August 22, 2024

Bid Documents

Prepared for:
CITY OF TONTITOWN

2024 PAVEMENT MAINTENANCE PROJECT Overlays

CT JOB NO. 24100800

Prepared by: Crafton Tull

300 N College Blvd. Ste 317 | Fayetteville, AR 72701 | 479-636-4838 | www.craftontull.com

TABLE OF CONTENTS – CIVIL
2024 PAVEMENT MAINTENANCE OVERLAYS

DIVISION 01 - GENERAL REQUIREMENTS

GENERAL REQUIREMENTS
&
TECHNICAL SPECIFICATIONS
FOR
2024 PAVEMENT MAINTENANCE PROJECT
TONTITOWN, ARKANSAS

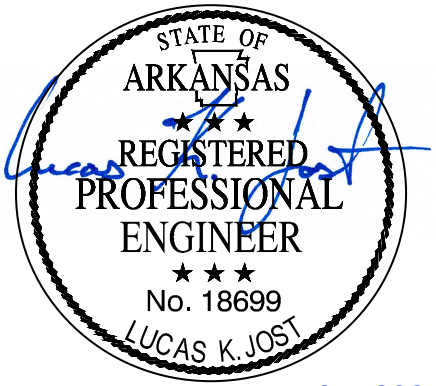
Prepared by:
Crafton Tull & Associates, Inc.
Architects, Engineers and Surveyors
300 N College Blvd., Suite 317
Fayetteville, AR 72701

August 22, 2024

CTA Project No. 24100800

2024 Pavement Maintenance Project Overlays
CTA Job No. 24100800

PROJECT ENGINEER:
Lucas Jost, P.E.
Crafton, Tull & Associates, Inc.
300 N College, Suite 317,
Fayetteville, AR 72701



8-4-2024

Civil Engineer of Record

012000

CONTRACT DOCUMENTS

INDEX

CONTRACT DOCUMENTS

ADVERTISEMENT FOR BIDS

City of Tontitown, Arkansas
OWNER

235 E Henri de Tonti Blvd, Tontitown, AR
ADDRESS

Separate sealed bids for the construction of 2024 Pavement Maintenance Overlays (Project) will be received by the City of Tontitown at Tontitown City Hall, E Henri de Tonti Blvd, Tontitown, Arkansas until 2:00 p.m. Central Time August 22, 2024, and then publicly.

The CONTRACT DOCUMENTS, consisting of Advertisement for Bids, Instruction to Bidders, Bid and Bid Bond, Agreement, General Conditions, Supplementary Conditions, Payment Bond, Performance Bond, Drawings, Specifications, and Addenda, may be obtained by emailing Luke.Jost@craftontull.com.

Bids submitted using SPECIFICATIONS AND CONTRACT DOCUMENTS obtained from any other source will be subject to rejection.

First Publication August 4, 2024

Second Publication August 11, 2024

INSTRUCTIONS TO BIDDERS

1. **Defined Terms.**

Terms used in these Instructions to Bidders which are defined in the Standard General Conditions of the Construction Contract, NSPE-ACEC Document EJCDC C-700, (2002 edition), have the meanings assigned to them in the General Conditions. The term, "Successful Bidder", means the lowest, qualified, responsible Bidder to whom the Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award.

2. **Copies of Bidding Documents.**

2.1 Complete sets of the Bidding Documents in the number and or the deposit sum, if any, stated in the Advertisement for Invitation may be obtained from Engineer (unless another issuing office is designated in the Advertisement or Invitation to Bid). The deposit will be refunded to Bidders who submit a bona-fide Bid and returns the Bidding Documents in good condition within ten (10) days after opening of Bids, unless noted otherwise.

2.2 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 Owner and Engineer, in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3. **Qualifications of Bidders.**

To demonstrate the qualifications to perform the Work, each Bidder must be prepared to submit within five (5) days of Owner's request written evidence of the types set forth in the Supplementary Conditions, such as financial data, previous experience and evidence of authority to conduct business in the jurisdiction where the Project is located. Each BID must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the contract.

4. **Examination of Contract Documents and Site.**

4.1 It is the responsibility of each Bidder before submitting a Bid, to (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may in any manner affect cost, progress, or performance or furnishing of the Work, (c) consider federal, state, and local Laws, and Regulations that may affect cost, progress, or performance or furnishing of the Work; (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify Engineer of all conflicts, errors or discrepancies in the Contract Documents.

4.2 Reference is made to the Supplementary Conditions for the identification of:

4.2.1 Those reports of explorations and tests of subsurface physical conditions at the site which have been utilized by Engineer in preparation of the Contract Documents Bidder may rely upon the accuracy of the technical data contained in such reports but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for the purposes of bidding or construction.

4.2.2 Those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site which have been utilized by Engineer in preparation of the Contract Documents Bidder may rely upon the accuracy of the technical data contained in such drawings but not upon the completeness thereof for the purposes of bidding or construction.

Copies of such reports and drawings will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which Bidder is entitled to rely as provided in Paragraphs 4.2.1 and 4.2.2 are incorporated therein by reference. Such technical data has been identified and established in the Supplementary Conditions.

4.3 Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to

Owner and Engineer by Owners of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.

4.4 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidder on subsurface conditions, Underground Facilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.02 and 4.03 of the General Conditions.

4.5 Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine his Bid for performing and furnishing the work in accordance with the time, price and other terms and conditions of Contract Documents.

4.6 On request in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of his Bid. Bidder shall fill all holes, clean up, and restore the site to its former condition upon completion of such explorations.

4.7 The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the work are identified in the Contract Documents.

All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

4.8 The submission of a Bid will constitute an incontrovertible representation by the Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and such means, methods, techniques, sequences or procedures of

construction as may be indicated in or required by the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of Work.

5. **Interpretations and Addenda**

5.1 All questions about the meaning or intent of the Contract Documents are to be directed to the Engineer. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten (10) days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

5.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Engineer.

6. **Bid Security**

6.1 Each Bid must be accompanied by Bid Security, made payable to Owner, in an amount of five percent (5%) of the Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached, if a form is prescribed) issued by a Surety meeting the requirements of Paragraph 5.01 of the General Conditions.

6.2 The Bid Security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Contract Security, whereupon it will be returned. If the successful Bidder fails to execute and deliver the Agreement and furnish the required contract security within fifteen (15) days of the Notice of Award, Owner may annul the Notice of Award and the Bid Security of that Bidder will be forfeited. The Bid Security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh (7^{th}) day after the

Effective Date of the Agreement or the forty-sixth (46th) day after the Bid opening whereupon Bid Security furnished by such Bidder will be returned. Bid Security of Bids, which are not competitive, will be returned within seven (7) days after the Bid opening.

7.1 **Contract Time**

The number of days within which, or the date by which, the Work is to be substantially completed and also completed and ready for final payment (the Contract Time), are set forth in the Bid form and will be included in the Agreement.

8. **Liquidated Damages**

Provisions for liquidated damages, if any, are set forth in the Agreement.

9. **Substitute or Equal Items**

The Contract, if awarded will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitutes or "or equal" items of material or equipment which may be furnished or used by Contractor if acceptable to Engineer. Application for such acceptance will not be considered by Engineer until after the "effective date of the Agreement". The procedure for submission of any such application by Contractor and consideration by Engineer is set forth in Paragraphs 6.05, and 6.06 and 6.07 of the General Conditions, which may be supplemented in the General Requirements.

10. **Subcontractors, Etc.**

10.1 If the supplementary conditions require the identity of certain Subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) to be submitted to Owner in advance of the specified date prior to the effective date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall, within seven (7) days after the Bid opening submit to Owner a list of all Subcontractors, Suppliers and other persons and organizations proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person and organization, if requested by Owner. If Owner or Engineer, after due investigation,

has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, either may, before the Notice of Award is given, request the apparent Successful bidder to submit an acceptable substitute without an increase in Bid price. If the apparent Successful Bidder declines to make any such substitution, Owner may award the contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Supplier, other persons and organizations. The declining to make requested substitutions will not constitute grounds for sacrificing the Bid Security of any Bidder. Any Subcontractor, Supplier, other person or organization listed and to whom Owner or Engineer does not make written objection prior to giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

10.2 In contracts where the Contract Price is on the basis of Cost-of-Work Plus Fee, the apparent Successful Bidder, prior to the Notice of Award, shall identify in writing to Owner those portions of the Work that such Bidder proposes to subcontract and after the Notice of Award may only subcontract other portions of the Work with Owner's written consent.

10.3 No Contractor shall be required to employ any Subcontractor, other person or organization against whom he has reasonable objection.

11. **Bid Form**

11.1 The Bid Form is included with the Bidding Documents; additional copies may be obtained from the Engineer.

11.2 All blanks on the Bid forms must be completed in ink or typewriter. The Bid price of each item on the form must be stated in words and numerals; in case of a conflict, words will take precedence.

11.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

11.4 Bids by partnership must be executed in the partnership name and signed by a partner whose title must appear under the signature and the official address of the partnership must be shown below the signature.

12. **Submission of Bids**

Bids shall be submitted at the time and place indicated in the Advertisement for Bid, and shall be included in an opaque sealed envelope, marked with the Project title and name and address of the Bidder, and accompanied by the Bid Security and other required documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation, "BID ENCLOSED", on the face of it.

13. **Modification and Withdrawal of Bids**

13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to opening of Bids.

13.2 If, within twenty-four (24) hours after bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of his Bid, that Bidder may withdraw his Bid and the Bid Security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.

14. **Opening of Bids**

Bids will be opened a. publicly ___X___ b. privately _____

14.1 When Bids are opened publicly, they will be read aloud and an abstract of the amounts of the base Bids and major alternatives (if any) will be made available after the opening of Bids.

14.2 When Bids are opened privately, an abstract of the same information will be made available to Bidders within seven (7) days after the date of Bid opening.

15. **Bids To Remain Open**

All bids shall remain open for forty-five (45) days after the day of the Bid Opening; but Owner may, in his sole discretion, release any Bid and return the Bid Security prior to that date.

16. **Award of Contract**

16.1 Owner reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the Work, and to negotiate contract terms with the Successful Bidder, and the right to disregard all nonconforming, non-responsive or conditional Bids. Also, Owner reserves the right to reject the Bid of any Bidder, if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. Discrepancies in multiplication of units of work and unit prices will be resolved in favor of unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

16.2 In evaluating Bids, Owner shall consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates and unit prices, or other data, as may be requested in the Bid Forms or prior to the Notice of Award.

16.3 Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the Supplementary Conditions. Owner also may consider the

operating costs, maintenance requirements, performance data, and guarantees of major items of materials and equipment proposed for incorporation in the work when such data is required to be submitted prior to the Notice of Award.

16.4 Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

16.5 If the contract is to be awarded, it will be awarded to the lowest Bidder whose evaluation by the Owner indicates to Owner that the award will be in the best interests of the Project.

16.6 If the contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within forty-five (45) days after the day of the Bid opening.

17. **Performance and Other Bonds**

Paragraph 5.01 of the General Conditions and the Supplementary Conditions set forth Owner's requirements as to Performance and Payment Bonds. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by the required Performance and Payment Bonds.

18. **Signing of Agreement**

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement and all other Contract Documents attached. Within fifteen (15) days thereafter, Contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds. Within ten (10) days thereafter, Owner will deliver one (1) fully executed, signed counterpart to Contractor. Each counterpart is to be accompanied by a complete set of the Drawings with appropriate identification.

BID

(A) PROJECT IDENTIFICATION: 2024 Pavement Maintenance Overlays

(B) CTA JOB # 24100800

(C) THIS BID IS SUBMITTED TO: City of Tontitown

1. The undersigned **BIDDER** proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.

2. **BIDDER** accepts all of the terms and conditions of the instructions to Bidders, including without limitation those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for forty-five (45) days after the days of the Bid opening. **BIDDER** will sign the Agreement with the Bonds and other documents required by the Contract Documents within fifteen (15) days after the date of Owner's Notice of Award.

3. In submitting this Bid, **BIDDER** represents, as more fully set forth in the Agreement, that:

   (a) **BIDDER** has examined copies of all the Contract Documents and of the following Addenda (receipt of all which is hereby acknowledged):

DATE	NUMBER

8/21/24

RFI - Answers
Paving Questions
Pothole Clarifications

(b) **BIDDER** has familiarized himself with the nature and extent of the Contract Documents, Work, site locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

(c) **BIDDER** has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and accepts any determination set forth in the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which **BIDDER** is entitled to rely.

(d) **BIDDER** has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or to supplement those referred to in (c) above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work as **BIDDER** considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time, and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.02 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports or similar information or data are or will be required by **BIDDER** for such purposes.

(e) **BIDDER** has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities and/or will be required by **BIDDER** in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.04 of the General Conditions.

(f) **BIDDER** has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

(g) **BIDDER** has given **ENGINEER** written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the Written resolution thereof by **ENGINEER** is acceptable to **BIDDER**.

(h) This bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; **BIDDER** has not directly or indirectly induced or solicited any other **BIDDER** to submit a false or sham Bid; **BIDDER** has not solicited or induced any person, firm, or corporation to refrain from bidding; and **BIDDER** has not sought by collusion to obtain for itself any advantage over any other **BIDDER** or the **OWNER**.

(I) The Base Bid shall include all the work called for on the Plans and in the Specifications.

4. Bidder will complete the work for the following prices:

BID SCHEDULE

Item No.	Item Description	Estimated Quantity	Unit	Unit Bid Price	Total Bid Amount
1.0	3/4" Lift of 4.75 mm Superpave Mix ~~High Polymer Micro-Surfacing~~	7,494	S.Y.	$9.75	$73,066.50
	NINE DOLLARS AND SEVENTY-FIVE CENTS (UNIT BID PRICE WRITTEN IN WORDS)				
	SEVENTY-THREE THOUSAND SIXTY-SIX DOLLARS AND FIFTY CENTS (TOTAL BID PRICE WRITTEN IN WORDS)				
2.0	2" ACHM Overlay (3/8" - PG70-22)	9,503	S.Y.	$18.00	$171,054.00
	EIGHTEEN DOLLARS AND ZERO CENTS (UNIT BID PRICE WRITTEN IN WORDS)				
	ONE HUNDRED SEVENTY-ONE THOUSAND FIFTY-FOUR DOLLARS AND ZERO CENTS (TOTAL BID PRICE WRITTEN IN WORDS)				
3.0	Minor Pothole Repair	100	S.Y.	$425.00	$42,500.00
	FOUR HUNDRED TWENTY-FIVE DOLLARS & ZERO CENTS (UNIT BID PRICE WRITTEN IN WORDS)				
	FORTY-TWO THOUSAND FIVE HUNDRED DOLLARS AND ZERO CENTS (TOTAL BID PRICE WRITTEN IN WORDS)				
4.0	Major Pothole Repair	180	S.Y.	$525.00	$94,500.00
	FIVE HUNDRED TWENTY-FIVE DOLLARS AND ZERO CENTS (UNIT BID PRICE WRITTEN IN WORDS)				
	NINETY-FOUR THOUSAND FIVE HUNDRED DOLLARS AND ZERO CENTS (TOTAL BID PRICE WRITTEN IN WORDS)				
5.0	4" White Striping	826	L.F.	$4.50	$3,717.00
	FOUR DOLLARS AND FIFTY CENTS (UNIT BID PRICE WRITTEN IN WORDS)				
	THREE THOUSAND SEVEN HUNDRED SEVENTEEN DOLLARS AND ZERO CENTS (TOTAL BID PRICE WRITTEN IN WORDS)				
6.0	Accessible Pavement Emblem	2	EA.	$450.00	$900.00
	FOUR HUNDRED FIFTY DOLLARS AND ZERO CENTS (UNIT BID PRICE WRITTEN IN WORDS)				
	NINE HUNDRED DOLLARS AND ZERO CENTS (TOTAL BID PRICE WRITTEN IN WORDS)				

BID SCHEDULE

Item No.	Item Description	Estimated Quantity	Unit	Unit Bid Price	Total Bid Amount
7.0	Remove & Reset Parking Wheel Stops	30	EA.	$300.00	$9,000.00
	THREE HUNDRED DOLLARS AND ZERO CENTS UNIT BID PRICE WRITTEN IN WORDS NINE THOUSAND DOLLARS AND ZERO CENTS TOTAL BID PRICE WRITTEN IN WORDS				
8.0	Traffic Control	1	L.S.	$9,500.00	$9,500.00
	NINE THOUSAND FIVE HUNDRED DOLLARS AND ZERO CENTS UNIT BID PRICE WRITTEN IN WORDS NINE THOUSAND FIVE HUNDRED DOLLARS AND ZERO CENTS TOTAL BID PRICE WRITTEN IN WORDS				
9.0	Mobilization	1	L.S.	$15,000.00	$15,000.00
	FIFTEEN THOUSAND DOLLARS AND ZERO CENTS UNIT BID PRICE WRITTEN IN WORDS FIFTEEN THOUSAND DOLLARS AND ZERO CENTS TOTAL BID PRICE WRITTEN IN WORDS				
10.0					
	UNIT BID PRICE WRITTEN IN WORDS TOTAL BID PRICE WRITTEN IN WORDS				
11.0					
	UNIT BID PRICE WRITTEN IN WORDS TOTAL BID PRICE WRITTEN IN WORDS				

TOTAL CONTRACT PRICE

FOUR HUNDRED NINETEEN THOUSAND TWO HUNDRED THIRTY-SEVEN DOLLARS AND FIFTY CENTS
(USE WORDS)

$419,237.50
(USE FIGURES)

5. **BIDDER** agrees that the Work will be substantially completed within 45 calendar days after the date when the Contract Time commences to run, as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment within 30 calendar days after the date Contract Time commences to run, as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment

BIDDER accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

6. The following documents are attached to and make a condition of this Bid:

(a) ✓ Bid Schedule
(b) ✓ Required Bid Security in the form of:
✓ 5% Bid Bond, 5% Cashier's Check.
(c) ✓ A Tabulation of Subcontractors and other persons and organizations required to be identified in this Bid.
(d) ✓ Required Bidder Qualification Statement with supporting data, if specified.
(e) ✓ Business Relationship Affidavit.
(f) ✓ Noncollusion Affidavit.

7. Communications concerning this Bid shall be addressed to:

APAC-Central, Inc. - Grant Ferguson
BIDDER'S NAME

755 E Millsap Rd, Fayetteville, AR 72703
BIDDER'S ADDRESS

479-263-9860
BIDDER'S PHONE NUMBER

8. The terms used in this Bid, which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents have the meanings assigned to them in the General Conditions.

SUBMITTED ON August, 22nd, 20 24.

AN INDIVIDUAL

_____

(Individual's Signature)

BY _____ (Seal)

(Individual's Name Typed)

doing business as _____

Business Address:

_____

_____

Phone No. _____

A PARTNERSHIP

BY _____ (Seal)

(Firm Name)

_____

(General Partner's Signature)

_____

(General Partner's Name Typed)

Business address:

_____

_____

Phone No. _____

A CORPORATION

BY APAC-Central, Inc.
(Corporation Name)

Delaware
(State of Incorporation)

BY _____
(Signature of Person Authorized to Sign)

Doug Luetjen
(Typed Name of Person Authorized to Sign)

Operations Manager of Estimating & Construction
(Title)

(Corporate Seal)

Attest _____
(Secretary)

Business Address:

755 E Millsap Rd

Fayetteville, AR 72703

Phone No.: 479-587-3300

A JOINT VENTURE

BY _____
(Signature)

_____
(Typed Name)

_____
(Address)

BY _____
(Signature)

_____
(Typed Name)

_____
(Address)

Document A310™ – 2010

Conforms with The American Institute of Architects AIA Document 310

Bond Number: 08222024

Bid Bond

CONTRACTOR:
(Name, legal status and address)

APAC-Central, Inc.
755 E. Millsap Road
Fayetteville, AR 72703

SURETY:
(Name, legal status and principal place of business)
Fidelity and Deposit Company of Maryland
1299 Zurich Way
Schaumburg, IL 60196-1056
State of Inc: Illinois

OWNER:
(Name, legal status and address)
City of Tontitown
235 E Henri de Tonti Blvd
Tontitown, AR

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

BOND AMOUNT: 5%

PROJECT:
(Name, location or address, and Project number, if any)

2024 Pavement Maintenance Project - Tontitown, AR

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 22 day of August , 2024

	APAC-Central, Inc.
(Witness)	*(Principal)* *(Seal)*
	(Title)
	Fidelity and Deposit Company of Maryland
(Witness)	*(Surety)* *(Seal)*
	(Title) Doug Luetjen, Attorney-In-Fact

APAC CENTRAL, INC. CORPORATE SEAL 1980 DELAWARE

ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Illinois, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Illinois (herein collectively called the "Companies"), by **Robert D. Murray, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Brandon Lefevre, Murry Cline, Michael Dugan, Kristopher McClanahan, Michael Eshleman, Doug Luetjen, James Hawkins, Joshua Davis and Doug Fronick, all of Fayetteville, Arkansas**, EACH, its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: Any and all bid bonds issued on behalf of **APAC - Central, Inc. of Fayetteville, Arkansas** each in a penalty not to exceed the sum of $1,000,000, **any and all bonds and undertakings,** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 3rd day of January, A.D. 2023.

ATTEST:
ZURICH AMERICAN INSURANCE COMPANY
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY
FIDELITY AND DEPOSIT COMPANY OF MARYLAND

By: Robert D. Murray
Vice President

By: Dawn E. Brown
Secretary

State of Maryland
County of Baltimore

On this 3rd day of January, A.D. 2023, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **Robert D. Murray, Vice President and Dawn E. Brown, Secretary** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

Iva Bethea
Notary Public
My Commission Expires September 30, 2023

Authenticity of this bond can be confirmed at bondvalidator.zurichna.com or 410-559-8790

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 22nd day of AUGUST, 2024.

MJ Pethick

By: Mary Jean Pethick
Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT A COMPLETE DESCRIPTION OF THE CLAIM INCLUDING THE PRINCIPAL ON THE BOND, THE BOND NUMBER, AND YOUR CONTACT INFORMATION TO:

Zurich Surety Claims
1299 Zurich Way
Schaumburg, IL 60196-1056
Ph: 800-626-4577

If your jurisdiction allows for electronic reporting of surety claims, please submit to:
reportsfclaims@zurichna.com

Authenticity of this bond can be confirmed at bondvalidator.zurichna.com or 410-559-8790

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____as Principal, and _____ as Surety, are hereby held and firmly bound unto City of Tontitown, as Owner in the penal sum of _____ or the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our successors and assigns.

Signed this _____ day of_____, 20____.

The Condition of the above obligation is such that whereas the Principal has submitted to City of Tontitown _____ a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the

2024 Pavement Maintenance Overlays Project _____

_____

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 bid 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 respect perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall 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.

_____ (L.S.)
Principal

_____
Surety

BY:_____

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.

AGREEMENT

This **AGREEMENT** is dated as of the _____ day of _____in the year 20___ by and between City of Tontitown (hereinafter called **OWNER**) and (hereinafter called **CONTRACTOR**). **OWNER** and **CONTRACTOR**, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

2024 Pavement Maintenance Overlays

The Project for which the work under the Contract Documents may be the whole or only a part is generally described as follows:

2024 Pavement Maintenance Overlays

ARTICLE 2. ENGINEER

The Project has been designed by Crafton Tull who is hereinafter called **ENGINEER** and who will assume all duties and responsibilities and will have the rights and authority assigned to **ENGINEER** in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 3. CONTRACT TIME

3.1 The Work will be substantially completed within 45 days after the date when the Contract Time commences to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 60 days after the date when the Contract Time commences to run.

3.2 Liquidated Damages. **OWNER** and **CONTRACTOR** recognize that time is of the essence of this Agreement and that **OWNER** will suffer financial loss if the Work is not substantially complete within the time specified in Paragraph 3.1 above in accordance with Paragraph 14.04 of the General Conditions plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by **OWNER** if the Work is not substantially complete on time. Accordingly, instead of requiring any such proof, **OWNER** and

CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) **CONTRACTOR** shall pay **OWNER** One-Hundred Dollars ($100) for each day that expires after the time specified in Paragraph 3.1 for substantial completion until the Work is substantially complete.

ARTICLE 4. CONTRACT PRICE

4.1 **OWNER** shall pay **CONTRACTOR** for performance of the work in accordance with Contract Documents in current funds as follows:

According to Bid Schedule pages CD-14 to CD- 15 , inclusive.

ARTICLE 5. PAYMENT PROCEDURES

Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions and Division 1 of the Technical Specifications. Applications for Payment will be processed by **ENGINEER** as provided in the General Conditions.

5.1 Progress Payments. **OWNER** shall make progress payments on account of the Contract Price on the basis of **CONTRACTOR'S** Applications for Payment as recommended by **ENGINEER**, on or about the tenth (10^{th}) days of each month during construction as provided below. All progress payments will be on the basis of the Work measured by the schedule of values established in Paragraph 2.07 of the General Conditions.

