are deemed to be consistent with backfilling and traffic handling requirements.

On the traffic lane adjacent to the lane being paved, opposing traffic may be alternately routed over the single lane in such a manner as to provide safe movement of the traffic with minimum delay. In such case, flagmen and an approved pilot vehicle with sign meeting the requirements of the plan standards shall be provided and operated to control the speed and sequence of movement of the traffic.

All failed areas that have been removed and all trenches shall be filled and compacted to the elevation of the existing pavement before work is discontinued for the day. In emergencies, the Engineer may permit the use of approved temporary materials for backfill, provided the temporary materials will be adequate to facilitate normal safe movement of traffic. Where the trenches are in an existing roadway, the trenches must be finished using a minimum 2 inch lift of Hot Bituminous Pavement within 48 hours of backfilling the trench.

Except under the following conditions, no portion of the roadway which is intended to be used for maintenance of traffic shall be blocked after work hours. In exceptional cases when all efforts have been made to restore the surface of the roadway and because of equipment failure or other uncontrollable causes complete restoration is not possible before work must be discontinued for that day, the Contractor shall provide adequate warning signals, barricades, flares, other appropriate devices, and flagmen, appropriately placed or stationed for the protection of the public. The Engineer may also require the use of a pilot vehicle as provided herein.

The Contractor shall be responsible for protection against loss or damage from any cause to all temporary structures (including approaches), and shall maintain them in a satisfactory condition until their use is no longer required. If a temporary structure, or approaches, is damaged due to high water or other reasons, it shall be replaced by the Contractor.

8. BASIS OF PAYMENT Maintenance of traffic will be paid for per Lump Sum, which price includes all materials, labor, necessary appurtenances, etc. for necessary maintenance of traffic.

TEMPORARY SILT FENCE

PART 1. GENERAL

1.01 SCOPE OF WORK

A. This work under this item consists of furnishing, constructing and maintaining a water permeable filter type fence for the purpose of removing suspended soil particles from the water passing through it in accordance with the drawings and these specifications.

B. The work shall include the removal of temporary fencing.

PART 2. MATERIALS

2.01 GEOTEXTILE FABRIC

A. Geotextile Fabric may be woven or non-woven consisting only of long chain polymeric yarns or filaments formed into a stable network such that the fibers retain their relative position. The fabric shall be mildew resistant and inert to biological degradation and naturally encountered chemicals, alkalis and acids.

B. The fabric shall contain stabilizers and/or inhibitors to make it resistant to deterioration from direct sunlight, ultraviolet rays and heat. The fabric edges shall be finished in such a manner to prevent raveling.

C. The fabric shall be furnished in widths of not less than 36 inches.

D. The fabric shall conform to the physical requirements of the Mississippi Standard Specifications for Road and Bridge Construction, 714.13.11-Table 1 Type II (90 lb Tensile Strength).

2.02 FENCE POSTS

A. Fence posts shall be steel tee posts, 5 feet long, approximately 1 3/8 inches by 1 3/8 inches, 1/8 inch thick and with a nominal weight of 1.33 pounds per foot. The posts shall have notices or hole for fastening the fabric to the posts.

PART 3. EXECUTION

3.01 CONSTRUCTION

A. The silt fence shall be constructed at the locations shown on the drawings or as directed. Posts shall be driven such that not more than 3 feet will protrude above ground. Posts shall be installed at not more than 6 feet apart. Fabric shall be attached to the posts with clips or other approved means. The bottom edge of the fabric shall be turned under 6 inches and buried 6 inches below the ground surface. The 6 inch by 6 inch trench shall be back-filled and tamped after fabric burial.

3.02 MAINTENANCE AND REMOVAL

A. The Contractor shall maintain the silt fence removing and replacing fabric which has deteriorated to the extent that it has become ineffective. Excessive accumulations of soil against the fence shall be removed. Maintenance will not be a separate pay item.

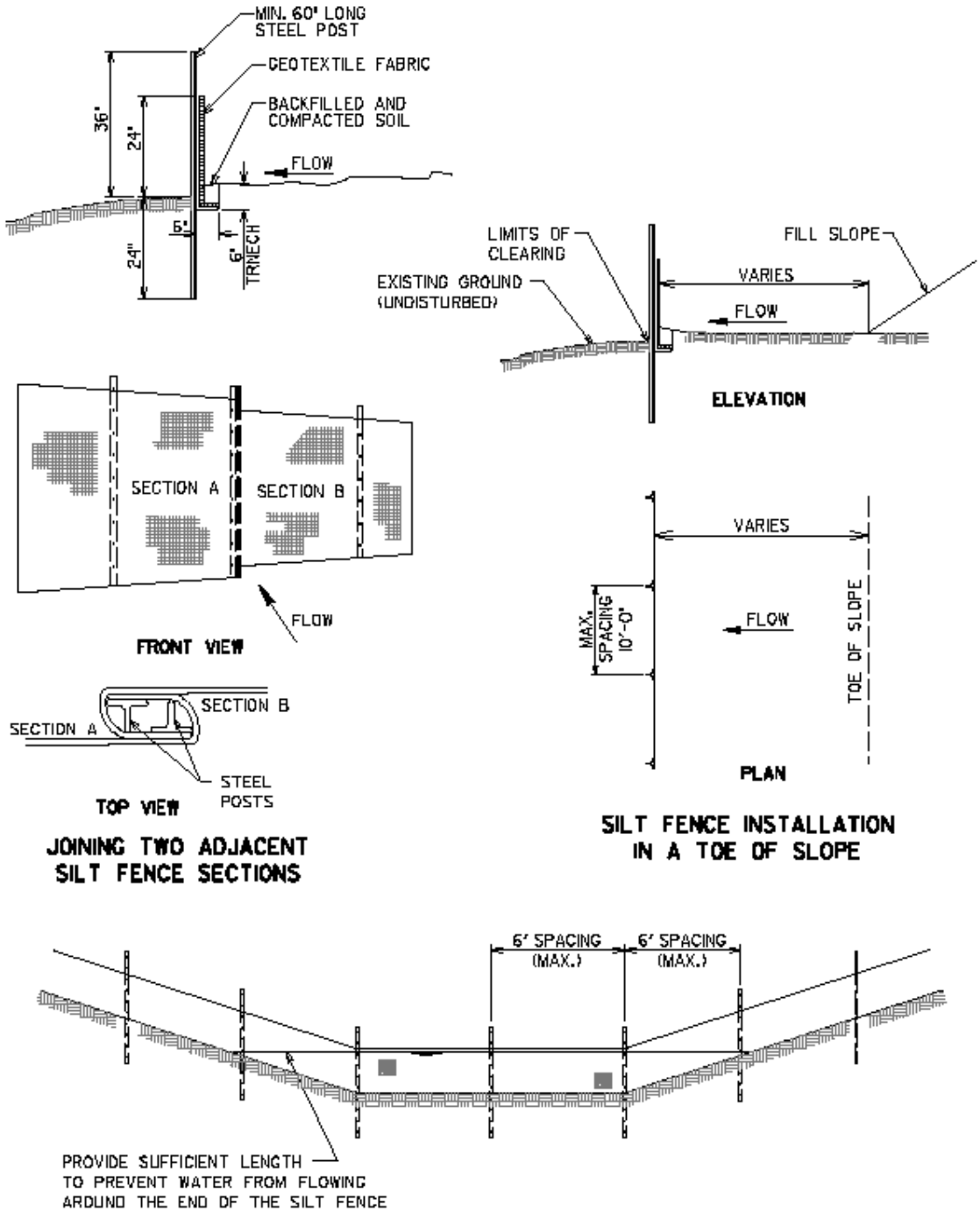
B. Unless otherwise directed, all temporary silt fence shall be removed. Upon removal, the silt accumulations shall be removed, the area shall be dressed, and erosion control measures applied to all bare areas. The fence materials will remain the property of the Contractor.

3.03 BASIS OF PAYMENT

A. The following Basis of Payment will apply to Unit Price Contracts only. **Where work under this division is a part of Lump Sum Item or Lump Sum Contract, the Basis of Payments will not apply.**

B. Measurement and payment for Temporary Silt Fence will be made only when a pay item is included in the Bid Form. The quantities are estimated for bidding purpose only and may vary due to field conditions during construction.

C. Temporary Silt Fence will be paid for at the Contract unit price per linear foot actually installed which shall be full compensation for the construction, maintenance and removal of the temporary silt fence.



SILT FENCE INSTALLATION IN A DRAINAGE DITCH

NOTE: USE DRAINAGE DITCH INSTALLATION FOR LOW FLOW CONDITIONS ONLY WHEN SHOWN ON THE DRAWINGS

MOBILIZATION

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Mobilization shall consist of moving all labor, equipment, supplies, and incidentals to the project site and removing same after all the work under the contract has been completed. It shall also include all mobilization pre-construction costs which are necessary direct costs to the project and are of a general nature rather than directly attributable to other pay items.

PART 2: MATERIALS

(None)

PART 3: EXECUTION

3.01 COMPENSATION

A. When five percent (5%) of the original contract amount is earned from other bid items (exclusive of those listed as dependent items), fifty percent (50%) of the amount of the bid for mobilization, or five percent (5%) of the original contract amount, whichever is lesser, will be paid.

B. When ten percent (10%) of the original contract amount is earned from other bid items (exclusive of those listed as dependent items), one hundred percent (100%) of the amount of the bid for mobilization, or ten percent (10%) of the original contract amount, whichever is lesser, will be paid.

C. Upon completion of the work, payment of any amount of bid for mobilization that is outstanding will be paid.

3.02 BASIS OF PAYMENT

A. Mobilization will be paid for at the contract lump sum price, which shall be full compensation for completing the work specified.

CONCRETE AND REINFORCING

1. GENERAL All concrete shall be composed of aggregate, Portland Cement, fly ash, slag (GGBFS), admixtures and water. Air-entrainment admixture shall be added to all concrete. Reinforcement shall be provided where shown on plans. All plain and reinforced concrete shall be prepared and constructed in accordance with these specifications, at the locations and of the form and dimensions called for on the plans or as specified. Unless otherwise noted, finished dimensions shall conform to American Concrete Institute (ACI) Specification 301-96, Section 1.7.2.

Referenced American Society for Testing and Materials (ASTM) standard specifications shall be understood to mean the latest current revision of the standard specifications.

A MIX DESIGN SHALL BE SUBMITTED TO THE ENGINEERS FOR REVIEW 7 DAYS PRIOR TO THE DELIVERY OF ANY CONCRETE TO THE JOB SITE.

THE BATCH PLANT SHALL BE CURRENTLY CERTIFIED BY THE MISSISSIPPI DEPARTMENT OF TRANSPORTATION AND PROOF OF SUCH CERTIFICATION SHALL BE SUBMITTED WITH THE MIX DESIGN.

2. MATERIALS

Portland Cement Portland cement shall conform to the Standard Specification for Portland Cement (ASTM C150), and shall be Type I or III or, at the Contractor's option, Type IA or IIIA (Air-entraining).

The Contractor shall furnish vendor's certified test report for each carload, or equivalent, of cement shipped for use on the Project. The report shall be delivered and approved before use of the cement. All such test reports shall be subject to verification by testing samples of materials as received for use on the project.

Fly Ash Fly ash shall conform to the standard specification for Fly Ash (ASTM C 618) and shall be Type C or Type F.

Slag Slag shall conform to the standard specification for Slag (ASTM C618) and shall be Grade 100 with loss on ignition less than five percent (<5%).

Concrete Aggregates Concrete aggregate shall conform to the Standard Specification for Concrete Aggregates (ASTM C33) and shall conform to ACI 301-96 Section 4.2.1.2. Coarse aggregate shall be crushed limestone.

The maximum size of the aggregate shall be not larger than 1/5 of the narrowest dimension between sides of the forms within which the concrete is to be cast nor larger than 3/4 of the minimum clear spacing between reinforcing bars, or between reinforcing bars and forms. For unreinforced slabs, the maximum size of aggregate shall not be larger than 1/3 of the slab thickness.

Admixtures Air-entraining admixtures shall be ASTM C-260 added so that the air content will be between 4 and 6 percent as determined by ASTM tests C138 or C231.

Water-reducing admixtures, when approved by the Engineers for use, shall be ASTM C-494.

Water Water used in mixing concrete shall be clean, fresh and drinkable.

Metal Reinforcement Reinforcing bars shall conform to Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement (ASTM A615), Grade 60.

Bar and rod mats for concrete reinforcement shall conform to Standard Specification for Fabricated Steel Bar or Rod Mats for Concrete Reinforcement (ASTM A184).

Wire for concrete reinforcement shall conform to Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, For Concrete (ASTM A1064/A1064M).

Welded wire fabric for concrete reinforcement shall conform to Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, For Concrete (ASTM A1064/A1064M).

Structural steel shall conform to Standard Specification for Structural Steel (ASTM A36).

Shop Drawings The Contractor shall submit shop drawings of reinforcement to the Engineers for approval before reinforcement is fabricated. Shop drawings shall conform to Manual of Standard Practice for Detailing Reinforcing Concrete Structures, ACI 315-74. Reinforcing steel details shall not include the use of re-intrant corners.

Storage of Materials Cement and aggregates shall be stored at the work in such a manner as to prevent deterioration or intrusion of foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete. Damaged reinforcement shall not be allowed within a structure.

3. CONCRETE QUALITY AND ALLOWABLE STRESSES

All concrete shall be watertight and shall have a minimum 28-day compressive strength of 4,000 pounds per square inch. Compressive tests shall be made in accordance with the Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens (ASTM C39).

The mixture shall contain not less than the equivalent of 6 bags of cementitious material per cubic yard of mixture by weight and the water-cement ratio shall not exceed 0.45 pounds of water per pound of cementitious material. Fly ash content may not exceed twenty percent (20%) of the cementitious material. Slump shall not exceed 4 inches as measured by ASTM C143. The slump at the time of delivery shall not exceed 6 inches when an approved mid-range water reducer is used while maintaining the approved water - cement ratios. In general, a water cement ratio shall be used which will yield test cylinders with a compressive strength averaging 500 psi above the specified strength.

MIX DESIGNS CONTAINING FLY ASH MAY BE USED ONLY IN STRUCTURAL ELEMENTS WITH MINIMUM DIMENSIONS GREATER THAN OR EQUAL TO 12".

The proportions of aggregate to cement for any concrete shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement with the method of placing employed on the work, but without permitting the materials to segregate or excess free water to collect on the surface. Laboratory mixtures will be made by the Contractor to determine the proper proportions of materials for the aggregate selected.

The methods of measuring concrete materials shall be subject to approval by the Engineers and shall be such that the proportions can be controlled accurately and checked easily at any time during the work. Measurement of materials for ready-mixed concrete shall conform to Standard Specification for Ready Mixed Concrete (ASTM C94).

4. MIXING AND PLACING CONCRETE

Preparation and Placing Concrete Before placing concrete, (1) all equipment for mixing and transporting the concrete shall be cleaned, (2) all debris and ice shall be removed from the places to be occupied by the concrete, (3) forms shall be thoroughly wetted or oiled, (4) masonry filler units that will be in contact with the concrete shall be well drenched, and (5) the reinforcement shall be thoroughly cleaned of oil or other coating. Concrete shall not be placed on frozen ground.

Water shall be removed from place of deposit before concrete is placed. The water table shall be lowered at least one foot below the bottom of the concrete pour.

A layer of 6-mil polyethylene shall be placed and lapped on the bedding before the concrete is placed. All holes and breaks in the polyethylene shall be patched immediately before pouring.

Mixing of Concrete The concrete shall be mixed until there is a uniform distribution of the materials and shall be discharged completely before the mixer is recharged.

For job-mixed concrete, the mixer shall be rotated at the speed recommended by the manufacturer and mixing shall be continued for at least one minute after all materials are in the mixer.

Ready-mixed concrete shall be mixed and delivered in accordance with the Standard Specifications for Ready-Mixed Concrete (ASTM C94).

Concrete shall be conveyed from the mixer to place of final deposit by methods which will prevent the separation or loss of the materials.

Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery end without separation of the materials.

Upon arrival at the job site, up to 1.5 gallons per cubic yard of mixing water may be added (per ASTM C94) to low slump concrete to bring the slump within the required limits. Water shall not be added at a later time.

Depositing If it is necessary to stabilize loose footing material, layers of washed gravel shall be placed and tamped to form an unyielding foundation. Concrete shall be deposited as nearly as practicable in its final position to avoid separation due to re-handling or flowing. The concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the space between the bars. No concrete that has partially hardened or been contaminated by foreign material shall be deposited on the work; nor shall retempered concrete be used.

Once started the concreting shall be carried on as a continuous operation until the placing of the panel or section is completed. The top surface shall be generally level. When construction joints are necessary, they shall be made as specified herein.

Concrete shall be thoroughly consolidated by suitable vibrators during placement and shall be thoroughly worked into the corners of the forms and around reinforcement and embedded fixtures.

5. CURING Concrete shall be protected from premature drying by covering as soon as possible with wetted burlap covered with polyethylene, and shall be kept thoroughly moist for at least 7 days. The moisture condition of surfaces shall be checked daily (more frequently during hot weather) and wetting or spraying shall be applied as necessary to maintain the moist condition for 7 days. If high-early-strength cement is used, the curing period may be reduced to 4 days.

In extreme conditions and on small pours, the Engineers may permit the use of a white pigmented liquid curing membrane.

6. COLD AND HOT WEATHER REQUIREMENTS Equipment shall be provided to heat the concrete materials and protect the concrete during freezing or near-freezing weather. No frozen materials or materials containing ice shall be used.

All concrete materials, reinforcement, forms, fillers and surface with which the concrete is to come into contact shall be free from ice. Whenever the temperature of the surrounding air is below 40°F, all concrete placed shall have a temperature of above 60°F and a means shall be provided to maintain a temperature of not less than 60°F for 2 days and 50°F for 3 days or, for as long as necessary to insure the proper curing of the concrete. The housing, covering, or other protection used in connection with curing shall remain in place and intact at least 24 hours after the artificial heating is discontinued. No dependence shall be placed on salt or other chemicals for the prevention of freezing.

During hot weather, upon arrival at the job site the temperature of the concrete mixture to be placed shall not exceed 90° F. The concrete materials shall be cooled before mixing or crushed ice of a size that will melt completely during mixing may be substituted at the batch plant for all or part of the mixing water.

7. FORMS

Design of Forms Forms shall conform to the shape, lines and dimensions of the members as called for on the drawings. They shall be substantial and sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape. The responsibility for the adequacy of the forms shall rest with the Contractor. Forms for all concrete surfaces exposed to view, both inside and outside, shall be constructed of smooth plywood or with a masonite lining or with an approved forming system to insure a smooth surface.

Chamfer strips shall be provided at all exposed edges and corners both vertical and horizontal unless otherwise instructed.

Segmented forms of approved design will be permitted on circular surfaces not exposed to view under normal operating conditions.

Removal of Forms Forms shall be removed in such a manner as to ensure the complete safety of the structure. Forms and shoring, supporting concrete and other weights shall be removed at the Contractor's risk but shall not be removed following a pour completion sooner than specified below. In no case shall the supporting forms or shoring be removed until the members have acquired sufficient strength to support safely their weight and the load thereon.

The removal of forms and shoring shall be based on one of the following methods.

Method 1: Elapsed Time After Concrete Placement for no-fly ash mix only.

Forms	Minimum Time
Columns (Not Under Any Load)	48 Hours

Side of Beams	48 Hours
Walls*	14 Days
Slabs	14 Days
Other Parts	7 Days

Forms	Minimum Time
Shoring and Centering	
Under Beams	14 Days
Under Bent Caps	7 Days

Method 2: Field Cured Test Cylinder Strength

Forms	Minimum Strength'
Columns (Not Under Any Load)	1000 psi
Sides of Beams	1000 psi
Walls*	2400 psi
Slabs	2400 psi
Other Parts	2400 psi
Shoring and Centering	
Under Beams	2400 psi
Under Bent Caps	2000 psi

*When specified by the Engineers, Forms for walls not under any load (vertical or horizontal pressure) may be removed after 48 hours (Method 1) or test cylinder strength of 1000 psi (Method 2).

Any method of form removal to cause over stressing of the concrete shall not be used. Forms and supports shall be removed in such a manner as to permit the concrete to uniformly and gradually take the stresses due to its own weight. Centers shall be gradually and uniformly lowered in such a manner as to avoid injurious stresses in any part of the structure.

Non-load carrying form facing may be removed after 24 hours of pour completion at the Contractor's risk.

All form ties shall be pulled out, broken or cut beneath the surface and all holes and depressions shall be neatly grouted.

8. DEFECTIVE WORK Any defective work disclosed after the forms have been removed shall immediately be removed and replaced. Deficiencies in dimensions or flaws in the surface which, in the opinion of the Engineers, cannot be satisfactorily repaired shall be cause for removal and replacement at the expense of the Contractor.

9. REINFORCEMENT

Cleaning and Bending At the time concrete is placed, reinforcement shall be free from rust, scale or other coatings in such amounts that would

destroy or seriously reduce the bond. All bars shall be bent cold, unless otherwise authorized by the Engineers. Bars partially embedded in concrete shall not be field bent except as specifically permitted by the Engineers.

Placing Metal reinforcement shall be accurately placed in accordance with the plans and shall be adequately secured in position by concrete blocks, metal chairs, spacers or ties. Wood fixtures shall not be used to support reinforcement.

Splices and Offsets In slabs, beams and girders, splices of reinforcement at points of maximum stress shall generally be avoided. SPLICES SHALL PROVIDE SUFFICIENT LAP (ACI 319-89) TO TRANSFER THE STRESS BETWEEN BARS BY BOND AND SHEAR. Unless otherwise directed, all rebar splices shall be at least 45 bar diameters.

Concrete Protection for Reinforcement The metal reinforcement shall be protected by the thickness of concrete indicated in the plans. Where not otherwise shown, the thickness of concrete over reinforcement shall be as follows:

Minimum concrete cover for reinforcement, except for extremely corrosive atmospheres, other severe exposures, or fire protection, shall be as given below.

Location	Minimum Cover, in.
Slabs and Joints	
Top and bottom bar for dry conditions	
#11 bars and smaller	3/4 inch
# 14 and #18 bars	1 ½ inch
Formed concrete surfaces exposed to earth, water or weather, and over or in contact with sewage and for bottoms bearing on work mat, or slabs supporting earth cover.	
#5 Bars and smaller	1 ½ inch
#6 through #8	2 inch
Bars and columns, formed	
For dry conditions	1 ½ inch
Stirrups and ties	2 inch
Principal reinforcement	2 ½ inch
Walls	
For dry conditions	
#11 bars and smaller	3/4 inch
#14 and #18 bars	1 ½ inch

Formed concrete surfaces, exposed to earth, water, sewage, weather, on in contact with ground	2 inch

Location	Minimum Cover, in.
Footings and base slabs	
At formed surfaces and bottoms bearing on concrete work mat	2 inch
At uniform surfaces and bottoms in contact with earth	2 inch
Top of footings	Same as Slabs
Over top of piles	2 inch

In all cases, the thickness of concrete over bars shall be at least equal the diameter of the bars.

Exposed reinforcement bars intended for bending with future extensions shall be protected from corrosion by concrete mortar covering.

10. CONSTRUCTION JOINTS Joints not shown in the contract documents shall be made and located so as to least impair the strength of the structure. In general, they shall be located at the plane of minimum moment. Joints in walls and columns shall be at the underside of floors, slabs and beams and at the tops of footings or floor slabs. Beams, girders, brackets, column capitals, haunches, and drop panels shall be placed at the same time as slabs.

The surface of the concrete at all joints shall be cleaned thoroughly and all laitance (float) removed prior to placing adjoining concrete.

Bond shall be obtained in horizontal joints by removing loose particles and applying a ½" coat of 1:1 cement-sand grout immediately before placing concrete.

Vertical surfaces shall be roughened in a manner which will expose the aggregate uniformly and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface.

All construction joints in structures containing liquids shall be watertight. Waterstops shall be provided at joints required to be watertight. Construction joints waterstops shall be 6" width tapered ribbed pattern or dumbbell pattern unless otherwise noted on the plans. Construction joints waterstops shall be Amico PVC #8073 or #8029, Green Streak PVC#748 or #580, or equal.

11. EXPANSION JOINTS Premolded expansion joint filler shall conform to Specifications for Preformed Expansion Joint Fillers for Concrete

Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) ASTM D-1751.

All expansion joints required to be water tight shall contain waterstops, expansion joint filler material and an elastic joint sealant compound. A bond breaker compound or membrane is required between expansion joint filler material and elastic joint sealant compound. Clean and prime the concrete surface as recommended by the elastic sealant manufacturer prior to placement of fillers and sealants.