5.1.1 Prior to Substantial completion, progress payments will be made in an amount equal to: The percentage indicated below, but in each case, less the aggregate of payments previously made and less such amounts as **ENGINEER** shall determine, or **OWNER** may withhold, in accordance with Paragraph 14.02 of the General Conditions - 90% of Work Completed. If Work has been 50% completed as determined by **ENGINEER**, and if the character and progress of the Work have been satisfactory to **OWNER** and **ENGINEER, OWNER** and **ENGINEER** may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage on account of Work completed in which case the remaining progress payments prior to Substantial Completion will be in an amount equal to 100% of the Work completed. One hundred percent of materials and equipment not incorporated in the Work, but delivered, suitably stored and accompanied by documentation satisfactory to **OWNER** as provided in Paragraph 14.02 of the General Conditions.

5.1.2 Upon Substantial Completion, progress payments will be made in an amount sufficient to increase total payments to **CONTRACTOR** to 95% of the Contract Price, less such amounts as **ENGINEER** shall determine or **OWNER** may withhold, in accordance with Paragraph 14.02 of the General Conditions.

5.2 Final Payment. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, **OWNER** shall pay the remainder of the Contract Price as recommended by **ENGINEER** as provided in said Paragraph 14.07.

ARTICLE 6. INTEREST

All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum rate allowed by law at the place of the Project.

ARTICLE 7. CONTRACTOR'S REPRESENTATIONS

In order to induce **OWNER** to enter into this Agreement, **CONTRACTOR** makes the following representations:

7.1 **CONTRACTOR** has familiarized himself with the nature and extent of the Contract Documents, work, site, locality, and with all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

7.2 **CONTRACTOR** has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions and accepts any determination set forth in the Supplementary Conditions, of the extent of the technical data obtained in such reports and drawings upon which **CONTRACTOR** is entitled to reply.

7.3 **CONTRACTOR** has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies (in addition to or to supplement those referred to in Paragraph 7.2 above) which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, progress, performance or furnishing of the Work as **CONTRACTOR** considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.02 of the General Conditions; and no additional examinations,

investigations, explorations, tests, reports, studies or similar information or data are or will be required by **CONTRACTOR** for such purpose.

7.4 **CONTRACTOR** has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by the **CONTRACTOR** in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.04 of the General Conditions.

7.5 **CONTRACTOR** has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

7.6 **CONTRACTOR** has given **ENGINEER** written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by **ENGINEER** is acceptable to **CONTRACTOR**.

ARTICLE 8. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between **OWNER** and **CONTRACTOR** concerning the Work consists of the following:

8.1 This Agreement (pages CD 32 to CD 38, inclusive).

8.2 Exhibits to this Agreement (pages ___ to ___, inclusive.)

8.3 Payment & Performance Bonds, (pages CD __ to CD __, inclusive).

8.4 Notice of Award (page CD 40); Notice to Proceed (page CD 41);

Certificate of Substantial Completion (page CD 42-43).

8.5 General Conditions (pages 1 to 61, inclusive).

8.6 Supplementary Conditions (pages SC-1 to SC- 11, inclusive).

8.7 Specifications bearing the title: Contract Documents

_____

and consisting of 4 divisions as listed in Table of Contents thereof.

8.8 Drawings, consisting of a sheets numbered 1 through __ inclusive with each sheet bearing the following general title:

_____

8.9 Addenda numbers _____ to _____, inclusive.

8.10 **CONTRACTOR'S** Bid (pages CD-11 to CD- 18 inclusive).

8.11 Documentation submitted by **CONTRACTOR** prior to Notice of Award (pages _____ to _____, inclusive).

8.12 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying, or supplementing the Contract Documents pursuant to Paragraphs 3.04 and 3.05 of the General Conditions.

8.13 The documents listed in Paragraphs 8.2 et. seq. above are attached to this Agreement (except as expressly noted otherwise above). There are no Contract Documents other than those listed above in this Article 8. The Contract Documents may only be amended, modified or supplemented as provided in Paragraphs 3.04 and 3.05 of the General Conditions.

ARTICLE 9. MISCELLANEOUS

9.1 Terms used in this Agreement, which are defined in Article 1 of the General Conditions shall have the meanings indicated in the General Conditions.

9.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law) and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.3 **OWNER** and **CONTRACTOR** each binds itself, it's partners, successors, assigns and legal representatives to the other party hereto, it's partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

IN WITNESS WHEREOF, OWNER and **CONTRACTOR** have signed this Agreement in triplicate. One counterpart each has been delivered to **OWNER, CONTRACTOR,** and **ENGINEER.** All portions of the Contract Documents have been signed or identified by **OWNER** and **CONTRACTOR** or by **ENGINEER** on their behalf.

This Agreement will be effective on the _____ day of _____in the year 20_____.

OWNER:

City of Tontitown, Arkansas

By _____

Angela Russell
(Please type)

Title: Mayor

ATTEST:

Name _____
(Please type)

Title _____

CONTRACTOR: (SEAL)

_____

BY _____

ATTEST:

_____

Name _____
(Please type)

Address _____

Name_____
(Please type)

Title_____

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

APAC-Central, Inc.
(Name of Contractor)

755 E Millsap Road, Fayetteville, AR 72703
(Address of Contractor)

a Corporation hereinafter called
(Corporation), (Partnership), or (Individual),

Principal, and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

City of Tontitown, Arkansas
(Name of Owner)

235 E Henri De Tonti Blvd., Tontitown, Arkansas
(Address of Owner)

hereinafter called **OWNER,** in the penal sum of _____ Dollars, ($_____) in lawful money of the United States, for payment of which sum well and truly to be made, we bind ourselves, and successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated the ___ day of _____, 20____, a copy of which is hereto attached and made a part hereof for the construction of: 2024 Pavement Maintenance Overlays

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such Contract, and any authorized extension of modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to terms of the Contract or to the work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time alteration or addition to the terms of the contractor 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 three counterparts, each one of which shall be deemed an original, this _____ day of_____,20_____.

ATTEST: _____
(Principal)

_____ BY _____
(Principal Secretary)

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address)

_____ _____
Surety

ATTEST:

_____
(Surety) Secretary

(SEAL)

_____ BY _____
(Witness as to Surety) (Attorney-in-Fact)

_____ _____
(Address) (Address)

_____ _____

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute bond.

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

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

APAC-Central, Inc.
(Name of Contractor)

755 E Millsap Road, Fayetteville, AR 72703
(Address of Contractor)

a Corporation hereinafter called
(Corporation), (Partnership), or (Individual),

Principal, and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

City of Tontitown, Arkansas
(Name of Owner)

235 E Henri De Tonti Blvd., Tontitown, Arkansas
(Address of Owner)

hereinafter called Owner, in the penal sum of _____ Dollars, ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated the _____ day of_____, 20_____, a copy of which is hereto attached and made a part hereof for the construction of: 2024 Pavement Maintenance Overlays

_____

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 guarantee 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 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 thereunder of the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the 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 three counterparts, each one of which shall be deemed an original, this ____ day of _____,20____.

ATTEST: _____
(Principal)

_____ BY _____
(Principal Secretary)

(SEAL)

_____ _____
(Witness as to Principal) (Address)

_____ _____
(Address)

_____ _____
Surety

ATTEST:

_____
(Surety) Secretary

(SEAL)

_____ BY _____
(Witness as to Surety() (Attorney-in-Fact)

_____ _____
(Address) (Address)

_____ _____

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute bond.

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

MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____, as Principal, and _____, as Surety, are held and firmly bound unto the City of Tontitown, Arkansas of the State of Arkansas, in the full and just sum of _____, for the payment of which, well and truly to be made, we, and each of us, bind ourselves, our heirs, executors and assigns, themselves, and its successors and assigns, jointly and severally, firmly by these presents.

Dated this _____ day of _____, 20___.

The conditions of this obligation are such that, whereas, said Principal has by a certain contract between _____ and _____, dated the _____ day of _____,20___, agree to construct

or improvements in exact accordance with the bid of such principal and according to certain Plans and Specifications heretofore made, adopted, and placed on file and to maintain the said improvements in good condition for a period of ____ year(s) from the date of acceptance.

NOW, THEREFORE, if said _____ for improvements for the period of one year(s) from and after the completion and acceptance of said improvements, shall maintain in good condition the said improvements, then this obligation to be void; otherwise to remain in full force and effect.

It is further agreed that if the said Principal or Surety herein shall fail to maintain said improvements in good condition for the said period of one year(s) and at any time repairs shall be necessary, that the cost of making said repairs shall be determined by the _____ _____ or some person or persons designated by them to ascertain the same, and if, upon thirty (30) days notice, the said amount ascertained, shall not be paid the Principal or Surety herein, or if the necessary repairs are not made, that said amount shall become due upon the expiration of thirty (30) days and suit may be maintained to recover the amount so determined in any Court of competent jurisdiction and that the amount so determined shall be conclusive upon the parties as to the amount due on this bond for the repair or repairs included therein, and that the cost of all repairs shall be so determined from time to time during the life of this bond, as the condition of the improvements may require.

_____

_____

Principal

BY _____

BY _____

_____

Surety BY _____

BUSINESS RELATIONSHIPS AFFIDAVIT

STATE OF ARKANSAS)
COUNTY OF _____)

_____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the nature of any partnership, joint venture, or other business relationship presently in effect or which existed within one (1) year prior to the date of this statement with the architect, engineer, or other party to the project is as follows:

_____

_____

_____

Affiant further states that any such business relationship presently in effect or which existed within one (1) year prior to the date of this statement between any officer or director of the bidding company and any officer or director of the architectural or engineering firm or other party to the project is as follows:

_____

_____

_____

Affiant further states that the names of all persons having any such business relationships and the positions they hold with their respective companies or firms are as follows:

_____

_____

_____

(If none of the business relationships hereinabove mentioned exist, affiant should so state.)

_____

SUBSCRIBED AND SWORN to before me this _____ day of _____.

_____

My Commission Expires: Notary Public

_____

NONCOLLUSION AFFIDAVIT

STATE OF ARKANSAS)
) ss.
COUNTY OF_____)

_____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the bidder has not been a party to any collusion among bidders in restraint of freedom of completion by agreement to bid at a fixed price or to refrain from bidding; or with any state official or employee as to quantity, quality or price in the prospective contract, or any other terms of said prospective contract; or in any discussions between bidders and any state official concerning exchange of money or other thing of value for special consideration in the letting of a contract.

_____

SUBSCRIBED AND SWORN to before me this _____ day of _____, 20____.

_____
Notary Public

My Commission Expires:

_____

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting legal representative of _____, do hereby certify as follows:

I have examined the attached contract(s) and surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements 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: _____

NOTICE OF AWARD

TO: APAC-Central, Inc.

755 E Millsap Road

Fayetteville, AR 72703

PROJECT DESCRIPTION: 2024 Pavement Maintenance Overlays

The OWNER has considered the BID submitted by you, for the above described WORK in response to the ADVERTISEMENT FOR BIDS, dated August 22, 2024, and INFORMATION FOR BIDDERS.

You are required, by the INFORMATION FOR BIDDERS, to execute the AGREEMENT and furnish the required CONTRACTOR'S PERFORMANCE BOND and PAYMENT BOND within fifteen calendar days from the date of this NOTICE to you.

If you fail to execute said AGREEMENT and to furnish said bonds within fifteen 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 _____ day of _____, 20___.

Owner: City of Tontitown, Arkansas

By: _____

Title: Mayor

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by:

_____

This the _____ day of _____ 20_____.

By: _____

Title: _____

NOTICE TO PROCEED

TO: APAC-Central, Inc.
755 E Millsap Road
Fayetteville, AR 72703

Date: _____

Project: 2024 Pavement Maintenance Overlays

You are hereby notified to commence work in accordance with the Agreement dated _____ on, or before, _____ , and you are to Substantially Complete the Work within _____ consecutive calendar days and Complete all Work within _____ consecutive calendar days. The contract time will begin on _____.

Date of Substantial Completion of work is therefore _____.

The date of **COMPLETION** of all work is therefore _____.

Owner: City of Tontitown, Arkansas

By: _____

Title: Mayor

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

_____

This the _____ day of _____, 20_____.

By: _____

Title: _____

CERTIFICATE OF SUBSTANTIAL COMPLETION

DATE OF ISSUANCE _____

OWNER City of Tontitown, Arkansas

CONTRACTOR APAC-Central, Inc.

Contract: _____

Project: 2024 Pavement Maintenance Overlays

OWNER's Contract No. _____ ENGINEER's Project No. 24100800

This Certificate of Substantial Completion applies to all Work under the Contract Documents or the following specified parts thereof:

To City of Tontitown, Arkansas
OWNER

And To APAC-Central, Inc.
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and the Work is hereby declared to be substantially complete in accordance with the Contract Documents on

_____
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance, and warranties and guarantees shall be as follows:

OWNER: _____

CONTRACTOR: _____

The following documents are attached to and made a part of this Certificate:

[For items to be attached see definition of Substantial Completion as supplemented and other specifically noted conditions precedent to achieving Substantial Completion as required by Contract Documents.]

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR'S obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on _____
Date

Crafton Tull
ENGINEER

By: _____
(Authorized Signature)

CONTRACTOR accepts this Certificate of Substantial Completion on _____
Date

APAC-Central, Inc.
CONTRACTOR

By: _____
(Authorized Signature)

OWNER accepts this Certificate of Substantial Completion on _____
Date

City of Tontitown, Arkansas
OWNER

By: _____
(Authorized Signature)

ADVERTISEMENT FOR BIDS

City of Tontitown, Arkansas
OWNER

235 E Henri de Tonti Blvd, Tontitown, AR
ADDRESS

Separate sealed bids for the construction of 2024 Pavement Maintenance Overlays (Project) will be received by the City of Tontitown at Tontitown City Hall, E Henri de Tonti Blvd, Tontitown, Arkansas until 2:00 p.m. Central Time August 22, 2024, and then publicly.

The CONTRACT DOCUMENTS, consisting of Advertisement for Bids, Instruction to Bidders, Bid and Bid Bond, Agreement, General Conditions, Supplementary Conditions, Payment Bond, Performance Bond, Drawings, Specifications, and Addenda, may be obtained by emailing Luke.Jost@craftontull.com.

Bids submitted using SPECIFICATIONS AND CONTRACT DOCUMENTS obtained from any other source will be subject to rejection.

First Publication August 4, 2024

Second Publication August 11, 2024

012020

GENERAL CONDITIONS

Engineers Joint Documents Committee
Design and Construction Related Documents
Instructions and License Agreement

Instructions

Before you use any EJCDC document:

1. Read the License Agreement. You agree to it and are bound by its terms when you use the EJCDC document.

2. Make sure that you have the correct version for your word processing software.

How to Use:

1. While EJCDC has expended considerable effort to make the software translations exact, it can be that a few document controls (e.g., bold, underline) did not carry over.

2. Similarly, your software may change the font specification if the font is not available in your system. It will choose a font that is close in appearance. In this event, the pagination may not match the control set.

3. If you modify the document, you must follow the instructions in the License Agreement about notification.

4. Also note the instruction in the License Agreement about the EJCDC copyright.

License Agreement

You should carefully read the following terms and conditions before using this document. Commencement of use of this document indicates your acceptance of these terms and conditions. If you do not agree to them, you should promptly return the materials to the vendor, and your money will be refunded.

The Engineers Joint Contract Documents Committee ("EJCDC") provides **EJCDC Design and Construction Related Documents** and licenses their use worldwide. You assume sole responsibility for the selection of specific documents or portions thereof to achieve your intended results, and for the installation, use, and results obtained from **EJCDC Design and Construction Related Documents**.

You acknowledge that you understand that the text of the contract documents of **EJCDC Design and Construction Related Documents** has important legal consequences and that consultation with an attorney is recommended with respect to use or modification of the text. You further acknowledge that EJCDC documents are protected by the copyright laws of the United States.

License:

You have a limited nonexclusive license to:

1. Use **EJCDC Design and Construction Related Documents** on any number of machines owned, leased or rented by your company or organization.

2. Use **EJCDC Design and Construction Related Documents** in printed form for bona fide contract documents.

3. Copy **EJCDC Design and Construction Related Documents** into any machine readable or printed form for backup or modification purposes in support of your use of **EJCDC Design and Construction Related Documents**.

You agree that you will:

1. Reproduce and include EJCDC's copyright notice on any printed or machine-readable copy, modification, or portion merged into another document or program. All proprietary rights in **EJCDC Design and Construction Related Documents** are and shall remain the property of EJCDC.

2. Not represent that any of the contract documents you generate from **EJCDC Design and Construction Related Documents** are EJCDC documents unless (i) the document text is used without alteration or (ii) all additions and changes to, and deletions from, the text are clearly shown.

You may not use, copy, modify, or transfer EJCDC Design and Construction Related Documents, or any copy, modification or merged portion, in whole or in part, except as expressly provided for in this license. Reproduction of EJCDC Design and Construction Related Documents in printed or machine-readable format for resale or educational purposes is expressly prohibited.

If you transfer possession of any copy, modification or merged portion of EJCDC Design and Construction Related Documents to another party, your license is automatically terminated.

Term:

The license is effective until terminated. You may terminate it at any time by destroying **EJCDC Design and Construction Related Documents** altogether with all copies, modifications and merged portions in any form. It will also terminate upon conditions set forth elsewhere in this Agreement or if you fail to comply with any term or condition of this Agreement. You agree upon such termination to destroy **EJCDC Design and Construction Related Documents** along with all copies, modifications and merged portions in any form.

Limited Warranty:

EJCDC warrants the CDs and diskettes on which **EJCDC Design and Construction Related Documents** is furnished to be free from defects in materials and workmanship under normal use for a period of ninety (90) days from the date of delivery to you as evidenced by a copy of your receipt.

There is no other warranty of any kind, either expressed or implied, including, but not limited to the implied warranties of merchantability and fitness for a particular purpose. Some states do not allow the exclusion of implied warranties, so the above exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

EJCDC does not warrant that the functions contained in **EJCDC Design and Construction Related Documents** will meet your requirements or that the operation of **EJCDC Design and Construction Related Documents** will be uninterrupted or error free.

Limitations of Remedies:

EJCDC's entire liability and your exclusive remedy shall be:

1. the replacement of any document not meeting EJCDC's "Limited Warranty" which is returned to EJCDC's selling agent with a copy of your receipt, or

2. if EJCDC's selling agent is unable to deliver a replacement CD or diskette which is free of defects in materials and workmanship, you may terminate this Agreement by returning EJCDC Document and your money will be refunded.

In no event will EJCDC be liable to you for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use or inability to use **EJCDC Design and Construction Related Documents** even if EJCDC has been advised of the possibility of such damages, or for any claim by any other party.

Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you.

General:

You may not sublicense, assign, or transfer this license except as expressly provided in this Agreement. Any attempt otherwise to sublicense, assign, or transfer any of the rights, duties, or obligations hereunder is void.

This Agreement shall be governed by the laws of the State of Virginia. Should you have any questions concerning this Agreement, you may contact EJCDC by writing to:

Arthur Schwartz, Esq.
General Counsel
National Society of Professional Engineers
1420 King Street
Alexandria, VA 22314

Phone: (703) 684-2845
Fax: (703) 836-4875
e-mail: aschwartz@nspe.org

You acknowledge that you have read this agreement, understand it and agree to be bound by its terms and conditions. You further agree that it is the complete and exclusive statement of the agreement between us which supersedes any proposal or prior agreement, oral or written, and any other communications between us relating to the subject matter of this agreement.

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

ACEC
American Council of Engineering Companies

The Associated General Contractors of America
Skill Responsibility Integrity

ASCE American Society of Civil Engineers

National Society of Professional Engineers
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

_____

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

_____

AMERICAN SOCIETY OF CIVIL ENGINEERS

_____

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

Endorsed by

CONSTRUCTION SPECIFICATIONS INSTITUTE

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

Page

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

30. *PCBs*—Polychlorinated biphenyls.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives:*

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

C. *Day:*

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

D. *Defective:*

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

a. does not conform to the Contract Documents; or

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

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

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

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

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

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

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

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

2.02 *Copies of Documents*

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

2.03 *Commencement of Contract Times; Notice to Proceed*

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

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.07 *Initial Acceptance of Schedules*

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

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of

the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

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

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

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

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

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

3.02 *Reference Standards*

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

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

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

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

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

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

B. *Resolving Discrepancies:*

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

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

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

3.04 *Amending and Supplementing Contract Documents*

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

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

1. A Field Order;

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

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

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

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

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

3.06 *Electronic Data*

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

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

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

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

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

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

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

4.02 *Subsurface and Physical Conditions*

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

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

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

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

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

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

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

4.03 *Differing Subsurface or Physical Conditions*

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

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

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

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

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

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

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

C. *Possible Price and Times Adjustments:*

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

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

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

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

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

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

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

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

4.04 *Underground Facilities*

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

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

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

   a. reviewing and checking all such information and data;

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

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

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

B. *Not Shown or Indicated:*

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

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

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

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

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

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

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

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

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

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

permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

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

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

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

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

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

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

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

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

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

5.02 *Licensed Sureties and Insurers*

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

5.03 *Certificates of Insurance*

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

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

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

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

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

5.04 *Contractor's Insurance*

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

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

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

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

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

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

   b. by any other person for any other reason;

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

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

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

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

employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

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

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

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

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

6. include completed operations coverage:

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

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

5.05 *Owner's Liability Insurance*

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

5.06 *Property Insurance*

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

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of

them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

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

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

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

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

6. include testing and startup; and

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

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

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

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

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

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

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

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

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

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

5.08 *Receipt and Application of Insurance Proceeds*

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

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

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

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

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

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

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

6.02 *Labor; Working Hours*

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

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

6.03 *Services, Materials, and Equipment*

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

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

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

6.04 *Progress Schedule*

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

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

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

6.05 *Substitutes and "Or-Equals"*

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

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

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

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

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

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

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

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

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

2. *Substitute Items:*

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

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

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

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

      1) shall certify that the proposed substitute item will:

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

         b) be similar in substance to that specified, and

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

      2) will state:

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

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

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

      3) will identify:

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

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

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

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

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

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

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

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

6.06 *Concerning Subcontractors, Suppliers, and Others*

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

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

entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

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

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

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

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

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

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

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

6.07 *Patent Fees and Royalties*

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

use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

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

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

6.08 *Permits*

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

6.09 *Laws and Regulations*

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

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

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner

and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

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

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

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

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

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

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

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

6.12 *Record Documents*

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

6.13 *Safety and Protection*

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

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

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

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

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

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

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

E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts

any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

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

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

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

1. *Shop Drawings:*

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

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

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

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

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

C. *Submittal Procedures:*

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

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

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

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

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

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

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

D. *Engineer's Review:*

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

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the

Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

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

E. *Resubmittal Procedures:*

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

6.18 *Continuing the Work*

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

6.19 *Contractor's General Warranty and Guarantee*

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

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

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

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

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

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

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

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

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

7. any correction of defective Work by Owner.

6.20 *Indemnification*

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

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

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

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

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

6.21 *Delegation of Professional Design Services*

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

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

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

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

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

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

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

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

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

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe

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

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

7.02 *Coordination*

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

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

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

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

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

7.03 *Legal Relationships*

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

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

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

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

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

8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

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

8.06 *Insurance*

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

8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

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

and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

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

8.12 *Compliance with Safety Program*

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

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

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

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

9.03 *Project Representative*

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

9.04 *Authorized Variations in Work*

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

9.05 *Rejecting Defective Work*

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

9.06 *Shop Drawings, Change Orders and Payments*

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

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

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

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

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations

on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

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

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

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

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

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

9.09 *Limitations on Engineer's Authority and Responsibilities*

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

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

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

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

and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

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

9.10 *Compliance with Safety Program*

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

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

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

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

10.02 *Unauthorized Changes in the Work*

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

10.03 *Execution of Change Orders*

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

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

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

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of

executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

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

10.05 *Claims*

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

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

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

1. deny the Claim in whole or in part;

2. approve the Claim; or

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

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

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

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

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

11.01 *Cost of the Work*

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

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

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

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

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

5. Supplemental costs including the following:

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

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

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

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

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

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

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

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

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

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

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

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

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

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

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

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

11.02 *Allowances*

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

B. *Cash Allowances:*

1. Contractor agrees that:

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

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in

the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

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

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

11.03 *Unit Price Work*

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

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

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

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

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

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

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

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

12.01 *Change of Contract Price*

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

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

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

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

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

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

1. a mutually acceptable fixed fee; or

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

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

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

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

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

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

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

12.02 *Change of Contract Times*

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

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

12.03 *Delays*

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

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

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

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

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

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

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

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

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

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

3. as otherwise specifically provided in the Contract Documents.

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

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

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

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

13.04 *Uncovering Work*

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

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

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

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

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers,

architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

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

13.07 *Correction Period*

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

1. repair such defective land or areas; or

2. correct such defective Work; or

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

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

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

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

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

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

13.08 *Acceptance of Defective Work*

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

13.09 *Owner May Correct Defective Work*

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

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

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

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

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

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

14.02 *Progress Payments*

A. *Applications for Payments:*

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

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

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

B. *Review of Applications:*

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

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's

review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

C. *Payment Becomes Due:*

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

D. *Reduction in Payment:*

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

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

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

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

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

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

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

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

   b. consent of the surety, if any, to final payment;

   c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's repeated disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

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

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other

dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or

3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

012050

SUPPLEMENTARY CONDITIONS

INDEX

SUPPLEMENTARY CONDITIONS

SUPPLEMENTARY CONDITIONS Error! Bookmark not defined.

(1) **GENERAL:**

The requirements of supplementary conditions shall govern when in conflict with the General Conditions.

(2) **DEFINITIONS:**

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

Advertisement

A public announcement as required by local law, inviting bids for work to be performed and materials to be furnished.

Award

The acceptance, by the **OWNER**, of the successful bidder's proposal.

Bidder

Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative who submits a proposal for the work contemplated.

Calendar Day

Every day shown on the calendar.

Contract Item (Pay Item)

A specific unit of work for which a price is provided in the contracts.

Drainage System

The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the project area.

Equipment

All machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the work.

Extra Work

An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the **ENGINEER** to be necessary to complete the work within the intended scope of the contract as previously modified.

Intention of Terms

Any reference to a specific requirement of a paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section specification or cited standard that may be pertinent to such specific reference.

Materials

Any substance specified for use in the construction of the contract work.

Pavement

The combined surface course, base course, and sub-base course, if any considered as a single unit.

Payment Bond

The approved form of security furnished by the **CONTRACTOR** and his surety as a guaranty that he will pay in full all bills and accounts for materials and labor used in the construction of the work.

Performance Bond

The approved form of security furnished by the **CONTRACTOR** and his Surety as a guaranty that the **CONTRACTOR** will complete the work in accordance with the terms of the contract.

Plans

The official drawings or exact reproductions, approved by the **ENGINEER**, which show the locations, character, dimensions and details of the project and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications.

Proposal

The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.

Specifications

A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing, which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.

Subgrade

The soil, which forms the pavement foundation.

Supplemental Agreement

A written agreement between the **CONTRACTOR** and **OWNER** covering: 1). Work that would increase and decrease the total amount of the awarded contract, or any major contract item, by more than 25%, such increased or decreased work being within the scope of the originally awarded contract, or 2). Work that is not within the scope of the originally awarded contract.

Surety

The corporation, partnership, or individual, other than the **CONTRACTOR**, executing payment or performance bonds, which are furnished to the **OWNER** by the **CONTRACTOR**.

(3) **BONDS:**

The following bonds will be required under this contract:

a.	Bid Bond	Yes X	No ___
b.	Performance Bond	Yes X	No ___
c.	Payment Bond	Yes X	No ___
d.	Maintenance Bond	Yes ___	No X

If required, coincident with the execution of the Contract, the **CONTRACTOR** shall furnish a good and sufficient surety bond in the amount of one hundred percent (100%) of the contract sum, guaranteeing the faithful performance of all covenants, stipulations, and agreements of the Contract, the payments of all bills or obligations that might or will in any manner become a claim against the **OWNER**, and guaranteeing the work against faulty workmanship and materials during construction and for one (1) year after completion, all provisions of the bond to be complete and in full accordance with the statutory requirements. The bond shall be executed with the proper Sureties through a company licensed and qualified to operate in the State and approved by the **OWNER**.

(4) **CONTRACTOR'S INSURANCE**

The **CONTRACTOR** shall obtain all insurance required by the General Conditions and in the amount required under this paragraph. The **CONTRACTOR** shall not allow any subcontractor to commence work on his subcontract until all similar insurance required of subcontractors has been obtained and approved. All such insurance shall be executed by the licensed resident local agent of the State in which the project is located.

1. **Public Liability and Property Damage Insurance**

The **CONTRACTOR** shall take out and maintain during the life of this contract such Public Liability and Property Damage Insurance as shall protect him and any subcontractor performing work covered by this contract, from claims or damage for personal injury, including accidental death, as well as from any claims for property damages, which may arise from operations under this Contract, whether such operation be by himself or by any subcontractor or by anyone directly or indirectly employed by either of them and the amount shall be as follows:

A.	Bodily Injury Liability,	$2,000,000 each person $2,000,000 each occurrence
B.	Property Damage Liability,	$2,000,000 each occurrence, and $2,000,000 aggregate

2. **Automobile Public Liability and Property Damage**

The **CONTRACTOR** shall maintain automobile public liability insurance in the amount of not less than $500,000 for injury, including accidental death, to one person, and $500,000 for one accident, and automobile property damage insurance in the amount of not less than $500,000 for one accident to protect him from any and all claims airing from the use of the following in the execution of work included in this Contract:

A. **CONTRACTOR'S** own automobiles and trucks.
B. Hired automobiles and trucks.
C. Automobiles and trucks not owned by **CONTRACTOR**.

The above is to cover the use of automobiles and trucks on and off the site of the project.

3. **Workmen's Compensation Insurance**

The **CONTRACTOR** shall take out and maintain during the life of this Contract, Workmen's Compensation Insurance as shall protect him and any subcontractor performing work covered by this Contract, from claims for damages for personal injury,

including accidental death, which may arise from operations under this Contract, whether such operation be by himself or by any subcontractor or anyone directly or indirectly employed by either of them as required under the laws of the State where the project is located.

4. The **CONTRACTOR** shall purchase in the name of the **OWNER**, and Crafton Tull & Associates, Inc., an **OWNER'S** Contingent Protective Liability Policy containing the same coverage limits as set out for the **CONTRACTOR'S** liability insurance, the original of this policy shall be delivered to the **OWNER.**

5. The **CONTRACTOR** and any subcontractors on contracts shall provide Public Liability and Property Damage Insurance which includes adequate protection against the special hazard of "Blasting for Rock Excavation", if any blasting is to be required on project.

6. **Property Insurance**

The **CONTRACTOR** shall maintain during the life of this Contract, Builder' Risk and "All Risk" Insurance as spelled out in Paragraph 5.6 of the General Conditions on the insurable portion of the project, in such amounts as will protect him and the **OWNER** against losses of completed or partially completed work due to fire, windstorm, hail, or other damage or loss.

Losses not covered by such insurance shall be borne by the **CONTRACTOR**, at no cost to the **OWNER.**

(5) **RESIDENT PROJECT REPRESENTATIVE:**

In accordance with Paragraph 9.03 of the General Conditions, a Resident Project Representative and assistants, as needed, will be provided by the **ENGINEER** to serve as their representatives on the project, if these services are contracted for by the **OWNER**.

(a) The duties of the Resident Project Representative will be:

1. Review the progress schedule, schedule of Shop Drawing submissions and schedule of values prepared by **CONTRACTOR** and consult with **ENGINEER** concerning their acceptability.

2. Attend pre-construction conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with **ENGINEER** and notify those expected to attend in advance. Attend meetings, and maintain and circulate copies of Minutes thereof.

3. Service as **ENGINEER'S** liaison with **CONTRACTOR**, working principally through **CONTRACTOR'S** superintendent and assist him in understanding the intent of the Contract Documents. Assist **ENGINEER** in serving as **OWNER'S** liaison with **CONTRACTOR** when **CONTRACTOR'S** operations affect **OWNER'S** on-site operations.

4. As requested by **ENGINEER**, assist in obtaining from **OWNER** additional details or information, when required at the job site for proper execution of the Work.

5. Receive and record date of receipt of Shop Drawings and samples, which are furnished at the site by **CONTRACTOR**, and notify **ENGINEER** of their

availability for examination.

6. Advise **ENGINEER** and **CONTRACTOR** or its superintendent immediately of the commencement of any Work requiring a Shop Drawing or sample submission if the submission has not been approved by **ENGINEER.**

7. Conduct on-site observations of the Work in progress to assist **ENGINEER** in determining if the Work is proceeding in accordance with the Contract Documents and that complete Work will conform to the Contract Documents.

8. Report to **ENGINEER** whenever he believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspections, tests or approval required to be made or has been damaged prior to final payment; and advise **ENGINEER** when he believes Work should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

9. Verify that tests, equipment and systems start-ups and operating and maintenance instructions are conducted as required by the Contract Documents and in presence of the required personnel, and that **CONTRACTOR** maintains adequate records thereof; observe, record and report to **ENGINEER** appropriate details relative to the test procedures and start-ups.

10. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the outcome of these inspections and report to **ENGINEER**.

11. Transmit to **CONTRACTOR, ENGINEER'S** clarifications and interpretations of the Contract Documents.

12. Consider and evaluate **CONTRACTOR'S** suggestions for modifications in Drawings or Specifications and report them with recommendations to **ENGINEER.**

13. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples submissions, reproductions of original Contract documents including all addenda, change orders, field orders, additional Drawings issued subsequent to the execution of the Contract, **ENGINEER'S** clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.

14. File a daily Construction Observation Report with **ENGINEER**, recording hours on the job site, weather conditions, data relative to questions of extras of deductions, list of visiting officials and representatives of manufacturers, fabricators, suppliers and distributors, daily activities,
decisions, observations in general and specific observations in more detail as in the case of observing test procedures.

15. Record names, address and telephone numbers of all **CONTRACTORS**, subcontractors and major suppliers of materials and equipment.

16. Furnish **ENGINEER** periodic reports as required of progress of the Work and **CONTRACTOR'S** compliance with the approved progress schedule and

schedule of Shop Drawing submissions.

17. Consult with **ENGINEER** in advance of schedule major tests, inspections or start of important phases of the Work.

18. Report immediately to **ENGINEER** upon the occurrence of any accident.

19. Review applications for payment with **CONTRACTOR** for compliance with the established procedure for their submission and forward them with recommendations to **ENGINEER**, noting particularly their relation to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.

20. During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by **CONTRACTOR** are applicable to the items actually installed; and deliver this material to **ENGINEER** for his review and forwarding to **OWNER** prior to final acceptance of the Work.

21. Before **ENGINEER** issues a Certificate of Substantial Completion, submit to **CONTRACTOR** a list of observed items requiring completion or correction.

22. Conduct final inspection in the company of **ENGINEER, OWNER**, and **CONTRACTOR** and prepare a final list of items to be completed or corrected.

23. Verify that all items on final list have been completed or corrected and make recommendations to **ENGINEER** concerning acceptance.

(b) The Authority of Resident Project Representative shall be limited as follows:

Except upon written instructions of **ENGINEER**, Resident Project Representative:

1. Shall not authorize any deviation from the Contract Documents or approve any substitute materials or equipment.

2. Shall not exceed limitations on **ENGINEER'S** authority as set forth in the Contract Documents.

3. Shall not undertake any of the responsibilities of **CONTRACTOR,** subcontractors or **CONTRACTOR'S** Superintendent, or expedite the Work.

4. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.

5. Shall not advise on or issue directions as to safety precautions and programs in connection with the Work.

6. Shall not authorize **OWNER** to occupy the Project in whole or in part.

7. Shall not participate in specialized field or laboratory tests.

The limitations on the **ENGINEER'S** responsibilities as specified in Paragraphs 9.04 thru

9.10 and on tests and inspections in Paragraph 13.03 of the General Conditions, shall be applicable to the Resident Project Representative and assistants.

(6) **RESPONSIBILITY REGARDING EXISTING UTILITIES AND STRUCTURES:**

The existence and location of underground utilities indicated on the plans are not guaranteed and shall be investigated and verified in the field by the **CONTRACTOR** before starting work. Excavation in the vicinity of existing structures and utilities shall be carefully done by hand.

The **CONTRACTOR** shall be held responsible for any damages to, and for maintenance and protection of existing utilities and structures.

(7) **WORK ON STATE HIGHWAY RIGHT-OF-WAY:**

Portions of project could involve work on the rights-of-way of State Highways. The **CONTRACTOR** shall conduct all such work in strict accordance with applicable regulations of the State Highway department or Equal Controlling Agency in the state where the project is to be constructed.

(8) **SUBCONTRACTORS:**

The **CONTRACTOR** shall obtain approval of the **ENGINEER** prior to subcontracting any portion of the work to another contractor.

(9) **GOVERNING LAWS AND REGULATIONS:**

The **CONTRACTOR** shall be familiar with all Federal, State and Local laws governing work of this nature and safeguarding the public during construction, and shall conform to such laws, ordinances and regulations.

The **CONTRACTOR'S** attention is directed to the State Licensing Law for Contractors, United States Department of Labor Occupational Safety and Health Act, and the U.S. Department of Transportation Manual on Uniform Traffic Control Devices for streets and highways.

It shall be the **CONTRACTOR'S** responsibility to obtain all necessary license and permits prior to starting construction.

(10) **RETAINAGE AND PAYMENT:**

Ten percent (10%) of all payments made pursuant to properly submitted and approved Applications for Payment shall be retained by **OWNER** until 50% of the work has been satisfactory completed as determined by the **OWNER** and **ENGINEER**. No additional **RETAINAGE** shall be withheld after 50% of the work has been completed as determined by the **ENGINEER** provided that the character and progress of the work are satisfactory to both the **OWNER** and **ENGINEER.**

(11) **RETURN OF DRAWINGS AND SPECIFICATIONS UPON TERMINATION:**

In the event of termination of this contract pursuant to Article 15 of the General Conditions, **CONTRACTOR** shall return to **OWNER** (or to **ENGINEER** for delivery to **OWNER**) all specifications, drawings, addenda, modifications, shop drawings, samples and the like used in the course of performance under this contract.

(12) **RELEASES AND LIEN WAIVERS:**

CONTRACTOR shall obtain and deliver to **OWNER** appropriate releases and/or lien waivers from all suppliers, subcontractors and the like used in completing the work hereunder, and **OWNER** shall not be obligated to pay **CONTRACTOR** in full until such items are delivered by **CONTRACTOR** to **OWNER.**

(13) **INDEPENDENT CONTRACTORS:**

Notwithstanding any language in the General Conditions to the contrary, it is the express intent of the parties hereto that **CONTRACTOR** and **ENGINEER** shall act as independent contractors during their performance under this Agreement. Other than as provided hereunder, **OWNER** shall have no right to direct **CONTRACTOR** or **ENGINEER** in their performance hereunder. **CONTRACTOR, ENGINEER,** and any persons hired or used by them during their performance hereunder are not now and shall not be, as a result of such performance, employees of **OWNER.**

(14) **CONTRACTOR'S RESIDENT SUPERINTENDENT:**

CONTRACTOR shall, prior to commencement of work hereunder, supply to **OWNER** in writing the name of its initial resident superintendent for coordination of work under this contract. Another person may be substituted in such resident superintendent's place pursuant to Paragraph 6.01.B of the General Conditions.

(15) **TESTING:**

(1) In accordance with Article 13 of the General Conditions the **OWNER** shall retain the services of a Testing Laboratory or Registered Professional **ENGINEER** practicing in the materials and testing field, herein-after referred to as the Lab Engineer, to perform all sampling and testing. The **OWNER** will be responsible for the costs of sampling and testing performed on the project. However, the **OWNER** will not be responsible for any additional testing as a result of poor workmanship.

(2) The **CONTRACTOR** shall notify the **ENGINEER** and the **OWNER** sufficiently in advance of any desired testing so that the services of the testing laboratory can be scheduled as near as possible to the times requested by the **CONTRACTOR.** All testing shall be scheduled during normal work hours on normal workdays.

(16) Pursuant to Arkansas Code Annotated §22-9-203, the **OWNER** encourages participation of small, minority, and woman owned business enterprises in the procurement of goods, services, and construction, either as a general contractor or subcontractor. It is further requested that whenever possible, majority contractors who require sub-contractors seek qualified small, minority, and woman owned businesses to partner with them.

(17) **DETERMINATION OF CONTRACT TIME AND EXTENSION OF CONTRACT TIME.**

(a) General. The time allowed for the completion of the Work included in the Contract will be stated in the Proposal and Contract, and will be known as the "Contract Time". The contract time will be specified as a fixed completion date or as calendar days.

The **CONTRACTOR** shall take into consideration all normal conditions considered unfavorable to the normal progress of the Work and place a sufficient work force and equipment on the project to ensure completion of the Work within the contract time.

The **ENGINEER** will determine the date upon which the Contract is substantially complete and time assessment will cease. In the event cleanup is necessary or items found at the final inspection are to be corrected, the **CONTRACTOR** shall complete this work in a timely manner prior to the final completion date or the **ENGINEER** will resume time charges.

(b) Fixed Completion Date. When the contract time is specified as a fixed date, it will be the date on which all work on the project shall be substantially complete.

(c) Calendar Day. Calendar day contract time includes delays for normal weather-related events, such as rain, snow, and freezing temperatures that may affect the progress of the construction in the following amounts on a per-month basis as hereinafter set out. Only weather-related delays in excess of these amounts will be considered for time extensions, if requested by the **CONTRACTOR**. Days Included in Contract Times for Normal Weather-Related Events are: (On A Monthly Basis)

Month	Normal Weather-Related Events
January	11
February	9
March	8
April	8
May	8
June	8
July	7
August	7
September	7
October	7
November	7
December	8

No changes in contract times will be allowed for any reason without a request in writing from the **CONTRACTOR**. This request shall include reasons for the request with supporting documentation as proof of extraordinary delays beyond the **CONTRACTOR'S** control. Normal rainfall amounts and soil conditions will not be considered as reasons for extensions of time, nor will workload of the **CONTRACTOR**. The request must be submitted for to the **ENGINEER** within 5 days of the end of the month to be considered. No compensation will be made for monetary damages due to weather delay(s).

(18) **PRICES TO INCLUDE AND SPECIAL SPECIFICATIONS:**

The bid price for all items shall include all labor, materials, equipment, and tools necessary or reasonably required to furnish and install in place, complete and in accordance with the Plans and Specifications, and as directed by the **ENGINEER**, in good operating conditions, the items as listed and shown and/or specified.

ABBREVIATIONS

The following is an explanation of the abbreviations, which are used throughout the Specifications.

1. AASHTO - The American Association of State Highway and Transportation Officials, the successor to AASHO.
2. ASA - The American Standards Association
3. AISC - The American Institute for Steel Construction
4. ASTM - The American Society for Testing and Materials
5. AWWA - The American Water Works Association
6. MBMA - The Metal Building Manufacturers Association
7. RPM - Revolutions Per Minute
8. AWS - The American Welding Society
9. AREA - The American Railway Engineering Association
10. NEMA - The National Electrical Manufacturers Association

STANDARDS

Where the reference is made to specifications such as ASTM, the latest edition shall be used and shall be considered a part of the specification.

012900

PAYMENT REQUESTS AND FORMS

INDEX

PAYMENT REQUESTS AND FORMS

INSERT PAGES P-1 THROUGH P-6 FROM SPREADSHEET NAMED:

Bid Sched, Pay Req, Progress Est, App for Pay, Affidavit, BidTab-Overlays.xlsx

SECTIONS FROM SPREADSHEET TO BE INSERTED:

Payment Request
Progress Estimate
Application for Payment
Affidavit

012100

REQUEST FOR INFORMATION

SECTION 013100 - REQUEST FOR INFORMATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Administrative and procedural requirements for handling and processing Request for Information (RFI).

2. RFI form.

1.2 DEFINITION

A. Request for Information: Formal process used during construction phase to facilitate communication between the Contractor, the CTA Resident Project Representative, and the CTA Engineer with regard to requests for additional information and clarification of intent of Contract Documents (Drawings and Specifications).

1.3 PROCEDURE

A. Submit RFI for conditions requiring clarification of the Contract Documents.

B. Submit in accordance with procedure as follows: (See Process Flow Chart at the end of this Section)

1. Subcontractors, manufacturers, and suppliers shall submit request for additional information and clarification to Contractor.

2. Contractor shall contact the CTA Resident Project Representative with request for additional information or clarification. The CTA Resident Project Representative will not accept request for information or clarification submitted directly from subcontractors, manufacturers, or suppliers.

3. The CTA Resident Project Representative will provide response to Contractor or he will direct the Contractor to submit RFI to the CTA Engineer.
   a. Generate RFI by one source per project and number accordingly.
   b. Submit one request for information or clarification per form.

4. The CTA Engineer will review RFI from Contractor with reasonable promptness and Contractor will be notified in writing of decisions made.
   a. The CTA Engineer's written response to RFI shall not be considered as a Pricing Order or Pricing Directive, nor does it authorize changes in Contract Sum or Contract Schedule.

C. Contractor shall maintain a log of RFIs sent to and responses from the CTA Engineer. RFI log shall be sent, by FAX every Friday to the CTA Engineer.

D. RFIs regarding scheduling, cost or coordination for Owner provided equipment shall be submitted directly to the CTA Resident Project Representative.

1.4 RFI FORM

A. Submit RFIs on attached form or duplicate format on letterhead. The CTA Engineer will not respond unless on proper form or equivalent format is utilized.

B. If submittal form or format does not provide space needed for complete information, additional sheets may be attached.

C. Do not use RFI form during bidding. Direct questions during bidding phase as indicated in Contract Documents.

PART 2 - PRODUCTS
Not Used.

PART 3 - EXECUTION
Not Used.

END OF SECTION 013100

Request for Information

2024 Pavement Maintenance Overlays

Project: 24100800

Date Submitted:_____Response Requested by:_____

Requesting Contractor's Name:_____

All Requests must include the associated reference such as drawing #, specification section, room #, column line location, etc.

REFERENCE:

RESPONSE:

Lucas Jost, P.E.
Project Engineer

Engineer's response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Sum or Contract Schedule.

014000

TESTING LABORATORY SERVICES

SECTION 014000 - TESTING LABORATORY SERVICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for testing and inspection services.

B. Related Documents and Sections:

1. EJCDC C-700, *Standard General Conditions of the Construction Contract*: Inspections, testing, and approvals required by public authorities.
2. Supplementary Conditions: Contract Closeout, Project Record Documents.
3. Project geotechnical report.

1.2 SELECTION AND PAYMENT

A. Owner Responsibilities: Employment and payment for services of an independent Testing Laboratory to perform specified testing and inspecting will be by the Owner under separate contract except for specified testing required to be selected and paid for by the Contractor as may be required by individual specification sections.

B. Contractor (Building) Responsibilities:

1. Employment of testing laboratory shall not relieve the Contractor of obligation to perform work in accordance with contract requirements.
2. Requirements for Contractor to provide quality control services as specified or required by the Owner or authorities having jurisdiction are not limited by provisions of this Section.
3. The Contractor shall not employ any entity engaged by the Owner, unless otherwise agreed in writing with the Owner.
4. The Contractor shall select and pay for testing laboratory services as may be required by individual specification sections.

C. Testing Lab Responsibilities: Testing laboratory services include inspections, tests, and related actions including reports performed by testing agency. They do not include Contract enforcement activities performed by the CTA Resident Project Representative or authorities having jurisdiction.

1. Provide the Architect/Engineer of Record a copy of the contractual provisions defining the testing laboratory's scope of services.

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

B. American Concrete Institute (ACI):

1. ACI 301 - Specifications for Structural Concrete for Buildings.

C. American Society for Testing and Materials (ASTM):

1. ASTM A325 - Specification for Structural Bolts, Steel, Heat Treated, 120/105 Ksi Minimum Tensile Strength.
2. ASTM A490 Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
3. ASTM C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field.
4. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
5. ASTM C 90 - Specification for Load-Bearing Concrete Masonry Units.
6. ASTM C 109 - Standard Test Method For Compressive Strength Of Hydraulic Cement Mortar (Using 2-in. or 50-mm Cube Specimens).
7. ASTM C 138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
8. ASTM C 140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
9. ASTM C 143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.
10. ASTM C 172 - Standard Practice for Sampling Freshly Mixed Concrete.
11. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
12. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
13. ASTM C 1019 - Standard Test Method for Sampling and Testing Grout.
14. ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
15. ASTM C 1093 - Standard Practice for Accreditation of Testing Agencies for Masonry.
16. ASTM D 71 – Standard Test Method for Relative Density of Solid Pitch and Asphalt (Displacement Method).
17. ASTM D 2950 – Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Method.
18. ASTM D 3740 – Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
19. ASTM D 4074 - Standard Test Method for Bitumen and Aggregate Content of Bitumen-Aggregate Mixtures From Roofing Samples.
20. ASTM D 4561 - Standard Practice for Quality Control Systems for Organizations Producing and Applying Bituminous Paving Materials.
21. ASTM E 329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
22. ASTM E 543 – Standard Specification for Agencies Performing Nondestructive Testing.
23. ASTM E 548 - Guide For General Criteria Use For Evaluating Laboratory Competence.
24. ASTM E 699 - Standard Practice for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating of Building Components.

D. American Welding Society (AWS):

1. AWS D1.1 - Structural Welding Code.
2. AWS QC1 - Standard and Guide for Qualification and Certification of Welding Inspectors.

E. Uniform Building Code (UBC):

1. Material, Testing, and Installation Standards.

a. Standard No. 21-4 - Hollow and Solid Load Bearing Concrete Masonry Units.
b. Standard No. 21-16 - Field Test Specimens for Mortar.
c. Standard No. 21-18 - Method of Sampling and Testing Grout.

1.4 QUALITY ASSURANCE

A. Testing agency will comply with requirements of ASTM C 1077, ASTM C 1093, ASTM D 3740, ASTM D 4561, ASTM E 329 ASTM E 543, ASTM E 548, and ASTM E 699.

B. Laboratory: Authorized to operate in state in which Project is located.

C. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards (NBS) Standards or accepted values of natural physical constants.

1.5 SUBMITTALS

A. Laboratory Quality Assurance: Submit the following.

1. Testing laboratory name, address, and telephone number, and names of full time Registered Engineer and responsible officer.
2. Copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
3. List of each individual test and inspection to be performed.
4. Submit to:

a. CTA Resident Project Representative.
b. Site Work Engineering Consultant.
c. Contractor.
d. Building Official (when required by the local authority having jurisdiction).
e. Owner.
f. Architect of Record, Attention: Construction Management Support Team.]