Expansion joint waterstops shall be 9-inch width, tapered and ribbed with a VINYLEX PVCRL 89-38 or DB9-38 center bulb pattern or shall be dumbbell pattern with a center bulb pattern unless otherwise shown on the drawings. Expansion joint waterstops shall be AMICO PVC #8066 or 8031, Greenstreak PVC #753 or #718, or equal.

Expansion joint filler material, elastic joint sealant compound, and premolded joint seals shall be approved commercially manufactured types.

Ties and other form accessories to be partially or wholly embedded in the concrete shall be of approved commercially manufactured types. After the ends of fasteners have been removed, the embedded portion of the tie shall terminate not less than 1-1/4" inches from any concrete surface either exposed to view or exposed to ground or water. Form ties shall be constructed so that the ends or end fasteners can be removed without spalling the concrete. All ties shall be of a waterseal structures. All embedded bolts and anchors shall be 303 type stainless steel.

In lieu of embedded bolts and anchors, epoxy grooved post-set bolts may be used when approved by the Engineers. Post-set anchors shall be stainless steel of adequate size and strength.

Wall pipes or wall sleeves with a separate flange inside the wall shall be provided for all pipe passing through walls, floors and other structural members containing liquids.

Apply an epoxy bonding agent to all concrete pipes and other precast concrete surfaces to be embedded in the concrete work. The agent shall be a two-component, flexible, non-shrink adhesive, AASHTO Spec. M-200-65, Type B. Apply per manufacturer's instruction and place wet concrete while the agent is tacky.

12. EMBEDDED ITEMS All sleeves, wall pipes, conduit, inserts, anchors, and other embedded items required for adjoining work or for its support shall be placed prior to concreting. All contractors whose work is related to the concrete or must be supported by it shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.

Expansion joint material, waterstops, and other embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, wall pipes, inserts, and

anchor slots, etc. shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

Reinforcement or other embedded metal items bonded to the concrete (except dowels in floors bonded only on side of joints) shall not be permitted to extend continuously through any expansion joint.

The Contractor shall protect by tape or grease embedded items that extend above grade and/or out of forms.

13. SURFACE FINISH Concrete surfaces shall be true, free from open or rough surfaces, depressions or projections.

After forms have been stripped, cut all form tie wires back to a minimum depth of 3/4 inch. Dampen these areas with clean water and then patch flush with the surrounding area using a non-shrink gout. Fill all honeycombed areas that are 3/8 inch or more in depth with non-shrink grout. Remove all concrete appurtenances that extend above the level of the surface by use of a mortar hoe, stone, or grinding.

As-Cast Formed Structures Except as indicated on the plans, vertical, inclined and horizontal formed surfaces shall be finished as follows:

> Rough Form Finish (ACE 5.3.3.a) Applies to as-cast vertical, inclined and horizontal surfaces more than one foot below finished ground lines. Patch tie holes and defects. Leave surfaces with the texture imparted by the forms.
>
> Smooth Form Finish (ACE 5.3.3.3b) Applies to as-cast vertical, inclined and horizontal surfaces above one foot below finished ground lines, structure's interior surfaces, including surfaces below normal water lines. Patch tie holes and defects. Remove all fins completely.

Rub Finished Formed Surfaces The surface finish of structural concrete exposed to view both inside (uncovered) and outside, under normal operating conditions, plus a one-foot strip below the finished ground or normal water lines shall have either a Smooth Rubbed Finish or a Coating System Finish. Not required inside covered containment structures unless otherwise noted.

> Smooth Rubbed Finish (ACI 5.3.3.4.a) Remove forms as early as permitted and perform necessary patching. Produce finish on newly hardened concrete no later than the day following form removal. Wet the surface and rut it with carborundum brick or other abrasive until uniform color and texture are produced. Use no cement grout other than cement paste drawn from the concrete itself by the rubbing process.

Coating Rubbed Finish Surface finish produced on hardened concrete by application of a cementitious based material on concrete surfaces previously brought to a Smooth Form Finish. The coating system shall be Thoroseal and Thorocoat, Tamoseal (Sand Finish) and Tammscoat or equal. The Coating system shall be applied only on surfaces prepared in accordance with the manufacturer's specifications.

Slabs

Scratched Finish (ACI 5.3.4.2.a) For surfaces intended to receive bonded applied cementitious applications.

Place, consolidate, stride off, and level concrete, eliminating high spots and low spots. Roughen the surface with stiff brushes on rakes before the final set. Produce a finish that will meet conventional bullfloated tolerance requirements of ACI 117.

Floated Finish (ACI 5.3.4.2.b) For surfaces to receive roofing, waterproofing membranes or sand bed terrazzo.

Place, consolidate, strike off, and level concrete, eliminating high spots and low spots. Do not work concrete further until it is ready of floating. Begin floating with a hand float, a bladed power float equipped with float shoes. Or a powered disk float when the bleed water sheen has disappeared and the surface has stiffened sufficiently to permit the operation. Produce a finish that will meet conventional straightedge tolerance requirements of ACI 117, then refloat the slab immediately to a uniform texture.

Troweled Finish (ACI 5.3.4.2.c) For inside floor slabs that may or may not be required to receive floor coverings or which are to be painted.

Float concrete surface, then once the moisture film and sheen have disappeared from the floated surface and the concrete has hardened enough to prevent an excess of fine material and water from being worked to the surface power trowel the surface. Hand trowel the surface smooth and free of trowel marks. Continue hand troweling until a ringing sound is produced and the floor is troweled. Tolerance for concrete floors shall be conventional straightedge in accordance with ACI 117.

Broom or Belt (ACI 5.3.4.2.d) For outside slab surfaces including driveways, sidewalks, and ramps unless noted otherwise.
Immediately after concrete has received a floated finish, give the concrete surface a coarse transverse scored texture by drawing a broom or burlap belt across the surface.

Nonslip Finish (ACI 5.3.4.2.h) For exterior platforms, steps, and landings and for exterior interior pedestrian ramps.

Apply a broom or belt finish or a dry-shake application of crushed aluminum oxide or other abrasive particles, as noted. Rate of application shall be not less than 25 lb/100 sq ft.

Dry-shake Finish (ACI5.3.4.2.e) To be applied as specified or as directed by the Engineer.

Blend metallic or mineral aggregate specified with portland cement in the proportions recommended by the aggregate manufacturer, or use bagged premixed material as specified. Approximately two-thirds of the blended material required for coverage to the surface by a method that ensures even coverage without segregation. Float finish the surface after application of the first dry-shake. Apply the remaining dry-shake material at right angles to the first application and in locations necessary to provide the specified minimum thickness. Begin final floating and finishing immediately after application of the dry-shake.

After selected material is embedded by the two floatings, complete operation with a broomed, floated, or troweled finish, as specified.

Heavy-Duty Topping for Two-Course Slabs (ACI 5.3.4.2.f) To be applied as specified by the Engineer.

Place and consolidate concrete for the base slab, and screed concrete to the specified depth below the top of the finished surface.

Topping placed the same day as the base slab may be placed as soon as bleed water in the base slab has disappeared and the surface will support a person without appreciable indentation.

When topping placement is deferred, brush the surface with a coarse wire broom to remove laitance and scratch the surface when concrete is plastic. Wet cure the base slab at least three days. Before placing the topping, clean the base slab surface thoroughly of contaminants and loose mortar or aggregate. Dampen the surface, leaving it free of standing water.

Immediately before placing topping, scrub into the slab surface a coat of bonding grout consisting of equal parts of cement and fine sand with enough water to make a creamy mixture. Do no allow grout to set or dry before topping is placed. Bonding agents other than cement grout may be used with prior acceptance.

Spread, compact, and float the topping mixtures, check for trueness of surface and complete operation with a floated, troweled, or broom finish as directed or specified.

14. TESTING Under the observation of the Engineers, the testing laboratory's representative shall take cylinders of the concrete mixture for compressive testing.

Mold and cure three cylinders for every 50 CuYd or part thereof in accordance with ASTM C31. The contractor shall provide a suitable area or container at the project site for initial storage and curing (up to the first 48 hours after molding) of specimens cast for testing purposes. Specimens shall be stored under conditions to maintain the temperature adjacent to the specimens in the range of 60 to 80 degrees F (16 to 27 degrees C) and which prevents damage and loss of moisture from the specimens.

Test cylinders in accordance with ASTM C39. Test one specimen at 7 days for information, and two specimens at 28 days for acceptance unless otherwise specified. The compressive strength test results for acceptance shall be the average of the compressive strengths from the two specimens tested at 28 days.

The strength level of concrete will be considered satisfactory when the average of all sets of three consecutive compressive strength test results equal or exceed 4000 psi and no individual strength test result falls below 3500 psi.

If the concrete cylinders for any portion of the structure fail to meet the above requirements, the Contractor shall, at his own expense, engage a laboratory to conduct tests in accordance with Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete (ASTM C42). Portions of structures failing to meet the allowable strengths as determined by these tests shall be removed and replaced by the Contractor, at his own expense, with concrete conforming to the specifications.

Concrete showing leakage after finishing shall be repaired and/or be topped or thickened as directed by the Engineer until watertight.

The concrete testing requirements for selected concrete placements may be waived at the Engineer's discretion.

15. BASIS OF PAYMENT Concrete and Reinforcing is a reference specification. Payment will be made as set out under each item specification.

CLEARING AND GRUBBING

1. SCOPE This item shall consist of the removal and satisfactory disposal of all trees and stumps; all pole stubs, roots, vegetation, rubbish, saw-dust, or any other material within the limits of the right-of-way; and, the removal of any and all structures and/or obstructions, shown on the plans or encountered during construction, which interfere with construction; it shall also include the protection and preservation from injury or defacement of designated trees, shrubs or plants; all in accordance with the provisions and requirements of these specifications and as indicated on other plans.

2. UTILITIES The Owner will remove and reset or arrange for the removal and resetting of the following obstructions encountered with as little delay to the Contractor as possible.

1. Electric poles and lines
2. Street markers
3. Sanitary Sewer Mains and Service Lines
4. Water Mains and Valves, Service Lines and Meter Settings (Valve boxes will be reset by Contractor.)
5. Fire Hydrants

The removal and/or resetting of telephone lines, gas mains, services and appurtenances shall be arranged with the utility by the Contractor. The Owner will pay the utility for necessary relocations.

Since the exact location of all these utilities is not known, the Contractor shall report location immediately upon discovery and exert all efforts to save the utilities harmless after discovery and during the prosecution of the work. Any damage occurring to any utility will be replaced at the expense of the Contractor.

3. GENERAL When construction and right-of-way lines have been established, the Engineers will designate all trees, shrubs or plants to remain and these shall be carefully preserved by the Contractor. All clearing and grubbing shall be done a satisfactory distance ahead of grading operations and grading will not be started until the area cleared and grubbed has been approved by the Engineers.

4. CLEARING All the surfaces of the right-of-way shall be completely cleared of perishable or objectionable vegetable matter and other obstruction, as herein defined, except such trees and shrubs which the Engineers designate to remain standing. All trees, brush and stumps within the limits of the project area to be cut, shall be cut sufficiently close to the ground to facilitate future mowing, except such trees and stumps that are to be grubbed, which may be cut to a convenient height for grubbing by bulldozer.

The contractor shall supply the location and assume all responsibility for the disposition of all cleared non-perishable debris.

If limb, bark or root injury should occur to any of the trees or shrubs designated to remain, the Contractor shall smooth any rough edges on the scarred areas in accordance with generally accepted horticultural practice and then cover the scars thoroughly with an asphaltum base tree paint.

5. GRUBBING Within the area of the construction lines, where excavation is to be made or embankment is to be placed, all trees, stumps, roots and other objectionable matter shall be grubbed out or otherwise completely removed and disposed of as hereinbefore indicated. When so directed, areas outside the construction lines in marshes or swampy sections shall be cleared of trees and the stumps cut off flush with the ground or at water level. All stumps, holes, and depressions caused by the grubbing operations that are below the finished surface of the roadway shall be back-filled to the level of the original ground and thoroughly compacted prior to the starting of grading operations.

6. OBSTRUCTIONS Every precaution shall be taken by the Contractor to preserve and protect all structures, fences, public and private utilities and improvements, above or below the ground, within the scope of the construction which are to remain.

The Contractor shall raze, remove and satisfactorily dispose of all buildings, structures, old curbs and gutter, sidewalks, fences, land other obstructions any portion of which is on the right-of-way, except those items hereinbefore indicated. Unless otherwise specifically directed, the substructure of a bridge and all culverts and minor structures shall be razed to the level of the adjacent ground or low water level. All material which has a salvage value shall be removed, without unnecessary damage, in sections or pieces which may be readily transported, and shall be piled by the Contractor at such places as may be designated. Disposition of unusable material shall be made in accordance with the disposal of debris, under Clearing.

All concrete pavement, base course, sidewalks, curbs, gutters, etc., designated for removal, shall be broken into "one man" stones and all such material, which is in excess of the quantity specified or ordered for use in the work, shall be stockpiled at designated locations for use by the Owner or otherwise disposed of when so directed.

7. BASIS OF PAYMENT This item will be paid for at the lump sum contract price bid for Clearing and grubbing, which price shall be full compensation for all work herein specified, including the furnishing of all materials, equipment, tools, labor and incidentals necessary to complete the work.

SITE EARTHWORK

PART 1: GENERAL

1.01 SCOPE OF WORK

A. The work covered by this section of the specifications consists of the excavation of all materials encountered within the limits of the work, the formation of embankments with all or part of the excavated materials, or the disposal of all or part of the excavated materials off the project limits at a location provided by the contractor. If required, it may also consist of the formation of embankments with selected Borrow Materials. Excavation and the formation of embankments shall be performed as shown on the plans or as designated by the engineer. Excavation for storm sewers, structures, etc., is not excavation as defined in this specification and is not paid for separately.

PART 2: MATERIALS

2.01 SELECTED BORROW MATERIAL

A. Selected Borrow Material shall conform to the Selected Borrow Material as specified in the “Granular Materials” specification.

PART 3: CONSTRUCTION

3.01 CONSTRUCTION STAKING

A. Construction staking on this project shall be provided by the Contractor. If the Contractor desires to implement the use of machine controls during the site grading activities, the engineer will make available the site surface CADD 3-D model, being a CAD file containing only the existing and finish grade contours.

3.02 CLEARING AND GRUBBING

A. Clearing and grubbing shall be performed as started in the “Clearing and Grubbing” specification.

B. Any obstructions which are designated to be removed or are in the way of construction shall be removed prior to the start of excavation. The contractor shall inform himself as to the proper movements of haul and disposal of materials. All removed items shall be disposed of as stipulated in the Clearing and Grubbing specification.

3.03 UNCLASSIFIED EXCAVATION

A. All excavated material, regardless of the type of material encountered, is defined as unclassified excavation and shall be included in the payments made under these specifications.

B. Unclassified excavation will be used in the formation of embankments, unless indicated otherwise.

C. Unclassified excavation, if not suitable or if not needed for embankments, shall be wasted on site or disposed of at a location off the project limits, provided by the owner. The disposal site shall be directly adjacent and accessible to the project site.

D. Unclassified excavation used in the formation of embankments and pads, shall be placed in successive horizontal layers of not more than 8 inches in loose depth. The contractor shall route his equipment at all times over the layers so as to distribute evenly the travel over the entire width. Each lift shall be compacted to 95 percent standard proctor density within two percent of optimum moisture content. Required densities may be estimated on a 100'x100' grid for each lift layer. In addition to other compaction requirements, as construction progresses and embankments or fill are being formed, the site shall be proof rolled with a loaded dump truck weighing at least 25 tons to detect any soft or loose (weak) soils. Proof-rolling shall be performed in the presence of the Engineer or field technician working under the direction of the Engineer.

E. The plans for this project will designate how the unclassified excavation is utilized.

F. Any material encountered during the execution of the work that will not permit satisfactory compaction for sub grade, shall be excavated as designated and approved by the Engineer. This unsuitable material shall be understood to be any material which, at the proper moisture content, cannot be processed to the required density and stability. When this material is encountered, it (at the direction of the Engineer) shall be excavated, and disposed of off the project limits at a site provided by the contractor. There will be no separate payment for this excavation.

3.04 SELECTED BORROW MATERIAL

A. When required by the plans, embankments and pads shall be formed of approved selected borrow material placed in successive horizontal layers of not more than 8 inches in loose depth for the full width of the cross-section. The contractor shall route his equipment at all times over the layers so as to distribute evenly the travel over the entire width. Each lift shall be compacted to 95 percent standard proctor density within two percent of optimum moisture content. Required densities may be estimated on a 100'x100' grid for each lift layer.

B. As construction progresses and embankments or fill are being formed, the site shall be proof rolled with a loaded dump truck weighing at least 25 tons to detect any soft or loose (weak) soils. Proof-rolling shall be performed in the presence of the Geotechnical Engineer or field technician working under the direction of the Geotechnical Engineer.

3.05 TOPSOIL EXCAVATION

A. Topsoil is defined on this project as all soft, wet, loose, organics, and other unsuitable miscellaneous materials remaining after site clearing operations. After all clearing operations on site and removal of trees, shrubs, bushes and other vegetation within the project area, topsoil material shall be removed from the project site as directed by the Engineer.

3.06 SUB GRADE PREPARATION

A. The top portion of the sub grade, both cut and fill sections, shall be shaped correctly and brought to a firm, unyielding layer. The top six (6) inches under the base course shall be compacted to at least 95 percent standard proctor method density at optimum moisture content.

B. Rolling and compaction of the entire area shall be done with equipment which will attain maximum results. Sheeps-foot, rubber-tired or flat rollers, or hand-tamping equipment shall be used as, in the opinion of the engineers, conditions require. Any portions of the area which are not accessible to a roller shall be compacted to the required density by other approved means.

C. Any irregularities or depressions that develop under rolling shall be corrected by loosening the material at those places and adding, removing or replacing material until the surface is smooth and uniform. All soft and yielding material which will not compact readily when rolled or tamped shall be removed as directed by the engineers and replaced with a suitable material.

D. During all compacting operations, the water content of the material shall be constantly adjusted, if necessary, by sprinkling or loosening and subsequent to within two (2) percent by weight of the optimum moisture content.

E. At all times the top of the sub grade shall be kept in such condition that it will drain readily and effectively. The contractor shall protect the sub grade from the damage, and in no case will vehicles be allowed to travel in a single tract. If ruts are formed, the sub grade shall be reshaped and rolled.

F. The top of the sub grade shall be of such smoothness that when tested, it shall not show any deviation in excess of one-half inch, nor shall it be more than 0.05 feet from the true established grade.

G. All materials shall be hauled from the original position to waste or the final position as directed. All haul shall be "free-haul", and there shall be no separate payment for haul of materials.

3.07 METHOD OF MEASUREMENT

A. The contractor must refer to the typical sections and grading plans provided for the proper construction of the project.

B. All quantities indicated as "Plan Measure" will be paid for at the contract price bid per unit measured, taken from the theoretical volumes as calculated from the lines and grades on the plans. Plan Measure quantities will not be overrun or underrun unless the item has been affected by a related change order or a change to the lines and grades on the plans. Plan Measure quantities do not require field measurements; therefore, any potential payment discrepancies have to be based on field-verified survey data as provided by the contractor. Based on such field verifications approved by the Engineer, adjustments to Plan Measure quantities may be made.

3.08 BASIS OF PAYMENT

The following Basis of Payment will apply to Unit Price contracts only. Where any or all of these items are parts of a Lump Sum contract amount or item, the Basis of Payment will not apply.

A. When, in opinion of the engineer, the Unclassified Excavation is completed according to the Plans and Specifications, Unclassified Excavation will be paid for at the contract price bid per Cubic Yard (Plan Measure), unless otherwise indicated, with no shrinkage factors or adjustments applied, which price shall be full compensation for the Excavation of all materials encountered, and for the formation of embankments with Excavated material.

B. When topsoil excavation has been completed according to the plans and specs, for on-site material as directed by the Engineer, specified topsoil excavation will be paid for at the contract unit price bid per Cubic Yard (Plan Measure), with no shrinkage factors or adjustments applied.

C. The payments for work under this specification shall include all materials, equipment, and labor for performing all items of work called for under this specification. **Where any or all of these items are parts of a Lump Sum contract amount or item, the Basis of Payment will not apply.**

Payment will be made under:
Unclassified Excavation (No Shrinkage) (Plan Measure) per Cubic Yard
Borrow Excavation (No Shrinkage) (Plan Measure) per Cubic Yard

WATTLES

PART 1: GENERAL

1.01 SCOPE OF WORK

A. This work consists of furnishing, constructing and maintaining wattles for the retention of soil around inlets, swale areas, small ditches, sediment basins and other areas as necessary. Also, the work includes removing and disposing of the wattles and silt accumulations.

B. Measurement and payment for wattles will be made only when a pay item is included in the bid schedule of the proposal. The quantity is estimated for bidding purposes only and will be dependent upon actual conditions which occur during construction of the project.

PART 2: MATERIALS

A. Wattles used shall have a minimum diameter of twenty inches (20″) and a length adequate to meet field conditions. The stakes in securing the wattles in place shall be placed approximately three feet (3′) apart throughout the length of the wattle. Stakes shall be wooden and of adequate size to stabilize the wattles to the satisfaction of the engineer.

PART 3: EXECUTION

3.01 GENERAL

A. The wattles shall be constructed at the locations directed by the engineer during construction.

3.02 MAINTENANCE AND REMOVAL

A. The Contractor shall maintain the wattles and dispose of silt accumulations.

B. When the wattles are no longer needed, they shall be removed and the contractor shall dispose of silt accumulations and treat the disturbed areas in accordance with the contract requirements.

3.03 METHOD OF MEASUREMENT

A. Wattles of the size specified will be measured per linear foot.

3.04. BASIS OF PAYMENT

A. Wattles, measured as prescribed above, will be paid for at the contract unit price per linear foot, which price shall be full compensation for installation, maintaining and removal of the wattles, the removal and disposal of accumulations and any required restoration of the disturbed areas. **Where this item is a part of a lump sum contract or item, this Basis of Payment will not apply.**

GEOTEXTILE FABRIC
FOR ROADWAY STABILIZATION

PART 1: GENERAL

1.01 SCOPE OF WORK

A. The work under this item shall consist of furnishing and placing Geotextile Fabric as shown on the plans and as designated in this specification.

PART 2: MATERIALS

2.01 GEOTEXTILE FABRIC

A. The Geotextile Fabric shall conform to Type V as specified in Table I of SECTION S-714.13 - Geotextiles of the "Mississippi Standard Specifications for State Aid Road and Bridge Construction," latest edition.

B. **The Geotextile Fabric shall be Non-Woven**.

PART 3: CONSTRUCTION

3.01 GEOTEXTILE FABRIC

A. The placement of the Geotextile Fabric shall conform to the "Mississippi Standard Specifications for State Aid Road and Bridge Construction", latest edition.

3.02 METHOD OF MEASUREMENT

A. The quantity of Geotextile Fabric to be paid for shall be measured by the following method. The area of coverage called for on the plans or as directed by the Engineer shall be field measured and the area of coverage, in square yards, without regard to laps, will be the quantity for payment. Any material placed contrary to direction will not be measured for payment.

3.03 BASIS OF PAYMENT

A. The Geotextile Fabric will be paid for at the contract unit price bid, per square yard, for the amount placed as specified and approved. This payment shall be full compensation for furnishing all materials, labor, and incidentals for a completed product.

STONE RIPRAP

PART 1: GENERAL

1.01 SCOPE

A. This item shall consist of the construction of a protective covering of stone riprap, along the slopes of embankments, around culvert inlets and outlets, around culvert headwalls, on slopes and bottom of ditches, or at other locations as indicated on the drawings or as directed, in accordance with these specifications and in conformity with the lines, grades and dimensions shown on the plans, or as established.

PART 2: MATERIALS

2.01 STONE RIPRAP

A. Aggregate for stone riprap shall consist of rough, unhewn, dense amorphous quarry stone, resistant to the action of air and water. The stone shall be as nearly rectangular in section as practicable and shall be suitable in all other respects for the purpose intended. The material must be well graded with the smaller stones such that a homogeneous blanket of stone riprap will result will all interstices reasonably well filled with rock.