B. Test and Inspection Reports:

1. Site Work Testing and Inspection: After each inspection or test, distribute report within three calendar days of time services were performed as follows:

a. CTA Resident Project Representative: 1 copy.
b. Site Work Engineering Consultant: 1 copy.
c. Contractor: 3 copies.
d. Building Official: Quantities as required.
e. Owner.

2. Building Testing and Inspection: After each inspection or test, distribute report within three calendar days of time services were performed as follows:

a. CTA Resident Project Representative: 1 copy.
b. Contractor: 3 copies.
c. Building Official: Quantities as required.
d. Owner.
e. Architect of Record: 2 copies, Attention Construction Management Support Team.

3. Tests and inspections indicating non conformance to the Contract Documents shall be stamped with a red stamp indicating "Non-Conformance" and distributed to the CTA Resident Project Representative within 24 hours of discovery.

1.6 TESTING AND INSPECTION FIRM REPORTS

A. Laboratory Report Format: Reports shall be made on 8-1/2 by 11 white paper, suitable for photocopying and binding in booklet form. Sheets shall have Testing and Inspection Firm's letterhead (including phone number and address). Larger sheets shall be folded and bound into the booklet.

B. Laboratory Report Data: Reports shall include the following:

1. Date issued.
2. Project title and number as it appears on the Contract Documents.
3. Store number.
4. Name of inspector.
5. Name and seal of registered engineer in responsible charge.
6. Date and time of sampling or inspection.
7. Identification of product and Specification Section.
8. Location of sampling or inspection in the Project.
9. Type of inspection or test.
10. Date of test.
11. Results of tests.
12. Indicate conformance or non-conformance with the Contract Document requirements and provide Testing and Inspection Firm's interpretation of test or inspection results.
13. When test results indicate non conformance with Contract Document requirements, provide Testing Laboratory's recommendations for corrective action.

C. Report non-conformance in materials or construction to the Construction Documents to the CTA Resident Project Representative within 24 hours of discovery by both written and verbal means.

D. When a non-conformance is noted in reports, comment on probable cause and provide recommendation for corrective action as an attachment to the 24 hour written notice to the CTA Resident Project Representative.

E. Note trends of decreasing quality in concrete due to changing seasons, conditions of curing, or other causes and bring to attention of the CTA Resident Project Representative with recommendations for corrective action before material falls below requirements of specifications for environmental tolerances. Report and log comments on Non-Conformance Correction Log.

1.7 LABORATORY RESPONSIBILITIES

A. Testing and Inspection Firm's registered professional engineer (P.E.) will be required to attend a CTA sponsored pre-construction meeting prior to actual start of the Project at no additional cost to the Owner.

B. Maintain a copy of Contract Drawings and Specifications with all Addenda and Change Orders.

C. Provide qualified personnel, under supervision of the Registered Professional Engineer (P.E.) in the state where Project is located, at site to comply with schedule and submit reports for each test and inspection as defined in Part 3 of this Section.

D. Perform specified inspection, sampling, and testing of products in accordance with specified standards.

E. Ascertain compliance of materials and mixes with requirements of Contract Documents.

F. Notify CTA Resident Project Representative, Sitework Engineering Consultant, Architect of Record, and Contractor of observed irregularities or non-conformance of Work or Products. If observed deviations will be probable cause of subsequent rejection of material, notify Contractor, the CTA Resident Project Representative, Sitework Engineering Consultant, and Architect of Record, sufficiently in advance for determination to continue operations or take corrective measures before continuing.

G. Perform retesting due to non-conformance with the Contract Documents. Costs will be deducted from the Sum due the Contractor.

1.8 TESTING AND INSPECTION FIRM LIMITS ON AUTHORITY

A. Testing and Inspection Firm may not:

1. Release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Approve or accept any portion of the Work.
3. Assume any duties of Contractor.
4. Stop the Work.

1.9 CONTRACTOR RESPONSIBILITIES

A. Contractor shall pay for:

1. Tests and inspections at the source or prior to incorporation into the Work of materials, products, or equipment to certify compliance with Contract Documents.
2. Additional tests, samples, inspection, or engineering services the Contractor determines appropriate for performance of Work or for Contractor's convenience.
3. Tests, inspections, or laboratory services necessary with respect to substitutions.
4. Additional tests and inspections when initial tests or inspections indicate Work does not comply with Contract Documents.
5. Tests and inspections required or conducted by public authorities as part of permits or inspection fees.
6. Other tests and inspections indicated to be "by Contractor."

B. Cooperate with Testing and Inspection Firm personnel, and provide access to the Work and to manufacturer's facilities.

C. Provide incidental labor and facilities to provide access to Work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

D. Provide Testing and Inspection Firm 24 hour notice prior to expected time for operations requiring inspecting and testing services.

E. Notify in writing the CTA Resident Project Representative three calendar days prior to expected time for operations requiring inspecting and testing services.

F. Repair and protection is Contractor's responsibility, regardless of assignment of responsibility for inspection, testing, or similar services.

1. Protect work exposed by or for quality assurance and quality control service activities.
2. Upon completion of inspection, testing, sample-taking, and similar services, restore constructed areas to conform to Contract Documents.

G. Costs of retesting and re-inspections will be deducted from the Sum due the Contractor.

H. Costs of any required redesign or re-engineering required by non-conformance tests and inspections will be deducted from the Sum due the Contractor.

1.10 PRODUCTS (NOT USED)

PART 2 EXECUTION

2.1 ASPHALTIC CONCRETE PAVING TESTING

A. Reference Section 321216 for Asphaltic Concrete Paving testing requirements.

2.2 SEGMENTAL RETAINING WALL SYSTEMS (IF APPLICABLE)

A. Reference Section 323223 for soil and backfill testing requirements.

2.3 CAST-IN-PLACE CONCRETE TESTING

A. Review the Contractor's proposed materials and mix design for conformance with specifications.

B. Perform testing in accordance with ACI 301 and testing standards listed in Section 321313.

C. Conduct strength tests:

1. Secure composite samples in accordance with ASTM C 172. Sample at regularly spaced intervals from middle portion of the batch. Sampling time shall not exceed 15 minutes.
2. Mold and cure specimens in accordance with ASTM C 31.

a. A minimum of four concrete test cylinders shall be taken for every 100 cubic yards or less of each class of concrete placed each day and not less than once for each 5000 square feet of surface area for slabs.
b. During the initial 24 hours (plus or minus 8 hours) after molding, the temperature immediately adjacent to the specimens shall be maintained in the range of 60 to 80 degrees F. Control loss of moisture from the specimens by shielding from the direct rays of the sun and from radiant heating devices.
c. Specimens transported prior to 48 hours after molding shall not be demolded, but shall continue initial curing at 60 to 80 degrees F until time for transporting.
d. Specimens transported after 48 hours age shall be demolded in 24 hours (plus or minus 8 hours). Curing shall then be continued but in saturated limewater at 73.4 degrees (plus or minus 3 degrees F) until the time of transporting.

3. Test cylinders in accordance with ASTM C 39.

    a. Date test cylinders and number consecutively. Give each cylinder of each set an identifying letter (i.e. A, B, C, D). Prepare a sketch of the building plan for each test set identifying location of placed concrete.
    b. Test one cylinder (A) at 7 days for information. If the compressive strength of the concrete sample is equal to or above the 28 day specified strength, test another cylinder (B) at 7 days. The average of the breaks shall constitute the compressive strength of the concrete sample.
    c. Test two cylinders (B and C) at 28 days and the average of the breaks shall constitute the compressive strength of the concrete sample.
    d. Retain fourth cylinder (D) for further testing if needed, but do not retain cylinder more than 60 days.

D. Conduct slump test for each cylinder set taken in accordance with ASTM C 143. Make additional slump tests for every other load from a stationary mixer or truck to test consistency. Sampling shall be in accordance with ASTM C 172.

E. Conduct air content test for each cylinder set for concrete exposed to freeze-thaw in accordance with ASTM C 231, ASTM C 173, or ASTM C 138. Indicate test method on report. Make test at same time as slump test.

F. Unit Weight: ASTM C 138.

G. Conduct temperature test for each cylinder set taken in accordance with ASTM C 1064. Test hourly when air temperature is 40 F and below or 80 F and above. Determine temperature of concrete sample and ambient air for each strength test.

H. Additional Tests: In-Place tests in accordance with ASTM C 42 shall be conducted as directed by the CTA Resident Project Representative when specified concrete strengths and other characteristics have not been attained in the structures.

I. In addition to required information noted previously in this Section, record the following information on concrete compression reports:

    1. Test cylinder number and letter.
    2. Specific foundations or structures covered by this test.
    3. Proportions of concrete mix or mix identification.
    4. Maximum size coarse aggregate.
    5. Specified compressive strength.
    6. Tested compressive strength.
    7. Slump, air-content (when applicable) and concrete temperature.
    8. Concrete plastic unit weight.
    9. Concrete Temperature.
    10. Elapsed time from batching at plant to discharge from delivery truck at project.
    11. Date and time concrete was placed.
    12. Ambient temperature, wind speed, and relative humidity during concrete placement.
    13. Name of technician securing samples.
    14. Curing conditions for concrete strength test specimens (field and laboratory).
    15. Date strength specimens transported to laboratory.
    16. Age of strength specimens when tested.
    17. Type of fracture during test.

J. At the start of each day's mixing, report any significant deviations from approved mix design including temperature, moisture and condition of aggregate.

K. Certify each delivery ticket of concrete. Report type of concrete delivered, amount of water added and time at which cement and aggregate were loaded into truck, and time at which concrete was discharged from truck.

2.4 MASONRY GROUT TESTING

A. Conduct strength tests in accordance with ASTM C 1019UBC Standard No. 21-18.

1. Take two strength samples for each 5000 square feet of masonry wall surface for each type of grout placed each day.
2. Create test samples by forming with wood surface on bottom and concrete block on sides. The samples shall be minimum 3 inches square and 6 inches high.
3. Initial cure during first 48 hours. Protect samples from loss of moisture by covering with wet cloth and keeping moist. Protect from freezing and variations in temperature. Record maximum and minimum temperatures by using a max/min thermometer.
4. Remove masonry units that form samples after 48 hours and transport grout samples to laboratory. Keep samples protected from vibration, freezing, and moisture loss during transportation.
5. Test samples with test method ASTM C 39 at 7 days & 28 days. Compressive strength shall be the average of the two samples and shall be adequate as defined in Drawings. If 7 day test breaks are equal to or above specified 28 day strength, do not break 28 day samples.

B. Conduct slump test at time compressive test samples are taken in accordance with ASTM C 143. Grout shall have a slump between 8 inches and 10 inches.

C. In addition to required information noted previously in this Section, record the following information on grout compression reports:

1. Mix design or mix designation.
2. Test sample number.
3. Specific wall areas covered by test.
4. Description of sample - dimensions amount out of plumb in percent.
5. Description of units used to form sample.
6. Curing history with max/min temperature, age when transported to lab, and age when tested.
7. Tested compressive strength.
8. Description of failure.

2.5 CONCRETE UNIT MASONRY TESTING

A. Conduct strength tests in accordance with ASTM C 140.

B. Select 3 units from each lot of 10,000 units or less, 6 units for each lot of 10,000 to 100,000 units, select 3 units for every 50,000 units.

C. Strength of concrete masonry units will be considered satisfactory if calculated test compressive strength conforms to requirements of ASTM C 90UBC Standard No. 21-4

D. In addition to required information noted previously in this Section, record the following information on concrete unit masonry compression reports:

1. Test sample number.

2. Specific wall areas covered by test.
3. Description of units used to form sample.
4. Tested compressive strength to the nearest 10 psi separately for each specimen and as the average of three specimens.

2.6 STRUCTURAL INSPECTION

A. Concrete Foundations and Slabs-On-Grade Inspections:

1. Inspect foundations for compliance with Drawings and Specifications. Report on the following:

    a. Concrete footing size and depth.
    b. Footing bar size, spacing, and placement (cover).
    c. Placement and vibration of concrete.
    d. Dowel bar size, orientation, embedment, and spacing.
    e. Anchor bolt size, orientation, embedment, and spacing.

2. Inspect slabs-on-grade for compliance with Drawings and Specifications. Report on the following:

    a. Preparation of subgrade.
    b. Slab thickness.
    c. Size, spacing, placement (cover), and lap of reinforcement.
    d. Size, spacing, and placement of joint dowels.
    e. Placement and finishing of concrete.
    f. Time of saw cuts after placement of concrete.

B. Masonry Wall Inspections:

1. Inspect wall for compliance with Drawings and Specifications. Report on the following:

    a. Placement of concrete masonry units (joint space, level, plumb).
    b. Horizontal reinforcing, spacing, and lap.
    c. Vertical bar size, spacing and placement (spacing across width of wall) at walls and control joints.
    d. Vertical bar laps.
    e. Lift heights, placement, and vibration of grout.

2. Inspect bond beams for compliance with Drawings and Specifications. Report on the following:

    a. Location.
    b. Size, placement, and lap of reinforcing bars.
    c. Placement and vibration of grout.

3. Inspect openings for compliance with Drawings and Specifications. Report on the following:

    a. Types of concrete masonry units used to form lintels.
    b. Reinforcing bar size and placement at lintel.
    c. Stirrup size and spacing at lintel.
    d. Vertical reinforcing size and placement at door jambs.
    e. Placement and vibration of grout in lintels and jambs.

4. Inspect pilasters for compliance with Drawings and Specifications. Report on the following:

    a. Vertical reinforcing size and placement.
    b. Tie size and placement.
    c. Placement and vibration of grout.

5. Inspect walls for compliance with Drawings and Specifications. Report on the following:
    a. Spacing and grouting of embedded plates for joist bearing.
    b. Spacing and grouting (or installation of Hilti anchors) of embedded plates for continuous angle attachment at roof perimeter.

C. Structural Steel Inspections:

1. Inspection of columns, beams, joist, and joists girders for compliance with Drawings and Specifications shall be by a professional engineer licensed in the state where the project is located. Report on the following:

    a. Size of members.
    b. Straightness.
    c. Erection tolerances and bearing length:

        1) Minimum 2-1/2 inch bearing length for joists.
        2) Minimum 5 inch bearing length for joist girders.

    d. Imperfections or damage.

D. Structural Connections Inspections:

1. Inspection of bolted connections for placement and tightness shall be by a professional engineer licensed in the state where the project is located. When designated on the Drawings as "Slip Critical," high strength bolts complying with ASTM A 325 or ASTM A 490 shall be tested to ensure they have been torqued to the minimum values as shown in the AISC specification for structural connections.All other bolt locations shall be visually inspected to verify bolt placement. 10 percent of all bolted connections shall be tested to verify that nuts are snug tight. All base plate anchor bolts shall be visually inspected for out-of-plumb and extension of threads beyond the nut.
2. Inspect welded connections for compliance with Drawings and Specifications. Welding inspection shall be by a Welding Inspector certified by AWS in accordance with AWS QC1-Standard and Guide for Qualification and Certification of Welding Inspectors, and meeting the qualification requirements of AWS D1.1. Report on the following:

    a. Verify that all welding is performed by welders certified for the type of welding indicated. Deck to joist welding shall be performed by welders certified for deck welding.
    b. A minimum of 10 percent of joist to joist girder welds selected at random and visually inspected for length and size of weld.
    c. A minimum of 25 percent of continuous roof perimeter angle to embedded plate and joist welds selected at random and visually inspected for length, spacing, and size of weld.
    d. A minimum of 25 percent of all deck-to-joist welds, visually inspected for size, spacing, and fusion. Perform random checks of deck for adhesion to joists.
    e. If more than 10 percent of the welds inspected are not acceptable, an additional 25 percent of all welds shall be inspected. If additional welds are unacceptable, 100 percent of all welds shall be inspected.

f. If approved by the Resident Project Representative, the testing engineer shall verify the adequacy of the welds in question by means of ultrasonic inspection.

E. Steel Roof Deck Inspections:

1. Inspect steel roof deck for compliance with Drawings and Specifications. Report on the following:

a. Select 6 random sheets for each type of deck used. Inspect for deck thickness, type, and material.
b. Inspect 10 percent of side lap connectors over entire roof area for type, size, and spacing of side lap connectors.

END OF SECTION 014000

STANDARD SPECIFICATIONS

FOR

STREET AND DRAINAGE CONSTRUCTION

Contents

DIVISION 100. GENERAL PROVISIONS

Section 111. Roadway Construction Control

111.01 Description. When this item is included in the proposal, it shall consist of furnishing and maintaining all lines, grades, and measurements necessary for the proper execution of the roadway work under the Contract, all according to the plans and specifications.

111.02 Materials. The Contractor shall furnish all stakes, templates, straightedges, surveying equipment, and other devices necessary for establishing, setting, checking, marking, and maintaining points, lines, grades, and layout of the work called for on the plans and in the specifications.

111.03 Construction Requirements.

(a) City Responsibilities. The Engineer/City Engineer will establish the benchmarks and horizontal control points referenced on the plans, certified correct by the Engineer, and furnish the data to the Contractor at the beginning of work.

Any additional information provided by the Engineer shall be verified by the Contractor before use and the Contractor shall accept full responsibility for any costs incurred as the result of the use of such additional information. Any checking performed for the final results.

The City will be responsible for taking all measurements to establish both current estimate and final estimate pay quantities, including any horizontal and vertical control points necessary to complete such measurements. When making these measurements, the Engineer/City may use any points, stakes, lines or elevations that have been set by the Contractor.

(b) Contractor Requirements. Roadway Construction Control shall include use by the Contractor of the plans and the vertical and horizontal control points established by the City as described above to perform all required construction surveying and layout. The Contractor shall make all necessary calculations and set all stakes including, but not limited to: centerline stakes; pavement lines; curb lines; grade stakes; roadway drainage; pipe culverts; box culverts; underdrains; clearing and grubbing limits; guardrail; fence; blue tops for subgrade, subbase, and base courses; and any other points, lines, or elevations deemed necessary for proper control of the work.

On projects that include an ACHM overlay and/or Asphalt Surface Treatment, the Contractor shall mark the stationing by setting a stake at least every 200 feet along the roadway. These stakes shall be placed on the shoulder or slope so that they will not interfere with the construction operations, but will be usable for determining locations along the roadway. On projects with widening sections where a grade line is not shown on the plans, the Contractor shall profile the existing pavement at the centerline and edges of pavement. This profile data

shall be furnished to the Engineer/City Engineer for use in the establishment of the finished grade line. This finished grade line will be furnished to the Contractor for use in computing and setting all grades required to construct the finished roadway section. The Contractor shall be responsible for joining the work to contiguous roadways and/or bridges in an acceptable manner. This shall include making minor adjustments to the plan grade and/or typical section as necessary to construct a smooth transition from the new work to match the existing roadway.

The Contractor shall provide sufficient qualified personnel to complete the work accurately. The supervision of the Contractor's surveying and personnel shall be the responsibility of the Contractor, and any errors resulting from the operations of such personnel shall be adjusted or corrected by the Contractor at no cost to the City.

111.04 Method of Measurement. Roadway Construction Control will be measured as a complete unit.

111.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract lump sum price bid for Roadway Construction Control, which price shall be full compensation for furnishing and maintaining all necessary lines, grades, and measurements; and for furnishing all engineering personnel, equipment, materials, tools, and incidentals necessary to complete the work.

No adjustments in the lump sum price bid will be made for Roadway Construction Control required due to normal increases or decreases in Contract quantities. However, if the amount of Roadway Construction Control required is increased or decreased in connection with a Change Order, compensation will be adjusted accordingly.

Partial payment for Roadway Construction Control will be made in proportion to the amount of work accomplished on this item. No additional payment will be made for restaking needed to maintain the control.

Payment will be made under:

Pay Item	Pay Unit
Roadway Construction Control	LS

Section 112. Trench and Excavation Safety Systems

112.01 Description. This item covers trench and excavation safety systems required for constructing improvements that necessitate open excavations on the project. All work under this item shall be in accordance with the current edition of the "Occupational Safety and Health Administration Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P", a copy of which may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

112.02 Notifications Required. The Contractor, prior to beginning any excavation, shall notify the State Department of Labor (Safety Division) that work is commencing on a project with excavations greater than five feet.

The contractor shall notify all Utility Companies and Owners in accordance with OSHA Administration 29 CFR 1926.651(b)(2) for the purpose of locating utilities and underground installations.

112.03 Existing Structures and Utilities. Where the trench or excavation endangers the stability of a building, wall, street, highway, utilities or other installation, the Contractor shall provide support systems such as shoring, bracing, or underpinning to ensure the stability of such structure or utility.

The Contractor may elect to remove and replace or relocate such structures or utilities with the written approval of the owner of the structure or utility and the Engineer.

112.04 Method of Measurement. After award of the contact, the Contractor shall submit to the Engineer a breakdown of costs for work involved in the lump sum price bid for "Trench and Excavation Safety Systems" and shall, with each periodic payment request, submit a certification by the Contractor's "competent person" as defined in Subpart P 1926.650(b) that the Contractor has complied with the provisions of "Occupational Safety and Health Administration Standard for Excavation and Trenches Safety System", 29 CFR 1926 Subpart P for work which payment is requested.

112.05 Basis of Payment. The work required by this item will be paid for at the lump sum price for "Trench and Excavation Safety Systems".

Payment will be made under:

Pay Item	Pay Unit
Trench and Excavation Safety Systems	LS

DIVISION 200. EARTHWORK

Section 201. Clearing and Grubbing

201.01 Description. This work consists of clearing, grubbing, removing, and disposing of all vegetation, obstructions and debris within designated limits of the Right-of-Way and easement areas. Vegetation and objects designated to remain shall be preserved free from injury or damage.

201.02 Definitions. Clearing and Grubbing shall be defined as follows:

Clearing shall consist of: cutting, removing, and disposing of trees, snags, stumps, shrubs, brush, limbs, and other vegetative growth; removal and disposal of existing fences, drainage structures, abandoned pipelines or utilities, paving, curbs and gutters, rubbish and trash, and other objectionable material(s). Clearing shall also include the preservation of trees, shrubs, and vegetative growth, which are not designated for removal.

Grubbing shall consist of the removal and disposal of wood or root matter below the ground surface remaining after clearing and shall include stumps, trunks, roots, or root systems greater than 2 inches in diameter to a depth of two feet below the natural ground surface.

201.03 Construction Requirements. All surface objects, trees, stumps, roots, and other protruding obstructions designated for removal shall be cleared and grubbed, including required mowing. Undisturbed and sound stumps and nonperishable solid objects located more than two feet below subgrade and slope of embankments may remain in place. When authorized, stumps and nonperishable solid objects that are located more than 1 foot below the ground line may remain if they are located outside the construction limits of excavation and embankment areas.

Existing pipes, culverts, bridges, and other drainage structures shall be removed to the natural stream bottom and those parts outside the stream shall be removed to 1 foot below natural ground surface. Materials designated as City salvaged material shall be dismantled without damage and stored at designated locations. All other structures shall be removed from the Right-of-Way.

All concrete pavement, base course, sidewalks, curbs, gutters, buildings, foundations, slabs, ballast, gravel, bituminous material, and pavement materials shall be disposed of unless specifically stated otherwise in the Plans or by the Engineer.

Concrete designated for use as rip rap shall be broken into pieces not to exceed 150 pounds and stockpiled at designated locations or promptly placed where specified on the project.

Ballast, gravel, bituminous material, or other surfacing or pavement materials designated for salvage shall be stockpiled at designated locations without contaminating the material with dirt or foreign materials. Old concrete pavement, sidewalks, curbs, gutters, and similar structures to be left in place shall be sawed to a straight and true vertical line or removed to an existing joint as shown on the plans or as directed by the Engineer.

In embankment areas, cavities resulting from removal of obstructions shall be backfilled and compacted with suitable material under Subsection 202.03.

Disposal of material and debris shall be done under applicable Federal, State, County, and City laws, ordinances, and regulations. Perishable material if burned shall be under constant care of a watchman so the surrounding vegetation, adjacent property, and anything designated to remain is not jeopardized.

Materials and debris may be disposed of by burial at locations acceptable to the Owner within the project limits, if at least 12 inches of cover material is provided and the area is graded, shaped, and seeded according to these specifications or otherwise restored to present a pleasing appearance. Said burial and restoration shall be at the Contractor's expense.

201.04 Measurement and Payment. No measurement of this item will be made. Payment will be made on a lump sum basis.

Pay Item	Pay Unit
Clearing and Grubbing	LS

Section 202. Excavation and Embankment

202.01 Description. This work consists of excavation, hauling, disposal, placement, consolidation and compaction of all materials encountered within the limits of the work that is not covered under another item.

Excavation will be classified as one of the following:

(a) Unclassified Excavation. Unclassified Excavation consists of the removal and disposal of all material of whatever character encountered in the work not covered under other items. This shall include removal of material in existing ditch lines along roadways to a depth of 1 foot below existing grade in the ditches. This shall also include stripping of vegetation and topsoil as required to a depth of one (1) foot below existing grade in embankment areas.

(b) Rock Excavation. Rock Excavation includes removal and disposal of rock material that by actual demonstration cannot be excavated with a Caterpillar Model No. 215D LC track-mounted hydraulic excavator equipped with two rippers or similarly approved equipment. Rock excavation also includes boulders one-half cubic yard or more in volume.

(c) Undercut Excavation. Undercut excavation includes removal and disposal of material not suitable for use as embankment material that is below the proposed subgrade elevation and that is more than 1' below existing ground within the roadway.

Embankment shall be defined as all material placed within the limits of the proposed roadway to achieve subgrade elevation. Embankment material may include approved on-site or approved off-site material.

202.02 Materials.

(a) General. Samples of material to be used as embankment material shall be submitted for approval per the requirements of these specifications. All material shall meet the requirements of local authority.

(b) Stone backfill. Stone backfill shall be as defined and specified in subsection 205, Undercut and Stone Backfill.

202.03 Construction Requirements.

(a) General. Excavations and embankments shall be finished to smooth and uniform surfaces. No excavation material shall be wasted without permission of the Engineer. Excavation and embankment operations shall be conducted without disturbing material outside the staked construction limits. Before beginning excavation, grading, and embankment operations, all necessary clearing, grubbing and top soil removal in that area shall be completed.

Excess or unsuitable excavated material, including topsoil, rock and boulders, shall be disposed of at locations acceptable to the Engineer. All approved surplus material shall be used to uniformly widen embankments and flatten slopes within the Right-of-Way. Rocks and boulders shall be covered with a minimum of 1 foot of embankment material.

Demolition of old roadways shall include filling of all ditches and grading to restore the original contour of the ground producing a pleasing appearance by forming natural, rounded slopes. Removal and disposal of pavements and base courses shall be performed under Section 201.

(b) Rock Excavation. Material classified as rock shall be excavated to a minimum depth of 6 inches and a maximum depth of 12 inches below proposed subgrade within the limits of the roadbed. The excavation shall be backfilled and compacted with material designated in the Contract or approved by the Engineer. Rock excavation removed in excess of 12 inches below subgrade will not be measured and paid for. Rock excavation backfill of the depth in excess of 12 inches below proposed subgrade is at the Contractor's expense.

Undrained pockets shall not be left in the rock surface. Depressions shall be drained. Bore holes shall be drilled along the slope line, maintaining the drill holes at the angle designated on the plans and ensuring that all drill holes are in the same plane. The diameter, spacing, and loading of presplit holes shall result in a neat break. The presplitting holes shall be drilled for the full depth of the ledge. The initial presplitting of a geological formation shall be accomplished utilizing a 100-foot test section. After drilling, loading, and shooting this test section, the material shall be removed to determine if the diameter, spacing, and loading of the presplit holes are adequate to give an acceptable backslope. If the results are determined to be acceptable, the presplitting may continue throughout the geological formation using those methods and procedures. If the presplitting is determined to be unsatisfactory, adjustments shall be made in the spacing, diameter and loading of the presplit holes utilizing another 100-foot test section.

Presplitting holes shall be loaded with explosives as per the manufacturer's recommendations. The cost of presplitting shall be included in the unit bid price for rock excavation.

(c) Undercut Excavation. If and where directed by the Engineer, unsuitable material encountered at the proposed subgrade elevation shall be removed to the depth specified or directed by the Engineer and backfilled and compacted with approved off-site material, in accordance with this section or in accordance with subsection 205, Stone Backfill as indicated or directed. Excavation operations shall be conducted so necessary measurements can be taken before replacing unsuitable material with approved backfill.

No payment will be made for this item if:

The contractor does not notify the Engineer of potential areas requiring undercut before excavating these areas.

An area that was previously stable becomes unstable due to actions of the contractor. These causes include, but are not limited to, ponding of water and construction traffic.

The Contractor does not allow the Engineer sufficient time to measure the undercut excavation volume before placing backfill material.

In addition, no payment will be made to remove and replace any embankment material placed on unsuitable soil that subsequently requires removal and replacement.

(d) Embankment Construction. Embankment construction includes the preparation of the areas where embankments are placed, placement and compaction of approved embankment material for replacement of unsuitable material, and placement and compaction of embankment material in all cavities and depressions within the roadway area.

Rocks, broken concrete, and other solid materials shall not be placed in embankment areas where piling is to be placed or driven.

Benching shall be required when embankment is placed on hillsides or against existing embankment with slopes that are steeper than 6-to-1 when measured at right angles to the roadway and shall be continuously benched in loose lifts not to exceed 12 inches. Benching shall be wide enough to permit the operations of placement and compaction equipment. All horizontal cuts shall begin at the intersection of the ground line and the vertical side of the previous bench. Existing slopes shall also be stepped to prevent wedging action of the embankment against structures. Excavation from benching shall be compacted with the new embankment material and the cost for benching and recompaction shall be included in the unit bid price for excavation.

When natural ground is within 4 feet of the subgrade, all sod and vegetable matter shall be removed from the surface where embankment is placed. The cleared surface shall be completely broken up by plowing, scarifying, or stepping to a minimum depth of 6 inches and shall then be compacted to the specified embankment density. Sod not requiring removal shall be thoroughly disked prior to embankment construction. Wherever a

compacted road surface containing granular material lies within 3 feet of the subgrade, the old road surface shall be scarified to a minimum depth of 6 inches and compacted to the specified embankment density.

If embankment can only be placed on one side of abutments, wing walls, piers, or culvert headwalls, compaction shall be accomplished without overturning of or placing excessive pressure against the structure. The fill adjacent to the end bent of a bridge shall not be placed higher than the bottom of the backwall until the superstructure is in place. When embankment is placed on both sides of a concrete wall or box-type structure, the embankment shall be brought up equally on both sides of the structure. Embankment that is adjacent to structures or inaccessible to normal compaction equipment shall be placed in 4" loose lifts and compacted with mechanical equipment to 95% of maximum density as determined by AASHTO T99.

Roadway embankment shall be placed in horizontal lifts not to exceed 8 inches (loose measurement) and compacted to the specified density before the next lift is placed. Spreading equipment shall be used to obtain uniform lift thickness prior to compaction. As the compaction progresses, leveling and manipulating shall be continuous to assure uniform density. Moisture content shall be increased or decreased as necessary to obtain the required density and stability. Construction equipment shall be routed uniformly over the entire embankment surface.

When the excavated material consists predominantly of rock too large to be placed in 8-inch lifts, the material may be placed in thicknesses up to the average rock dimension not to exceed 3 feet. Each lift shall be leveled and smoothed by distribution of spalls and finer fragments of earth. Rock shall not be end dumped directly on the previously completed lift of embankment. Rock shall be dumped in the lift of embankment being constructed and pushed into place. The lifts shall not be constructed above an elevation 2 feet below the finished subgrade.

A minimum of 2 feet of compacted embankment shall be placed over structures before rock is placed.

(e) Moisture and Density Requirements. All lifts in embankment areas shall be compacted to not less than 95 percent of the maximum density. The moisture content of the material shall be uniformly increased or decreased to within 2% of optimum moisture content before compaction.

Maximum density will be determined using AASHTO T 99 or ASTM D698 (Standard Proctor). In-place field density measurements shall be determined using AASHTO T 191, T233 , or T 310.

Density requirements do not apply to portions of embankments constructed of materials such as rock that cannot be tested by approved testing methods.

202.04 Method of Measurement.

(a) Undercut and Backfill will be measured by the cubic yard of material placed and compacted according to the specifications and as directed by the Engineer. Measurements of the excavated area will be taken by the Engineer after excavation and before backfilling. The quantity of Undercut and Backfill will be measured as In Place quantities. Measurement for undercut will begin at subgrade elevation or one (1) foot below existing ground, whichever is lower.

(b) Rock Excavation will be measured by the cubic yard of rock in place actually removed according to the specifications. Measurements taken after the rock is removed and before any associated backfilling will be used to calculate rock excavation quantities.

(c) Unclassified Excavation will not be measured and the plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made. In such case, the revised quantity shall be agreed upon prior to beginning any work associated with the change.

(d) Embankment will not be measured and the plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made. In such case, the revised quantity shall be agreed upon prior to beginning any work associated with the change.

202.05 Basis of Payment. Quantities of earthwork completed, accepted and measured as provided above will be paid for at the Contract Price bid as follows:

(a) Undercut Excavation shall be paid for at the Contract Price bid per cubic yard (CY) for Undercut and Backfill. Said price shall be full compensation for excavation, disposal, furnishing, hauling, placing, and compacting approved off-site material according to the plans and specifications. This price shall not include final compaction and finish grading to subgrade elevation. Final compaction and finish grading will be paid for under the item "Subgrade Preparation."

(b) Rock excavation shall be paid for at the Contract Price bid per cubic yard (CY) for Rock Excavation. Said price shall be full compensation for rock removal and disposal to the lines and depths shown on the plans and according to these specifications, and for furnishing, hauling, placing, and compacting approved material in the excavated area as required.

(c) All earthwork not paid for under other items will be paid for under the separate items (1) Unclassified Excavation or (2) Embankment as follows:

(1) Excavation shall be paid for at the Contract Price bid per cubic yard (CY) for Excavation. Said price shall be full compensation for excavation, hauling off, and disposal of all materials on the project that are not required for completion of the project; and any other excavation, grading or other miscellaneous earthwork items not included in other items of work. The plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made.

(2) Embankment shall be paid for at the Contract Price bid per cubic yard (CY) for Embankment. Said price shall be full compensation for placement of materials on the jobsite, whether from on-site or off-site sources, to establish the lines and grades shown on the plans; placement of embankment as backfill for excavated areas to 1 foot below existing ground in roadway areas; and any other embankment, grading or other miscellaneous earthwork items not included in other items of work. The plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made.

Pay Item	**Pay Unit**
Undercut and Backfill	CY
Rock Excavation	CY
Unclassified Excavation	CY (Plan Quantity)
Embankment	CY (Plan Quantity)

Section 203. Subgrade Preparation

203.01 Description. This work consists of preparing the subgrade for placement of the base course, curb and gutter, and asphalt courses. The intent of this specification is to provide a stable subgrade consisting of approved material compacted as specified.

203.02 Materials. Materials not specified.

203.03 Construction Requirements. Material at subgrade will receive one or a combination of the following treatments as directed by the Engineer:

(a) Unsuitable material will be excavated to a depth as directed by the Engineer, disposed of, and replaced with off-site material approved by the Engineer. This material shall be placed and compacted to conform to Subsection 202.03.

(b) If the material is acceptable for use as subgrade material, the subgrade will be scarified to a depth of 8 inches and recompacted to conform to Subsection 202.03 of these Specifications.

(c) In areas requiring fill to achieve subgrade elevation, the subgrade shall consist of approved on-site or off-site material compacted in accordance with Subsection 202.03 of these Specifications.

The subgrade shall be shaped for its full width to the required grade and cross section. The finished subgrade shall not vary at any point by more than .02 foot from the prescribed elevation.

Finished sections damaged by construction operations shall be corrected by the contractor at no cost to the Owner.

203.04 Method of Measurement. Measurement for this item will be as follows:

(a) Excavation and backfill of any areas of subgrade requiring undercut will be measured as specified in Section 202.04.

(b) Subgrade Preparation will be measured by the square yard. Measurement will include all subgrade area including areas up to 1' behind proposed back of curbs. Measurement will include areas of undercut, areas that receive scarification and recompaction of existing acceptable material, and areas where fill material is required to achieve subgrade elevation. The plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made. In such case, the revised quantity shall be agreed upon prior to beginning any work associated with the change.

(c) Fill material required to achieve subgrade elevation will be measured as specified in Section 202.4.

203.05 Basis of Payment. Quantities of earthwork completed, accepted and measured as provided above will be paid for at the Contract Price bid as follows:

(a) Undercut Excavation shall be paid for as stated in Section 202.5a. This price shall not include final compaction and finish grading to subgrade elevation. Final compaction and finish grading will be paid for under the item "Subgrade Preparation."

(b) Subgrade preparation will be paid for at the Contract Price per square yard (SY) for Subgrade Preparation. Said price shall be full compensation for scarification (if required), compaction, and finish grading of subgrade areas.

Pay Item	**Pay Unit**
Subgrade Preparation	SY (Plan Quantity)

Section 204. Select Grading

204.01 Description. This work consists of excavating, placing, and compacting material between the back of the roadway curb and the limits of the work. It also includes grading and placing topsoil in this area or other disturbed areas.

204.02 Materials.

(a) General. Material used for backfilling curbs and grading for sidewalk shall be free of trash, organics, and other deleterious materials.

(b) Topsoil. Topsoil may be obtained from sources outside the right-of-way limits or from areas within the project limits that will be occupied by cuts and/or embankments. When topsoil is furnished from sources outside the right-of-way, the Contractor shall be responsible for locating and obtaining the material and for performing all work, including erosion

control, prevention of water pollution, and restoration, according to the specifications. The cost of such work will be considered included in the contract unit price bid for Topsoil Furnished and Placed. At the request of the Owner, the Contractor shall furnish copies of agreements with the property owners.

Topsoil shall be good quality, fertile, friable, surface soil and consist of loamy sand, sandy loam, clay loam, or sandy clay loam and shall be clean, rich, dark soil that contains adequate organic material. River sand will not be accepted as topsoil. Topsoil shall be reasonably free from subsoil, slag, weeds, grasses, roots, or stones greater than:

- 1/4 inch for residential/commercial lawn areas, or
- 1 inch for all other areas.

Topsoil shall have a pH suitable for intended use areas. Obtain soil only from naturally well-drained sites where topsoil occurs in depths greater than 4". Do not obtain from bogs, marshes or steep clayey slopes. Do not strip, collect, or deposit topsoil while soil is wet.

In no case shall topsoil be excavated more than 12" from the original ground level. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sods and herbaceous growth, such as grass and weeds, shall not be removed but shall be thoroughly broken up and intermixed with the soil during handling operations.

204.03 Construction Requirements.

(a) Curb Backfill and Grading. After curbs have set sufficiently, they shall be backfilled with approved material and graded so that no ponding will occur. Areas on which sidewalk or driveways are to be constructed shall be compacted to 90% of maximum density as measured by AASHTO T99 or ASTM D698 (Standard Proctor).

Upon completion of the construction of sidewalks, driveways, and other items of construction within the construction limits, all areas to receive topsoil shall be excavated, graded, backfilled and compacted as necessary to remove all depressions, ridges, soft areas, waste concrete, and other items that will interfere with placement of the topsoil layer. All slopes shall be excavated to a maximum slope of 1 vertical foot in 3 horizontal feet unless otherwise noted in the plans or directed by the Engineer.

(b) Topsoil Placement. After the areas to receive topsoil have been prepared to the satisfaction of the Engineer, topsoil placement may begin.

Topsoil shall be placed on all earth areas to a minimum depth of 4 inches unless shown otherwise on the plans or directed by the Engineer. Topsoil shall be graded to within 1 inch of finished elevation, and lightly compacted. Before placing seed all topsoiled areas shall be lightly scarified and raked to remove rocks, sticks, roots, and other undesirable materials as outlined in Section 204.02b.

204.04 Method of Measurement.

(a) Curb Backfill and Grading. Backfilling of curbs and grading of areas between the back of curb and the construction limits will be measured by the Station. A Station for the purposes of this Section is defined as 100' in length for both sides of the roadway, with a width reaching to the outer construction limits on both sides of the road.

(b) Topsoil. Topsoil furnished and placed will be measured by the square yard based on the location. Measurement will be made to the permanent street right-of-way or permanent easement or to the toe or top of slopes as shown on the plans. Areas outside these limits disturbed by the Contractor shall be topsoiled and restored at no cost to the Owner.

204.05 Basis of Payment. Quantities completed, accepted, and measured as provided above will be paid for at the Contract Price bid as follows:

(a) Curb backfill and grading will be paid for at the unit price per station (Sta). Said price shall be full compensation for excavation, hauling, placing, and compacting approved material to the lines and grades shown on the plans.

(b) Topsoil will be paid for at the unit price bid per square yard (SY). Said price shall be full compensation for excavating, stockpiling, hauling, placing, grading, and all other labor, tools, and equipment to provide a layer of topsoil in accordance with the specifications.

Pay Item	Pay Unit
Curb Backfill and Grading	Sta
4" Topsoil Placement (Yard Areas)	SY
4" Topsoil Placement (Other Areas)	SY

Section 205. Undercut and Stone Backfill

205.01 Description. This item shall consist of excavation and disposal of unsuitable materials and furnishing, hauling, placing, spreading, consolidating and compacting stone materials as specified at locations designated on the Plans or as designated by the Engineer.

If and where directed by the Engineer, unsuitable material encountered at the proposed subgrade elevation shall be removed to the depth specified or directed by the Engineer and backfilled with Stone Backfill as further defined herein.

205.02 Materials.

a) Stone Backfill. Stone for Stone Backfill shall be hard, durable, crushed stone aggregate, as manufactured by local quarries, ranging in size from 11/2" (40mm) minimum to 6" (150mm) maximum. Stone Backfill shall not contain more than 5% by weight of shale, slate or other deleterious matter. The stone shall be uniformly graded and the amount passing the 11/2" (37.5 mm) sieve shall be not more than 10% by weight.

b) Aggregate Base Course Cap. When backfilling with Stone Backfill to subgrade elevation, or to an elevation below subgrade when directed by the Engineer, the top 4" to 6" (100 mm to 150 mm) shall be material complying with subsection 401, "Aggregate Base Course" for Class 7 Aggregate Base Course.

205.03 Construction Requirements.

(a) Excavation. Excavation operations shall be conducted so necessary measurements can be taken before replacing unsuitable material with approved backfill.

(b) Stone Backfill. The area shall be excavated and the Stone Backfill shall be placed within the limits shown on the Plans or as designated by the Engineer. The excavated materials shall be disposed of by the Contractor in compliance with these Specifications. The stone may be dumped into the areas undercut without regard to depth of layer. The stone shall be spread, shaped, and consolidated to the line and grade determined in the field by the Engineer to provide a firm and unyielding foundation for the subgrade and/or subbase course and/or base course.

(c) Aggregate Base Course Cap. The Class 7 Aggregate Base Course Cap shall be compacted per the requirements of subsection 401, "Aggregate Base Course".

205.04 Method of Measurement.

(a) Undercut and Stone Backfill will be measured by the ton of material placed and consolidated or compacted according to the specifications and as directed by the Engineer. Measurements of the excavated area will be taken by the Engineer after excavation and before backfilling. The quantity of Undercut and Backfill will be measured as <u>In Place</u> quantities. Measurement for undercut will begin at subgrade elevation or one (1) foot below existing ground, whichever is lower.

(b) Aggregate Base Course Cap shall not be measured for separate payment but shall be measured and paid for as Stone Backfill.

205.05 Basis of Payment.

(a) Undercut Excavation and Stone Backfill shall be paid for at the Contract Bid Price per ton for Undercut and Stone Backfill. Said price shall be full compensation for excavation and disposal of unsuitable material; for furnishing, hauling, placing, shaping and consolidating or compacting material according to the plans and specifications; and for all labor, equipment, tools, and incidentals necessary to complete the work. Excavation and backfill authorized by the Engineer that is in excess of the volume occupied by the Stone Backfill will be measured and paid for under the appropriate subsections of these Specifications for the appropriate classifications of material.

(b) No payment will be made for this item if:

The contractor does not notify the Engineer of potential areas requiring undercut <u>before</u> excavating these areas.

An area that was previously stable becomes unstable due to actions of the contractor. These causes include, but are not limited to, ponding of water and construction traffic.

The Contractor does not allow the Engineer sufficient time to measure the undercut excavation volume before placing backfill material.

In addition, no payment will be made to remove and replace any embankment material placed on unsuitable soil that subsequently requires removal and replacement.

Pay Item	**Pay Unit**
Undercut and Stone Backfill	Ton

DIVISION 300. STORM DRAINAGE

Section 301. Storm Drainage Pipe

301.01 Description. This work consists of the construction or reconstruction of pipe culverts, including excavation and backfill of storm sewer trenches.

301.02 Materials. All materials supplied under the requirements of this section shall meet the requirements of Section 606 of AHTD Specifications. All reinforced concrete pipe shall be Class III unless otherwise shown on the Plans or directed in the Specifications. Sizes and gauges of corrugated metal pipe shall be as shown on the plans.

301.03 Construction Requirements.

(a) General. Unsuitable material excavated for storm sewer placement shall be disposed of under Subsection 202.03(a). Suitable surplus excavated material shall be used in the construction of embankments. Unsuitable excavated material below the designed bottom of pipe elevation shall be replaced and compacted using approved material. Rock, hardpan, and other unyielding material shall be excavated below the designed grade for a depth of 6 inches minimum and 8 inches maximum. This extra depth excavation shall be backfilled with approved bedding material. Trenches shall be excavated to a minimum width that allows for proper jointing of the pipe and compaction of backfill material under and around the pipe. The completed trench bottom shall be firm for its full length and width.

(b) Bedding. All storm sewer pipe shall be bedded with a minimum of 4 inches of approved granular material. Bedding shall be placed to the required depth and shaped to conform to the bottom configuration of the pipe.

(c) Laying Pipe. Pipe placement shall begin at the downstream end. Pipe shall be in contact with the shaped bedding throughout its full length. Bell or groove ends of concrete pipe and outside circumferential laps of flexible pipe shall be placed facing upstream. Flexible pipe shall be placed with longitudinal laps or seams at the sides.

Paved or partially lined pipe shall be laid so the longitudinal centerline of the paved segment coincides with the flow line. Elliptical pipe shall be installed so the orientation of a vertical plane through the longitudinal axis of the conduit does not vary more than 5 degrees from the design orientation.

Pipe that is not in true alignment or that shows settlement after placement shall be removed and re-laid at no cost to the Owner.

(d) Joining Pipe. The method of joining pipe sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even.

Pipe protruding through structure walls shall be cut off flush with the inside face of wall and grouted.

All surfaces of the joint upon or against which joint seal gaskets may bear shall be smooth, free of spalls, cracks, fractures, and imperfections that would adversely affect the performance of the joint. A primer shall be applied if recommended by the manufacturer.

When preformed rubber gasket is selected by the Contractor, the gasket shall be the sole element depended upon to make the joint flexible and watertight. The gasket shall be a continuous ring that fits snugly into the annular space between the overlapping surfaces of the assembled pipe joint to form a flexible watertight seal.

The gasket shall not be stretched more than 30% of its original circumference when seated on the spigot or tongue end of the pipe.

When bitumen/butyl plastic gasket is selected by the Contractor, the following procedure shall be used. The protective wrapping shall be removed from one side of the gasket. The gasket shall be pressed firmly to the vertical shoulder of the pipe joint, end to end continuing around the entire circumference of the joint. The remaining protective wrapping shall be removed and the pipe forced into connection until material fills the joint space.

For either type of gasket used and to ensure an even and well filled joint, the final joining of the pipe shall be accomplished by either pushing or pulling, by approved mechanical means, each joint of the pipe as it is laid. In cold weather, when directed, the joint material shall be warmed in a hot water bath, or by other approved methods, to the extent required to keep the material pliable for placement without breaking or cracking.

(e) Backfilling. The pipe shall be backfilled with bedding material in 4 inch compacted lifts to the springline. Pipe placed under roadways or driveways will then be backfilled with aggregate base material meeting the requirements of Section 401 placed in 4 inch lifts compacted to 95% of maximum density near optimum moisture as determined by AASHTO T180 or ASTM D1557. Flowable fill in accordance with these specifications may be used as an alternate to the aggregate base material. For the purpose of this section, roadway shall be defined as back of curb to back of curb.

All other areas shall be backfilled with material free from lumps or clods placed in layers not to exceed 6” at or near optimum moisture content and compacted with mechanical equipment

to 90% of the maximum density, as determined by AASHTO T 99 or ASTM D698, to the limits shown on the plans. Pipe damaged during construction operations shall be replaced at no cost to the Owner.

When the existing material excavated for the pipe trench is declared by the Engineer as unsuitable for pipe backfill, this material shall be placed at other locations on the job and used to backfill behind curbs and/or placed on the fill slopes. If the Engineer determines that no suitable location exists on the job to utilize this material, the Engineer may approve the material to be wasted at an appropriate location outside the job limits. Material declared unsuitable for backfill shall be replaced with suitable material from roadway excavation and/or off-site sources.

(f) Curtain walls for Flared End Sections. The foundation for curtain walls shall be prepared to the required depth. For cast-in-place curtain walls, the forming, placement of reinforcing steel, and placement, finishing, and curing of concrete shall be according to the applicable requirements of subsections 601' "Cast-in-Place Concrete" and 602, "Reinforcing Steel". Precast curtain walls shall be installed according to the applicable requirements for laying concrete pipe. Curtain walls shall not be measured for separate payment but shall be included with and subsidiary to Flared End Sections.

(g) Temporary Repairs for Roadway Cuts. All roadway cuts shall be temporarily or permanently repaired in accordance with Section 405, "Asphalt Concrete Patching For Maintenance of Traffic" within 24 hours of the completion of trench backfill for the work, or segment of work, which required the excavation and/or cut.