B. The Gradation of the Stone Riprap shall be as follows:

Percentage Larger Than
(By weight of the mass)

Stone Weight (lbs.)	300 Lb. Stone Riprap	200 Lb. Stone Riprap	100 Lb. Stone Riprap
300	0	--	--
200	--	0	--
100	--	--	0
60	80	--	--
40	--	80	--
20	90	--	80
10	--	90	--
5	--	--	90

2.02 GEOTEXTILE FABRIC

A. Geotextile Fabric for use under the stone riprap shall conform to the physical requirements of Type "V" in Table 1 of Section 714.13.11 of the Mississippi Standard Specifications for State Aid Road and Bridge Construction, 2004 Edition.

PART 3: EXECUTION

3.01 GENERAL

A. Prior to the placement of the stone riprap, shape the slopes or ground surface to the lines and grades indicated on the plans or as directed and thoroughly compact the slopes. Unless otherwise stipulated, or directed, slopes shall not be steeper than the natural angle of repose of the material upon which the riprap is to be placed. Form the outer edges and the top of the stone riprap where the construction terminates so that the surface of the stone riprap will be embedded and even with the surface of the adjacent slope or ground, and on slopes, place the bottom of the stone riprap at least 2 feet below the natural ground surface, unless otherwise directed.

B. A layer of Geotextile Fabric shall be placed under the stone riprap.

3.02 CLEANING UP

A. Upon completion of the work, clean the surface of the stone riprap and remove and dispose of surplus material and debris. Leave the site of the work in a neat and presentable condition.

3.03 METHOD OF MEASUREMENT

A. Stone Riprap, of the size specified, will be measured in tons (2000 pounds) or fraction thereof. Actual and approved weight tickets will determine the amount. Stone Riprap placed contrary to directions will not be paid for.

3.04 BASIS OF PAYMENT

A. The following Basis of Payment will apply to unit price contracts only. Where this item is a part of a Lump Sum Pay item or contract, this Basis of Payment will not apply.

B. Work under this item will be paid for at the contract unit price per ton for Stone Riprap, complete in place and accepted, which price shall be full compensation for furnishing, hauling and placing all riprap materials, for furnishing and placing the geotextile fabric, for all excavation, subgrade preparation, backfilling and for

all materials, equipment, tools, labor and incidentals necessary to complete the work.

C. Geotextile Fabric under Riprap will be paid for at the contract unit price bid, for the amount placed as specified and approved.

GRANULAR MATERIALS

PART 1: GENERAL

1.01 SCOPE OF WORK

A. This item shall consist of the provision of crushed stone, selected borrow material, washed gravel and clay gravel for incorporation into the work as specified elsewhere or directed.

B. The Contractor shall furnish certified test reports of the proposed materials and gradations prior to incorporation into the work.

PART 2: MATERIALS

2.01 CRUSHED STONE

A. Crushed Stone shall consist of fragments of sound, durable limestone, free from disintegrated stone, salt, alkali, vegetable matter, or adherent coatings and other deleterious substances; and shall be reasonably free from thin or elongated pieces. The percentage of wear shall not exceed 50%.

B. The gradation of the crushed stone shall be as follows:

TYPE	FINE	MEDIUM	COARSE	CRUSHER RUN
Square Opening Sieves			Percent Passing (by weight)	
3-inch	-----	-----	100	-----
2 inch	-----	-----	60-70	-----
1-1/2 inch	-----	-----	-----	100
1-1/4 inch	-----	100	5-40	-----
1 inch	-----	90-100	0-10	90-100
3/4 inch	100	20-60	-----	-----
1/2 inch	95-100	0-10	-----	-----
3/8 inch	45-90	-----	-----	45-85
No. 4	0-15	0-3	-----	30-65
No. 16	0-3	-----	-----	-----
No. 40	-----	-----	-----	15-30
No. 200	-----	-----	-----	4-15

2.02 SELECTED BORROW MATERIAL

A. Selected Borrow Material shall be a mixture of sand and clay and shall contain sufficient binder material, natural or processed, to produce a uniform mixture

complying with the requirements of these specifications. The materials shall be uniform and free of organic matter such as leaves, grass, roots, and other objectionable or foreign substances.

B. The gradation of the natural or processed material shall be as follows:

Square Opening Sieves	Percent Passing (by weight)
No. 10	100
No. 40	20 - 100
No. 60	15 - 100
No. 200	6 - 40

C. The material shall have a plasticity index of at least 6 and no more than 16 and have a liquid limit of not more than 36. (Local clean pit run topping-like material will normally meet this specification.)

2.03 WASHED GRAVEL

A. Washed Gravel shall be composed of hard, tough, durable particles reasonably free of injurious or deleterious substances. The percentage of wear shall not exceed 50%.

B. The gradation and characteristics of the washed gravel shall be as follows:

Square Opening Sieves	Percent Passing (by weight)
2-inch	100
1-1/2 inch	90-100
1inch	80-100
3/4 inch	55-100
1/2 inch	35-80
3/8 inch	12-65
No. 4	5-30
No. 10	0-8

2.04 CLAY GRAVEL

A. Clay Gravel shall be composed of natural or artificial mixtures of aggregates and soil mortar so proportioned as to meet all the requirements as hereinafter specified.

B. The coarse aggregate (material retained on the No. 10 sieve) shall consist of hard, durable particles of uncrushed gravel and shall be free from vegetable or other

deleterious substances. The percentage of wear shall not exceed 50%.

C. The binder portion of the surface material (that portion passing the No. 10 sieve) shall be composed of a natural or artificial mixture of natural quartz sand combined with silt and clay.

D. The gradation of the coarse aggregate shall be as follows:

Square Opening Sieves	Percent Passing (by weight)
3"	100
1-1/2"	85-100
1"	65-100
1/2"	35-90
No. 4	30-75
No. 10	30-55

E. The gradation of the binder material shall be as follows:

Square Opening Sieves	Percent Passing (by weight)
No. 10	100
No. 40	20-90
No. 60	15-80
No. 200	8-40

E. The binder material shall have a plasticity index of not more than 10 and have a liquid limit of not more than 30.

2.05 TOP SOIL

A. Topsoil material from offsite sources provided by the Contractor shall be a well-graded soil of good uniform quality, without detrimental admixture of subsoil, refuse, or foreign material and reasonably free of hard clods, stones, cement, brick, slag, concrete, sticks, or other undesirable material harmful to plant life.

B. It shall have a pH value of not less than 4.5 nor more than 8.0, and shall be classified as a group A-4 or A-6 soil with a minimum PI 6.0 as specified by AASHTO Designation: M 145. Sampling and test results from the source of supply must be approved by the Engineer prior to the use of any offsite topsoil material furnished by the Contractor.

PART 3: EXECUTION

3.01 TESTS

A. Sampling and testing shall be in accordance with the following standard methods of the AASHTO: Sampling, T-2; Sieve Analysis, T-27; Liquid Limit, T-89; Plasticity Index, T-90.

B. The loss by abrasion test shall be as specified under AASHTO Test T-96.

C. Sampling and testing to determine the pH shall be by MT-30 or other approved method by the Engineer.

3.02 SOURCE OF SUPPLY

A. Obtain approval of sources of supply of all materials prior to delivery of any material. Submit samples of each as directed.

3.03 BASIS OF PAYMENT

A. Granular Materials is a reference specification. Payment will be made as set out in each item specification.

CRUSHED LIMESTONE

PART 1: GENERAL

1.01 SCOPE OF WORK

A. This work shall consist of constructing a dense graded crushed limestone base on a prepared subgrade in accordance with the requirements of these specifications and in reasonably close conformity with the lines, grades and thicknesses, shown on the plans.

PASRT 2: MATERIALS

2.01 MATERIAL REQUIREMENTS

A. **Crushed limestone shall conform to the size noted on the Construction Drawings and/or Bid Form as specified in the "Granular Materials" specifications.**

B. Crushed limestone must be placed in its required location when it is delivered to the job site. No stockpiling of crushed limestone will be allowed unless approved in writing by the engineer. Crushed limestone will not be paid for as stored materials.

PART 3: EXECUTION

3.01 SUBGRADE PREPARATION

A. The top portion of the subgrade, both cut and fill sections, shall be shaped correctly and brought to a firm, unyielding layer. The top 6 inches shall be compacted to at least 95% Standard Proctor Method density at optimum moisture content.

B. Rolling and compaction of the entire area shall be done with equipment which will attain maximum results.

C. Any irregularities or depressions that develop under compaction shall be corrected by loosening the material at those places and adding, removing, or replacing material until the surface is smooth and uniform. All soft and yielding material which will not compact readily shall be removed and replaced with suitable material.

D. During all compaction operations, the water content of the material shall be constantly adjusted, if necessary, by sprinkling or loosening and subsequent evaporating to within 2% by weight of the optimum moisture content.

E. At all times the top of the subgrade shall be kept in such condition that it will drain readily and effectively. The Contractor shall protect the subgrade from

damage, and in no case will vehicles be allowed to travel in a single track. If ruts are formed, the subgrade shall be reshaped and rolled.

F. The top of the subgrade shall be of such smoothness that when tested, it shall not show any deviation in excess of 1/2 inch nor shall it be more than 0.05 foot from the true established grade.

G. Where material is encountered that will not permit satisfactory compaction for subgrade, excavation, disposal and replacement for this material will be required and will be considered as incidental to subgrade preparation. No extra pay will be allowed for this item.

3.02 CONSTRUCTION

A. Spreading, Compacting and Finishing

1. Crushed limestone base course shall be constructed in layers not to exceed 8 inches in compacted thickness. The first layer shall be constructed upon a layer of geotextile fabric on an approved underlying course. In constructing any required subsequent layer of the stone base the previously laid layer(s) shall have been constructed in accordance with these specifications and shall have been maintained free of all ruts or irregularities and loose material and at the proper moisture content.
2. Spreading, shaping and compacting of the crushed stone shall be performed during daylight hours only.
3. To facilitate the bond between layers of the crushed stone base, subsequent layer(s) shall be placed upon previously placed layers as soon as practicable.
4. The contractor shall avoid cutting into the underlying completed course or layer at any time, and by any method. He shall be responsible for maintaining the proper moisture content in the material including the vertical faces of half width spreads of construction.
5. Compacting shall begin promptly after satisfactory spreading of the material and while moisture content is at optimum.
6. The density of the completed portions of each layer of the base course shall be 95% Standard Proctor density.
7. When completed the base course layers shall be smooth, hard, dense, unyielding, and well bonded. It shall be the Contractor's responsibility to:
    a. Maintain optimum moisture content by reducing or accelerating loss of moisture.
    b. Make adjustments as necessary to meet thickness, line, grade, and density requirements.
    c. Minimize segregation or degradation of aggregates.
    d. Remove from the site and for the full layer depth any materials found to be unsatisfactory and replace with satisfactory material.
    e. Avoid cleavage lines in the base.
    f. Insure a completed base course meeting all requirements of these specifications.

B. Limitation

1. No stone shall be place upon an underlying course, or layer, when such course is or layer is frozen, rutted or otherwise deformed, nor when it is not to the required grade and cross section and does not have the proper moisture content and required density.
2. No stone shall be placed when the atmospheric temperature is below 35 degrees F. or when the latest weather bulletin indicates the probability of freezing temperatures within 12 hours in the area in which the project is located.
3. No stone shall be placed when over 10 percent of the stone placed in the previous day's operation fails to meet specified requirements for surface finish or density until the Contractor has made such adjustments or changes in equipment, operating procedure, and methods as are necessary to assure the securing or required results.

3.03 METHOD OF MEASUREMENT

A. When in the opinion of the Engineers the Crushed Limestone base course is completed in accordance with the plans and specifications, the quantity for payment will be measured by the following method. The total area of placement of the Crushed Limestone as shown on the plans or as directed by the Engineer will be measured along neat lines and multiplied by the depth required to be placed in that area. The resultant volume in cubic yards (with no shrinkage allowed) will be the quantity for payment.

B. All quantities indicated as “Plan Measure” will be paid for at the contract price bid per unit measured, taken from the theoretical volumes as calculated from the lines and grades on the plans. Plan Measure quantities will not be overrun or underrun unless the item has been affected by a related change order or a change to the lines and grades on the plans. Plan Measure quantities do not require field measurements; therefore, any potential payment discrepancies have to be based on field-verified survey data as provided by the contractor. Based on such field verifications approved by the Engineer, adjustments to Plan Measure quantities may be made.

3.04 BASIS FOR PAYMENT

A. The following Basis of Payment will apply to Unit Price Contracts only. **Where work under this division is a part of Lump Sum Item or Lump Sum Contract, the Basis of Payments will not apply.**

B All quantities indicated as “Plan Measure” will be paid for at the contract price bid per unit measured, taken from the theoretical volumes as calculated from the lines and grades on the plans. Plan Measure quantities will not be overrun or underrun unless the item has been affected by a related change order or a change to the lines and grades on the plans. Plan Measure quantities do not

require field measurements; therefore, any potential payment discrepancies have to be based on field-verified survey data as provided by the contractor. Based on such field verifications approved by the Engineer, adjustments to Plan Measure quantities may be made.

C. The completed and accepted crushed limestone base course, will be paid for at the contract unit price bid per Cu.Yd., which price shall be full compensation for furnishing stone aggregates and water for freight and unloading; for all proportioning, mixing, loading, hauling, spreading, watering, compacting, curing, protecting and maintaining; for replacing defective areas, if required; and for all equipment, tools, labor, and incidentals necessary to complete the work.

D. Payment will be made as the following per size:
Crushed Limestone (Size) per Cu. Yd.
Crushed Limestone, (Size ¾" & Down) (Remove and Relay)
Water will not be measured for separate payment.

CONCRETE STRUCTURES

(CONCRETE HEADER CURB, CONCRETE PAVED DITCHES, & CONCRETE MINOR STRUCTURES)

1. SCOPE This item shall consist of the placement of Concrete Header Curbs, Concrete Paved Ditches, Concrete Inlets, Concrete Junction Boxes, and Concrete Aprons and other structures in accordance with the sections as to the dimensions and grades shown on the plans. Concrete and Reinforcing shall be as specified under the "Concrete and Reinforcing" specification.

2. PREPARING SUBGRADE The subgrade upon which these items are constructed shall be compacted to a firm and uniform density and grade. Subgrade compaction shall reach at least 95% Standard Proctor Method density at optimum moisture content. It is the Contractor's responsibility to provide a stable and unyielding foundation for the structures.

3. PLACING AND FINISHING Concrete shall be placed in forms sufficiently strong to prevent any lateral deflection. All concrete and reinforcing work shall conform to the "Concrete and Reinforcing" specification.

4. CONCRETE HEADER CURB Templates for curb shall be set in a manner so that no deflection of the forms will occur. The concrete shall be placed in the forms to the final depth required and shall be tamped and spaded until it is consolidated and mortar entirely covers and forms the top surface. The exposed surfaces of the concrete shall be floated smooth and the edges rounded using standard procedures. Before the concrete is given the final finishing, the surface shall be tested with a straight-edge, and the irregularities of more than 1/4 inch in length of the placement shall be eliminated.

5. CONCRETE INLETS, BOXES & STRUCTURES Concrete Inlets, Boxes, and Structures shall be constructed at the locations shown on the plans and in accordance to the details and standard drawings included in the plans.

6. CONCRETE PAVED DITCHES & APRONS Concrete Paved Ditches and Aprons shall be constructed at the locations shown on the plans and in accordance to the details shown in the plans and in accordance with the specifications. The ditches and aprons shall provide positive drainage to the intended termination points.

7. BACKFILL After the concrete has set sufficiently, the spaces adjacent to and behind the structures shall be backfilled to the required elevation shown on the plans or as directed by the Engineer. The backfill material may be on site material or it may be a sandy clay material with a maximum plasticity index of 10 and a maximum liquid limit of 30. There is no separate payment for the furnishing, placing, and compacting of this material. Back slopes shall be graded to present well

drained, pleasing slopes.

8. BASIS OF PAYMENT Payment for work included in this section of the specifications will be made as stated below. These specifications and details shown on the plans shall take precedence over any reference to pay items, measurement for payments, or basis of payments on the MDOT or Office of State Aid Standard Drawings.

Payment for Concrete Header Curb will be made at the contract unit price bid, per linear foot, for the amount of curb actually installed and accepted. Payment for this work shall include all materials, equipment, and labor for a completed project.

Payment for Concrete Paved ditches and Concrete Aprons will be made at the contract unit price bid, per cubic yard for Paved Ditch Concrete, which price shall be full compensation for all excavation, backfill, materials, equipment, and labor required for a completed project.

Payment for Concrete Structures, Inlets, Junction Boxes, and other structures will be made at the contract unit price bid, per cubic yard for Minor Structure Concrete, which price shall be full compensation for all excavation, backfill, materials, connections, equipment, and labor required for a completed project.

Payments will be made under:

Concrete Header Curb ..... per Lin. Ft.

Paved Ditch Concrete ..... per Cubic Yard

Minor Structure Concrete ..... per Cubic Yard

Reinforcing steel will not be paid for separately.

Grates and Frames, Manhole Tops and Rings, etc., will not be paid for separately

Payment for any items of work called for in the plans or in the specifications for which there is no pay item shall be absorbed in the cost for other items.

SOLID SODDING

1. SCOPE This item shall consist of furnishing and planting Bermuda and Carpet grass sod so as to provide a complete cover on the areas shown on the plans or designated by the Engineers to be sodded.

2. MATERIALS Sod shall be native to the locality of the work and shall when placed be live, fresh, growing grass with at least two (2) inches of soil adhering firmly to the roots. The sod shall be reasonably free from obnoxious weeds or other grasses, or which might affect its subsistence or hardiness when transplanted. The sod shall be in blocks at least 8" x 8", preferably 12" x 12".

3. PROCURING AND HANDLING SOD All sod shall be procured from areas where the soil is fertile and contains a high percentage of loamy topsoil, and from areas that have been grazed or mowed sufficiently to form a dense turf.

Mechanical devices, such as sod cutters, may be used for cutting the sod into strips or blocks. Care shall be exercised at all times to retain the native soil on the roots of the sod during the process of excavating, hauling and planting.

The sod blocks shall be transplanted within twenty-four (24) hours from the time of cutting, unless they are stacked at their destination in a manner satisfactory to the Engineer. All sod stacks shall be kept moist and protected from exposure to the air and sun, and from freezing.

In no event shall more than two (2) days elapse between the cutting and planting of the sod.

4. CONDITIONING OF AREA TO RECEIVE SOLID SODDING Before placing or depositing sodding upon any area, all shaping and dressing of such areas shall have been satisfactorily completed.

5. GROUND PREPARATION AND FERTILIZER The area to be sodded shall be prepared to a loose, moist condition. The surface shall be smooth, uniform and true to line and cross-section. Apply and incorporate 2 lb. 13:13:13 commercial fertilizer per 100 square feet of sod area.

6. PLANTING SOD Solid sod shall be placed on the prepared surface with the edges in close contact. All cracks between blocks of sod shall be closed with small pieces of fresh sod, and all cracks too small for sod shall be filled by a light dressing of topsoil. Alternate sod blocks shall be suitably pegged to prevent erosion prior to establishment of the turf. The entire sodded area shall then be compacted and watered to the satisfaction of the Engineers. Rollers, or other approved equipment may be used for compacting.

7. LIMITATIONS Sodding shall be done during the period between March 1 and November 15, unless written permission is given by the Engineers to extend the planting season during the dormant season.

8. MAINTENANCE The Contractor shall maintain the sodding until final acceptance of the project. Maintenance shall consist of preserving, protecting, replacing, and such work as may be necessary to keep the sod in a satisfactory condition.

The Contractor shall be responsible for satisfactory growth of the grass, and until final acceptance he will be required to water and mow the grass at such intervals as will insure a living and growing sod at the time of acceptance. A "living and growing sod" shall be interpreted to include sod that is seasonably dormant during the cold or dry season with roots that have taken hold in the topsoil and capable of growing off after the dormant period.

9. BASIS OF PAYMENT This item will be paid for at the contract unit price bid per square yard for solid sodding which price shall be full compensation for furnishing, planting, and maintaining the sod until acceptance of the contract; ground preparation, fertilizing, watering, and all materials, equipment, tools, labor and incidentals necessary to complete the work. **Where this item is a part of a lump sum contract or item, this Basis of Payment will not apply.**

SECTION 805 – REINFORCEMENT

S-805.01 – Description. This work shall consist of furnishing and placing steel reinforcement for bridges in accordance with these specifications and in reasonably close conformity with the dimensions, bending, spacing, and other requirements shown on the plans.

S-805.02 – Materials. Materials used shall conform with the requirements of S-711.

Supports for bar reinforcement shall meet the requirements of S-711.02.7.

S-805.02.1 – Order Lists. Before ordering reinforcement, all Order Lists and bending diagrams shall be furnished by the Contractor for the approval of the Engineer, and no materials shall be ordered until the lists and bending diagrams have been approved. The approval of Order Lists and bending diagrams by the Engineer shall in no way relieve the Contractor of responsibility for their correctness. All expense incidental to the revision of material furnished in accordance with such lists and diagrams to make it comply with the design drawings shall be borne by the Contractor.

Order Lists for box bridges shall conform to the provisions and requirements of S-602.

S-805.03 – Construction Requirements.

S-805.03.1 – Protection of Material. Steel reinforcement shall be protected at all times from damage. Damaged material will not be approved for use in the work. When placed in the work and immediately prior to placing the concrete, the reinforcement shall be free from dirt, oil, paint, grease, and other foreign substances and shall be free of loose or thick rust or mill scale which could impair bond of the steel with the concrete.

S-805.03.2 – Fabrication. Bent-bar reinforcement shall be cold bent to the shapes shown on the plans, and unless otherwise provided on the plans or by authorization, bends shall be made in accordance with S-711.02. Bars partially embedded in concrete shall not be field-bent except as shown on the plans or permitted.

Bar reinforcement shall be shipped in standard bundles and tagged and marked in accordance with the Code of Standard Practice of the Concrete Reinforcing Steel Institute.

S-805.03.3 – Placing and Fastening. Reinforcement shall be accurately placed in the positions shown on the plans and firmly held during the placing and setting of concrete.

Bars shall be tied at all intersections; except where spacing is less than 1 foot in each direction, alternate intersections shall be tied.

Distances from the forms shall be maintained by means of stays, blocks, ties, hangers, or other approved supports. Blocks for holding reinforcement from contact with the forms shall be precast mortar blocks of approved shape and dimensions or approved metal chairs. Layers of bars shall be separated by precast mortar blocks or by other equally suitable devices. The use of pebbles, pieces of broken stone or brick, metal pipe, or wooden blocks will not be permitted. The clear distance between parallel bars (except in columns and between multiple layers of bars in beams) shall not be less than the nominal diameter of the bars, 1-1/3 times the maximum size of the coarse aggregate, nor 1 inch.

Where reinforcement in beams or girders is placed in two or more layers, the clear distance between layers shall not be less than 1 inch, and the bars in the upper layers shall be placed directly above those in the bottom layer.

In spirally reinforced and in tied columns, the clear distance between longitudinal bars shall not be less than 1-1/2 times the bar diameter, 1-1/2 times the maximum size of the coarse aggregate, nor 1-1/2 inches.

The clear distance between bars shall also apply to the clear distance between a contact splice and adjacent splices or bars.

Reinforcement in any member shall be inspected and approved by the Engineer before the placing of concrete begins. Concrete placed in violation of this provision may be rejected and removal and replacement of concrete and reinforcement required.

If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.

S-805.03.4 – Splicing of Bars. All reinforcement shall be furnished in the full lengths indicated on the plans. Splicing of bars, except when shown on the plans, will not be permitted without the written approval of the Engineer. Splices shall be staggered insofar as possible.

The minimum distance to the surface of the concrete shall be as specified on the plans. Reinforcement shall not be welded except if detailed on the plans or if authorized by the Engineer in writing.

Welding shall conform to the current American Welding Society specifications, Recommended Practices for Welding Reinforcement Steel, Metal Inserts, and Connections in Reinforced Concrete Construction.

S-805.03.5 – Lapping of Mesh or Mats. Sheets of mesh or bar mat reinforcement shall overlap each other sufficiently to maintain a uniform strength and shall be securely fastened at the ends and edges. The edge lap shall not be less than one mesh in width.

S-805.03.6 – Substitutions. Substitutions of different size bars will be permitted only with specific authorization by the Engineer. If steel is substituted, it shall have an area equivalent to the design area or larger.

S-805.03.7 – Epoxy-Coated Bars.

S-805.03.7.1 – Repair of Damaged Epoxy Coating. When required, damaged epoxy coating shall be repaired with patching material conforming to ASTM Designation A 775. Repair shall be done in accordance with the patching material manufacturer's recommendations.