301.04 Method of Measurement. Storm drainage pipe of the type and size specified will be measured by the linear foot (LF) measured parallel to the flowline of the pipe. Where inlets, junction boxes, or other structures are included in lines of pipe, that length of pipe extending to and flush with the inside of the structure wall will be included for measurement but no other portion of the structure length or width will be so included. Whenever possible, the lengths shown on the plans may be adjusted by the Engineer to accommodate the pipe lengths available from the supplier that most nearly match the plan lengths. Flared end sections for pipe culverts will be measured by the unit and will include the curtain wall, complete in place.

301.05 Basis of Payment. Work completed, accepted, and measured as provided above will be paid for at the Contract Price bid as follows:

(a) Pipe will be paid for at the unit price per linear foot (LF) for each type and size of pipe and type of backfill specified; which price shall be full compensation for furnishing, hauling, and installing the pipe; for material including joint filler for concrete pipe and connection bands for metal pipe; for excavation and backfilling, including class 7 base as required, and for all other labor, tools, and equipment necessary to complete the work.

(b) Flared End Sections (FES) will be paid for at the unit price per each (EA) for the type and size of the flared end section specified; which price shall be full compensation for furnishing, hauling, and installing the flared end sections; for material including joint filler for concrete

pipe and connection bands for metal flared end sections; for curtain walls complete in place; for excavation and backfilling, including compacted backfill, and for all other labor, tools, and equipment necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
__" (Pipe Type and Material) Within Roadway	LF
__" (Pipe Type and Material) Outside Roadway	LF
__" (FES Type and Material)	EA

Section 302. Drop Inlets and Junction Boxes

302.01 Description. This item shall consist of the construction of drop inlets, junction boxes, and drop inlet extensions with rings and covers or grates and frames.

302.02 Materials.

(a) All concrete for this section shall conform to the requirements for Class B Concrete as provided in Section 601.

(b) Reinforcing steel shall conform to the requirements of Section 602.

(c) Steel for welded steel grates and frames shall conform to the requirements of ASTM A 36.

(d) Iron castings for rings and covers, grates and frames, and other appurtenances shall conform to the requirements of ASTM A 48, Class 30A. Bearing surfaces between rings and covers or grates and frames shall be cast or machined with such precision that uniform bearing shall be provided throughout the perimeter area of contact. Castings shall be of the weight shown on the plans. Minimum weight of ring and lid shall be 275 pounds. The lid shall include the local authority's logo or other features according to the Plans/Details.

(e) Precast concrete units of the type, size, and designation shown on the plans may not be used unless written permission is given by the Engineer. Precast units shall be subject to the requirements of AASHTO M 199. Units so manufactured must be certified by a professional engineer registered in the State of Arkansas that they have been designed and manufactured according to AASHTO M199 and that they meet the requirements for HS20 loading. Joint materials shall conform to Subsection 301.02.

(f) Curing Materials. Curing materials shall meet the requirements of Subsection 601.15.

302.03 Construction Requirements. Drop inlets, junction boxes, and drop inlet extensions shall be constructed with either reinforced or non-reinforced concrete, as shown on the plans.

Concrete shall not be placed until the Engineer has inspected the forms and the placement of reinforcing steel and rings or frames.

Round monolithic drop inlets may have the floors cast monolithically with the walls. All other concrete floors shall be placed at least 24 hours before beginning construction of the walls. A longer period of time may be required if weather conditions make it necessary.

When completed, the concrete shall be cured as specified in Subsection 601.15.

Walls shall be constructed to form a tight joint with the floor and around the inlet and outlet pipes. Pipes shall be cut flush with the inside surfaces of the wall.

Utility lines that are carried through the walls shall be protected in an approved manner to avoid damage.

Faces of drop inlets and drop inlet extensions shall be placed as a part of the curb in order to preserve the proper alignment.

Precast concrete drop inlets or junction boxes may be used only by special permission of the Engineer. Inlet and extension tops and throats will be cast-in-place with no exceptions.

Precast reinforced concrete drop inlet or junction box sections shall be carefully set with joints conforming to the requirements of Subsection 301.03(d).

Metal rings or frames shall be set accurately to the finished elevations so that no subsequent adjustments will be necessary. They shall be set in a full mortar bed with firm bearing on the walls or securely fastened to the forms so that no movement will occur when concrete is placed around them.

Welded steel grates and frames shall be welded with ¼" fillet welds, and painted in accordance with the plans.

302.04 Backfilling. Backfill around inlets and junction boxes shall be with approved material as defined in the following paragraphs. Backfilling of inlets and junction boxes shall not begin until results of concrete cylinder tests demonstrate that concrete has reached 75% of specified strength. Backfill material shall be placed in layers not to exceed 4" in depth and shall be compacted to 95% of maximum density as measured by AASHTO T 99 for soil materials or by AASHTO T 180 for aggregate base materials.

All structures or parts of structures that fall within the limits of the roadway (defined as centerline to 1' behind the backs of curbs) shall be backfilled with aggregate base material unless otherwise allowed in writing by the Engineer.

Structures in other areas shall be backfilled with approved material provided from on-site or off-site areas.

Structures shall be cleaned of any accumulation of silt, debris, or foreign matter of any kind, and shall be reasonably free of such accumulations at the time of final inspection.

302.05 Method of Measurement. Drop inlets, junction boxes, and drop inlet extensions will be measured by the unit. One drop inlet extension unit is measured at a 4' length. Each unit shall consist of the concrete frame, the ring and grate, and any pipe required to form the vertical portion of the drain including a standard elbow or tee.

302.06 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid each for Drop Inlets, Drop Inlet Extensions, or Junction Boxes, of the size and type specified, which price shall be full compensation for constructing drop inlets, drop inlet extensions, or junction boxes; for furnishing, installing, and painting (if required), of rings and covers or grates and frames; for excavation and backfill; and for all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
(Size) Drop Inlets (Type)	EA
(Size) Junction Boxes (Type)	EA
(Size) Drop Inlet Extension	EA

Section 303. Concrete Box Culverts

303.01 Description. This work consists of constructing reinforced concrete box culverts, in accordance with the details shown on the plans, and to the lines, grades, and dimensions shown on the plans. This work also includes associated wingwalls and aprons at the ends of the box culvert.

303.02 Materials. Concrete for reinforced concrete box culverts shall be class B in accordance with Section 601 unless specified otherwise. Reinforcing steel shall be in accordance with Section 602. Precast concrete box culverts shall be subject to the requirements of AASHTO M 259-98 and AASHTO M 273-00. Units so manufactured must be designed and certified by a professional engineer registered in the State of Arkansas that the pecast culvert(s) have been designed and manufactured according to AASHTO M 259-988 and/or AASHTO M 273-00 for the site specific conditions and the requirements for minimum HS20 live load.

303.03 Construction Requirements. Concrete box culverts shall be constructed on firm, unyielding material. Unsuitable material found at the planned elevation of the box bottom shall be removed and replaced with material acceptable to the Engineer to provide an adequate foundation for construction of the box culvert. No concrete shall be placed before approval of the subgrade by the Engineer.

Reinforcing steel and concrete for box culverts shall be provided and placed in accordance with Sections 601 and 602 and as detailed on the plans. All concrete shall be placed in the dry unless otherwise directed by the Engineer.

Precast box culverts shall be placed in accordance with Section 301.03.

Backfill material placed within the roadway limits (defined as centerline of roadway to 1' behind the back of curb) or under driveways and parking lots shall be AHTD Class 7 aggregate base material or gravelly clay material, generally known as "hillside". Aggregate base shall be placed in layers not to exceed 4" loose depth and shall be compacted to 95% of maximum density as determined by AASHTO T 180 or ASTM D1557. "Hillside" material shall be placed in layers not to exceed 8" loose depth and shall be compacted to 95% of maximum density as determined by AASHTO T 99 or ASTM D698.

Backfill material placed in other areas shall be "hillside" material or other material that may be approved by the Engineer. Backfill in these areas shall be placed in layers not to exceed 8" loose depth and shall be compacted to 90% of maximum density as determined by AASHTO T 99 or ASTM D698.

No backfill shall be placed against box culvert walls or on box culvert tops until the concrete has cured for 14 days and until test cylinders show that the minimum specified strength has been obtained.

Backfill shall be placed and compacted on both sides of the box culvert simultaneously.

303.04 Method of Measurement. Measurement will be by one of the following methods as detailed below. The method to be used will be stated in the bid form.

(a) Lump Sum Method. No measurement will be made for this item. Payment will be on a lump sum basis.

(b) Unit Price Method. Concrete box culverts will be measured by the linear foot (LF) of box culvert constructed. Measurement will be taken at the centerline of the box culvert. Wingwalls, headwalls, and other appurtenances will not be measured under this item but will be considered as a separate lump sum item.

303.05 Basis of Payment.

(a) Lump Sum Method. Payment using this method will be on a lump sum basis. The lump sum price shall include all labor, materials, equipment, and incidentals necessary to completely construct each box culvert. Payment shall also include construction of all wingwalls, headwalls, and other appurtenances, as shown on the plans, excavation, backfill, and over excavation as necessary to provide a stable subgrade for box culvert construction.

(b) Unit Price Method. Payment using this method will be made at the per linear foot price (LF) for box culvert completed, accepted and measured as provided above. The per lineal foot price shall include all labor, materials, equipment, and incidentals necessary to completely construct each box culvert. Payment shall also include excavation, backfill, and over excavation as necessary to provide a stable subgrade for box culvert construction. This per linear foot price shall not include construction of headwalls, wingwalls, and other appurtenances. They will be paid on a lump sum basis for each box culvert.

Payment will be made under:

Pay Item	Pay Unit
(Size) Cast-in-Place Concrete Box Culvert	LS or LF
(Size) Precast Concrete Box Culvert	LS or LF
Wingwalls & Appurtenances	LS

Section 304. Vacant

Section 305. Open Channels

305.01 Description. This work consists of construction of open channels, including earthen and concrete channels.

305.02 Channel Excavation. Channels shall be excavated to the lines and grades shown on the plans. All constructed grades and slopes shall be within ± 0.1 feet of the plan grade. Ponding or standing water in the constructed channel will not be allowed.

305.03 Earthen Channel Finishes. Earthen channels shall receive a 4" minimum layer of topsoil meeting the requirements of Section 204. Topsoil shall be firmly compacted, then the surface scarified in preparation for seed or sod. All rocks and clods larger than 1 inch in diameter shall be removed before seeding or sodding operations begin. Seeding or sodding as specified on the plans shall be accomplished according to the requirements of Section 505.

Erosion control fabric, if specified, shall be placed according to manufacturer's specifications. Fabric shall be of the type specified unless an alternate type is approved in writing by the Engineer. The Contractor shall submit a sample of the alternate fabric type along with specifications before such approval is granted.

305.04 Concrete Ditch Paving.

(a) Materials. Concrete for ditch paving shall be Class A concrete in accordance with section 601.

(b) Construction Requirements.

1) **Subgrade.** The subgrade shall be excavated or filled to the required grade. Soft and yielding material shall be removed and replaced with suitable material and the entire subgrade shall be thoroughly compacted.

2) **Forms.** Forms shall be constructed of metal or wood, free from warp, and of sufficient strength to resist springing during the process of depositing concrete. They shall be securely staked, braced, set, and held firmly to the required line and grade. Forms shall be cleaned and oiled before concrete is placed against them.

3) **Placing and Finishing.** The concrete shall be deposited in the forms upon a wetted subgrade to such depth that when it is compacted and finished, the flow line shall be at the required elevation and the sides at required widths, slopes, and thicknesses. The concrete shall be thoroughly compacted and the edges along the forms spaded to prevent honeycomb. The flow lines and sides shall be struck off with a straightedge and tamped sufficiently to flush mortar to the surface, after which it shall be finished with a wood float to a smooth and even surface. Edges shall be rounded with a ¼" edger.

   Transverse joints ¼" wide shall be tooled or sawed perpendicular to the flow line at intervals not greater than 15' measured longitudinally along the flow line. Joints shall continue across the bottom and up the slope to form a continuous joint. 3" diameter weepholes shall be spaced at 10' intervals along the channel. These weepholes shall be constructed in both channel walls a minimum of 6 inches and a maximum of 1 foot above the channel flowline. Weepholes will not be required if the channel wall is less than 1' tall.

   When completed, the concrete shall be cured as specified in Section 601.

4) **Backfilling.** Immediately after the forms have been removed, the spaces on each side of the paving shall be backfilled with suitable material and compacted with mechanical equipment. Solid sodding shall be placed in conjunction with backfill when provided on the plans.

5) **Expansion Joints.** When a section of ditch paving terminates at a drop inlet or other structure, a space not less than ½" wide shall be left between the end of the paving and the structure. This space shall be filled with joint filler conforming to the requirements of AASHTO M 213. Expansion joints shall also be placed between successive placements or as directed by the Engineer.

6) **Placement on Slopes.** Slope paving shall begin at the toe of the slope and be constructed to the lines and dimensions as shown on the plans or as directed.

7) **Toewalls.** Concrete toewalls shall be constructed at the ends of all paved channels that do not terminate at a concrete structure. Toewalls shall be a minimum of 8" thick and 3' deep below the flowline of the channel, and shall be placed monolithically with the concrete channel.

305.05 Method of Measurement.

(a) Excavation for earthen or concrete channels shall be measured by the cubic yard (CY) of material removed. Quantities will be measured by cross sections taken before and after

excavation operations. Payment for plan quantity of channel excavation will be made unless a change in the channel profile or cross section is made.

(b) Concrete channels will be measured by the square yard (SY) of concrete placed.

(c) Erosion control fabric will be measured by the square yard (SY) of area covered by fabric. Overlaps, splices, and other additional fabric required for proper placement of fabric according to manufacturers' specifications will not be measured.

305.06 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price per square yard for concrete channels and per square yard for erosion control fabric. Said price shall be full compensation for placement and finishing of concrete as specified, placement of erosion control fabric per manufacturer's specifications, and all other labor, equipment, and materials necessary for a complete installation of each item as detailed on the plans.

Excavation will be paid on a CY basis. The plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made. Payment for excavation shall include excavation and removal of material as required, grading to proposed elevations, and all other items of work required to prepare proposed channel areas for concrete or topsoil as required. Topsoil, seeding, and sodding as specified or shown on the plans will be paid for under other items of work.

Payment will be made under:

Pay Item	**Pay Unit**
Channel Excavation	CY (Plan Quantity)
Concrete Channel Paving	SY
Erosion Control Fabric	SY

Section 306. Filter Blanket and Riprap

306.01 Description. This item consists of a protective layer of riprap, including filter blanket.

306.02 Materials. Stone for riprap shall be from an approved source and shall consist of a durable material with a percent of wear not greater than 45 by the Los Angeles Abrasion Test (AASHTO T96). Riprap stone shall have angular or fractured faces, and shall not weigh less than 140 pounds per cubic foot.

Riprap stone shall be well graded to produce a minimum of voids. The maximum size of each piece shall be no greater than 18" in any dimension, and approximately 50% of material shall consist of pieces weighing 35 pounds or more.

Filter blanket material shall consist of crushed stone reasonably well graded from coarse to fine as approved by the Engineer, or shall be a synthetic geotextile filter fabric meeting the requirements of AASHTO M288 for Erosion Control Class A.

306.03 Construction Requirements.

(a) General. Prior to placing filter blanket and riprap, the slopes shall be shaped as shown on the plans. When rock or hard shale is encountered at the toe of the slope, the riprap shall be keyed into this material the depth of the riprap.

Riprap shall be placed immediately following construction of the embankment in order to provide slope protection.

(b) Filter Blanket. Granular filter blanket material shall be spread uniformly on the previously prepared and approved surface to the thickness and location shown on the plans. Placement of the material by methods that will cause segregation or cause damage to the surface will not be permitted. Compaction of filter blanket will not be required, but it shall be finished to present a reasonably even surface free from mounds or windrows.

When fabric is used in lieu of granular material, it shall be placed directly on the prepared surface. Fabric sections may be placed vertically or horizontally on the slope. Adjacent fabric sections shall be joined by overlapping a minimum of 2' at the edges and pinning the overlapped strip with U-shaped wire pins, single shaped steel pins with metal disc heads, or similar fasteners. The fasteners shall be 6" or more in length and shall hold the fabric firmly in place. Fasteners shall be inserted through both strips of overlapped fabric at intervals of approximately 4' along the overlap. Additional pins shall be installed as necessary to prevent displacement of the fabric.

Fabric shall be overlapped in the direction of water flow. The fabric shall be turned down and buried approximately 12" at the exterior limits.

No construction equipment will be permitted directly on the fabric.

(c) Dumped Riprap. Stone or broken concrete for dumped riprap shall be placed in such a manner as to produce a reasonably well graded mass of rock with the minimum practicable percentage of voids and shall be constructed to the lines and grades shown on the plans or as directed by the Engineer. Unless otherwise specified, the minimum rip-rap depth shall be 18 inches. Material shall be placed in such a manner as to avoid displacing the underlying material. The larger pieces shall be well distributed throughout the entire mass and the finished riprap shall be free from objectionable pockets of small or large pieces. Hand placing, to a limited extent, may be required, but only to the extent necessary to secure the results specified above. Placing riprap by dumping into chutes or by similar methods likely to cause segregation of various sizes will not be permitted.

Riprap stone shall not be deposited in a manner that will cause damage to the filter blanket. Any damage to fabric during placement of riprap shall be corrected by the Contractor at no cost to the Owner prior to proceeding with the work. Damaged fabric shall be repaired by

placing a piece of fabric large enough to cover the damaged area, overlapping, and pinning in accordance with this section.

306.04 Measurement and Payment. Quantities of 18" thick rip-rap will be measured by the square yard (SY). Filter blanket will not be measured.

Payment for quantities of rip-rap completed and accepted and measured as provided above will be paid for at the unit contract price bid per square yard. Said price shall be full compensation for excavation and grading, placement of filter fabric, and placement of the rip-rap to the lines, grades, and depth specified.

Payment will be made under:

Pay Item	Pay Unit
Rip Rap	SY

Section 307. Flowable Select Material

307.01 Description. This item shall consist of the furnishing, mixing, and placing a flowable mixture of portland cement, fly ash, sand, and water for backfilling bridge abutments, pipe culverts, box culverts, structural plate pipe and arches, or other uses as approved by the Engineer. The material shall be placed in close conformity with the lines, grades, dimensions, and details shown on the plans or established by the Engineer.

307.02 Materials. The materials used in the flowable select material shall conform to the applicable requirements of Section 601. The portland cement, fly ash, and chemical admixtures shall be listed on the QPL.

(a) Mix Design. The mix design will be prepared by the Contractor. The mixture will be proportioned to produce a flowable mixture without segregation. Material for one cubic yard, absolute volume, shall be as follows:

Cement 80 - 100 lbs.
Fly ash 220 - 300 lbs.
Sand Variable to equal one cubic yard
Water Approximately 65 gallons

The minimum flow of the mixture shall be 8" as determined by the test method described herein. The unit weight shall be a minimum of 110 lbs./cubic foot. The mix design shall be accompanied by the following documentation:

- A listing of the weights of all components of the proposed mix (water and admixtures may be measured by volume);
- Certified test results for flow and unit weight.

When unsatisfactory results or other conditions make it necessary, a new mix design will be established.

(b) Sampling and Testing. Sampling and testing will be performed by the Owner. The flow test shall consist of filling a 3" diameter x 6" high open-ended cylinder to the top with the flowable material mixture. If necessary, the top of the mixture will be struck off level. The cylinder will then be pulled straight up and the flow will be measured by the approximate diameter of the mixture. There shall be no evidence of segregation in the mixture. The unit weight shall be determined according to AASHTO T 121, except that rodding and tapping shall not be done.

307.03 Construction Requirements. The Contractor shall provide sufficient supervision, labor, equipment, tools, and materials to assure proper production, delivery, and placement. When deemed necessary by the Engineer, the flowable select material shall be contained within the designated area by metal or wood forms that are sufficiently tight as to keep the loss of material to a minimum, or by other means as approved by the Engineer. The flowable select material shall be discharged from the mixer and conveyed into the space to be filled according to Section 601. The fill material shall be brought up uniformly to the fill line shown on the plans or as directed by the Engineer. Placing of other material over flowable select material may begin after the flowable select material has taken its initial set, is stable, and does not displace under equipment.

307.04 Method of Measurement. Flowable Select Material will be measured by the cubic yard. The quantities shown included in the proposal will be considered the final quantities and no further measurement will be made unless, in the opinion of the Engineer or upon evidence furnished by the Contractor, substantial variations exist between the planned quantities and actual quantities due to changes in alignment or dimensions or to apparent errors.

307.05 Basis of Payment. Work completed, accepted, and measured as provided above will be paid for at the contract unit price bid per cubic yard for Flowable Select Material, which price shall be full compensation for designing the mix; for furnishing, mixing, and placing the material; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Flowable Select Material	CY

DIVISION 400. BASE AND PAVING

Section 401. Aggregate Base Course

401.01 Description. This work consists of preparing an aggregate base course on a prepared foundation.

401.02 Materials. Materials for aggregate base course shall meet the requirements of the AHTD Standard Specifications (2003) Section 303 for Class 7.

401.03 Construction Requirements. The base course material shall be placed on a completed and approved subgrade or existing base that has been bladed to substantially conform to the grade and cross section shown on the plans.

The subgrade shall be prepared as specified in Section 203 and shall be free from an excess or deficiency of moisture at the time of placing base course material. The subgrade shall also comply, where applicable, with the requirements of other items that may be contained in the Contract that provide for the construction, reconstruction, or shaping of the subgrade or the reconstruction of the existing base course. Base course material shall not be placed on a frozen subgrade or subbase.

The aggregate shall be placed on the subgrade or other base course material and spread uniformly to such depth and lines that when compacted it will have the thickness, width, and cross section shown on the plans. Unless otherwise specified or directed, base material shall extend full depth to 1' beyond the planned back of curb line.

If the specified compacted depth of the base course exceeds 8" the base shall be constructed in two or more layers of approximately equal thickness.

The material shall be spread the same day that it is hauled. Spreading shall be performed in such a manner that no segregation of coarse and fine particles nor nests or hard areas caused by dumping the aggregate on the subgrade will exist. Care shall be taken to prevent mixing of subgrade or unspecified material with the base course material in the blading and spreading operation.

When the base course is placed adjacent to an existing or newly constructed asphalt surface course or portland cement concrete pavement, the aggregate shall not be dumped or mixed on the pavement surface. Mechanical spreading equipment shall be used, if necessary, to place the base course on the subgrade.

Each course shall be thoroughly mixed for the full depth of the course and shall be compacted by any satisfactory method that will produce the density specified. The aggregate shall be maintained substantially at optimum moisture during the mixing, spreading, and compacting operations. The specified grade and cross section shall be maintained by blading throughout the compaction operation. The material in each course shall be compacted to a density, not less than 95% of the maximum density determined in the laboratory by AASHTO T 180 or ASTM D1557. The aggregate shall be compacted across the full width of application.

The compacted base course shall be tested for depth and any deficiencies corrected by scarifying, placing additional material, mixing, reshaping, and recompacting to the specified density, as directed. The base course shall be shaped for its full width to the required grade and cross section. The finished base course layer shall not vary at any point by more than .02 foot from the prescribed elevation.

The Contractor shall maintain the base course in a satisfactory condition until accepted.

401.04 Method of Measurement. Aggregate base course will be measured in square yards of material in place per the plans. Measurement will include areas up to 1' behind the backs of curbs if required on the plans. Aggregate base course placed beyond 1' behind the back of curbs will not be measured.

401.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per square yard for Aggregate Base Course, which price shall be full compensation for preparing the subgrade; for furnishing material; for spreading; finishing, watering, manipulating, and compacting; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Pay Item	**Pay Unit**
(Depth) Aggregate Base Course	SY

Section 402. Prime and Tack Coats

402.01 Description. This work consists of preparing and treating an existing surface with asphalt or emulsified petroleum products and, if required, blotter material.

402.02 Materials.

(a) Asphalt. Asphalt cement shall meet the requirements of AASHTO M 20 or M 226.

(b) Emulsified Asphalt. Emulsified asphalt shall meet the requirements of AASHTO M 140 or M 208.

(c) **Emulsified petroleum products.** Emulsified petroleum products, "EPR-1 Prime" or approved equal, may be used as the Prime Coat when indicated on the Plans or approved by the Engineer.

(d) Blotter Material. Aggregate for blotter material shall meet the requirements of AASHTO M 43 for size 10.

Asphalt will be conditionally accepted at the source. Blotter material may be accepted in the stockpile, at the source, or at the roadway prior to placement.

402.03 Construction Requirements.

(a) Weather Limitations. Prime and tack coats shall not be applied on a wet surface, when the surface temperature is below 45 degrees F, or when weather conditions would prevent the proper construction of the prime or tack coat.

(b) Equipment. The contractor shall provide equipment for heating the asphalt and uniformly applying the asphalt and blotter material. The distributor shall be capable of uniformly distributing prime and tack coats at even temperatures on variable surface widths at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard. Distributor equipment shall include a tachometer, pressure gages, volume measuring devices or a calibrated tank, and a thermometer for measuring temperatures of tank contents.

(c) Preparation of Surface. Surfaces to be primed shall be shaped to the required grade and section, free from all ruts, corrugations, segregated material, or other irregularities and uniformly compacted and broomed. Surfaces to receive tack coat shall be free of dirt, gravel, and other debris and shall be thoroughly washed and broomed to produce a clean and dry surface.