S-805.03.7.2 – Handling of Epoxy-Coated Bars. The Contractor shall use padded or nonmetallic slings and padded straps to protect the coated reinforcement from damage. The bundled bars shall not be dropped or dragged and must be stored on wooded cribbing. If, in the opinion of the Engineer, the coated bars or plates have been damaged as a result of the Contractor's negligence, the material will be rejected. The Contractor may propose, for the approval of the Engineer, alternative precautionary measures.

S-805.03.7.3 – Placing of Epoxy-Coated Bars. Epoxy-coated reinforcing bars supported from formwork shall rest on coated wire bar supports, or on bar supports made of dielectric material or other acceptable materials. Wire bar supports shall be coated with dielectric material for a minimum distance of 2 inches from the point of contact with the epoxy-coated reinforcing bars. In walls having reinforcing bars, spreader bars where specified by the Engineer shall be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing bars shall be made of corrosion resistant material. Epoxy-coated reinforcing bars shall be fastened with nylon-, epoxy-, or plastic-coated tie wire or other acceptable materials.

Compensation

S-805.04 – Method of Measurement. Steel reinforcement incorporated in bridge concrete and accepted will be measured in pounds based on the total computed weight for the sizes and lengths of bars, mesh, and mats shown on the plans or authorized by the Engineer. Reinforcement for box-bridge concrete will be measured and paid for in accordance with S-602.

Epoxy-coated reinforcement bars, not included in other pay items, will be measured in pounds based on the computed weight from the theoretical weight of plain round bars of the same nominal size as shown in Table 711-I.

The weight of mesh will be computed from the theoretical weight of plain wire. If the weight per square foot is given on the plan, that weight will be used.

The weight of plain or deformed bars, or bar mat, will be computed from the theoretical weight of plain round bars of the same nominal size as shown in Table 711-I.

The weight for payment of structural steel reinforcement, incorporated into the work and accepted, will be the theoretical weight of the material used.

The weight of reinforcement used in railings measured on a linear foot basis will not be measured for separate payment. The weight of reinforcement in precast piles and other items where the reinforcement is included in the contract price for the item will not be measured.

No allowance will be made for clips, wire, separators, wire chairs, and other material used in fastening the reinforcement in place. If bars are substituted upon the Contractor's request and as a result more steel is used than specified, only the bars specified will be measured for payment.

When splices other than those shown on the plans are made for the convenience of the Contractor, the extra steel will not be measured.

When shown on the plans or ordered, reinforcement placed in connection with steel pile encasement in concrete will be measured in pounds. Measurement of reinforcement will be based on field measurement to determine the approved encased length. The quantity of reinforcement per linear foot of encased piling shall be as indicated on the applicable contract drawing(s).

S-805.05 – Basis of Payment. Reinforcement will be paid for at the contract unit price per pound, which shall be full compensation for completing the work specified.

Reinforcement for pile encasement will be paid for at the contract unit price per pound. The weight of reinforcement to be paid for shall be calculated by multiplying the total approved length of piling encased by the weight per linear-foot quantity as set forth on applicable contract drawing(s).

Payment will be made under the following pay items:

Table 805-I: Section 805 Basis of Payment

Pay Item Number	Pay Item	Basis
S-805-A	Reinforcement	Per Pound
S-805-B	Reinforcement, Epoxy-Coated	Per Pound

SECTION 804 – CONCRETE BRIDGES AND STRUCTURES

S-804.01 – Description. This work shall consist of constructing concrete bridges and structures in accordance with these specifications and in reasonably close conformity with the dimensions, designs, lines, and elevations indicated on the plans or established by the Engineer.

Construction of box bridges shall be in accordance with S-601 and S-602.

S-804.02 – Material.

S-804.02.1 – General. Concrete produced and controlled from this specification shall be accepted upon proper certification of concrete production through an approved quality control program and verification by job site acceptance criteria. The Contractor shall develop and implement a quality control program that will be used to maintain the required properties of concrete. Quality control and acceptance shall be achieved by individual test results. For projects less than or equal to 200 cubic yards, refer to the requirements of State Aid's SOP SA-II-3-7.

The materials for concrete bridges and structures, when sampled and tested in accordance with S-700.03, shall meet the requirements of the following subsections:

Portland Cement	S-701.01 and S-701.02
Admixtures	S-713.02
Fly Ash	S-714.05
Water	S-714.01.1 and S-714.01.2
Fine Aggregate	S-703.02
Coarse Aggregate	S-703.03
Curing Materials	S-713.01
Joint Materials	S-707.01, S-707.02, and S-707.07
Structural Steel Joints and Bearing Devices	S-717.01
Sheet Copper	S-716.07.2
Bronze Bearing Devices	S-716.06
Copper-Alloy Bearing Devices	S-716.07.1
Self-Lubricating Bearing Plates	S-716.08
Bearing Pads	S-714.10

Wire Rope or Wire Cable for Prestressed Concrete..... S-700.01 and S-711.03

Sprayed Finish for Concrete Surface.... S-714.12

Reinforcing Steel S-711.02

S-804.02.2 – Use, Care, and Handling. The use, care, and handling of materials shall conform to the specific requirements of S-804.02.4 and S-804.02.5. Unless otherwise authorized, only fine aggregate or coarse aggregate of one type and from the same source shall be used in the construction of any one unit of a structure. Should the Contractor, with written permission of the Engineer, elect to substitute high-early-strength cement for cement of the type specified, the Contractor will not receive additional compensation for the substitution.

S-804.02.3 – Sampling and Testing. Sampling and testing shall meet the requirements of these specifications.

S-804.02.4 – Care and Storage of Concrete Aggregates. The handling and storage of aggregates shall be such as to prevent segregation or contamination with foreign materials. The Engineer may require that aggregates be stored on separate platforms at satisfactory locations.

When specified, coarse aggregates shall be separated into two or more sizes in order to secure greater uniformity of the concrete mixture. Different sizes of aggregate shall be stored in separate stockpiles sufficiently removed from each other to prevent the material at the edges of the piles from becoming intermixed.

S-804.02.5 – Storage of Cement. All cement shall be stored in suitable weatherproof buildings or bins. These buildings or bins shall be placed in locations approved by the Engineer. Provision for storage shall be ample, and the shipments of cement as received shall be stored separately or other provisions made to the satisfaction of the Engineer for easy access for the identification, inspection, and sampling of each shipment as deemed desirable. Stored cement shall meet the test requirements at any time after storage when a retest is ordered by the Engineer.

On small jobs, open storage consisting of a raised platform and ample waterproof covering may be permitted by written authorization from the Engineer.

When specified, the Contractor shall keep accurate records of deliveries of cement and of its use in the work. Copies of these records shall be supplied in the form required by the Engineer.

S-804.02.6 – Classification and Uses of Concrete. When a specific class of concrete is not specified on the plans or in the contract documents, the structure

or parts thereof shall be constructed with the class of concrete as directed by the Engineer.

The classes and their uses are as follows:

Table 804-I: Classification and Uses of Concrete

Class	Use
Class AA	Concrete for bridge construction and concrete exposed to seawater
Class A	No longer used
Class B	General use, heavily reinforced sections, cast-in-place concrete piles, and conventional concrete piles
Class BB	Box Bridge Concrete
Class C	Massive sections or lightly reinforced sections
Class D	Massive unreinforced sections and riprap
Class DS	Drilled shaft concrete
Class F	Concrete for prestressed members
Class FX	Extra-strength concrete for prestressed members, as shown on plans
Class S	For all seal concrete deposited under water

S-804.02.7 – Composition of Concrete. The composition of concrete mixtures shall meet the requirements of these specifications.

S-804.02.8 – Laboratory Accreditation. The Contractor shall be responsible for furnishing the laboratory used to perform concrete quality control tests. The laboratory may be the Contractor's facility, the concrete producer's facility, or a certified independent testing laboratory.

Only laboratories certified by MDOT are qualified to perform material testing. Certification by the AASHTO Accreditation Program (AAP) will be acceptable if the laboratory is listed in the latest AASHTO Accreditation Program publication and maintains accreditation through completion of concrete work.

The Contractor's laboratory designated for quality control testing shall have equipment necessary to test aggregates and concrete for the test methods listed in the following table.

Table 804-II: Concrete and Aggregate Testing Capability Requirements

AASHTO T 2	Sampling Aggregates
AASHTO T 19	Bulk Density ("Unit Weight") and Voids in Aggregates
AASHTO T 22	Compressive Strength of Cylindrical Concrete Specimens
AASHTO T 23	Making and Curing Concrete Test Specimens in the Field
AASHTO T 27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T 84	Specific Gravity and Absorption of Fine Aggregate
AASHTO T 85	Specific Gravity and Absorption of Coarse Aggregate
AASHTO T 119	Slump of Hydraulic Cement Concrete
AASHTO T 121	Mass per Cubic Meter (Cubic Foot), Yield, and Air Content (Gravimetric) of Concrete
AASHTO T 126	Making and Curing Concrete Test Specimens in the Laboratory
AASHTO T 141	Sampling Freshly Mixed Concrete
AASHTO T 152	Air Content of Freshly Mixed Concrete by Pressure Method [(a)]
AASHTO T 196	Air Content of Freshly Mixed Concrete by the Volumetric Method [(a)]
AASHTO T 231	Capping Cylindrical Concrete Specimens
AASHTO T 248	Reducing Field Samples of Aggregate to Testing Size
AASHTO T 255	Total Evaporable Moisture Content of Aggregate by Drying
ASTM C 1064	Temperature of Freshly Mixed Portland Cement Concrete

Notes:

a) Equipment necessary for either pressure or volumetric air content.

Testing equipment shall have been inspected by MDOT or through AAP. Testing equipment calibration files shall be made available upon request by the Engineer.

S-804.02.9 – Testing Personnel. Technicians testing Portland cement concrete, for either acceptance or production control purposes, shall be certified by an accepted certification program. Recertification is required after 5 years. Certification requirements are listed in the following table.

Table 804-III: Concrete Technician Certification Requirements

Required Certification	Concrete Technician's Tasks
MDOT Class I or ACI Grade I	Field Testing of Plastic Concrete, AASHTO Designation T 23, T 119, T 121, T 141, T 152, T 196, and ASTM Designation C 1064
MDOT Class II	Aggregate Sampling, Total Moisture, and Sieve Analysis, AASHTO Designation T 2, T 27, T 248, T 255
MDOT Class III	Unit Weight and Voids of Aggregates, Specific Gravity,[(a)] Concrete Mix Design, Capping and Compressive Strength of Cylindrical Concrete Specimens,[(a)] AASHTO Designation T 19, T 22, T 84, T 85, T 126, T 231

Notes:

a) Technicians performing specific gravity or compressive strength tests shall be either Certified Class III or may be supervised by a Certified Class III Technician. Also, technicians performing these tests are required to demonstrate the specific gravity and compressive strength tests during the inspection of laboratory equipment by the MDOT Central Laboratory.

S-804.02.10 – Portland Cement Concrete Mix Design. At least 30 days prior to production of concrete, the Contractor shall submit to the Engineer proposed concrete mix designs. Materials shall be from approved sources meeting the requirements of the Standard Specifications. Proportions for the mix designs shall be for the class of concrete required by the contract plans and shall meet the requirements of Table 804-IV. The concrete producer shall assign a permanent unique mix number to each mix design. Each mix design shall be field-verified as required in S-804.02.10.3. Acceptable field verification data shall be required for final approval of a mix design. All concrete mix designs will be reviewed by the MDOT Central Laboratory, or other State-Aid-approved laboratory, prior to use. Concrete mix designs disapproved will be returned to the Contractor with a statement explaining the disapproval.

Table 804-IV: Master Proportion Table for Structural Concrete Design

Class	Coarse Aggregate Size No. (a)	Maximum Water/ Cementitious Ratio (b)	Specified Compressive Strength (f'c) (psi)	Maximum Slump (c) (inches)	Total Air Content (%)
AA	57 or 67	0.45	4,000	3	3.0 to 6.0
BB	57 or 67	0.50	3,500	4	3.0 to 6.0
B	57 or 67	0.50	3,500	4	3.0 to 6.0
C	57 or 67	0.55	3,000	4	3.0 to 6.0
D	57 or 67	0.70	2,000	4	3.0 to 6.0
F	67	0.40	5,000	3	(d)
FX	67	(As required by special provisions)		3	(d)
S	57 or 67	0.45	3,000	8	3.0 to 6.0
DS	67	0.45	4,000	(e)	(e)

Notes:

a) Maximum size aggregate shall conform to the concrete mix design for the specified aggregate.

b) Maximum replacement of Portland cement by weight is 25% for fly ash or 50% for ground granulated blast furnace slag. The addition of fly ash as a replacement for cement will not be permitted in Type IP blended hydraulic cement, Portland cement combined with ground granulated blast furnace slag, or Type III Portland cement when specified in the contract.

c) The slump may be increased up to 6 inches with an approved mid-range water reducer or up to 8 inches with an approved type F or G high-range water reducer. A mid-range water reducer is classified as a water reducer that reduces the mix water a minimum of 8% when compared to a control mix with no admixtures. Minus slump requirements shall meet those set forth in Table 3 of AASHTO M 157 specifications.

d) No entrained air except for pilings exposed to seawater.

e) Class DS concrete for drilled shafts shall have an 8 ± 1-inch slump. In the event the free-fall method of concrete placement is used, the slump shall be 6 ± 1 inch. No fly ash, ground granulated blast furnace slag, or F or G high-range water reducers are allowed in drilled shaft concrete. A slump retention admixture is required.

Either Type A, D, F, G, or mid-range chemical admixture shall be used in all classes of concrete, except as noted above for drilled shaft concrete. Any combinations of water-reducing admixtures shall be approved by the Engineer before their use.

S-804.02.10.1 – Proportioning of Portland Cement Concrete Mix Design. Proportioning of Portland cement concrete shall be based on an existing mix of which the producer has field experience and documentation or based on a recently batched laboratory mix tested according to the required specifications.

S-804.02.10.1.1 – Proportioning on the Basis of Previous Field Experience of Trial Mixtures. Where a concrete production facility has a record based on at least 10 consecutive strength tests within the past 12 months from a mixture not previously used on MDOT or State-Aid projects, the standard deviation shall be calculated. The record of tests from which the standard deviation is calculated shall:

A. Represent similar materials and conditions to those expected. Changes in materials and proportions within the test record shall not have been more closely restricted than those for the proposed work.

B. Represent concrete produced to meet a specified strength.

C. Consist of 10 consecutive tests, average of two cylinders per test, tested at 28 days.

The standard deviation, *s*, shall be calculated as:

$$s = [\Sigma (X_i - \bar{X})^2 \div (N - 1)]^{1/2}$$

where:

X_i = strength result of an individual test

$\bar{X}$ = average of individual tests in the series

N = number of tests in the series

When the concrete production facility does not have a record of tests for calculating standard deviation as required in the above formula, the requirements of S-804.02.10.1.2 shall govern.

The required average compressive strength (f'_{cr}) used as the basis for selecting concrete proportions shall conform to the inequality listed below, while using a standard deviation, *s*, calculated as shown above.

$$\bar{X} \geq f'_{cr}$$

where:

$f'_{cr} = f'_c + 1.43s$

where:

f'_c = specified compressive strength of concrete (psi)

f'_{cr} = required average compressive strength of concrete (psi)

s = standard deviation (psi)

Note that 1.43 represents the Lower Quality Index necessary to ensure that 93% of compressive strength tests are above f'_c.

S-804.02.10.1.2 – Proportioning on the Basis of Laboratory Trial Mixtures. When an acceptable record of field test results is not available, concrete proportions shall be established based on laboratory trial mixtures meeting the following restrictions:

A. The combination of materials shall be those intended for use in the proposed work.

B. Trial mixtures having proportions and consistencies suitable for the proposed work shall be made using the ACI 211.1 as a guide to proportion the mix design.

C. Trial mixtures shall be designed to produce a slump within ±3/4 inches of the maximum permitted, and for air-entrained concrete, 6.0 ± 0.5% total air content. The temperature of freshly mixed concrete in trial mixtures shall be reported.

D. For each proposed mixture, at least three compressive test cylinders shall be made and cured in accordance with AASHTO Designation T 126. Each change of water–cement ratio shall be considered a new mixture. The cylinders shall be tested for strength in accordance with AASHTO Designation T 22 and shall meet the required 28-day strength.

E. The required average strength of laboratory trial mixes shall exceed f'_c by 1,200 psi for concrete mix designs less than 5,000 psi and by 1,400 psi for concrete mix designs of 5,000 psi or more.

F. The laboratory trial batch mixtures shall have been made within the previous 12 months before being submitted for approval and shall not have been previously used on MDOT or State-Aid projects.

S-804.02.10.2 – Documentation of Average Strength. Documentation that the proposed concrete proportions will produce an average strength equal to or

greater than the required average shall consist of the strength test records from field tests or results from laboratory trial mixtures.

S-804.02.10.3 – Field Verification of Concrete Mix Design. Concrete mix designs will only be tentatively approved pending field verification. Mix designs may be transferred to other projects without additional field verification testing after the mix design has passed the field verification process.

The Contractor's Certified Quality Control Technicians shall test each concrete mix design upon the first placement of the mix. Aggregates and concrete tests during the first placement shall be as follows:

Table 804-V: First-Placement Aggregate and Concrete Tests

Aggregates	Concrete
Bulk Specific Gravity Moisture Gradation	Water Content Slump Air Content Unit Weight Yield

The mix shall be verified to yield within 2.0% of the correct volume when all the mix water is added to the batch, producing a slump within a minus 1-1/2 inches tolerance, or minus 2-1/2 inches with Type F or G chemical admixture, of the maximum permitted and total air content within a minus 1-1/2% tolerance of the maximum allowable air content listed in Table 804-IV. The mix shall be adjusted and retested, if necessary, on subsequent placements until the above-mentioned properties are met. If the requirements of yield, slump, or air are not met after three attempts, subsequent field verification testing shall not be permitted, and the mix design shall not be used until the requirements listed above are met. Any mix-design adjustments or changes in the mix proportions are to be made by a Class III Certified Technician representing the Contractor. After the mix design has been verified and adjustments made, verification test results will be reviewed by the Engineer.

S-804.02.10.4 – Adjustments of Mixture Proportions. After 10 compressive tests have been performed for which a standard deviation is calculated, the mix design may be adjusted provided the average strength ($\bar{X}$) complies with the inequality in S-804.02.10.1.1 and the adjusted mix design satisfies the water/cementitious ratio requirement listed in Table 804-IV. Any adjustments of the concrete mix design shall necessitate repeat of field verification procedures as described in S-804.02.10.3 and approval by the Engineer.

S-804.02.11 – Concrete Batch Plants. The concrete batch plant and assigned mixer trucks shall be on the list of approved concrete batch plants and mixer trucks. For large-quantity projects the plant shall meet the requirements for an automatic system capable of recording batch weights. It shall also have automatic moisture compensation for the fine aggregate.

For projects with the total volume less than 2,000 cubic yards, the plant can be equipped for manual batching with a fine aggregate moisture meter visible to the plant operator.

The concrete batch plant shall have available adequate facilities to cool concrete during hot weather.

S-804.02.12 – Contractor's Quality Control. The Contractor shall provide and maintain a quality control program that will provide reasonable assurance that all materials and products submitted to the Engineer for acceptance will conform to the contract requirements, whether manufactured or processed by the Contractor or procured from suppliers, subcontractors, or vendors.

The Contractor's quality control program shall implement the minimum quality control requirements shown in Table 804-VI. The quality control activities shown in the table are considered to be normal activities necessary to control the production and placing of a given product or material at an acceptable quality level. To facilitate the Engineer's activities, all completed gradation samples shall be retained for a minimum of 60 days by the Contractor or until further disposition is designated by the Engineer.

The Contractor shall perform, or have performed, the inspections and tests required to substantiate product conformance to contract document requirements and shall also perform, or have performed, all inspections and tests otherwise required.

The Contractor's quality control program shall encompass the requirements of AASHTO Designation M 157 into concrete production and control, equipment requirements, testing, and batch ticket information. The requirement of AASHTO Designation M 157, Section 11.7, shall be followed except on arrival to the job site a maximum of 1-1/2 gallons of water per cubic yard shall be allowed to be added to bring the slump within the required limits. Water shall not be added at a later time.

The Contractor's quality control inspections and tests shall be documented and shall be available for review by the Engineer throughout the life of the contract.

As set out in these specifications, quality control sampling and testing performed by the Contractor will be used by the Engineer for determination of acceptability of the concrete.

The Contractor shall maintain standard equipment and qualified personnel as required to ensure conformance to contract requirements.

S-804.02.12.1 – Quality Control Plan. The Contractor shall prepare a Quality Control Plan which shall identify the personnel responsible for the Contractor's quality control, including the company official who will act as liaison with the Engineer. The Quality Control Plan shall be submitted in writing to the Engineer for approval 30 days prior to the production of concrete.

The class(es) of concrete involved will be listed separately. If an existing mix design(s) is to be used, the mix design number(s) as previously approved shall be listed.

It is intended that sampling and testing be in accordance with standard methods and procedures, and that measuring and testing equipment be standard and properly calibrated. If alternative sampling methods, procedures, and inspection equipment are to be used, they shall be detailed in the Quality Control Plan.

S-804.02.12.1.1 – Elements of Plan. The plan shall address all elements that affect the quality of the structural concrete including, but not limited to, the following:

A. Stockpile Management

B. Procedures for Corrective Actions for Noncompliance with Specifications

C. Procedure for Controlling Concrete Temperatures

S-804.02.12.2 – Personnel Requirements. The Contractor's designated certified technician shall perform and use quality control tests and other quality control practices to ensure that delivered materials and proportioning meet the requirements of the mix design, including temperature, slump, air content, and strength, and shall periodically inspect all equipment used in transporting, proportioning, and mixing.

The Contractor's designated technician shall periodically inspect all equipment used in placing, consolidating, finishing, and curing to ensure it is operating properly and that placement, consolidation, finishing, and curing conform to the mix design and other contract requirements.

S-804.02.12.3 – Documentation. The Contractor shall maintain adequate records of all inspections and tests. The records shall indicate the nature and number of observations made, the number and type of deficiencies found, date and time of samples taken, the quantities approved and rejected, and the nature of corrective action taken, as appropriate. The Contractor's documentation procedures will be subject to approval by the Engineer prior to the start of the work and to compliance checks during the progress of the work.

All conforming and nonconforming inspections and test results shall be kept complete and shall be available at all times to the Engineer during the performance of the work. Forms shall be on a computer-acceptable medium. Batch tickets and gradation data shall be documented in accordance with State-Aid requirements. Copies shall be submitted to the Engineer as the work progresses.

Test data for Portland cement concrete, including gradation, shall be charted in accordance with the applicable requirements.

The Contractor may use additional control charts as deemed appropriate. It is normally expected that testing and charting will be completed within 24 hours after sampling.

All charts and records documenting the Contractor's quality control inspections and tests shall become the property of the Engineer upon completion of the work.

S-804.02.12.4 – Corrective Action. The Contractor shall take prompt action to correct conditions that have resulted, or could result, in the delivery to the project of materials or products that do not conform to the requirements of the contract documents. All corrective actions shall be documented.

S-804.02.12.5 – Nonconforming Materials. The Contractor shall establish and maintain an effective and positive system for controlling nonconforming material, including procedures for its identification, isolation, and disposition. Reclaiming or reworking of nonconforming materials shall be in accordance with procedures acceptable to the Engineer.

All nonconforming materials and products shall be positively identified to prevent use, shipment, and intermingling with conforming materials and products. Holding areas, mutually agreeable to the Engineer and the Contractor, shall be provided by the Contractor.

Table 804-VI: Contractor's Minimum Requirements for Portland Cement Concrete Quality Control

Control Requirement	Frequency	AASHTO/ ASTM Designation
A. Plant and Trucks		
i) Mixer Blades	Monthly	
ii) Scales		
a) Tared	Daily	
b) Calibrate	Every 6 months	
c) Check Calibration	Weekly	
iii) Gauges & Meters – Plant & Truck		
a) Calibrate	Every 6 months	
b) Check Calibration	Weekly	
iv) Admixture Dispenser		
a) Calibrate	Every 6 months	
b) Check Operation & Calibration	Daily	
B. Aggregates		
i) Sampling		T 2
ii) Fine Aggregate		
a) Gradation/FM	250 yd^3 concrete	T 27
b) Moisture	Check meter against test results weekly	T 255
c) Specific Gravity/ Absorption	2,500 yd^3 concrete (at least one per project)	T 84
iii) Coarse Aggregates		
a) Gradation/FM	250 yd^3 concrete	T 27
b) Moisture	Minimum of once daily or more as needed to control production	T 255
c) Specific Gravity/ Absorption	2,500 yd^3 concrete (at least one per project)	T 85

Control Requirement	Frequency	AASHTO/ ASTM Designation
C. Plastic Concrete		
i) Sampling	–	T 141
ii) Air Content	First load then one per 50 yd^3	T 152 or T 196
iii) Slump	First load then one per 50 yd^3	T 119
iv) Compressive Strength	One set (two cylinders) for 0-100 yd^3 inclusive and one set for each additional 100 yd^3 or fraction thereof for each class concrete delivered and placed on a calendar day from a single supplier. A test shall be the average of two cylinders.	T 22, T 23, T 231
v) Yield	Each 400 yd^3	T 121
vi) Temperature	With each sample	C 1064

S-804.02.13 – Quality Assurance Sampling and Testing. Quality assurance (QA) inspection and testing will be provided by the Engineer to assure that the Contractor's quality control (QC) testing meets the requirements of these specifications.