(d) Application of Asphalt. Asphalt shall be applied by a pressure distributor in a uniform, continuous spread. When traffic is maintained, not more than ½ the width of the section shall be treated in one application. Care shall be taken so the application of asphalt at the junctions of spreads is not in excess of the specified amount. Excess asphalt shall be squeegeed from the surface. Skipped areas or deficiencies shall be corrected. Building paper shall be placed over the end of the previous applications, and the joining application shall start on the building paper. Building paper used shall be removed and satisfactorily disposed of.

When traffic is maintained, one-way traffic shall be permitted on the untreated portion of the roadbed. After the asphalt has been absorbed by the surface and will not pick up, traffic shall be transferred to the treated portion and the remaining width of the section shall be primed.

The quantities, rate of application, temperatures, and areas to be treated shall be approved before application of the prime or tack coat.

(e) Emulsified petroleum products Emulsified petroleum products, "EPR-1 Prime" or approved equal, where indicated on the Plans or approved by the Engineer as the Prime Coat shall be installed per the Manufacturer's recommendations and as follows:

> Required Field Dilution Rate – 3 parts water to 1 part EPR-1 PRIME (Note: Verification samples will be obtained prior to dilution); (b) Minimum required Application Rate – 0.30 gallons per square yard.

(f) Application of Blotter Material. If the prime coat fails to penetrate within the time specified and the roadway must be used by traffic, blotter material shall be spread in the quantities required to absorb any excess asphalt.

(g) Prime Coats not required. Unless indicated or directed otherwise, prime coats will not be required when the initial asphalt course placed upon the aggregate is a minimum of 4 inches in thickness.

402.04 Measurement and Payment. Prime coat, when required, will be measured and paid for per square yard of material placed at the required application rate. Tack coat will not be measured and will be subsidiary to other items. Blotter material will not be measured but will be subsidiary to other items.

Pay Item	Pay Unit
Prime Coat	SY

Section 403. Asphalt Concrete Hot Mix

403.01 Description. This item consists of furnishing and placing asphalt concrete hot mix of the type specified on a prepared foundation.

403.02 Materials, Design, and Quality Control of Marshall Mixes

(a) Materials. Materials for Asphalt Concrete Binder Course shall meet the requirements of Section 406 of the AHTD Standard Specifications Edition of 1996. Materials for Asphalt Concrete Surface Course shall meet the requirements of Section 407 of the AHTD Standard Specifications Edition of 1996 and as follows:

All surface courses serving as wearing courses in travel lanes and not covered with a friction course shall contain not more than 60% limestone aggregate in the course mineral aggregate fraction. If and where so indicated in the Plans and the Bid for Unit Price Contract, and where the surface course is installed by two or more lifts, then the surface course(s) which shall be installed beneath the final lift of the wearing course may be an all limestone course aggregate mix otherwise complying with Section 409 of the AHTD Standard Specifications Edition of 1996 and subject to the review and acceptance by the Engineer and Owner.

(b) Design and Quality Control Requirements Design and quality control of Marshall mixes shall be as specified in Section 404 of the AHTD Standard Specifications Edition of 1996.

(c) Materials and Equipment for Asphalt Concrete Plant Mix Courses Materials and equipment for asphalt concrete plant mix courses shall meet the requirements of Section 409 of the AHTD Standard Specifications Edition of 2003.

403.03 Materials, Design, and Quality Control of Superpave Mixes

(a) Materials. Materials for Asphalt Concrete Binder Course shall meet the requirements of Section 406 of the AHTD Standard Specifications Edition of 2003. Materials for Asphalt

Concrete Surface Course shall meet the requirements of Section 407 of the AHTD Standard Specifications Edition of 2003 and as follows:

All surface courses serving as wearing courses shall comply with Section 409 of the AHTD Standard Specifications Edition 2003. If and where so indicated in the Plans and the Bid for Unit Price Contract, and where the surface course is installed by two or more lifts, then the surface course(s) which shall be installed beneath the final lift of the wearing course may be an all limestone course aggregate mix otherwise complying with Section 409 of the AHTD Standard Specifications Edition 2003 and subject to the review and acceptance by the Engineer and Owner.

(b) Design and Quality Control Requirements. Design and quality control of Superpave mixes shall be as specified in Section 404 of the AHTD Standard Specifications Edition of 2003.

(c) Materials and Equipment for Asphalt Concrete Plant Mix Courses. Materials and equipment for asphalt concrete plant mix courses shall meet the requirements of Section 409 of the AHTD Standard Specifications Edition of 2003, except for the requirements of Section 409.04(b) is at the contractor's option. If a material transfer device is used, the requirements of Section 409.04(b) shall apply.

403.04 Construction Requirements.

(a) Description. The methods employed in performing the work shall be at the Contractor's option. When the production and/or placement of the material does not comply with the specifications, the Contractor shall make the changes necessary to bring the work into compliance.

(b) Pre-Placement Conference. Unless waived by the Engineer, prior to the start of paving operations the Contractor shall conduct a Pre-Placement Conference involving the Contractor's personnel and the Engineer and Owner's personnel. The Contractor's proposed plant, delivery, laydown, compaction, and equipment shall be discussed and, if deemed necessary by the Engineer, all the equipment inspected. The accepted mix designs and materials to be used shall be discussed. The proposed mixing and compaction temperatures, sampling and testing plan, haul route, rolling pattern, and other pertinent information shall be discussed. The Pre-Placement Conference and all items discussed shall be documented by the Contractor and furnished to the Engineer within ten calendar days after the Pre-Placement Conference.

(c) Preparation of Mixture. The aggregates, mineral filler, and asphalt binder shall be measured separately and accurately mixed in the proper proportions according to the mix design. The aggregates shall be thoroughly coated and the mixture shall not show an excess or deficiency of asphalt binder, injury or damage due to burning or overheating, or an improper combination of aggregates. The continuous production of ACHM shall be within plus or minus 25° F (14° C) of the mixing temperature shown on the approved mix design. Momentary temperature spikes shall be kept to a minimum.

(d) Preparation of Base or Existing Surface. Newly constructed base courses or subgrade shall be prepared as set forth in the specification item covering such items.

Prior to placing asphalt base, binder, or surface courses, all required corrections of the existing pavement or base, such as filling potholes, sags, and depressions, or alterations of the existing pavement crown, shall be made. Such corrections shall be accomplished by placing asphalt binder or surface course mixtures at the location and in a manner as directed by the Engineer. Asphalt material used for wedging or leveling courses, or for fillings holes, may be placed by hand, blade grader, or mechanical spreader methods. The mixture shall be featheredged to a smooth and even surface around the edges of these areas.

Prior to arrival of the mixture on the work, the prepared surface shall be cleaned of all loose and foreign materials and primed or tack coated as specified. Excessive joint and crack filler shall be removed before application of the prime or tack coat. The mixture shall not be placed on a surface that shows evidence of free moisture.

Contact surfaces of curbing, gutters, manholes, and other structures shall be painted with a thin coating of rapid curing cutback asphalt or emulsified asphalt. No direct compensation will be made for this work.

If the earlier course has been contaminated with dirt or other foreign materials, or when the time lapse between courses is in excess of 72 hours, the earlier course shall be cleaned and given a tack coat prior to placing the succeeding course. If directed by the Engineer, a tack coat shall be used even though the lapsed time has been less than 72 hours.

(e) Transporting. The mixture shall be transported from the mixing plant to the work in vehicles with clean tight beds.

When the mixture is being hauled more than 15 miles or when the mixture is being placed between November 1 and April 1, the beds of the vehicles shall be covered with canvas or other suitable material to retard loss of heat. The cover shall extend over the sides and ends or the truck bed and shall be securely fastened. When the mixture is being hauled less than 15 miles the cover shall be stored on the truck at all times to be utilized when overtaken by sudden rains.

No loads shall be sent so late in the day as to interfere with spreading and compacting the mixture during daylight hours unless adequate artificial lighting is provided.

Sufficient haul vehicles and plant production rate shall be maintained to the project to provide a continuous operation on the roadway.

Only non-petroleum release agents approved by the Engineer shall be used in haul trucks.

(f) Spreading and Finishing. The mixture shall be placed on an approved surface, spread, and struck off to the line, grade, and elevation established. The mixture shall be placed only on a base that shows no evidence of free moisture, and only when weather conditions are suitable.

The mixture from all types of plants should be delivered to the paver within the recommended compaction temperature range as shown on the approved job mix design. These recommended temperatures should be used in placing and compacting the material. In addition, surface and binder course mixtures shall not be placed on the roadway at a temperature lower than 250° F.

The paver shall uniformly distribute and compact the mixture in front of the screed for the full width being paved. The screed or strike-off assembly shall effectively produce a finished surface of smooth and uniform texture without tearing, shoving, or gouging the mixture. The paver shall be operated at forward speeds consistent with satisfactory laying of the mixture. The speed of the paver shall be matched with the plant production rate and number of hauling units. Stop and go operation of the paver is to be avoided.

The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 6". In general, the joint in the top layer shall be at the centerline of the pavement if the asphalt is placed in 2 passes or less, or at lane lines if the asphalt is placed in more than 2 passes.

(g) Rolling and Density Requirements and Joints. The mixture, after being spread, shall be thoroughly compacted by rolling as soon as it will bear the weight of the rollers without undue displacement.

At the beginning of placement of each mix design, the Contractor shall establish an optimum rolling pattern that will achieve the specified density for the mix being placed. The Contractor may continue with paving operations while the optimum rolling pattern is being established. The established rolling pattern shall be used for compacting all mix placed unless a change in the job mix formula occurs or unacceptable results are obtained. Whenever a change in the job mix formula occurs, or when the compaction method or equipment is changed, or when unacceptable results are obtained, a new optimum rolling pattern shall be established.

The number, weight, and type of rollers, and the optimum rolling pattern shall be such that the specified density and surface requirements are consistently attained while the mixture is in a workable condition. Final approval of the rollers and the rolling pattern will be based upon satisfactory performance and the ability to compact the mixture to the specified density and surface requirements. Rollers that produce excessive crushing of aggregate particles will not be permitted.

When using vibratory rollers, the Contractor shall exercise due caution to prevent any deterioration of the material caused by excessive rolling or vibration. Vibratory rollers shall be operated in such a manner that overlap of adjacent passes shall be held to a minimum. Vibration shall not be used on courses less than 1 ½ " thick.

Rolling shall start longitudinally at the low edge and proceed toward the higher portion of the mat. When paving in echelon or abutting the previously placed lane, the longitudinal joint shall be rolled first followed by the regular rolling procedure. Alternate passes of the roller shall be terminated at least 3' from any preceding stop. Rolling on superelevated curves shall

progress from the low side. Rollers shall not be stopped perpendicular to the centerline of the traveled way.

The speed of the roller shall be slow enough to avoid displacement of the hot mixture, and in no case more than 3 mph. The roller shall be operated in such a manner that no displacement of the mat will occur. Rolling shall proceed continuously until the required density is attained and all roller marks are eliminated, leaving the surface smooth and uniform and the required density attained. To prevent adhesion of the asphalt mixture to the rollers, the rollers shall be kept moist for the full width of the rollers, but excess water will not be permitted.

Rollers shall not pass over the unprotected end of a freshly laid mixture. Transverse joints shall be formed by cutting back on the previous run to expose the full depth of the course. A brush coat of asphalt material shall be used on contact surfaces of transverse joints just before additional mixture is placed against the previously placed material.

(h) Weather Limitations. Bituminous mixtures shall not be placed on any wet or frozen surface or when weather conditions otherwise prevent the proper handling and finishing of the mixture.

Bituminous mixtures may only be placed when either the ambient air temperature or the road surface temperature is equal to or greater than that shown in the table.

Regardless of the temperatures herein specified, paving will not be allowed unless specific density, either by percent of field mold density or by rolling procedure, can be achieved before the bituminous mixture cools to 175 degrees Fahrenheit.

Bituminous Placement Temperature Limitations:

Paving Course	**Thickness (Inches)**	**Min. Air Temperature (Degrees F.)**	**Min. Road Surface Temperature (Degrees F.)**
Surface	All	45	45
Subsurface	Less than 3	40	45
Subsurface	3 or more	30	35

403.05 Acceptance of Pavement and Adjustments in Payment.

(a) Marshall Mixes. Acceptance of asphalt payment designed using the Marshall Method shall be according to Section 410.09 of the AHTD Standard Specifications Edition of 1996 except as modified herein.

(b) Superpave Mixes Acceptance of asphalt payment designed using Superpave Methods shall be according to Section 410.09 of the AHTD Standard Specifications Edition of 2003 except as modified herein.

403.06 Modifications and Augmentations of AHTD Standard Specifications. Modifications and augmentations of AHTD Standard Specifications detailed in this subsection apply to both the 1996 and 2003 Editions of the Standard Specifications.

Samples for all properties except density, thickness, and the investigation of segregation shall be obtained from trucks at the plant. The contractor/testing agency shall clearly mark the load ticket of each sampled truck to indicate that the load has been sampled.

The Contractor shall provide the straight-edge for use in pavement smoothness testing.

Sublot sizes for density and depth measurements will be 500 tons, and lot sizes will be 3000 tons. Locations for cores to be taken for density and depth testing will be determined using AHTD Test Method #465.

Compliance, price reduction, and rejection limits for density will be in accordance with Table 410-1 of the AHTD Standard Specifications. Calculations of price reductions will be in accordance with 410.09(d)(5) of the AHTD Standard Specifications. For asphalt that is outside the limits shown as lot rejection limits but within the limits shown as sublot rejection limits in Table 410-1, the Engineer shall determine if that mix shall be removed at the contractor's expense or left in place without pay to contractor.

All asphalt that is outside the limits shown as sublot rejection limits shall be removed in accordance with this section.

For small projects (less than 1500 tons total) price reduction amounts shall be reduced to 50% of the amounts specified in Section 410 of the AHTD Standard Specifications.

Thickness of the finished asphalt will be monitored by measuring the thickness of the density cores taken. The average of all depth measurements shall not be less than the required depth shown on the plans. Depth of any core in excess of plus three-eighths inch (+ 3/8") will not be used in computing the average depth. If the average depth is less than the required depth, it will be corrected by overlaying with additional ACHM surface, or as directed by the Engineer.

In addition, thickness of individual cores shall not be less that 3/8" less than the plan depth.

The method for determining the limits of removal for density or depth is as follows: If a single core test falls outside of the limits shown as "Sublot Rejection Limits" in 410-1, two additional tests shall be run in close proximity (within three feet). If the average of these three tests is within the sublot rejection limits in Table 410-1, then this average shall become the value for the density of this sublot. If the average of the three tests is still outside of the sublot rejection limits, tests shall be run at 50-foot intervals in both directions until results are found that are within the sublot rejection limits.

All asphalt that is outside of the limits shown as sublot rejection limits as determined by the above method shall be removed and replaced. After replacement, a core shall be taken in the replacement asphalt and the density determined. The average of this density test and the two isolation tests shall become the density for the sublot.

The contractor shall do all coring and testing for density and depth at no additional cost to the Owner. The Engineer may require additional cores cut for verification of the contractor's test. Verification testing will be paid for by the Owner.

When lots and sublot divisions for initial and final courses do not coincide, the Contractor may be required to take additional samples (full-depth) at his expense to determine asphalt thickness. Locations of such cores shall be approved by the Engineer.

Section 410.10 of the AHTD Standard Specifications will not be used under this contract.

403.07 Method of Measurement. Measurement will be by one of the following methods as detailed below. The method to be used will be stated in the bid form.

Asphalt concrete hot mix (ACHM) will be measured by either:

(a) the ton, or

(b) the square yard (SY)

of material in place and as indicated on the Plans and the Bid for Unit Price Contract.

Asphalt concrete hot mix (ACHM) where indicated to be measured by the ton will be substantiated by weight tickets, which shall be submitted to the Engineer at the time of asphalt delivery. Deductions for asphalt placed in areas not designated in the plans and not directed by the Engineer or for asphalt placed at depths more than 1/8" over plan depth will be made at the discretion of the Engineer. Measurement of these deductions will be by a method deemed appropriate by the Engineer.

Asphalt concrete hot mix (ACHM) where indicated to be measured by the square yard (SY) will be substantiated by surface area measurements of asphalt concrete hot mix in place. Deductions for asphalt placed in areas not designated in the plans and not directed by the Engineer will be made at the discretion of the Engineer. Measurement of these deductions will be by a method deemed appropriate by the Engineer.

403.08 Basis of Payment. Payment will be based upon the method of measurements and by one of the following methods as detailed below.

Asphalt concrete hot mix will be paid for by either:

(a) Per ton: at the contract unit price bid per ton of material placed in plan locations; said price shall include furnishing mix designs, furnishing material, for heating, mixing, hauling, placing, rolling, finishing, and for all other labor, equipment, tools, and incidentals necessary to complete the work, or

(b) Square yard (SY): at the contract unit price bid per (depth asphalt concrete hot mix) square yard (SY) of material placed in plan locations; said price shall include furnishing mix designs, furnishing material, for heating, mixing, hauling, placing, rolling, finishing, and for all other labor, equipment, tools, and incidentals necessary to complete the work,

as indicated on the Plans and the Bid for Unit Price Contract.

Payment will be made under:

Pay Item	**Pay Unit**
Asphalt Concrete Hot Mix Binder Course (ACHMBC)	Ton
Asphalt Concrete Hot Mix Surface Course/Wearing Course (ACHMSC/WC)	Ton
Asphalt Concrete Hot Mix Surface Course not Wearing Course (ACHMSC/NWC)	Ton

OR

Pay Item	**Pay Unit**
(Depth) Asphalt Concrete Hot Mix Binder Course (ACHMBC)	SY
(Depth) Asphalt Concrete Hot Mix Surface Course/ Wearing Course (ACHMSC/WC)	SY
(Depth) Asphalt Concrete Hot Mix Surface Course not Wearing Course (ACHMSC/NWC)	SY

Section 404. Asphalt Concrete Hot Mix Base Course

404.01 Description. This item shall consist of a base course constructed on an accepted course according to these specifications and in substantial conformity with the lines, grades, and typical cross sections shown on the plans.

404.02 Materials. The materials and equipment shall comply with the requirements of Asphalt Concrete Hot Mix Base Course (Section 405 of the AHTD Standard Specifications).

404.03 Construction Requirements. Construction requirements shall comply with the requirements of Asphalt Concrete Hot Mix Base Course (Section 405 of the AHTD Standard Specifications).

404.04 Method of Measurement. Measurement will be by one of the following methods as detailed below. The method to be used will be stated in the bid form.

Asphalt concrete hot mix base course will be measured by either:

(a) the ton, or

(b) the square yard (SY)

of material in place and as indicated on the Plans and the Bid for Unit Price Contract.

Asphalt concrete hot mix base course where indicated to be measured by the ton will be substantiated by weight tickets, which shall be submitted to the Engineer at the time of asphalt delivery. Deductions for asphalt placed in areas not designated in the plans and not directed by the Engineer or for asphalt placed at depths more than 1/8" over plan depth will be made at the discretion of the Engineer. Measurement of these deductions will be by a method deemed appropriate by the Engineer.

Asphalt concrete hot mix base course where indicated to be measured by the square yard (SY) will be substantiated by surface area measurements of asphalt concrete hot mix in place. Deductions for asphalt placed in areas not designated in the plans and not directed by the Engineer will be made at the discretion of the Engineer. Measurement of these deductions will be by a method deemed appropriate by the Engineer.

404.05 Basis of Payment. Payment will be based upon the method of measurements and by one of the following methods as detailed below.

Asphalt concrete hot mix base course will be paid for by either:

(a) Per ton: at the contract unit price bid per ton of material placed in plan locations; said price shall include furnishing mix designs, furnishing material, for heating, mixing, hauling, placing, rolling, finishing, and for all other labor, equipment, tools, and incidentals necessary to complete the work, or

(b) Square yard (SY): at the contract unit price bid per (depth asphalt concrete hot mix) square yard (SY) of material placed in plan locations; said price shall include furnishing mix designs, furnishing material, for heating, mixing, hauling, placing, rolling, finishing, and for all other labor, equipment, tools, and incidentals necessary to complete the work,

as indicated on the Plans and the Bid for Unit Price Contract.

Payment will be made under:

Pay Item	**Pay Unit**
Asphalt Concrete Hot Mix Base Course	Ton

OR

Pay Item	**Pay Unit**
(Depth) Asphalt Concrete Hot Mix Base Course	SY

Section 405. Asphalt Concrete Patching for Maintenance of Traffic

405.01 Description. This item shall consist of an asphalt concrete material composed of mineral aggregate and asphalt binder for use in patching to maintain traffic including temporary repairs for roadway cuts. This item shall be placed for all roadway cuts unless directed otherwise by the Engineer. This item will be placed for other maintenance of traffic if and where directed on the plans or by the Engineer.

405.02 Materials and Composition. Materials and equipment shall conform to the requirements of ACHM Surface Course (Standard Specification Section 403) or Asphalt Concrete Cold Plant Mix (Section 411 of AHTD Standard Specifications).

405.03 Construction Requirements. Construction requirements shall conform, insofar as possible, to Section 406 and as follows:

All roadway cuts shall be temporarily or permanently repaired within 24 hours of the completion of trench backfill for the work, or segment of work, which required the excavation and/or cut.

Temporary roadway cut repairs shall be a minimum of two (2) inches and a maximum of three (3) inches of asphalt and shall comply with Specification Section 405 and 406.

Permanent roadway cut repairs shall comply with the plans and specifications and as directed by the Engineer.

Temporary roadway cut repairs shall be maintained by the contractor.

Temporary roadway cut repairs shall be removed and disposed of by the Contractor as necessary during installation of permanent roadway cut repairs or new roadway construction.

405.04 Method of Measurement. Asphalt Concrete Patching for Maintenance of Traffic will be measured by the ton of mix placed as directed by the Engineer. In no case shall measurement of the Temporary Repairs for Roadway Cut extend beyond the pay limit shown on the details on the Plans. Temporary Repairs for Roadway Cut with depths less than two (2) inches and all depths greater than three (3) inches shall not be measured for payment.

405.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per ton for Asphalt Concrete Patching for Maintenance of Traffic, which price shall be full compensation for furnishing materials; for heating, mixing, hauling, placing, and compacting; and for all labor, equipment, tools, and incidentals necessary to complete the work. No payment will be made for:

Material placed with out authorization of Engineer.

Material placed beyond the pay limits shown on the detail for each type of pavement repair.

Material placed to repair previously patched areas unless approved by the Engineer.

Payment will be made under:

Pay Item	Pay Unit
Asphalt Concrete Patching for Maintenance of Traffic	Ton

Section 406. Asphalt Concrete Hot Mix Patching of Existing Roadway

406.01 Description. This item shall consist of patching the existing roadway using asphalt concrete material composed of mineral aggregate and asphalt binder.

406.02 Materials and Composition. Materials shall conform to the requirements of Section 402, Tack Coat and Section 403.

406.03 Construction Requirements. Unstable areas in existing roadways and shoulders, designated by the Engineer to be repaired, shall be removed to provide firm vertical sides and a firm, stable, bottom generally parallel with the existing surface. All loose or foreign material shall be removed from the hole. A tack coat of emulsified asphalt shall be applied to the sides of the hole. Asphalt Concrete Hot Mix Binder or Surface Course shall be placed in the hole in uniform layers, not to exceed 4 inches loose measurement. Compaction, satisfactory to the Engineer, shall be accomplished with a mechanical tamper or other approved methods. The finished surface shall be smooth and level with the surrounding surface.

406.04 Method of Measurement. Asphalt Concrete Hot Mix Patching of Existing Roadway will be measured by the ton of mix.

406.05 Basis of Payment. Work completed and accepted and measured as provided above, will be paid for at the contract unit price bid per ton for ACHM Patching of Existing Roadway, which price shall be full compensation for excavation of the existing roadway; for removal and disposal of excavated material; for compacting and tacking the excavated area; for furnishing materials; for heating, mixing, hauling, placing, and compacting the materials; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Asphalt Concrete Hot Mix Patching of Existing Roadway	Ton

DIVISION 500. MISCELLANEOUS CONSTRUCTION

Section 501. Concrete Curb and Gutter

501.01 Description. This item shall consist of the construction of integral curb, concrete curb, or concrete combination curb and gutter according to these specifications and in conformity with the locations, lines, and grades shown on the plans or as directed.

501.02 Materials. The Concrete shall be Class B Concrete as provided in Section 601. The maximum allowable slump shall be 4 inches.

When an extrusion machine is used, the Contractor may modify the concrete mix design, upon approval of the Engineer, to improve workability while maintaining the requirements for Class A or B Concrete.

Material for joint filler shall comply with AASHTO M 213.

501.03 Construction Requirements.

(a) Subgrade. The subgrade shall be shaped to the required depth below the finished surface, according to the dimensions shown on the plans, and shall be compacted to a firm, even surface. Where curb is to be placed as part of a street, the compaction requirements of the street shall apply to the subgrade and base course underneath the curb.

(b) Placing and Finishing.