Acceptance of the material is based on the inspection of the construction, monitoring of the Contractor's quality control program, QC test results, and the comparison of the QA test results with the QC test results. The Engineer may use the results of the Contractor's QC tests as a part of the acceptance procedures instead of the results of QA tests, provided:

A. The Engineer's inspection and monitoring activities indicate that the Contractor is following the approved quality control program and, respectively;

B. For aggregates, the results from the Contractor's QC and the Engineer's QA testing of aggregate gradations compare by both meeting the aggregate type's gradation requirements;

C. For concrete, the Contractor's QC and Engineer's QA testing of concrete compressive strengths compare within 990 psi provided both the QC and QA test results are equal to or exceed the minimum compressive strength requirements.

The minimum frequency for QA testing of aggregate and plastic concrete by the Engineer is summarized in the following table.

Table 804-VII: Minimum Test Frequency Requirements

Quality Assurance Tests	Frequency	AASHTO/ ASTM Designation
A. Aggregates		
i) Sampling	–	T 2
ii) Fine Aggregate Gradation and FM	250 yd^3 concrete	T 27
iii) Coarse Aggregates Gradation and FM	250 yd^3 concrete	T 27
B. Plastic Concrete		
i) Sampling	–	T 141
ii) Air Content	Every 100 yd^3	T 152 or T 196
iii) Slump	Every 100 yd^3	T 119
iv) Compressive Strength	One set (two cylinders) for every 100 yd^3 inclusive. A test shall be the average of two cylinders.	T 22, T 23, T 231
v) Temperature	With each sample	C 1064

Periodic inspection by the Engineer of the Contractor's QC testing and production will continue through the duration of the project. Weekly reviews will be made of the Contractor's QC records and charts.

For aggregates, comparison of data of the Contractor's QC aggregate gradation test results to those of the Engineer's QA aggregate gradation test results will be made monthly during concrete production periods according to State Aid Standard Operating Procedures. When it is determined that the Contractor's QC test results of aggregate gradations are comparative to that of the Engineer's QA test results, then the Engineer will use the Contractor's QC results as a basis for acceptance of the aggregates, and the Engineer's QA

testing frequency of aggregates may be reduced to a frequency of no less than three QA tests to every 10 QC tests. If the Contractor's QC aggregate gradation test results fail to compare to those of the Engineer's QA aggregate gradation test results, the Engineer's testing for aggregate gradations will revert to the frequency shown in Table 804-VII for aggregates until the Contractor's and Engineer's aggregate gradation test data compare.

For concrete compressive strength, comparison of data of the Contractor's QC compressive strength test results to those of the Engineer's QA compressive strength test results will be made monthly during concrete production periods according to State Aid Standard Operating Procedures. When it is determined that the Contractor's QC test results of concrete compressive strengths are comparative to that of the Engineer's QA test results, then the Engineer will use the Contractor's QC results as a basis for acceptance of the concrete and the Engineer's QA testing frequency of concrete compressive strengths may be reduced to a frequency of no less than three QA tests to every 10 QC tests. If the Contractor's QC compressive strength test results fail to compare to those of the Engineer's QA compressive strength test results, the Engineer's testing will revert to the frequency shown in Table 804-VII for plastic concrete until the Contractor's and Engineer's compressive strength test data compare.

S-804.02.13.1 – Basis of Acceptance.

S-804.02.13.1.1 – Slump. Slump of plastic concrete shall meet the requirements of Table 804-IV. A check test shall be made on another portion of the sample before rejection of any load.

S-804.02.13.1.2 – Air. Total air content of concrete shall be within the specified range for the class of concrete listed in Table 804-IV. A check test shall be made on another portion of the sample before rejection of any load.

S-804.02.13.1.3 – Yield. If the yield of the concrete mix design is more than ±3% of the designed volume, the mix shall be adjusted by a Class III Certified Technician representing the Contractor to yield the correct volume ±3%. If batching of the proportions of the mix design varies outside the batching tolerance range of the originally approved proportions by more than the tolerances allowed in S-804.02.13.1, the new proportions shall be field-verified per S-804.02.10.3.

S-804.02.13.1.4 – Temperature. Cold-weather concreting shall follow the requirements of S-804.03.16.1. Hot-weather concreting shall follow the requirements of S-804.03.16.2 with a maximum concrete temperature of 95°F for Class DS concrete containing a slump retention admixture and for concrete mixes containing pozzolanic materials as a replacement of Portland cement. For other classes of concrete without pozzolanic materials, the maximum concrete temperature shall be 90°F. Concrete with a temperature more than the

maximum allowable temperature shall be rejected and not used in State-Aid work.

S-804.02.13.1.5 – Compressive Strength. Laboratory-cured concrete compressive strength tests shall conform to the specified strength (*f'c*) listed in the specifications. Concrete represented by a compressive strength test below the specified strength (*f'c*) may be removed and replaced by the Contractor. If the Contractor elects not to remove the material, it will be evaluated by the Engineer as to the adequacy for the use intended. All concrete evaluated as unsatisfactory for the intended use shall be removed and replaced by the Contractor at no additional cost to the project. For concrete allowed to remain in place, reduction in payment will be as follows.

When the evaluation indicates that the work may remain in place, a percentage reduction in pay will be assessed based on a comparison of the deficient 28-day test result to the specified strength. The Engineer will provide for an adjustment in pay as follows for the material represented by the test result.

Total Pay on Material in Question = Unit Price - (Unit Price * Percentage Reduction)

$$\text{Percentage Reduction} = \frac{(f'c - X)}{f'c} * 100$$

where:

$f'c$ = specified 28-day compressive strength (psi)

X = individual compressive strength below $f'c$ (psi)

If a project has more than 2,000 cubic yards of concrete, MDOT Specifications will be followed.

S-804.02.14 – Dispute Resolution. Disputes over variations between Contractor's QC test results and the Engineer's QA test results shall be resolved at the lowest possible level. When there are significant discrepancies between the QC test results and the QA test results, the Contractor's Quality Control Manager, the Engineer, and the State Aid District Engineer shall look for differences in the procedures and attempt to correct the inappropriate procedure before requesting a third-party resolution.

If the dispute cannot be resolved at the project level, the State Aid Engineer will serve as a third party to resolve the dispute. The State Aid Engineer's decision shall be binding.

The Contractor shall be responsible for the cost associated with the third-party resolution if the final decision is such that the Engineer's QA test results were

correct. Likewise, the project fund will be responsible for the cost when the final decision is such that the Contractor's QC test results were correct.

S-804.03 – Construction Requirements.

S-804.03.1 – Measurement of Materials.

S-804.03.1.1 – General. The degree of accuracy for measuring materials shall be in accordance with AASHTO Designation M 157.

S-804.03.1.2 – Measurement by Weighing. Except when otherwise specified or authorized, materials shall be measured by weighing. The apparatus provided for weighing materials shall be suitably designed and constructed for this purpose. Cement and aggregates shall be weighed separately. Cement in standard bags need not be weighed, but bulk cement shall be weighed. The mixing water shall be measured by volume or by weight. All measuring devices shall be subject to approval.

S-804.03.2 – Blank.

S-804.03.3 – Blank.

S-804.03.4 – Hand-Mixing. Hand-mixing of concrete will not be allowed.

S-804.03.5 – Delivery. The plant supplying concrete shall have sufficient capacity and transporting apparatus to ensure continuous delivery at the rate required. The rate of delivery shall be such as to provide for the proper continuity in handling, placing, and furnishing of the concrete. The rate shall be such that the interval between batches shall not exceed 20 minutes. The methods of delivering and handling the concrete shall be that which will facilitate placing with minimum rehandling and without damage to the structure or the concrete.

S-804.03.6 – Handling and Placing Concrete.

S-804.03.6.1 – General. Prior to placing concrete, all reinforcement shall have been accurately placed in the position shown on the plans and fastened as set out in S-805. All sawdust, chips, and other construction debris and extraneous matter shall have been removed from the interior of the forms. Temporary struts, braces, and stays holding the forms in correct shape and alignment shall be removed when the concrete placing has reached an elevation rendering their service unnecessary. These temporary members shall be entirely removed from the forms and shall not be buried in the concrete.

No concrete shall be placed until the forms and reinforcement have been inspected.

Except as provided for truck mixers and truck agitators, concrete shall be placed in the forms within 30 minutes after the time that the cement is first added to the mix.

Concrete shall be placed so as to avoid segregation of materials and displacement of reinforcement. The use of troughs, chutes, and pipes over 25 feet in length for gravity conveyance of concrete to the forms will not be permitted except when authorized by the Engineer and subject to the production of quality concrete.

Only approved mechanical conveyors will be permitted.

Open troughs and chutes shall be metal or metal-lined. The use of aluminum pipes, chutes, or other devices made of aluminum that come into direct contact with the concrete shall not be used. Where steep slopes are required, the chutes shall be equipped with baffles or be in short sections that change the direction of movement.

All chutes, troughs, and pipes shall be kept clean and free from coatings of hardened concrete by thoroughly flushing with water after each run. Water used for flushing shall be discharged clear of the structure.

When placing operations involve dropping the concrete more than 5 feet, it shall be deposited through sheet metal or other approved pipes to prevent segregation and unnecessary splashing. The pipes shall be made in sections to permit discharging and raising as the placement progresses. A non-jointed pipe may be used if sufficient openings of the proper size are provided to allow for the flow of the concrete into the shaft. As far as practicable, the pipes shall be kept full of concrete during placing, and their ends shall be kept buried in the newly placed concrete.

Except as hereinafter provided, concrete shall be placed in horizontal layers not more than 12 inches thick. When, with the Engineer's approval, less than the complete length of a layer is placed in one operation, it shall be terminated in a vertical bulkhead. Each layer shall be placed and compacted before the preceding layer has taken its initial set and shall be compacted so as to avoid the formation of a construction joint with the preceding layer.

S-804.03.6.2 – Consolidation. Concrete, during and immediately after depositing, shall be thoroughly consolidated by the use of approved mechanical vibrators and suitable spading tools. Hand-spading alone will be permitted on small structural members such as railing and small culvert headwalls. Mechanical vibration of concrete shall be subject to the following:

A. The vibration shall be internal unless special authorization of other methods is given by the Engineer or as provided herein.

B. In general, vibrators shall be a type and design approved by the Engineer. They shall be capable of vibration frequencies of at least 4,500 impulses per minute.

C. The intensity of vibration shall be such as to visibly affect a mass of concrete of 1-inch slump over a radius of at least 18 inches.

D. The Contractor shall provide sufficient vibrators to properly compact each batch immediately after it is placed in the forms.

E. Vibrators shall be manipulated so as to thoroughly work the concrete around the reinforcement and embedded fixtures and into the corners and angles of the forms.

   Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. The vibrators shall be inserted into and withdrawn out of the concrete slowly. The vibration shall be of sufficient duration and intensity to thoroughly compact the concrete, but shall not be continued so as to cause segregation. Vibration shall not be continued at any one point to the extent that localized areas of grout are formed.

   Application of vibrators shall be at points uniformly spaced and not farther apart than twice the radius over which the vibration is visibly effective.

F. Vibration shall not be applied directly or through the reinforcement to sections or layers of concrete which have taken initial set. It shall not be used to make concrete flow in the forms over distances so great as to cause segregation, and vibrators shall not be used to transport concrete in the forms.

G. Vibration shall be supplemented by spading as necessary to ensure smooth surfaces and dense concrete along form surfaces, in corners, and in locations impossible to reach with vibrators.

H. These provisions shall apply to the filler concrete for steel grid floors except that the vibrator shall be applied to the steel.

I. These provisions shall apply to precast piling, concrete cribbing, and other precast members except that, if approved by the Engineer, the manufacturer's methods of vibrations may be used.

When hand-spading is used for consolidation, a sufficient number of workers with spading tools shall be provided. They will be required to flush a thin layer of mortar to all the surfaces and thoroughly and satisfactorily consolidate the concrete.

The entire operation of depositing and consolidating the concrete shall be conducted so that the concrete shall be smooth and dense and free from honeycomb or pockets of segregated aggregate.

S-804.03.6.3 – Discontinuance of Placing. When placing is temporarily discontinued, the concrete, after becoming firm enough to retain its form, shall be cleaned of laitance and other objectionable material to a sufficient depth to expose sound concrete. To avoid visible joints insofar as possible upon

exposed faces, the top surface of the concrete adjacent to the forms shall be smoothed with a trowel. Where a "feather edge" might be produced at a construction joint, such as in the sloped top surface of a wing wall, an inset formwork shall be used in the preceding layer to produce a blocked-out portion that will provide an edge thickness of at least 6 inches in the succeeding layer. Work shall not be discontinued within 18 inches of the top of any face unless provision has been made for a coping less than 18 inches thick. In this case and if permitted by the Engineer, the construction joint may be made at the underside of the coping.

Immediately following the discontinuance of placing concrete, all accumulations of mortar splashed on the reinforcement and the surface of forms shall be removed. Dried mortar chips and dust shall not be puddled into the unset concrete. If the accumulations are not removed prior to the concrete becoming set, care shall be exercised not to break or injure the concrete-steel bond at and near the surface of the concrete while cleaning the reinforcement. After initial set the forms shall not be jarred, and no strain shall be placed on the ends of projecting reinforcement until the concrete has sufficiently set to ensure against any damage by such jarring or strain.

S-804.03.6.4 – Placing Bridge Concrete. The method and sequence of placing concrete shall conform to the provisions and requirements set forth for the particular type of construction.

S-804.03.6.4.1 – Foundations and Substructures. Concrete seals shall be placed in accordance with S-804.03.9. All other concrete for foundations shall be poured in the dry unless otherwise stipulated or authorization is given in writing by the Engineer to do otherwise. Concrete shall not be placed in foundations until the foundation area has been inspected and approved.

Unless otherwise specified, the placement of concrete in the substructure shall be in accordance with the general requirements of S-804.03.6.

Unless otherwise directed, concrete in columns shall be placed in one continuous operation, and shall be allowed to set at least 12 hours before the caps are placed.

S-804.03.6.4.2 – Superstructure. For simple spans, concrete shall preferably be deposited by beginning at the center of the span and working toward the ends. For continuous spans, concrete shall be deposited as shown on the plans. Concrete in girders shall be uniformly deposited for the full length of the girder and brought up evenly in horizontal layers.

Unless otherwise permitted by the Engineer, concrete shall not be placed in the superstructure until the column forms have been stripped sufficiently to determine the character of the concrete in the columns. Unless otherwise permitted by the Engineer, the load of the superstructure shall not be placed on pile bents until the caps have been in place at least 7 days and shall not be

placed on other types of bents until the bents have been in place at least 14 days.

In placing concrete around steel shapes, it shall be placed on one side of the shape until it flushes up over the bottom flange of the shape on the opposite side, after which it shall be placed on both sides to completion.

Concrete in girder haunches less than 3 feet in height shall be placed at the same time as that in the girder stem. Whenever a haunch or fillet has a height of 3 feet or more at the abutment or columns, the haunch and the girder shall be poured in three successive stages: first, up to the lower side of the haunch; second, to the lower side of the girder; and third, to completion.

Except when intermediate construction joints are specified, concrete in slab, T-beam, or deck-girder spans shall be placed in one continuous operation for each span.

The floors and girders of through-girder superstructures shall be placed in one continuous operation unless otherwise specified, in which case special shear anchorage shall be provided to ensure monolithic action between girder and floor.

Concrete in box girders shall be placed as shown on the plans.

Concrete shall not be chuted directly into the forms of the span and shall be placed continuously with sufficient speed to be monolithic and to allow for finishing before initial set.

S-804.03.7 – Pneumatic Placing. Pneumatic placing of concrete will be permitted only if specified in the contract or if authorized by the Engineer. The equipment shall be so arranged that no vibrations result which might damage freshly placed concrete.

Where concrete is conveyed and placed by pneumatic means the equipment shall be suitable in kind and adequate in capacity for the work. The machine shall be located as close as practicable to the place of deposit. The position of the discharge end of the line shall not be more than 10 feet from the point of deposit. The discharge lines shall be horizontal or inclined upward from the machine. At the conclusion of placement, the entire equipment shall be thoroughly cleaned.

S-804.03.8 – Pumping Concrete. Placement of concrete by pumping will be permitted only if specified in the contract or if authorized in writing by the Engineer. If used, the equipment shall be arranged so that no vibrations result which might damage freshly placed concrete.

Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall be suitable in kind and adequate in capacity for the work. The operation of the pump shall be such that a continuous stream of concrete

without air pockets is produced. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. After this operation, the entire equipment shall be thoroughly cleaned.

The use of aluminum pipe as a conveyance for the concrete will not be permitted.

S-804.03.9 – Depositing Concrete Under Water. Concrete shall not be deposited in water except with the approval of the Engineer.

Concrete deposited under water shall be Class S.

Concrete deposited under water shall be carefully placed in a compact mass in its final position by means of a tremie, a bottom-dump bucket, or other approved method and shall not be disturbed after being deposited. Special care shall be exercised to maintain still water at the point of deposit. No concrete shall be placed in running water and all formwork designed to retain concrete under water shall be watertight. The consistency of the concrete shall be carefully regulated, and special care shall be exercised to prevent segregation of materials.

Concrete seals shall be placed continuously from start to finish, and the surface of the concrete shall be kept as nearly horizontal as practicable at all times. To ensure thorough bonding, each succeeding layer of a seal shall be placed before the preceding layer has taken initial set.

When a tremie is used, it shall consist of a tube having a diameter of at least 10 inches and constructed in sections having flanged couplings fitted with gaskets. The means of supporting the tremie shall be such as to permit the free movement of the discharge over the entire top surface of the work and to permit it to be lowered rapidly when necessary to choke off or retard the flow of concrete. The discharge end shall be closed at the start of the work so as to prevent water entering the tube and shall be entirely sealed. The tremie tube shall be kept full to the bottom of the hopper. When a batch is dumped into the hopper, the flow of concrete shall be induced by slightly raising the discharge end, always keeping it in the deposited concrete. The flow is then stopped by lowering the tremie. The flow shall be continuous until the work is completed.

Depositing of concrete by the drop-bottom bucket method shall conform to the following. The top of the bucket shall be open. The bottom doors shall open freely downward and outward when tripped. The bucket shall be completely filled and slowly lowered to avoid backwash. It shall not be dumped until it rests on the surface upon which the concrete is to be deposited, and when discharged shall be withdrawn slowly until well above the concrete.

Dewatering may proceed when the concrete seal is sufficiently hard and strong. As a general rule, this time will be 48 hours for concrete made with high-early-strength cement and three days for concrete made with other types of cement. All laitance and other unsatisfactory material shall be removed from the exposed surface by scraping, chipping, or other means which will not injure the surface of the concrete.

S-804.03.10 – Construction Joints.

S-804.03.10.1 – General. Unless otherwise approved by the Engineer, construction joints shall be made only where located on the plans or shown in the pouring schedule. If not detailed on the plans, or in the case of emergency, construction joints shall be placed as directed by the Engineer. Shear keys or inclined reinforcement shall be used where necessary to transmit shear or to bond the two sections together.

For continuous spans, bridge deck concrete shall be deposited as shown on the plans. Deviation from the pouring schedule shown on the plans is not permitted.

S-804.03.10.2 – Bonding. Before depositing new concrete on or against concrete which has hardened, the forms shall be retightened. The surface of the hardened concrete shall be roughened as required by the Engineer and in a manner that will not leave loosened particles of aggregate or damaged concrete at the surface. It shall be thoroughly cleaned of foreign matter and laitance and saturated with water. When directed by the Engineer, the cleaned and saturated surfaces, including vertical and inclined surfaces, shall first be thoroughly covered with a coating of mortar or neat cement grout against which the new concrete shall be placed before the grout has attained its initial set.

The placing of concrete shall be carried continuously from joint to joint. The face edges of all joints which are exposed to view shall be carefully finished, true to line and elevation.

In order to bond successive courses, suitable depressed or raised keys of the designated size shall be constructed. Raised keys shall be monolithic with the concrete of the lower course.

S-804.03.11 – Concrete Exposed to Seawater. Unless otherwise specifically provided, concrete for structures exposed to seawater shall be Class AA concrete as referenced in S-804.02.10. The clear distance from the face of the concrete to the nearest face of reinforcing steel shall be at least 4 inches. The mixing time and the water content shall be carefully controlled and regulated so as to produce concrete of maximum impermeability. The concrete shall be thoroughly compacted, and stone pockets shall be avoided. No construction joints shall be formed between the levels of extreme low water and extreme high water as determined by the Engineer. Between these levels, seawater shall

not come into direct contact with the new concrete for at least 30 days. The surface concrete as left by the forms shall be left undisturbed.

S-804.03.12 – Blank.

S-804.03.13 – Falsework. The Contractor shall submit to the Engineer two copies of structural design analysis and detail drawings, which show the method of falsework or centering. These designs and detail plans shall be prepared and bear the seal of a Registered Professional Engineer with experience in falsework design.

Falsework plans shall include falsework elevations together with all other dimensions and details considered necessary for the construction.

Other pertinent data needed is size and spacing of all falsework members and minimum bearing requirements for false piles.

Upon completion of falsework erection, the Registered Professional Engineer shall certify that the erected falsework is capable of supporting the load for construction.

Falsework piling shall be spaced and driven so that the bearing value of each pile is sufficient to support the load that will be imposed upon it. The bearing value of the piles should be calculated according to the appropriate formula given in S-803.

For designing falsework and centering, a weight of 150 pounds per cubic foot shall be assumed for green concrete. All falsework shall be designed and constructed to provide the necessary rigidity and to support the loads without appreciable settlement or deformation. The Contractor may be required to employ screw jacks or hardwood wedges to take up slight settlement in the falsework either before or during the placing of concrete. An allowance shall be made for anticipated compressibility of falsework and for the placement of shims, wedges, or jacks to produce the permanent structural camber shown on the plans. If, during construction, any weakness develops and the falsework shows any undue settlement or distortion, the work shall be stopped, the part of the structure affected removed, and the falsework strengthened before work is resumed. Falsework which cannot be founded on a satisfactory footing shall be supported on piling, which shall be spaced, driven, and removed, as referenced in S-804.03.15, in a manner approved by the Engineer.

All structures built across a public street or highway on which maintenance of traffic is required shall have falsework so arranged that a vertical clearance of at least 12 feet, 6 inches is provided. Unless otherwise specified, a horizontal clearance of at least the width of the traveled way shall be provided at all times. If the vertical clearance is less than 13 feet, 6 inches, or the horizontal clearance is less than the full crown width of the roadway, the Contractor shall install and maintain appropriate safety devices, clearance signs, and warning

lights, and shall notify the Engineer sufficiently in advance of restricting the clearance for the Engineer to advise the appropriate authorities. All traffic control and safety devices shall be in accordance with the current edition of the *Manual on Uniform Traffic Control Devices* (MUTCD).

S-804.03.14 – Forms.

S-804.03.14.1 – General. Forms shall be wood, metal, or other material approved by the Engineer. All forms shall be built mortar-tight and sufficiently rigid to prevent distortion due to pressure of the concrete and other loads incident to the construction operations. Forms shall be constructed and maintained so as to prevent warping and the opening of joints due to shrinkage. The forms shall be substantial and unyielding and shall be so designed that the finished concrete will conform to the proper dimensions and contours. The design of the forms shall take into account the effect of vibration of concrete as it is placed.

Minimum requirements for slab overhang forms shall be 3/4-inch plywood supported on 2-inch by 6-inch S4S wood timbers placed flatwise on 16-inch centers.

Adjustable brackets for support of slab overhang forms shall be spaced at a maximum distance of 3.0 feet center to center unless specifically approved otherwise. Grade points for forms shall coincide with the location of the adjustable form brackets.

Forms for surfaces exposed to view shall be of uniform thickness with a smooth inside surface of an approved type. Joints in forms for exposed surfaces shall be closely fitted to eliminate fins, stone pockets, or other variations in the surface of the concrete which would mar a smooth and uniform texture.

Forms shall be filleted at all sharp corners and shall be given a bevel or draft in the case of all projections, such as girders and copings, to ensure easy removal.

Metal ties or anchorages within the forms shall be so constructed as to permit their removal, without injury to the concrete, to a depth of at least the reinforcing steel clearance shown on the plans. In case ordinary wire ties are permitted, all wires, upon removal of the forms, shall be cut back at least 1/4 inch from the face of the concrete with chisels or nippers. Nippers shall be used for green concrete. All fittings for metal ties shall be designed so that upon their removal the cavities which are left will be the smallest practicable size. The cavities shall be filled with cement mortar and the surface left sound, smooth, even, and uniform in color.

Forms shall be set and maintained to the lines designated until the concrete is sufficiently cured for form removal. Forms shall remain in place for periods

which shall be determined as hereinafter specified. If forms are deemed to be unsatisfactory in any way, either before or during the placing of concrete, the Engineer will order the work stopped until the defects have been corrected.

The shape, strength, rigidity, watertightness, and surface smoothness of reused forms shall be maintained at all times. Warped or bulged lumber shall be resized before being reused. Forms which are unsatisfactory in any respect shall not be reused. Access to the lower portions of forms for narrow walls and columns shall be provided for cleaning out extraneous material immediately before placing the concrete.

All forms shall be treated with an approved oil or saturated with water immediately before placing the concrete. For rail members or other members with exposed faces, the forms shall be treated only with an approved oil to prevent the adherence of concrete. Any material which will adhere to or discolor the concrete shall not be used.

When metal forms are used, they shall be kept free from rust, grease, or other foreign matter which may discolor the concrete. They shall be of sufficient thickness and so connected that they will remain true to shape and line, and shall conform in all respects as herein prescribed for mortar tightness, filleted corners, beveled projections, etc. They shall be constructed so as to ensure easy removal without injury to concrete. All inside bolt and rivet heads shall be countersunk.

All chamfer strips shall be dressed, straight, and of uniform width and shall be maintained as such at all times.

S-804.03.14.2 – Stay-In-Place Metal Forms. The use of stay-in-place metal forms will not be allowed unless approval is given in writing by the Engineer with concurrence of the State Aid Bridge Engineer.

S-804.03.15 – Removal of Falsework, Forms, and Housing. In the determination of the time for the removal of falsework, forms, and housing and the discontinuance of heating, consideration shall be given to the location and character of the structure, the weather and other conditions influencing the setting of the concrete, and the materials used in the mix. No forms or supports shall be removed prior to approval by the Engineer. During cold weather, removal of housing and the discontinuance of heating shall be in accordance with S-804.03.16.1.

Concrete in the last pour of a continuous superstructure shall have attained a compressive strength of 2,400 psi, as determined by cylinder tests, prior to striking any falsework. It is important that falsework be removed as evenly as possible to prevent excessive deflection stresses in the spans.

At the Contractor's option and with the approval of the Engineer, the time for removal of forms may be determined by cylinder tests, in which case the

Contractor shall furnish facilities for testing the cylinders. The facilities shall include an approved concrete-testing machine of sufficient capacity and calibrated by an acceptable commercial laboratory. Tests shall be conducted in the presence of the Engineer's representative to witness and record strengths obtained on each break or performed by a certified technician in an approved testing laboratory.

When form removal or placing of beams is not controlled by cylinder tests, Column A in Table 804-VIII, exclusive of the days when the ambient temperature is below 40°F, herein shall apply as a guide for removal of forms and falsework. When cylinder tests are used, Column B shall be used. The cylinders shall be cured under conditions which are not more favorable than those existing for the portions of the structure which they represent.

If Type IP cement or Type I or II Portland cement plus fly ash is used, only Column B will be applicable.

Table 804-VIII: Bridge Concrete Minimum Cure Requirements

	Column A: Minimum Cure Time	**Column B: Minimum Cylinder Test psi**
Forms		
Columns	24 Hours	1,000
Side of Beams	24 Hours	1,000
Walls Not Under Pressure	24 Hours	1,000
Floor Slabs, overhead	7 Days	2,000
Floor Slabs, between beams	7 Days	2,000
Slab Spans	14 Days	2,400
Other Parts	24 Hours	1,000
Centering		
Under Beams	14 Days	2,400
Under Bent Caps	7 Days	2,000
Limitation for Placing Beams on		
Pile Bents, pile under beam	3 Days	2,000
Frame Bents, two or more columns	7 Days	2,200
Frame Bents, single column	14 Days	2,400

Methods of form removal likely to cause overstressing of the concrete shall not be used. Forms and supports shall be removed in a manner that will permit the concrete to uniformly and gradually bear the stresses due to its own weight. Centers shall be gradually and uniformly lowered in a manner that will avoid injurious stresses in any part of the structure.

As soon as concrete for railings, ornamental work, parapets, and vertical faces which require a rubbed finish has attained a safe strength, the forms shall be carefully removed without marring the surfaces and corners, the required finishing performed, and the required curing continued.

Prior to final inspection of the work, the Contractor shall remove all falsework, forms, excavated material, or other material placed in the stream channel during construction. Falsework piles may be cut or broken off at least 1 foot below the mudline or ground line unless the plans specifically indicate that they are to be pulled and completely removed from the channel.

S-S-804.03.16 – Cold- or Hot-Weather Concreting.

S-804.03.16.1 – Cold-Weather Concreting. In cold weather, the temperature of the concrete when delivered to the job site shall conform to the temperature limitations of Table 804-IX below.

When the Contractor proposes to place concrete during seasons when there is a probability of ambient temperatures lower than 40°F, the Contractor shall have available on the project the approved facilities necessary to enclose uncured concrete and to keep the temperature of the air inside the enclosure within the ranges and for the minimum periods specified herein.

When there are indications of temperatures of less than 40°F during the first 4 days after placement of the concrete, the concrete shall be protected from cold temperatures by maintaining a temperature between 50°F and 100°F for at least 4 days after placement and between 40°F and 100°F for at least 3 additional days. The Contractor shall use heating equipment such as stoves, salamanders, or steam equipment as deemed necessary to protect the concrete. When dry heat is used, means of maintaining atmospheric moisture shall be provided.

One or more of the aggregates and/or mixing water may be heated. The aggregates may be heated by steam, dry heat, or by placing in the mixing water which has been heated. Frozen aggregates shall not be used. When either aggregates or water are heated above 100°F, the aggregates and water shall be combined first in the mixer before the cement is added to avoid flash set. Cement shall not be mixed with water or with a mixture of water and aggregate having a temperature greater than 100°F.

The use of salt or other chemical admixtures in lieu of heating will not be permitted.

Before placing concrete, all ice or frost shall be removed from the forms and reinforcement.

In the case of concrete placed directly on or in the ground, such as for footings or bottom slabs, a sufficient supply of straw, hay, grass, or other suitable blanketing material shall be provided to protect the work when the air temperature may be expected to drop below 35°F. The Contractor shall be responsible for the quality and strength of the concrete placed during cold weather, and all concrete injured by frost action shall be removed and replaced at no additional cost to the project. The Engineer reserves the right to perform destructive or nondestructive testing for evaluation of damage caused by cold weather.

The Contractor shall assume all risk and added cost connected with the placing and protecting of concrete during cold weather. Permission given by the Engineer to place concrete during such time will in no way relieve the Contractor of responsibility for satisfactory results. Should it be determined at any time that the concrete placed under such conditions is unsatisfactory, it shall be removed and replaced with satisfactory concrete by the Contractor without extra compensation.

Table 804-IX: Cold-Weather Temperature Limitations on Concrete When Delivered to Job Site

Ambient Temperature (°F)	Minimum Concrete Temperature (°F)	
	For sections with smallest dimension less than 12 inches	For sections with smallest dimension 12 inches or greater
30 to 45	60	50
0 to 30	65	55
Below 0	70	60

S-804.03.16.2 – Hot-Weather Concreting. The manufacture, placement, and protection of concrete during hot weather requires special attention to ensure that uniform slump ranges and satisfactory placement qualities are maintained, that surface cracking is held to a minimum, and that design strengths are produced.

S-804.03.17 – Curing Concrete. Concrete surfaces shall be protected from premature drying by covering as soon as possible with a satisfactory curing material. When wetted burlap is used, it shall be not less than two thicknesses of Class 3 burlap or its equivalent, and the burlap shall be kept continuously and thoroughly wet. Careful attention shall be given to the proper curing and protection of concrete, and curing by the wetting method shall continue for a

period of at least 7 days after placing the concrete. If high-early-strength cement is used, this period may be reduced to 4 days.

Surfaces to have a Class 2 rubbed or sprayed finish and bridge deck surfaces when the atmospheric temperature is 90°F or above shall be cured only by wetting methods. The curing of concrete bridges with membrane curing will be permitted only under the conditions specified herein.

Surfaces on which curing is to be by liquid membrane shall be given the required surface finish prior to the application of curing compound. During the finishing period the concrete shall be protected by the water method of curing. Concrete surfaces cured by the liquid membrane method shall receive two applications of curing compound. The first application shall be applied immediately after the finishing is completed and accepted. Prior to applying the first application, the concrete shall be thoroughly wetted with water and the liquid membrane applied just as the surface film of water disappears. The second application shall be applied immediately after the first application has set.

The rate of application of curing compound will be as prescribed by the Engineer with a minimum spreading rate per application of 1 gallon per 200 square feet of concrete surface. The coating shall be protected against marring for at least 10 days after the application of the curing compound. The coating on bridge decks shall receive extra attention and may require additional protection as required by the Engineer. All membrane marred or otherwise disturbed shall be given an additional coating. Should the surface coating be subjected repeatedly to injury, the Engineer may require that the water-curing method be applied at once.

When using curing compound, the compound should be thoroughly mixed within an hour before use. If the use of curing compound results in a streaked or blotched appearance, the method shall cease to be used and water curing applied until the cause of defective appearance is corrected.

Other precautions to ensure the development of strength shall be taken as directed.

Adequate tarpaulins of ample size shall be on the project and used as necessary to protect the work in case of rain or other emergencies.

Conditions governing the placement of concrete and the requirements for the placement, protection, and curing of concrete during cold or hot weather shall conform to the limitations, conditions, and requirements stipulated in S-804.03.16 as applicable.

S-804.03.18 – Expansion and Fixed Joints, Bearings, Anchor Bolts, Plates, Castings, Pipes, Drains, Conduits, Etc. All joints shall be constructed

according to details shown on the plans. The edges of the concrete at open or filled joints shall be chamfered or edged as indicated on the plans.

S-804.03.18.1 – Open Joints. Open joints shall be placed in the locations shown on the plans and shall be constructed by the insertion and subsequent removal of a wood strip, metal plate, or other approved material. The insertion and removal of the template shall be accomplished without chipping or breaking the corners of the concrete. Reinforcement shall not extend across an open joint unless so specified on the plans.

S-804.03.18.2 – Filled Joints. Poured expansion joints and joints to be sealed with premolded materials shall be constructed similar to open joints. When premolded types are specified, the filler shall be placed in the correct position as the concrete on one side of the joint is placed. When the form is removed, the concrete on the other side shall be placed. Adequate water stops of metal, rubber, or plastic shall be carefully placed as shown on the plans.

S-804.03.18.3 – Premolded and Preformed Joint Seals. When preformed elastomeric compressive joint seals are specified, the previously formed and cured open joint shall be thoroughly cleaned of all foreign matter, the required adhesive uniformly applied, and the seal installed in accordance with the recommendations of the manufacturer of the seal.

When premolded filler is used for the joints in the roadway slab, the tops shall be adequately sealed with poured joint filler in accordance with details on the plans. Premolded filler shall be permanently fastened to an adjacent concrete surface by appropriate use of copper wire, copper nails, or galvanized nails.

S-804.03.18.4 – Steel Joints. The plates, angles, or other structural shapes shall be accurately shaped at the shop to conform to the section of the concrete floor. Fabrication and painting shall conform to the specifications covering those items. When called for on the plans or in the special provisions, the material shall be galvanized in lieu of painting. Care shall be taken to ensure that the surface in the finished plane is true and free of warping. Positive methods shall be employed in placing the joints to keep them in correct position during the placing of the concrete. The opening at expansion joints shall be that designated on the plans at normal temperature, and care shall be taken to avoid impairment of the clearance in any manner.

S-804.03.18.5 – Water Stops. Adequate water stops of metal, rubber, or plastic shall be placed as shown on the plans. Where movement at the joint is provided for, the water stops shall be of a type permitting movement without injury. They shall be spliced, welded, or soldered to form continuous watertight joints.

S-804.03.18.6 – Bearing Devices. Bearing plates, rockers, and other bearing devices shall be constructed according to details shown on the plans. Unless otherwise specified or set in plastic concrete, they shall be set in grout to ensure uniform bearing. Structural steel and painting shall conform to the

requirements of S-810 and S-814. When specified, the material shall be galvanized in lieu of painting. The rockers or other expansion-bearing devices shall be set, considering the temperature at the time of erection, so that the required position of the device is provided.

At all points of bearing contact, concrete members shall be separated from underlying members by dimensioned bearing pads or by methods and/or materials specified on the plans.

When not otherwise specifically provided, contact areas between concrete superstructures and substructures shall be separated by three layers of No. 15, Type I, roofing felt.

S-804.03.18.7 – Friction Joints. Metal friction joints shall consist of plates as indicated on the plans and shall be securely anchored in correct position. All sliding surfaces shall be thoroughly coated with an approved graphite grease. Movement shall not be impeded by the concrete in which the plates are embedded.

S-804.03.18.8 – Placing Anchor Bolts, Plates, Castings, Grillage, Conduits, Etc. All anchor bolts, plates, castings, grillage, conduits, etc., indicated on the plans to be placed in or on the concrete shall be placed, set, or embedded as indicated or as directed. These items of the construction shall be set in Portland cement mortar as referenced in S-714.11.5, except that anchor bolts may, as permitted by the Engineer, be built into the masonry, set in drilled holes, or placed as the concrete is being constructed by inserting encasing pipe or oiled wood forms of sufficient size to allow for adjustment of the bolts. After removal of the pipe or forms, the space around the bolts shall be filled with Portland cement mortar, completely filling the holes. The bolt shall be set accurately and perpendicular to the plane of the seat.

Anchor bolts which are to be set in the masonry prior to the erection of the superstructure shall be carefully set to proper location and elevation with a template or by other suitable means.

When bed plates are set in mortar, no superstructure or other load shall be placed thereon until this mortar has been allowed to set for a period of at least 96 hours, subject to the restrictions for cold-weather concreting in S-804.03.16.1. The mortar shall be kept well-moistened during this period.

Weep-hole drains shall be installed in abutments and retaining walls, and roadway drains or scuppers shall be installed in the roadway slabs in accordance with the details shown on the plans.

Where backfill is to be made at weep holes or openings in the structure, sand or stone chimneys or French drains shall be constructed as specified and shall extend through the portion of the backfill to be drained. Except as otherwise

provided, the sand, stone, or slag used in this construction shall meet the requirements of S-704.04.

S-804.03.19 – Finishing Concrete Surfaces.

S-804.03.19.1 – Classes of Finishes. Surface finishes of exposed concrete surfaces shall be classified as follows:

Table 804-X: Concrete Finishes

Class	Finish
Class 1	Ordinary Surface Finish
Class 2	Rubbed or Spray Finish
Class 3	Tooled Finish
Class 4	Sandblast Finish
Class 5	Wirebrush or Scrubbed Finish
Class 6	Floated Surface Finish

S-804.03.19.2 – Class 1, Ordinary Surface Finish. Immediately following the removal of forms, all fins and irregular projections shall be removed from all surfaces except from those which are not to be exposed or not to be waterproofed. On all surfaces, the cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges, and other defects shall be thoroughly cleaned, and after having been kept saturated with water for at least 3 hours shall be carefully pointed and trued with a mortar of cement and fine aggregate mixed in the proportions used in the class of the concrete being finished. Mortar used in pointing shall be not more than 1 hour old. The mortar patches shall be cured as specified under S-804.03.17. All construction and expansion joints shall be left carefully tooled and free of mortar and concrete. The joint filler shall be left exposed for its full length with clean and true edges.

The resulting surfaces shall be true and uniform. All surfaces which cannot be repaired to the satisfaction of the Engineer shall be given a Class 2 rubbed finish.

S-804.03.19.3 – Class 2, Rubbed or Spray Finish.

S-804.03.19.3.1 – Rubbed Finish. After removal of forms, the Class 1 finish shall be completed and the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for at least 3 hours. Surfaces shall be rubbed with a medium-coarse Carborundum stone using a small amount of mortar on its face. The mortar shall be composed of cement and sand mixed in the proportions used in the concrete being finished. Rubbing shall be continued

until all form marks, projections, and irregularities have been removed, all voids have been filled, and a uniform surface has been obtained. The paste produced by this rubbing shall be left in place at that time.

After all concrete above the surface being treated has been cast, the final finish shall be obtained by rubbing with a fine Carborundum stone and water. This rubbing shall continue until the entire surface is of a smooth texture and uniform color.

After the final rubbing is completed and the surface has dried, it shall be rubbed with burlap to remove loose powder and objectionable marks.

S-804.03.19.3.2 – Spray Finish. Prior to the spray finish, the concrete shall be given a Class 1 finish in accordance with S-804.03.19.2, supplemented if necessary with a grout meeting the requirements of S-714.11 with fine aggregate modified to require 100% passing the No. 16 sieve.

Grout shall be applied with burlap pads or float sponges, and as soon as the grout has dried the surface shall be brushed to remove all loose grout and the surface shall be left smooth and free of air holes. Surfaces to be sprayed shall be free of efflorescence, flaking coatings, dirt, oil, and other foreign substances. Prior to application of the spray finish, the surfaces shall be free of moisture, as determined by sight and touch, and in a condition consistent with the manufacturer's published recommendations.

The spray finish material shall meet the requirements of S-714.12 and shall be listed on MDOT's Approved Products List. The spray finish shall be applied with heavy-duty spray equipment capable of maintaining a constant pressure as necessary for proper application. The material shall be applied as recommended by the manufacturer except the rate of application shall not be less than 1 gallon per 50 square feet of surface area without prior written approval of the Engineer.

The completed finish shall be tightly bonded to the structure and present a uniform appearance and texture equal to or better than a rubbed finish. If necessary, additional coats shall be sprayed to produce the desired surface texture and uniformity. Upon failure to adhere positively to the structure without chipping or cracking or to attain the desired surface appearance, the coatings shall be completely removed and the surface given a rubbed finish in accordance with S-804.03.19.3.1, or other approved methods shall be used to obtain the desired surface finish to the satisfaction of the Engineer without additional cost to the project.

S-804.03.19.4 – Classes 3, 4, and 5 Finishes. If required, specifications for these finishes will be contained in the special provisions.

S-804.03.19.5 – Class 6, Floated-Surface Finish. After the concrete has been deposited in place, it shall be consolidated and the surface shall be struck off

by means of a strike board and floated with a wooden or cork float. An edging tool shall be used on edges and expansion joints. The surface shall not vary more than 1/8 inch under a 10-foot straightedge. The surface shall have a granular or matte texture which will not be slick when wet.

S-804.03.19.6 – Required Finishes for Various Surfaces.

S-804.03.19.6.1 – General. Unless otherwise specified, the top surface of sidewalks, the top horizontal surfaces of footings, and top slabs of box bridges, box culverts, or other structures shall be given a Class 6 finish. All formed concrete surfaces shall be given a Class 1 finish, except on surfaces which are completely enclosed, such as the inside surfaces of cells of box girders, the removal of fins and form marks and the rubbing of mortared surfaces to a uniform color will not be required.

In reference to finishing, exposed surfaces are surfaces or faces which may be seen after all backfill has been placed. Exposed surfaces requiring a Class 2 finish shall be finished at least 1 foot below the ground line or the low-water elevation, whichever is higher.

The Class 2 finish shall be made upon a Class 1 finish. After the removal of forms the Class 1 finish shall be completed and the rubbing of concrete shall be started as soon as the condition of the concrete will permit.

Bridge deck shall be finished in accordance with S-804.03.19.7.

S-804.03.19.6.2 – Finishing Formed Concrete Surfaces of Box Bridges, Box Culverts, Pipe Headwalls, and Minor Structures. The exposed surfaces of wing walls and parapets of box bridges and box culverts to be used as vehicular or pedestrian underpasses shall be given a Class 2 finish. Exposed surfaces of other box culverts or box bridges, pipe culvert headwalls, and other minor structures shall be given a Class 1 finish unless otherwise indicated on the plans.

The exposed surfaces of retaining walls, including copings and parapets, shall receive a Class 2 finish.

S-804.03.19.6.3 – Finishing Formed Concrete Surface of Bridges. All formed concrete bridge surfaces which are exposed shall have a Class 1 or 2 finish as set forth herein unless designated otherwise on the plans.

Bridges with designated surfaces for Class 2 finish are classified as follows:

Table 804-XI: Bridges Requiring a Class 2 Finish

Bridge Group	Description
Group A	Bridges over highways, roads, and streets
Group B	Bridges over waterways and railroads
Group BB	Twin or adjacent bridges of Group B category

When a Group B or BB bridge also spans a highway, road, or street, exposed concrete surfaces shall be finished in accordance with Group A requirements.

A. Superstructures. Concrete surfaces to be given a Class 2 finish shall be the exposed surfaces of wings and rails and other exposed surfaces indicated by a double line in Figures 804-1, 804-2, and 804-3.

   When a Group B or BB bridge also spans a highway, road, or street, the superstructure of spans over and extending one span in each direction beyond the lower-level highway, road, or street shall be given a Class 2 finish as shown for Group A.

B. Substructures. Concrete surfaces to be given a Class 2 finish are as follows:

   i) Group A. Exposed surfaces of abutments, end bents, end bent posts, wing walls, railing, retaining walls, parapets, copings, piers, columns, piles, caps, struts or walls between columns or piles, encasement of steel piles, arch rings, and spandrel walls.

   ii) Group B and BB. Exposed surfaces of abutments, wing walls, end bent posts, railing, retaining walls, parapets, and copings.

Figure 804-1: Group A – Bridges over Highways, Roads, & Streets

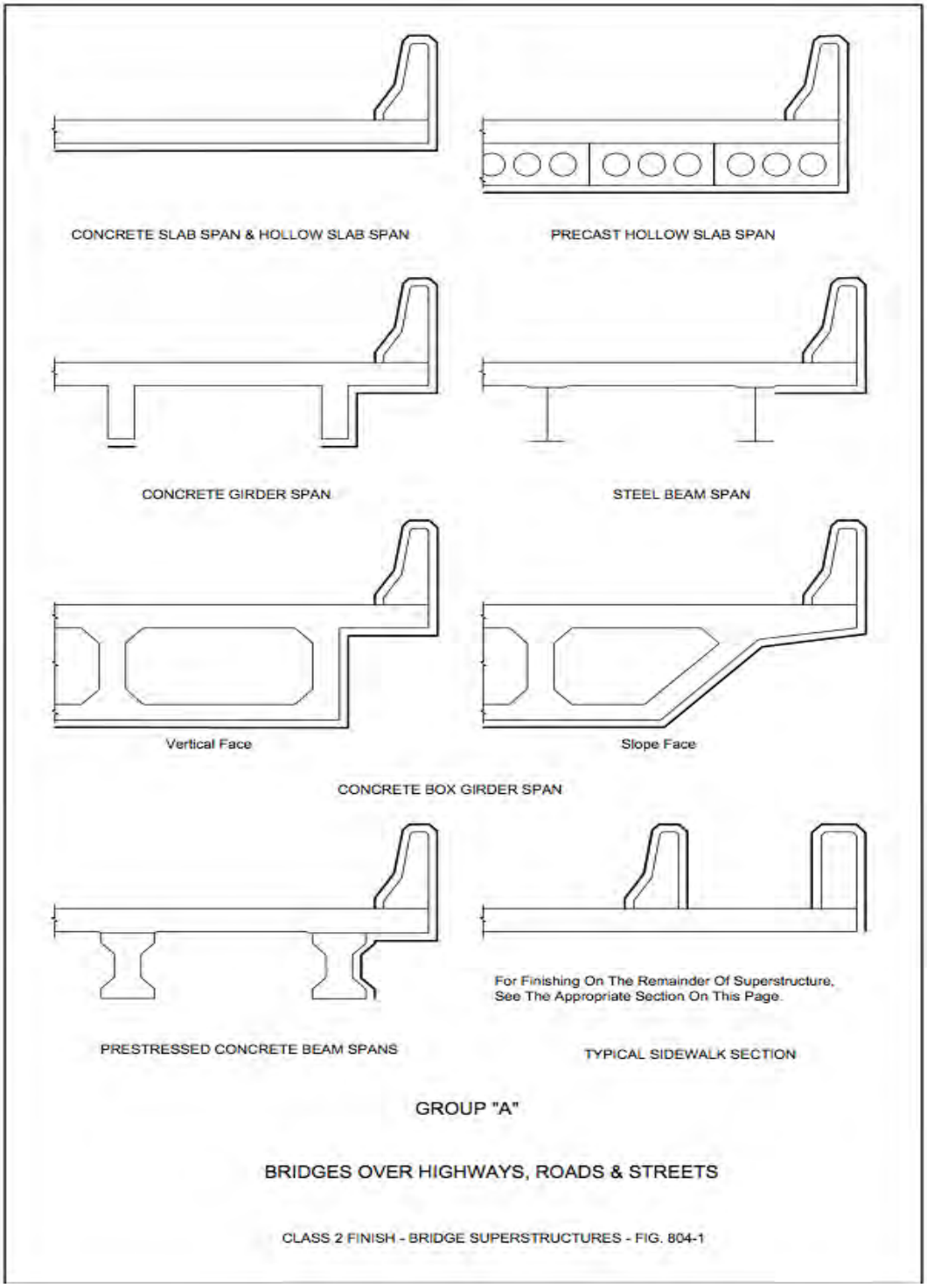


Figure 804-2: Group B – Bridges over Waterways and Bridges over Railroad Tracks

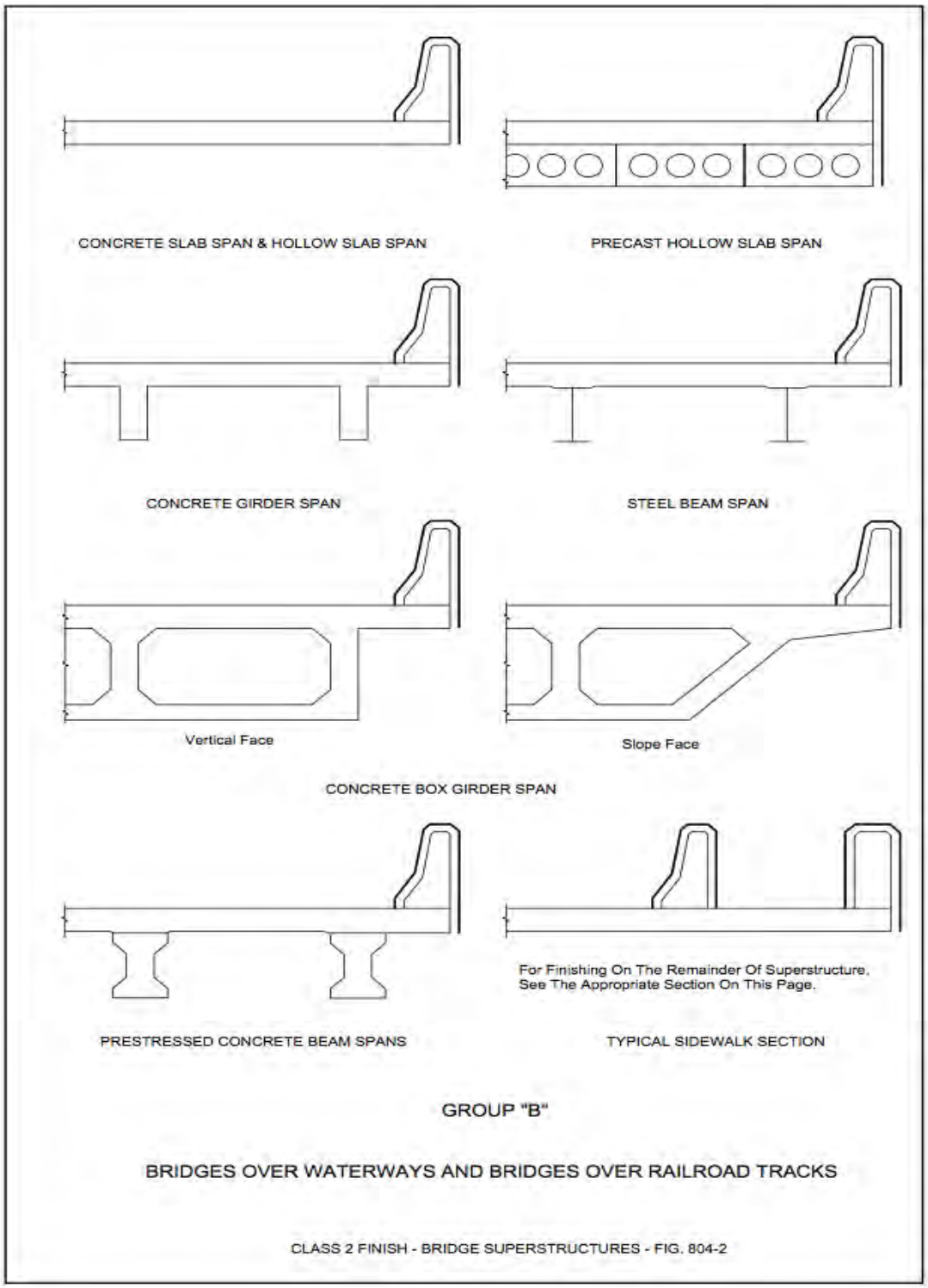
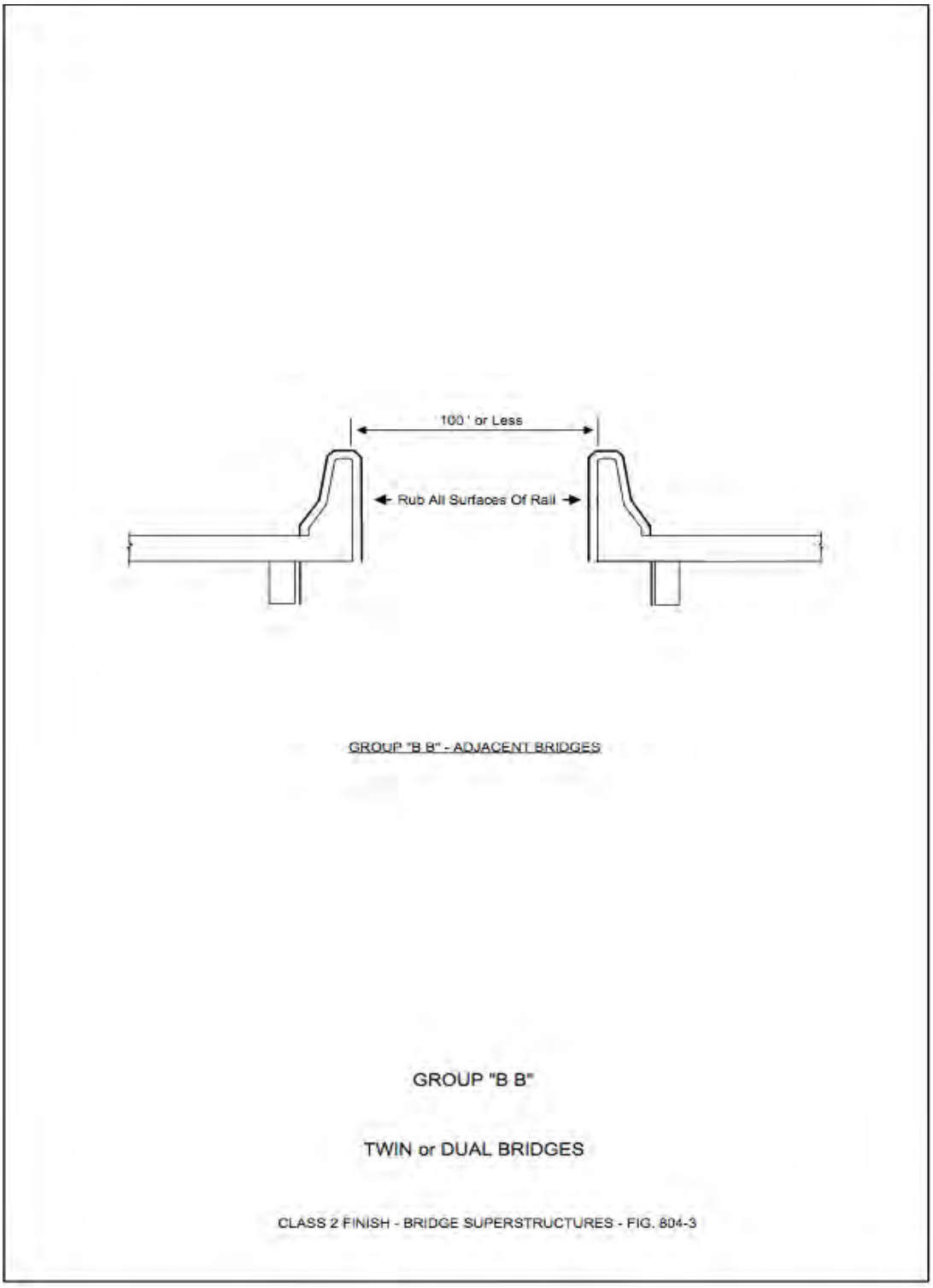


Figure 804-3: Group BB – Twin or Dual Bridges



S-804.03.19.7 – Finishing Bridge Floors.

S-804.03.19.7.1 – General. Concrete bridge decks shall be struck off and finished by the method(s) designated on the plans.

In the event a method is not designated, the Contractor may use either the longitudinal or transverse method subject to the requirements contained in these specifications.

Except when indicated otherwise on the plans, the final surface texture of the bridge floor shall be either a drag, belt, or broom finish. The surface shall be in accordance with the following requirements for **final strike-off, consolidation, and finishing:**

A. **Sequence**. The sequence of operations shall be the strike-off and consolidation, floating and removal of laitance, straightedging, and final surface finish. If a finish is not designated, the finish shall be a belt finish.

   Concrete, as soon as placed, shall be struck off and screeded. An approved portable screed shall be used. A second screed shall be provided for striking off the bottom layer of concrete if reinforcement is used and the pavement is placed in two layers.

   The screed for the surface shall be at least 2 feet longer than the maximum width of the slab to be struck off. It shall be of approved design, sufficiently rigid to retain its shape, and be constructed of metal or of other suitable material shod with metal.

   Consolidation shall be attained by the use of a suitable vibrator or other approved equipment.

   In operation the screed shall be moved forward with a combined longitudinal and transverse shearing motion, and manipulated so that neither end is raised from the side forms during the striking off process. If necessary, this shall be repeated until the surface is of uniform texture, true to grade and cross-section, and free from porous areas.

   In general, the addition of superficial water to the surface of the concrete to assist in finishing operations will not be permitted. If the application of water to the surface is permitted, it shall be applied as a fog spray by means of approved spray equipment.

B. **Finishing at Joints**. The concrete adjacent to joints shall be compacted or firmly placed without voids or segregation against the joint material, and also under and around all load transfer devices, joint assembly units, and other features designed to extend into the pavement. Concrete adjacent to joints shall be mechanically vibrated.

After the concrete has been placed and vibrated adjacent to the joints, the finishing machine shall be brought forward, operating in a manner to avoid damage or misalignment of joints. If uninterrupted operation of the finishing machine to, over, and beyond the joints causes segregation of concrete, damage to, or misalignment of the joints, the finishing machine shall be stopped when the front screed is approximately 8 inches from the joint. Segregated concrete shall be removed from in front of and off the joint, and the front screed shall be lifted and set directly on top of the joint and the forward motion of the finishing machine resumed. When the second screed is close enough to permit the excess mortar in front of it to flow over the joint, it shall be lifted and carried over the joint. Thereafter, the finishing machine may be run over the joint without lifting the screeds, provided there is no segregated concrete immediately between the joint and the screed or on top of the joint.

C. **Machine-Finishing**. Unless otherwise specified, full-width vibration shall be performed. If uniform and satisfactory density of the concrete is not obtained by the vibratory method at joints, along forms, at structures, and throughout the pavement, the Contractor shall furnish equipment and methods which will produce pavement conforming to the specifications.

D. **Hand-Finishing**. Unless otherwise specified, hand-finishing methods, other than the hand-floating method described below, will not be permitted except under the following conditions:

   i) In the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on the grade when the breakdown occurs.

   ii) Narrow widths or areas where operation of mechanical equipment is impractical may be finished by hand methods.

E. **Floating**. After the concrete has been struck off and consolidated, it shall be further smoothed and trued by means of a longitudinal float, using one of the following methods as specified:

   i) Hand Method. The hand-operated longitudinal float shall be at least 12 feet long and 6 inches wide, properly stiffened to prevent flexibility and warping. The longitudinal float, operated from foot bridges spanning but not touching the concrete, shall be worked with a sawing motion while held in a floating position parallel to the road centerline, and passing gradually from one side of the pavement to the other. Movement ahead along the centerline of the pavement shall be in successive advances of not more than one-half the length

of the float. Excess water and soupy material shall be wasted over the sides on each pass.

ii) Mechanical Method. The mechanical longitudinal float shall be of a design approved by the Engineer and shall be in good working condition. The float shall be accurately adjusted to the required crown, and coordinated with the adjustments of the transverse finishing machine so that a small amount of mortar is carried ahead of the float at all times. The float shall pass over each area of pavement at least two times, but excessive operation over a given area will not be permitted. Excess water and soupy material shall be wasted over the sides on each pass.

As an alternative to the mechanical method, the Contractor may use a machine composed of a cutting and smoothing float, or floats, suspended from and guided by a rigid frame. The frame shall be carried by four or more visible wheels riding on and constantly in contact with the side forms, or track line of a slip-form paver.

If necessary, following one of the preceding methods of floating, long-handled floats having blades at least 5 feet long and 6 inches wide may be used to smooth and fill in open-textured areas in the pavement. Long-handled floats shall not be used to float the entire surface of the pavement in lieu of, or to supplement, one of the preceding methods of floating. When strike-off and consolidation are done by the hand method and the crown of the pavement will not permit the use of the longitudinal float, the surface shall be floated transversely by means of the long-handled float. Care shall be taken not to work the crown out of the pavement during the operation. After floating, excess water and laitance shall be removed from the surface of the pavement by a straightedge 10 feet or more in length. Successive drags shall be lapped one-half the length of the blade.

F. **Straightedge Testing and Surface Correction**. After the floating has been completed and while the concrete is still plastic, the surface of the concrete shall be tested with a 10-foot straightedge. For this purpose the Contractor shall furnish and use an accurate 10-foot straightedge swung from handles 3 feet longer than one-half the width of the slab. The straightedge shall be held in contact with the surface in successive positions parallel to the road centerline and the whole area gone over from one side of the slab to the other as necessary. The advance along the road shall be in successive stages of not more than one-half the length of the straightedge. All depressions found shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and

refinished. Special attention shall be given to ensure that the surface across joints is smooth and to grade. Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straightedge, and the slab conforms to the required grade and cross-section.

G. **Final Finish**. The surface finish of the concrete shall be that designated on the plans and in the bid schedule of the contract. If a finish is not designated, the finish shall be a belt finish.

H. **Drag Finish**. This finish shall consist of a uniform surface of gritty texture produced by dragging a seamless strip of damp burlap or cotton fabric longitudinally along the full width of pavement. For pavement 16 feet or more in width, the drag shall be mounted on a bridge which travels on the forms or track line. The dimensions of the drag shall be such that a strip of burlap or fabric at least 3 feet wide is in contact with the full width of pavement surface while the drag is used. The drag shall consist of at least two layers of burlap with the bottom layer approximately 6 inches wider than the upper layer. The drag shall be maintained in a condition that will produce a surface of uniform appearance with corrugations approximately 1/16 inch in depth. Drags shall be maintained clean and free from encrusted mortar. Drags that cannot be cleaned shall be discarded and replaced by new drags.

I. **Broom Finish**. A broom finish shall be applied when the water sheen has practically disappeared. The broom shall be drawn from the center to the edge of the pavement with adjacent strokes slightly overlapping. The brooming operations shall produce corrugations in the surface that are uniform in appearance and not more than 1/16 inch in depth. Brooming shall be completed before the concrete has set to a degree that the surface will be torn or unduly roughened by the operation. The finished surface shall be free from rough and porous areas, irregularities, and depressions. Brooms shall be of the quality, size, and construction and operated so as to produce a surface finish meeting the approval of the Engineer. Subject to satisfactory results being obtained and approval of the Engineer, the Contractor will be permitted to substitute mechanical brooming in lieu of manual brooming as herein described.

J. **Belt Finish**. When straightedging is complete and the water sheen has practically disappeared and just before the concrete becomes nonplastic, the surface shall be belted with a two-ply canvas belt 8 inches wide and at least 3 feet longer than the pavement width. Hand belts shall have suitable handles to permit controlled, uniform manipulation. The belt shall be operated with short strokes transverse

to the road centerline and with a rapid advance parallel to the centerline. Subject to satisfactory results being obtained and approval of the Engineer, the Contractor will be permitted to use mechanical belting in lieu of manual belting as herein described.

K. **Transverse Tine Finish**. The surface shall first be given a drag finish. After completion of the drag finish, the pavement shall be given an additional texture by transverse tining.

The final surface texture shall be produced with a metal-tine finishing device. The texturing device shall be so constructed and operated as to produce uniform parallel grooves perpendicular to the centerline of the pavement 1/2 inch on centers and having a depth of 1/8 ± 1/32 inch.

The metal tine device shall be operated by approved mechanical means when texturing main roadway pavement lanes. Manual methods may be used for texturing small irregular areas inaccessible to the texturing machine.

The depth of the finished grooves will be determined by the use of a standard commercial tire tread depth measuring gauge with 1/32-inch graduations that can be easily and accurately read, a brass wire brush, and a steel straightedge approximately 1/4 inch by 1 inch by 12 inches. The Contractor shall furnish this equipment for use by and subject to the approval of the Engineer.

If for any reason the concrete hardens to the extent that the tining equipment does not provide grooving in accordance with these requirements, or if rainfall damages the finish and the Engineer permits the concrete to remain in place, the Contractor shall use other approved devices such as saws to construct the grooves substantially in accordance with the requirements specified herein.

L. **Transverse Grooved Finish**. After the concrete has cured for a minimum of 7 days, areas to be transverse-grooved shall be grooved with a sawing device. Grooves shall be perpendicular to the centerline of the roadway and extend as close as possible to the edge but in no case more than 2 feet from the edge, gutter line, etc. The tolerance for the width of the groove is +1/16 inch to -0 inches, and the tolerance for the depth and spacing of the grooves is ±1/16 inch.

M. **Edging at Forms and Joints**. After the final finish, but before the concrete has taken its initial set, the pavement along each side of each slab, and on each side of transverse expansion joints, formed joints, transverse construction joints, and emergency construction joints, shall be worked with an approved tool and rounded to the radius required by the plans. A well-defined and continuous radius shall be

produced and a smooth, dense, mortar finish obtained. The surface of the slab shall not be unduly disturbed by tilting of the tool during use.

At all joints, all tool marks appearing on the slab adjacent to the joints shall be eliminated by brooming the surface. In doing this, the rounding of the corner of the slab shall not be disturbed. All concrete on top of the joint filler shall be completely removed.

All joints shall be tested with a straightedge before the concrete has set, and correction made if one side of the joint is higher than the other, or if they are higher or lower than the adjacent slabs.

S-804.03.19.7.2 – Longitudinal Method. The longitudinal method requires that the strike-off screed be supported on accurately graded and supported bulkheads or templates placed across the full width at the end(s) of the pour. Before the concrete is placed, approved fixed templates or wood bulkheads of not less than 1-1/4-inch lumber shall be placed perpendicular to the centerline of the roadway, or in the case of skew bridges, at the angle of skew. The upper surface of the template or bulkheads shall be accurately set to conform to the required grade and crown.

Special attention shall be given to the gutter lines where the strike-off screed cannot reach. The gutters shall be finished by hand and tested with the straightedge. Floor drains shall be set lower than the finished gutter line and finished over. After initial set, the concrete shall be dished out and finished around the drains to form an outlet.

After the concrete has been deposited and rough-graded, it shall be struck off by means of a strike-off screed resting on the bulkheads or fixed templates. The strike-off screed shall be of a type satisfactory to the Engineer and shall have sufficient strength to retain its shape under all working conditions. The final surface shall comply with the applicable requirements above, and unless otherwise specified in the contract, the final finish under this method shall be a belt finish.

In general, the overall strike-off screed should be trussed, with bracing heavy enough to support the weight of a man without deflecting, and should be adjustable for camber and correction of sag.

The strike-off screed shall ride on the bulkheads or fixed templates at the ends of the section being finished. Care shall be taken to see that the bulkhead or fixed template elevations are accurately set since the entire span surface will be controlled by them. The manipulation of the screed shall be such that neither end is raised from the bulkheads or templates during the process.

The concrete shall be struck off by beginning at one curb and proceeding entirely across the span. A slight excess of concrete shall be kept in front of the cutting edge at all times. This operation shall be repeated at least three

times. In each case, the strike-off screed shall be picked up and carried back to the beginning point. No backward strokes will be allowed. The strike-off screed shall be moved along the bulkheads or fixed templates with a combined longitudinal and transverse motion. This operation may be manual or mechanical. Standing or walking in the fresh concrete ahead of the strike-off screed will not be permitted.

S-804.03.19.7.3 – Transverse Method. The transverse method requires that the screeding equipment be supported on accurately graded and supported rails placed beyond the gutter lines and parallel with the centerline of the bridge.

The machine shall be so constructed and operated as to produce a bridge deck of uniform density with minimum manipulation of the fresh concrete and achieved in the shortest possible time. Manual transverse methods of screeding will not be permitted.

The finishing machine shall be supported on vertically adjustable rails set a sufficient distance from the gutter line to allow free movement of the screed from gutter line to gutter line. Satisfactory means of load distribution with minimum rail deflection shall be provided. The screed rails for a deck pour shall be completely in place for the full length of the pour and shall be firmly secured prior to placing concrete. The screed rails shall be adjusted as necessary to compensate for settlement and deflection occurring during the screeding operations. Supports for the screed rail shall be located directly over slab-overhang support brackets as referenced in S-804.03.14.1.

At least one dry run shall be made the length of each pour with a “tell-tale” device attached to the screed carriage to ensure the specified clearance to the reinforcing steel.

The screed shall be equipped with a metal cutting edge or other approved mechanical means for accurately fine-grading the plastic concrete to the required grade and surface smoothness and shall be supported by a bridging structure sufficiently rigid and heavy to perform operations satisfactorily on concrete of minimum slump without vibration, distortion, or wrecking of forms. The screed shall be mechanically actuated to deliver the screeding action and for travel in a longitudinal direction at a uniform rate along the bridge deck.

The screed shall complete sufficient passes to strike off all of the excess concrete with ample mortar along the entire leading edge to ensure filling of low spots. Care shall be taken to remove all objectionable material from the gutters where final hand-finishing will be required.

The selection of the transverse method may require the Contractor to furnish bridge deck concrete which contains an approved water-reducing set-retarding admixture in the quantity approved by the Engineer at no additional cost to the project. See S-713.02 for more information.

Other finishing requirements shall be in accordance with the general requirements in S-804.03.19.7.1 and as specified on the plans.

S-804.03.19.7.4 – Acceptance Procedure for Bridge Deck Smoothness. Bridges must meet a 1/8-inch-in-10-feet straightedge requirement in the longitudinal and transverse directions.

S-804.03.19.7.4.1 – Grinding Bridge Decks.

S-804.03.19.7.4.1.1 – Equipment. The grinding equipment shall be a power-driven, self-propelled machine that is specifically designed to smooth and texture Portland cement concrete pavement with diamond blades. The effective wheelbase of the machine shall not be less than 12.0 feet. It shall have a set of pivoting tandem bogey wheels at the front of the machine, and the rear wheels shall be arranged to travel in the track of the fresh-cut pavement. The center of the grinding head shall be no more than 3.0 feet forward from the center of the back wheels.

The equipment shall be of a size that will cut or plane at least 3.0 feet wide. It shall also be of a shape and dimension that does not encroach on traffic movement outside of the work area. The equipment shall be capable of grinding the surface without causing spalls at cracks, joints, or other locations.

S-804.03.19.7.4.1.2 – Grinding. The grinding areas will be determined by the Contractor, based on the 10-foot straightedge test, and approved by the Engineer. The Contractor shall develop and submit to the Engineer for approval a Grinding Plan. The Contractor shall allow up to 45 days for the Engineer to review the plan prior to starting any grinding operations. This plan shall include as a minimum:

A. Name of the project superintendent in responsible charge of the grinding operation.

B. List and description of all equipment to be used.

C. Maximum depth of each pass allowed by the grinding equipment.

D. Maximum width of each pass allowed by the grinding equipment.

E. Details of a sequence of the grinding operation.

F. Data showing reinforcing steel clearance in all areas to be ground.

G. A detailed drawing of the deck showing areas to be ground, with station numbers and grinding depths clearly indicated.

H. A description of grinding in areas where drains are in conflict with grind areas.

I. Details of any changes in deck drainage, anticipated ponding, etc.

The Engineer will evaluate the grinding plan for conformance with the plans and specifications, after which the Engineer will notify the Contractor of any additional information required and/or changes that may be needed. Any part of the plan that is unacceptable will be rejected and the Contractor shall submit changes for reevaluation. All approvals given by the Engineer shall be subject to trial and satisfactory performance in the field, and shall not relieve the Contractor of the responsibility to satisfactorily complete the work.

The construction operation shall be scheduled and proceed in a manner that produces a uniform finished surface. Grinding will be accomplished in a manner that eliminates joint or crack faults while providing positive lateral drainage by maintaining a constant cross-slope between grinding extremities in each lane. Auxiliary or ramp-lane grinding shall transition as required from the mainline edge to provide positive drainage and an acceptable riding surface.

The operation shall result in a finished surface that conforms as close as possible to the typical cross-section and the requirements specified in S-804.03.19.7.4.1.3.

The Contractor shall establish positive means for removal of grinding residue. Residue shall not be permitted to flow across lanes used by public traffic or into gutters or drainage facilities.

S-804.03.19.7.4.1.3 – Final Surface Finish. The grinding process shall produce a finish surface that is as close as possible to grade and uniform in appearance with a longitudinal line-type texture. The line-type texture shall contain parallel longitudinal corrugations that present a narrow ridge corduroy-type appearance. The peaks of the ridges shall be approximately 1/16 inch higher than the bottoms of the grooves, with approximately 53 to 57 evenly spaced grooves per foot. Grinding-chip thickness shall be a minimum of 0.080 inches.

The finished bridge deck and bridge end slabs shall be retested for smoothness as per S-804.03.19.7.4.

S-804.03.19.8 – Finishing Horizontal Surfaces of Footings or Top Slabs of Box Bridges, Culverts, or Other Structures. The finishing of horizontal surfaces of footing or top slabs of box bridges, culverts, or other structures shall be achieved by placing an excess of material in the form and removing or striking off the excess with a template, forcing the coarse aggregate below the mortar surface. After the concrete has been struck off the surface shall be given a Class 6 finish.

S-804.03.19.9 – Finishing Exposed Surfaces of Sidewalks. After the concrete has been deposited in place it shall be consolidated and the exposed surface shall be given a Class 6 finish. An edging tool of the required radius shall be used on all edges and at all expansion joints. The surface shall have a granular texture which will not be slick when wet.

Sidewalk surfaces shall be laid out in blocks with an approved grooving tool as shown on the plans or as directed by the Engineer.

S-804.03.20 – Opening Bridges.

S-804.03.20.1 – Public Traffic. Unless otherwise specified, concrete bridge decks shall be closed to public highway traffic for a period of at least 21 days after placing concrete.

S-804.03.20.2 – Construction Traffic. Unless otherwise specified, concrete bridge decks shall be closed to construction traffic for a period of 7 days after placing concrete or when the minimum required compressive strength for the concrete placed is obtained.

S-804.03.21 – Final Clean-up. Upon completion of the work all equipment, surplus materials, forms, and waste material shall be removed, the bridge cleaned, and the work site given a final clean-up.

S-804.03.22 – Prestressed Concrete Bridge Members.

S-804.03.22.1 – General. All installations and plants for the manufacture of prestressed bridge members shall be certified by the Precast/Prestressed Concrete Institute (PCI). Bridge members manufactured in plants or installations not so approved will not be accepted for use in the work. The Contractor or other manufacturer shall employ a technician skilled in the adopted system of prestressing to supervise the manufacturing operations. This technician shall be certified according to the guidelines of this specification. The Contractor shall develop and implement a Quality System as per Division I of the PCI *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products,* current edition. The Quality System shall be submitted to the MDOT District Materials Engineer for approval.

S-804.03.22.2 – Stressing Requirements. The jacks for stressing shall be equipped with accurate calibrated gauges for registering the jacking pressure. Means shall be provided for measuring elongation of strands to at least the nearest 1/16 inch.

Prior to beginning work, the Contractor or manufacturer shall have all jacks to be used, together with their gauges, calibrated by an approved laboratory. All jacks and gauges shall have an accuracy of reading within 2%. The testing agency shall furnish the Engineer a statement certifying that the jacks and gauges meet this requirement. During the progress of the work, if a gauge appears to be giving erratic results or if the gauge pressure and elongations indicate materially differing stresses, recalibration will be required.

Calibration of jacks and gauges shall be repeated at intervals deemed necessary by the Engineer. These intervals for calibration shall not exceed 1 year.

Shop drawings of nonstandard prestressed beams, including an erection plan, shall be submitted in duplicate to the Engineer for approval, with concurrence of the State Aid Bridge Engineer, prior to manufacture of members.

S-804.03.22.2.1 – Methods. Plans for the particular bridge members will show prestressing by one of the following methods:

A. Pre-tensioning. The prestressing strands are stressed initially. After the concrete is placed, cured, and has attained the compressive strength shown on the plans, the stress is transferred to the member. The method used for pre-tensions shall be in accordance with Division V of the PCI *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products,* current edition.

B. Post-tensioning. The post-tensioning tendons are installed in voids or ducts and are stressed and anchored after development of the compressive strength specified on the plans. The voids or ducts are then pressure-grouted.

C. Combined Method. Part of the reinforcing is pre-tensioned and part post-tensioned. Under this method all applicable requirements for the two methods specified shall apply to the respective stressing elements being used.

S-804.03.22.2.2 – Alternative Details for Prestressed Members. In the event that the Contractor/ Manufacturer desires to use materials or methods that differ in any respect from those shown on the plans or described in these specifications, the Contractor shall submit for approval full plan details on acceptable tracings suitable for reproduction and specifications which shall become the property of the Engineer. In order for alternative materials and/or methods to be considered, they must comply fully with the following:

A. Provisions equal to those stipulated in these specifications.

B. Current AASHTO Specifications.

C. Recommendations of materials manufacturer.

D. Camber tolerance of beams and spans shown on plans.

Note: Alternative materials and methods will not be authorized on Federal-Aid projects.

The Engineer shall be the sole judge as to the adequacy and propriety of any variation of materials or methods.

S-804.03.22.2.3 – Stressing Procedure.

A. General. Stressing shall be performed by suitable jacks working against unyielding anchorages and capable of maintaining the required

stress for an indefinite period without movement or yielding. Strands may be stressed singularly or in a group.

The tension to be applied to each strand shall be as shown on the plans. The tension shall be measured by both jacking gauges and elongations in the strands and the result shall check within close limits.

It is anticipated that there may be a difference in indicated tension between jack pressure and elongation of about 5%. In this event, the discrepancy shall be placed on the side of slight overstress rather than understress.

In the event of an apparent discrepancy between gauge pressure and elongation of as much as 5%, the entire operation shall be carefully checked, and the source of error determined before proceeding further.

Elongation is to be measured after the strands have been suitably anchored, and all possible slippage at the anchorages has been eliminated.

In all stressing operations, the stressing force shall be kept as nearly symmetrical about the vertical axis of the member as practicable.

B. Pre-tensioning. All strands to be prestressed shall be brought to a uniform initial tension prior to being given their full pre-tensioning. This uniform initial tension of approximately 1,000 to 2,000 pounds shall be measured by suitable means such as a dynamometer so that its value can be used as a check against elongation computed and measured.

After the initial tensioning, the strand or group shall be stressed until the required elongation and jacking pressure is within the limits specified.

When the strands are stressed in accordance with the plan requirements and these specifications and all other reinforcing is in place, the concrete shall be placed in the prepared forms.

Strand stress shall be maintained until the concrete between anchorages has attained the required compressive strength as determined by cylinder tests, after which the strands shall be cut off flush with the ends of column members, and cut as shown on the plans for beams, girders, etc. Strands shall be cut or released in such a manner that eccentricity of prestress will be kept to a minimum and no damage to the member will result. The strand cutting pattern shall be as shown on the plans or as approved by the State Aid Bridge Engineer.

C. Post-tensioning. For all post-tensioning tendons/bars the anchor plates shall set exactly normal in all directions to the axis of the tendon/bar. Parallel wire anchorage cones shall be recessed within the beams. Tensioning shall not take place until the concrete has reached the compressive strength shown on the plans.

   Elongation and jacking pressures shall make appropriate allowance for all possible slippage or relaxation of the anchorage. Post-tensioning tendons/bars shall be stressed in the order and manner shown on the plans.

   The units shall be tensioned until the required elongations and jacking pressures are attained and reconciled within the limits specified in S-804.03.22.2.3(A), with such overstresses as approved by the Engineer for anchorage relaxation.

   Independent references shall be established adjacent to each anchorage to indicate any yielding or slippage that may occur between the time of initial stressing and final release of the strands.

   Straight tendons/bars may be tensioned from one end. Unless otherwise specified, curved tendons shall be stressed by jacking from both ends of the tendons.

D. Combined Method. In the event that girders are manufactured with part of the reinforcement pre-tensioned and part post-tensioned, the applicable portions of the requirements listed herein shall apply to each type.

S-804.03.22.3 – Manufacture.

S-804.03.22.3.1 – Forms. The forms used for prestressed bridge members shall meet the requirements of Division II of the PCI *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products,* current edition.

S-804.03.22.3.2 – Placing and Fastening Steel. Placing and fastening of all steel used for prestressed bridge members shall meet the requirements of Division V of the PCI *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products,* current edition.

S-804.03.22.3.3 – Holes for Prestressing Tendons/Bars. Holes provided in girders for prestressing tendons/bars shall be formed by means of inflatable rubber tubing, flexible metal conduit, metal tubing, or other approved means.

S-804.03.22.4 – Placing and Curing Concrete.

S-804.03.22.4.1 – Placing. The placing of concrete shall meet the applicable requirements of Division III of PCI *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products,* current edition.

S-804.03.22.4.2 – Curing. Initial and accelerated curing of all members shall meet the applicable requirements of Division IV of the PCI *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products,* current edition, except for the following listed requirements.

The source of heat for accelerated cure shall be steam. Calibrated thermocouples shall be implanted into the concrete members to monitor areas expected to have maximum and minimum heat. Curing methods and procedures listed in the prestress producer's PCI Plant Quality System Manual shall be approved by MDOT before their implementation.

S-804.03.22.4.3 – Removal of Side Forms. Side forms may be removed after the concrete has attained sufficient strength to maintain a true section. In order to obtain "sufficient strength," it may be necessary to cure members for 12 hours or more as prescribed in S-804.03.22.4.2, or to attain a minimum compressive strength of 1,000 psi.

If high-early-strength concrete is obtained by use of low slump (0 to 1.5-inch) concrete, vacuum process, or other approved methods, side forms may be removed earlier; however, approval of the methods and revision from normal schedules will be made only after inspections by the MDOT District and Central laboratories have determined that satisfactory results will be attained by the methods and schedules proposed.

S-804.03.22.4.4 – Grouting. The holes through post-tensioned members in which the tendons are installed shall be equipped with approved grouting vents. All prestressing tendons to be bonded shall be free of dirt, loose rust, grease, or other deleterious substances. Before grouting, the ducts shall be free of water, dirt, and other foreign substances. The ducts shall be blown out with compressed air until no water comes through the ducts. For long members with draped tendons, an open tap at low points may be necessary. After completion of stressing, the annular space between sides of the tendon and sides of the hole shall be grouted as set out in the following paragraphs.

With the grouting vent open at one end of the core hole, grout shall be applied continuously under moderate pressure at the other end until all entrapped air is forced out through the open grout vent, as evidenced by a steady stream of grout at the vent. Whereupon, the open vent shall be closed under pressure. The grouting pressure shall be gradually increased to a refusal of at least 75 psi and held at this pressure for approximately 10 seconds, and the vent shall then be closed under this pressure.

Portland cement grout shall consist of a mixture of:

A. 1 part Type 1 Portland cement

B. 1/4 part fly ash

C. 3/4 part washed sand [(a)]

D. 4 to 6 gallons of water per bag of cement

Notes:

a) All passing the No. 16 sieve and not more than 5% retained on the No. 30 sieve.

A plasticizing admixture, subject to approval by the Engineer, shall be used in accordance with the manufacturer's recommendations.

The grout shall be mixed in a mechanical mixer, shall have the consistency of heavy paint, and shall be kept agitated until placed.

Members shall not be moved before the grout has set, ordinarily at least 24 hours at 80°F or higher.

S-804.03.22.5 – Finishing and Marking. Units shall be given a Class 1 finish at the plant and shall be given a Class 2 finish after erection when required.

Recesses in girders at end of diaphragm bars, holes left by form ties, and other surface irregularities shall be carefully cleaned and patched with an approved non-shrink commercial grout or a non-shrinkage mortar of the following composition:

A. 1 part Type 1 cement

B. 1-1/2 to 2 parts fine sand

C. 1/2 to 3/4 ounces aluminum powder per bag of cement

D. Approved admixture per S-713.02

E. Sufficient water to produce a workable but rather stiff mix

The units shall be clearly marked in accordance with MDOT SOP.

S-804.03.22.6 – Handling, Storage, and Installation. Post-tensioned members may be handled immediately after completion of stressing and when the grout has set. Pre-tensioned members may be handled immediately after release of tensioning. In either case, the members shall have developed a minimum compressive strength of 4,000 psi prior to handling. In the event that stressing is not done in a continuous operation, members shall not be handled before they are sufficiently stressed, as determined by the Engineer, to sustain all forces and bending moments due to handling. In the handling, storage, and transporting of beams or girders, they shall be maintained in an upright position (position as cast) at all times and shall be picked up from points within distance from beam ends equal to beam depth or at pick-up points designated on the plans. Disregard of this requirement or dropping of units may be cause for rejection, whether or not injury to the unit is apparent. Piles shall be picked up and loaded for shipment at points shown by the suspension diagram on the plans. Extreme care shall be used in handling and storing piles to prevent

damage. The dropping of a pile may be cause for rejection of same, whether or not there is apparent injury to the member.

Care shall be exercised during the storage, hoisting, and handling of prestressed units to prevent damage. Damaged units shall be replaced by the Contractor at no additional costs to the project.

When members are stacked for storage, each layer shall be supported at or near the pick-up points. Supports shall be carefully placed in a vertical line in order that the weight of any member will not stress an underlying member. To prevent damage in moving members it is suggested that rigid supports be covered with a cushion of wood or other resilient material.

Members shall not be transported until at least 2 days after the concrete has reached a compressive strength of 5,000 psi, or greater strength when shown on the plans.

Prestressed concrete piles shall not be driven until the concrete is 14 days old and has reached the compressive strength stated on the plans.

After prestressed concrete voided slab units are set, doweled, and bolted in their final position, the keyways and dowel holes shall be filled with an approved non-shrink grout. Traffic shall not be permitted on the spans for 24 hours after grouting, and heavy construction equipment exceeding 15 tons shall not be permitted on the spans for a period of 72 hours after grouting.

Adjacent slab units that mismatch more than 1/4 inch shall be adjusted prior to grouting of the shear keys. The maximum deviation from cross-section and grade (exclusive of camber) at any point shall not exceed 1/4 inch, and when the surface is checked with a 10-foot straightedge applied both parallel and perpendicular to the centerline, the variance shall not exceed 1/4 inch.

In addition to the requirements set out in this section, the applicable requirements of S-803 shall apply.

S-804.03.22.7 – Tolerances for Accepting Prestressed Concrete. Member shall meet the dimension tolerances set by Division VII of the PCI *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products*, current edition.

S-804.03.22.8 – Testing of Materials. Concrete and aggregate testing shall meet the requirements of Division VI of the PCI *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products*, current edition, except that the concrete mix design shall meet the requirements of S-804.02.10. Also, in addition to concrete compressive tests samples made for de-tensioning and 28-day strength, test samples shall be made and tested in order to prove compliance to the requirements of S-804.03.22.6 for handling and shipping prestressed members. Compressive strength test cylinders for de-tensioning, handling, and shipping shall receive the same type curing as the

prestressed members they represent. Compressive strength samples shall be made each day for each prestress casting bed.

S-804.03.22.9 – Testing Personnel. Technicians employed in the production of prestressed members shall be certified in the PCI Quality Control Personnel Certification program. Each producer of prestressed members shall have at least one individual certified as a Level II Technician/Inspector in the PCI Quality Control Personnel Certification program on site during production for State Aid projects.

S-804.03.22.10 – Documentation. The prestressed producer for each prestressed concrete bridge member shall maintain documentation as set forth in MDOT's SOP. Testing and inspection record forms shall be approved by the MDOT Central Laboratory and as a minimum contain information listed in Division VI of the PCI *Manual for Quality Control for Plants and Production of Structural Precast Concrete Products,* current edition.

S-804.03.22.11 – Use in the Work. Before any prestressed member is incorporated into the work, documentation as described in S-804.03.22.10 is required along with visual inspection of the member at the bridge construction site. The Engineer's personnel will make visual inspection of the prestressed member at the bridge construction site.

S-804.04 – Method of Measurement. Concrete, complete and accepted, will be measured in cubic yards. The concrete volume will be computed from the neat dimensions shown on the plans, except for such variations as may be ordered in writing by the Engineer. The quantity of concrete involved in fillets, scorings, and chamfers 1 square inch or less in cross-sectional area will not be deducted from this volume. Deductions shall be made for the following:

A. The volume of structural steel, including steel piling, encased in concrete.

B. The volume of timber piles encased in concrete, assuming the volume to be 0.80 cubic feet per linear foot of pile.

C. The volume of concrete piles encased in concrete.

No deduction will be made for the volume of concrete displaced by steel reinforcement, floor drains, or expansion joint material that is 1 inch or less in width normal to the centerline of the joint. Where railing is bid as a separate item, that portion of the railing above the top of the curb, above the surface of the sidewalk, or above the bridge roadway, as the case may be, will not be included in the measurement of concrete, but will be measured as railing. Massive pylons or posts which are to be excepted from payment for railing and are intended to be measured as concrete will be so noted on the plans.

When shown on the plans or directed by the Engineer, concrete placed as a seal for cofferdams will be measured by the cubic yard actually in place, except

that no measurement will be made of seal concrete placed outside of an area bounded by vertical planes 18 inches outside the neat lines of the footing as shown on the plans or as directed and parallel thereto.

Reinforcing steel will be measured and paid for in pounds as set out in S-805.

Unless otherwise specified, structural steel will be measured and paid for as set out in S-810.

Excavation for bridges will be measured and paid for as in S-801.

Piling will be measured and paid for as set out in S-802 and S-803.

Railing will be measured and paid for as set out in S-813.

Prestressed concrete beams will be measured by the linear foot.

Prestressed concrete voided slab units, interior and exterior with railing, and precast concrete caps, intermediate and end cap with winged abutment wall, of the size and type specified, will be measured by the unit complete in place and accepted. Railing, winged abutment walls, grout, tie rods, nuts, washers, bearing pads and other appurtenances will not be measured for separate payment.

S-804.05 – Basis of Payment. Concrete will be paid for at the contract unit price per cubic yard for the class or classes specified, complete in place. Prestressed concrete beams will be paid for at the contract unit price per linear foot of specified size and type.

Concrete pile encasement will be paid for at the contract unit price per cubic yard for the class or classes specified, complete in place.

The quantity of concrete to paid for shall be the product of multiplying the total length encased by the volume per cubic yard as set forth on applicable standard drawing(s).

Payment at the contract unit prices bid shall be full compensation for furnishing all materials, equipment, tools, labor, and incidentals necessary to complete the work.

Payment will be made under the following pay items:

Table 804-XII: Section 804 Basis of Payment

Pay Item Number	Pay Item	Basis
S-804-A	Bridge Concrete, Class [class]	Per Cubic Yard
S-804-B	Box Bridge Concrete, Class [class]	Per Cubic Yard
S-804-C	[length]' Prestressed Concrete Beam, Type [type]	Per Linear Foot
S-804-D	[size] Prestressed Concrete Modified Pile Beams	Per Linear Foot

Special Provision
901-S-803-1
Piling Splices
Project No. SAP-48(19)M
Monroe County

OFFICE OF STATE AID ROAD CONSTRUCTION
MISSISSIPPI DEPARTMENT OF TRANSPORTATION

DATE: June 1, 2016

SUBJECT: Piling Splices

The MISSISSIPPI STANDARD SPECIFICATIONS FOR STATE AID ROAD AND BRIDGE CONSTRUCTION 2004 EDITION is hereby supplemented as follows:

Subsection 803.04.8 – Splices on Page 8-46 of the Mississippi Standard Specifications For State Aid Road and Bridge Construction Mississippi Department of Transportation 2004 Edition is hereby added in its entirety after the seventh paragraph on page 8-46.

Add the following after the above addition

901-S-803.04.8.2–Method of Measurement. Splice plates to deteriorated steel piling will be measured by the linear foot of each plate, web and flange, actually welded in place as shown on the contract plans.

901-S-803.05.8.1– Basis of Payment. Splice plates, measured as per 901-S-803.04.8.1, will be paid for at the contract unit price per linear foot, which price shall include the cost of cleaning of the existing pile, fabrication of splice plate, and all labor, equipment, welding, and incidentals necessary to complete the splice.

Payment will be made under:

Pay Item No. 901-S-803-P: Piling Splices - per Linear Foot

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-420-4 **CODE: (SP)**

DATE: **02/19/2019**

SUBJECT: Undersealing

Section 907-420, Undersealing, 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 907-420 – UNDERSEALING

907-420.01–Description. This work shall consist of filling voids (undersealing) in the soil adjacent to a pipe culvert(s), box culverts(s), bridge structure(s), or other locations determined by the Engineer. It is intended that the voids around the pipe culverts will be filled from the surface and voids around the box culverts will be filled from within the box culvert.

907-420.02–Material. The material for filling the voids shall be a "hydro-sensitive" high density polyurethane meeting the following requirements.

Properties	Test Value	Test Method
Density, lbs./ft., minimum	4.0	ASTM D 1622
Tensile Strength, psi, minimum	100	ASTM D 1622
Compression Strength, psi (at yield point), minimum	90	ASTM D 1621

The Contractor shall furnish the Engineer with certified test reports showing that the material meets the requirements of the specification.

907-420.03–Construction Requirements. All undersealing will be done at the locations specified in the plans, or as directed by the Engineer.

907-420.03.1–Equipment. The equipment shall be that customarily used in undersealing operations. Generally, it shall consist of a pneumatic or electric drill capable of drilling holes of adequate size in the embankment soil or culvert wall to accomplish the work. The exact depth into the embankment shall be determined by the Contractor. The equipment shall be in satisfactory operating condition and operated in such a manner as to prevent unnecessary damage to existing roadways, structures, and the surrounding area. The pump shall be capable of injecting the high density polyurethane at a rate and to a depth necessary to fill the void adjacent to the existing structures.

907-420.03.2–Drilling Holes. Unless otherwise shown in the plans, the size and location of the injection holes shall be as determined by the Manufacturer/Contractor.

907-420.03.3–Injection Process. The nozzle of the discharge hose shall be secured in the drilled hole in a manner that provides an adequate seal during the pumping process. The polyurethane

material shall be injected through the drilled holes until all known or encountered voids are filled. The rate and amount of material injection shall be determined by the Manufacturer/Contractor.

When the nozzle is removed, the hole shall be plugged or sealed to the satisfaction of the Engineer. Any excess polyurethane material shall be removed.

907-420.04--Method of Measurement. Undersealing, complete and accepted, will be measured by the pound. The quantity of urethane will be based on the supplier's packaging information for the material delivered and incorporated into the project.

907-420.05--Basis of Payment. Undersealing, as measured prescribed above, will be paid for at the contract unit price per pound, which price shall include all mobilization, labor, equipment, tools, materials, and incidentals necessary to complete the required work.

Cost for maintenance of traffic and individual traffic control devices as required for undersealing operations shall be included in the unit price for undersealing and will not be measured for separate payment.

Payment will be made under:

907-420-A: Undersealing - per pound