1) **Integral Curb.** After the concrete pavement has been struck off, the curb forms shall be clamped or otherwise securely fastened in place to the slab form and additional concrete for the curb shall then be deposited and thoroughly tamped. The concrete shall be placed within 30 minutes after the pavement slab has been finished and care shall be taken to secure monolithic construction. The concrete shall be spaded or vibrated sufficiently to eliminate voids and shall be tamped to bring the mortar to the surface. It shall then be finished smooth and even with a wood float and given a Class 6 finish according to Section 601.16. The edges shall be rounded with an approved finishing tool to the radius shown on the plans.

2) **Concrete Curb or Concrete Combination Curb and Gutter.** The concrete shall be deposited in the forms upon wetted subgrade and vibrated and spaded until mortar entirely covers the surface, after which it shall be finished smooth and even by means of a wood float and given a Class 6 finish according to Section 601.16. Edges shall be rounded as shown on the plans while the concrete is still plastic.

(c) Joints. Expansion joints for concrete curb or concrete combination of curb and gutter shall be installed at stationary structures such as catch basins, drop inlets, etc., and at ends of curb returns. Where curb and gutter is constructed adjacent to or on rigid pavements, the location and width of joints shall coincide with those in the pavement, where practicable.

Expansion joints shall have a thickness of ½" and shall be filled with joint filler according to Section 601.11 shaped to the cross section of the curb and constructed at right angles to the curb line.

Contraction joints for concrete curb or concrete combination curb and gutter shall be 1/8" to 3/8" wide x 1 ½" deep and shall be constructed at 15' intervals. They shall be constructed at right angles to the centerline and perpendicular to the surface of the curb and gutter. Where curb and gutter is constructed adjacent to or on rigid pavements, the location and width of joints shall coincide with those in the pavement, where practicable. Contraction joints shall be formed by sawing, unless otherwise specified, and filled according to the requirements for Joint Seals as specified in Section 601.11, or with a commercially available silicone product approved by the Engineer.

(d) Surface Tests. Before the concrete is given the final finishing, the surface of the gutter and the top of the curb shall be true to line and grade. The maximum variation in 10' shall not exceed 3/8".

(e) Curing. When completed, the concrete shall be cured as specified in Section 601.15.

(f) Backfilling. After the concrete has set sufficiently, the space behind the curb shall be refilled to the required elevation with suitable material, free from topsoil, leaves, twigs, or other organic material, trash, large rocks, or other deleterious materials. This material shall be firmly compacted to 90% of the material's maximum density as determined by AASHTO T99 or ASTM D698 by means of approved mechanical equipment and neatly graded.

501.04 Method of Measurement. Curbing will be measured by the linear foot (LF) along the face of the curb at the gutter line. Integral curb placed with concrete pavement will not be measured separately, but shall be included in the price bid for concrete pavement. Modified curbs across driveways and streets will be measured as curb. Curbs placed as part of commercial asphalt driveway construction will also be measured as curb.

501.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per linear foot (LF) for Concrete Curb or Concrete Curb and Gutter, which price shall be full compensation for furnishing materials, including joint filler; for forms; for mixing, placing, and finishing concrete; and for excavation and backfilling when not included in other items.

Pay Item	Pay Unit
Concrete Curb and Gutter	LF

Section 502. Concrete Sidewalks

502.01 Description. This item shall consist of the construction of concrete walks according to these specifications and in conformity with the dimensions, locations, lines, and grade shown on the plans or as directed.

502.02 Materials. The concrete shall comply with the requirements for Class B Concrete as provided in Section 601. The maximum allowable slump shall be 4 inches.

502.03 Construction Requirements.

(a) Subgrade. The subgrade shall be excavated or filled to the required grade. Unacceptable material shall be removed and replaced with suitable material, free from topsoil, leaves, twigs, or other organic material, trash, large rocks, or other deleterious materials, and the entire subgrade shall be thoroughly compacted with approved mechanical equipment to not less than 90% of the material's maximum density as determined by AASHTO T99 or ASTM D698.

(b) Placing and Finishing. The concrete shall be deposited in the forms upon the wetted subgrade to such depth that when it is compacted and finished, the top shall be at the required elevation. It shall be thoroughly consolidated and the edges along the forms spaded to prevent honeycomb. The top shall then be struck off with a straightedge and tamped or vibrated sufficiently to flush mortar to the surface, after which it shall be given a Class 6 finish according to Section 601.16. Edges shall be rounded with a ¼" radius, including edges at joints.

Transverse joints in the walks shall be cut with a ¼" jointer at intervals not greater than the width of the walk being constructed, or as directed.

When completed, the concrete shall be cured as specified in Section 601.15.

(c) Backfilling. After the forms have been removed, the spaces on each side of the walk shall be backfilled with suitable material, which shall be firmly compacted and neatly graded. Topsoil meeting the requirements of Section 204 shall be used when areas adjacent to the sidewalk are to be seeded or sodded.

(d) Expansion Joints. A space not less than ½" wide shall be left between the sidewalks and adjacent structures, except that no space shall be left between the sides of the walks and adjacent curbs. This space shall be filled with approved joint filler complying with AASHTO M 213.

502.04 Method of Measurement. Concrete sidewalk will be measured by the square yard (SY).

502.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per square yard (SY) for Concrete Sidewalks, which price shall be full compensation for furnishing materials including joint filler; constructing the concrete sidewalk; for excavation and backfilling where not included in other contract items; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
(depth) Concrete Sidewalk	SY

Section 503. Driveway Construction or Reconstruction

503.01 Description. This work consists of reconstructing existing driveways or constructing new driveways with concrete, asphalt, aggregate base course, or other materials as shown on the Plans or as directed by the Engineer.

503.02 Materials. Concrete for driveway reconstruction shall be Class B according to the requirements of Section 601. Asphalt shall be Surface Course per the requirements of Section 403. Aggregate base course shall meet the requirements of Section 401. All other materials shall be as specified or as directed by the Engineer.

503.03 Construction Requirements.

(a) General. Aprons and driveways shall be constructed in the locations, to the lines and grades, and of the material type shown on the Plans, or as directed by the Engineer. Construction of driveways with greater than 8% slope perpendicular to the street will not be allowed except as approved by the Engineer. Driveway widths shall match widths of existing driveways, with a minimum driveway width of 14'. All driveways designated as commercial driveways shall be constructed with concrete curb and gutter along each side of the driveway.

Driveways and aprons shall be constructed on a compacted subgrade consisting of material approved by the Engineer.

(b) Driveway Removal. Existing driveways shall be removed to the locations shown on the plans or as directed by the Engineer to create a smooth transition from the roadway to the adjacent property. The back limit of the driveway shall be sawed if required to produce a neat line.

(c) Concrete Apron. Concrete apron shall be constructed on all driveways beginning at the back of curbs and extending to the back of sidewalk, or to 6' behind the back of curb, which ever is greater. Concrete aprons shall be of a residential or commercial type as shown on the plans. The apron thickness shall be as shown on the Plans, but not less than six inches (6"). Mixing, placement, and finishing of concrete shall be as required in Section 601. Contraction joints shall be constructed so that slabs are no more than 15' in any dimension. One half-inch (½") expansion material meeting the requirements of Section 601.11 shall be placed between the backs of curbs and the apron. Joints shall be tooled or sawed at 10' intervals perpendicular to the street. These saw joints shall be filled with joint sealant meeting the requirements of Section 601.11.

(d) Concrete Driveways. Concrete driveways shall be constructed where shown on the Plans or as directed by the Engineer. The driveway thickness shall be as shown on the Plans, but not less than six inches (6"). Mixing, placement, and finishing of concrete shall be as required in Section 601. Contraction joints shall be constructed so that slabs are no more than 15' in any dimension. When concrete driveways are constructed monolithically with concrete apron, a contraction joint shall be constructed at the interface between the apron and the driveway. All joints shall be sealed according to Section 601.11.

(e) Asphalt Driveways. Asphalt driveways shall consist of approved Surface Mix. Construction of asphalt driveways shall meet the requirements of Section 403. The thickness of the asphalt driveway section shall be as shown on the Plans, but in no case shall be less than 3" of asphalt constructed on 4" of aggregate base course.

(f) Aggregate Base Driveways. All existing driveways constructed of soil or gravel shall be reconstructed with aggregate base meeting the requirements of Section 401. Placement of base material shall be according to the lines and grades shown on the plans or as directed by the Engineer. Thickness of base shall be as shown on the plans, but in no case shall be less than 6". Compaction requirements are as specified in Section 401.

503.04 Method of Measurement. Asphalt or concrete driveway removal shall be measured by the square yard (SY) from the existing roadway edge to the limits of the driveway removal. Removal of other driveways will not be measured. Concrete aprons and all driveways shall be measured by the square yard (SY). Curb constructed as part of concrete aprons or concrete driveways will be measured as driveway. Curb for asphalt driveways will not be measured as part of this item.

503.05 Basis of Payment. Work completed and measured as provided above will be paid for at the contract unit price bid per square yard for the various items. This price shall be full compensation for furnishing and placing materials, for excavation and subgrade preparation; for shaping and finishing; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Concrete Aprons	SY
Concrete Driveway	SY
Asphalt Driveway	SY
Aggregate Base Course Driveway	SY
Asphalt/Concrete Driveway Removal	SY

Section 504. Headwalls and Retaining Walls

504.01 Description. This item consists of constructing concrete headwalls and retaining walls at the locations and to the lines and grades shown on the plans. Modular Block retaining walls, and/or Mechanically Stabilized Earth retaining structures with facing, when so indicated in the plans or the proposal shall be specified in a Special Provision supplemental to these Standard Specifications.

504.02 Materials. Concrete shall meet the requirements of Section 601 for Class B for headwalls, and Class B for retaining walls.

Reinforcing steel shall meet the requirements of Section 602.

504.03 Construction Requirements. The subgrade on which the footing is to be placed shall be prepared by excavating to the required grade and thoroughly compacting the existing material. If the existing material at the elevation of the bottom of the footing is soft and yielding, and the Engineer so directs, it shall be removed and replaced with suitable material according to Section 202.

Reinforcing steel shall be placed as shown on the plans. Weepholes of the size shown on the plans shall be set in the forms before concrete is placed.

Concrete shall be furnished, placed, finished, and cured according to the requirements of Section 601.

504.04 Method of Measurement. Concrete headwalls and concrete retaining walls will be measured by the cubic yard of concrete placed and accepted. . Concrete, reinforcing steel, filter fabric, compacted drainage stone backfill, expansion joint materials, weep holes, weephole screens, compacted earth backfill and all other items indicated on the Plans or required for a complete headwall and/or retaining wall shall not be measured for separate payment but will be considered subsidiary to the items involved.

Additional undercut excavation as required under footings will be measured by the cubic yard compacted in place.

504.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per cubic yard (CY). Concrete Headwalls or Concrete Retaining Walls. Said price shall be full compensation for furnishing all materials, including reinforcing steel; for structural excavation and compaction; for all forming and bracing; for mixing, transporting, placing, finishing, and curing; and for all equipment, tools, labor, and incidentals necessary to complete the work.

Additional excavation and embankment under footings will be paid for at the unit price bid for Undercut Excavation. No payment for additional excavation will be made unless such excavation is directed by the Engineer.

Payment will be made under:

Pay Item	Pay Unit
Concrete Headwalls	CY
Concrete Retaining Walls	CY

Section 505. Seeding and Sodding

505.01 Description. This item shall consist of furnishing and applying lime, fertilizer, seed, mulch cover, and water according to these Specifications at locations shown on the plans or as directed.

The work under this item shall be accomplished as soon as practicable after the grading in an area has been completed in order to deter erosion of the roadway and siltation of streams.

505.02 Materials.

(a) Lime. Lime shall be agricultural grade ground limestone or equivalent as approved by the Engineer.

(b) Fertilizer. Fertilizer shall be a commercial grade, uniform in composition, free flowing, and suitable for application with mechanical equipment. It shall be delivered to the site in labeled containers conforming to current Arkansas fertilizer laws and bearing the name, trademark, and warranty of the producer.

(c) Seed. Except as modified herein, the seed shall comply with the current rules and regulations of the Arkansas State Plant Board and the germination test shall be valid on the date the seed is used. It shall have a minimum of 98% pure seed and 85% germination by weight, and shall contain no more than 1% weed seeds. A combined total of 50 noxious weed seeds shall be the maximum amount allowed per pound of seed with the following exceptions: Johnson grass seed, wild onion seed, wild garlic seed, field bindweed seed, nut grass seed, sickle pod seed, sesbania seed, indigo seed, morning-glory seed, and cocklebur seed will not be allowed in any amount. Seed shall be furnished in sealed, standard containers. Seed that has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable.

Seed planted between June 16 and August 31 may require more water than that specified in Subsection 505.03 in order to survive. Therefore, watering shall continue after germination until growth is established.

The seeding mixture may be altered if authorized or directed by the Engineer. The actual mix and varieties used shall be submitted to the Engineer before seed is placed.

Seed shall be provided at the following mix and rates:

SEED TYPE	LB/AC
MARCH 15 – JUNE 15	
Turf Fescue	250
Bermuda Grass (common) unhulled	10
Annual Rye	50
JUNE 15 – AUGUST 31	
Turf Fescue	200
Bermuda Grass (common) hulled	5
Bermuda Grass (common) unhulled	10
AUGUST 31 – MARCH 15	
Turf Fescue	250
Annual Rye	50

At the Contractor's option, annual rye only may be seeded at a minimum rate of 30 pounds per acre between the dates of October 31 to March 15. The Contractor shall return between the dates of March 15 and May 1 and reseed with the mix specified for the March 15 – June 15 time period. Preparation for reseeding shall be in accordance with Section 204.

(d) Sod. Sod shall be composed of either field grown grass or approved nursery grown grass and shall consist of a densely rooted growth of grass substantially free from noxious weeds and undesirable grasses. Sod type shall be as specified on the plans. When sod is placed to repair damaged areas, the sod shall be of the same type and variety as the existing grass.

The sod shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh, and uninjured at the time of placing. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be placed as soon as possible after being cut and shall be kept moist from the time it is cut until it is placed in its final position.

The source of field grown sod shall be inspected and approved by the Engineer before being cut for use in the work. After approval, the area from which the sod is to be harvested shall be closely mowed and raked as necessary to remove excessive top growth and debris.

Approved devices, such as sod cutters, shall be used for cutting the sod and due care shall be exercised to retain the native soil intact. The sod shall be cut in uniform strips approximately 300 mm (12") in width and not less than 300 mm (12") in length, but not longer than can be conveniently handled and transported.

(e) Mulch. Mulch cover shall consist of straw from threshed rice, oats, wheat, barley, or rye; of wood excelsior; or of hay obtained from various legumes or grasses, such as lespedeza, clover, vetch, soybeans, bermuda, carpet sedge, bahia, fescue, or other legumes or grasses; or a combination thereof. Mulch shall be dry and reasonably free from Johnson grass or other noxious weeds, and shall not be excessively brittle or in an advanced state of decomposition. All material will be inspected and approved prior to use.

(f) Tackifiers. Tackifiers used in mulch anchoring shall be of such quality that the mulch cover will be bound together to form a cover mat that will stay intact under normal climactic conditions.

All tackifiers used shall have prior approval or be listed on the AHTD Qualified Products List (QPL). The type and brand of tackifier to be used shall be submitted to the Engineer for approval.

(g) Water. Water shall be of irrigation quality and free of impurities that would be detrimental to plant growth.

505.03 Construction Requirements.

(a) Seeding. Areas to be seeded shall be dressed to the shape and section shown on the plans. A 4" layer of topsoil, if required, shall be furnished, placed, and prepared as specified in Section 204.

Fertilizer shall be applied at the rate of 800 pounds per acre of 10-20-10, or the equivalent amount of plant food. Fertilizer shall be uniformly incorporated into the soil alone or in conjunction with the required lime. If the Contractor so elects, the fertilizer may be combined with the seed in the hydro-seeding operation.

Broadcast sowing may be accomplished by hand seeders or by approved power equipment. Either method shall result in uniform distribution and no work shall be performed during high winds. The area seeded shall be lightly firmed with a cultipacker immediately after broadcasting.

If a hydro-seeder is used for seeding, fertilizer and seed may be incorporated into one operation but a maximum of 800 pounds of fertilizer shall be permitted for each 1500 gallons of water. If the Contractor so elects, the fertilizer may be applied during preparation of the seedbed. The area shall be lightly firmed with a cultipacker immediately before hydro-seeding.

Mulch cover shall be applied immediately after seeding and shall be spread uniformly over the entire area. If the Contractor so elects, an approved mulching machine may be used whereby the application of mulch cover and tackifier may be combined into one operation. Mulch shall be placed so that the ground is completely covered to a thickness of approximately 2 inches. Care shall be taken to prevent tackifier materials from discoloring or marking structures, pavements, utilities, or other plant growth. Removal of any objectionable discoloration shall be at no cost to the Owner.

Immediately following or during the application of the mulch cover on seeded areas, the mulch shall be anchored by one of the following methods:

Tracking or Roller Method. The mulch shall be effectively pressed into the soil using steel cleated track or cleated roller equipment. The anchoring shall be performed so that the grooves formed are perpendicular to the flow of water down backslopes and foreslopes. The equipment and method used shall produce acceptable results.

Other Tackifiers. An approved tackifier shall be applied according to the rates recommended by the manufacturer. Asphalt tackifier will not be allowed.

The method used shall be at the Contractor's option unless otherwise specified or directed. In lieu of separate application of tackifiers, the Contractor may use equipment that combines the application of mulch and tackifier into one operation. Application shall be at the specified rates.

After application of the mulch cover, water shall be applied in sufficient quantity, as directed by the Engineer, to thoroughly moisten the soil to the depth of pulverization and then as necessary to germinate the seed.

When directed by the Engineer, the Contractor shall apply water in an amount such that, in conjunction with any rainfall, the seeded and mulched areas will receive an amount equivalent to a minimum of 1" of water each week beginning the week after seeding and continuing for a minimum of three (3) weeks. Water applied at this rate will not be paid for separately but shall be considered subsidiary to seeding. If directed by the Engineer, additional water shall be applied to sustain grass growth.

Failure to meet this requirement will result in a partial withholding and/or recovery of payments for the seeding and mulch cover. Additional work and materials required due to the Contractor's negligence in maintaining completed work or failure to water grass as directed shall be accomplished at no cost to the Owner.

For all areas seeded, final acceptance will be delayed until an acceptable stand of grass of uniform color and density is established to the satisfaction of the Owner. Before final acceptance, the Contractor shall repair or replace any seeding or mulching that is defective or damaged. If the defect or damage is due to the Contractor's negligence, the work shall be done at no additional cost to the Owner. If the damage or defect is not the Contractor's fault, the work will be measured and paid for according to these Specifications.

(b) Sod. Areas to be sodded shall be dressed to the shape and section shown on the plans and the top and bottom of slopes shall be rounded to a radius of approximately 3' unless otherwise directed. The finished slopes shall be prepared with 4" of topsoil meeting the requirements of Section 204. Water may be applied before, during, and after slope preparation, as directed by the Engineer, in order to maintain the desired moisture content in the soil.

Immediately before placement of sod, fertilizer shall be broadcast at the rate of 250 pounds per acre of 10-20-10, or the equivalent amount of plant food, and incorporated into the top 1" of soil.

Sod shall be moist and shall be placed on a moist earth bed. Sod strips shall be laid along contour lines, by hand, commencing at the base of the area to be sodded and working upward. The transverse joints of sod strips shall be broken, and the sod carefully laid to produce tight joints. At the top of slopes the sod shall be turned into the embankment slightly and a layer of earth placed over it and compacted to conduct surface water over and onto the sod. The sod shall be firmed, watered, and refirmed immediately after it is placed.

The firming shall be accomplished by use of a lawn roller or approved tamper, with care being taken to avoid tearing end strips of sod.

When sodding is completed, the sodded areas shall be cleared of loose sod, excess soil, or other foreign material; a thin application of topsoil shall be scattered over the sod as a top dressing; and the areas thoroughly moistened. Water shall be applied as necessary at the direction of the Engineer for a period of at least 3 weeks. The time required for application of water will not be included in the computation of contract time for completion of the project provided all other work under the Contract has been completed.

The Contractor shall maintain sodded areas from the time of completion until final acceptance of the project by the Owner. Additional work and materials required because of the Contractor's negligence in maintaining the work shall be accomplished at no cost to the Owner.

505.04 Method of Measurement. Seeding will be measured by the acre of actual area covered. Sod will be measured by the SY yard of actual area covered. Additional watering if so directed will be measured by thousands of gallons (MG) applied.

505.05 Basis of Payment. Seeding completed and accepted and measured as provided above will be paid for at the contract unit price bid per acre for Seeding, which price shall be full compensation for seedbed preparation; for furnishing and applying fertilizer, lime, seed, mulch, and tackifier; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payments for seeding will be made according to the following schedule:

50 % On the first regularly scheduled estimate after the Seeding and Mulch Cover are completed.

25% On the next regularly scheduled estimate, provided that the Engineer determines that the seeded and mulched areas have received at least the amount of water specified in Section 505.03 above.

25% On the succeeding regularly scheduled estimate, provided that the Engineer determines that a dense lawn of permanent grass has been established.

Sodding completed and accepted and measured as provided above will be paid for at the contract unit price bid per square yard for Sodding, which price shall be full compensation for bed preparation; for furnishing and applying fertilizer, topsoil, and sod; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Additional watering above and beyond the 1" per week for the first three weeks will be paid for at the unit price per thousand gallons (M.G.) of water applied. This work will be paid for only when directed to by the Engineer. Any watering to be paid for under this item shall be conducted in the presence of the Engineer.

Payment will be made under:

Pay Item	Pay Unit
Seeding	Acre
Sodding	SY
Additional Watering	MG

Section 506. Mailboxes

506.01 Description. This item shall consist of furnishing and erecting mailbox posts and installing existing mailboxes on the new posts. When required, it shall also include furnishing and installing new mailboxes. It shall also include maintenance of existing mailboxes during construction to ensure uninterrupted mail service in the construction limits.

506.02 Materials. The mailbox post shall be either metal or coniferous wood. All mailbox posts placed under the contract shall be of the same type. Wood posts shall be 4"x 4" square and shall be pressure treated with creosote, pentachlorophenol or chromated copper arsenate. Metal posts shall be 2" in diameter and shall be galvanized.

Mailbox support hardware, including shelf, platform and bracket shall be as shown on the plans. Anti-twist plate, clamps, spacers, nuts, bolts, and washers shall be galvanized steel.

New mailboxes, when specified on the plans or directed by the Engineer, shall comply with the U.S. Postal Service and shall be the same size as the existing mailbox.

506.03 Construction Methods. Mailboxes shall be constructed in the same locations as the existing mailboxes. It is the Contractor's responsibility to note the locations of existing mailboxes before construction begins. The bottom of the box shall be set at an elevation 3'-6" above the roadway surface. The roadside face of the box shall be 6" from the face of the curb. Where a mailbox is located at a driveway entrance, it shall be placed on the far side of the driveway in the direction of the delivery route. Where a mailbox is located at an intersecting road, it shall be located a minimum of 100' beyond the center of the intersecting road in the direction of the delivery route. If requested by the local postmaster, height and placement of mailboxes may vary slightly as directed by the Engineer.

No more than two mailboxes may be mounted on one post. Post spacing for multiple mailbox installations shall be a maximum of 36".

The mailbox post shall be embedded a minimum of 24" into the ground. A metal post shall have an anti-twist plate that extends no more than 10" below the ground surface.

The existing mailbox shall be separated from the existing post and attached to the new post. If the existing mailbox is damaged beyond repair by the Contractor, the mailbox shall be replaced at no cost to the Owner. If the existing mailbox cannot physically be removed from the existing post and re-used, the mailbox shall be replaced under the item Mailboxes. When a mailbox is replaced, the Contractor shall be responsible for placing identification markings on the new mailbox corresponding to the markings on the original mailbox.

Unless otherwise specified, all existing mailbox supports shall be removed and replaced with new supports. If directed by the Engineer the existing mailbox shall be restored under the Contract item Remove and Replace Mailboxes. If directed by the Engineer, the existing support and mailbox shall be removed and protected until placement in its planned location. This work shall be paid for under the item Mailbox/Support Relocation.

506.04 Method of Measurement. Mailbox Supports, Mailboxes, Remove and Replace Mailboxes, and Mailbox/Support Relocation will be measured by the unit.

506.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Mailbox Supports of the type specified, for Mailboxes, or for Remove and Replace Mailboxes, or for Mailbox/Support Relocation; which price shall be full compensation for furnishing all materials: for setting posts; for removing and reattaching existing mailboxes; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Mailbox Supports (single)	EA
Mailbox Supports (double)	EA
Mailboxes	EA
Remove and Replace Mailboxes	EA
Mailbox/Support Relocation	EA

Section 507. Pavement Markings

507.01 Description. This item shall consist of furnishing and placing pavement markings, including words, arrows, and emblems, of the color, type and material specified, in accordance with these specifications and to the dimensions and at the locations shown on the plans or as directed.

The markings are to be placed under existing traffic conditions. The work shall meet the requirements of the MUTCD except as modified by these specifications.

507.02 Materials. (a) Paint. Paint shall be a ready mixed white and yellow paint suitable for application on concrete and bituminous pavements. All paints used for this application shall be listed on the AHTD Qualified Products List (QPL). The manufacturer shall furnish a certification for each lot certifying that the materials supplied conform to all the requirements specified and stating that the material is formulated the same as the material tested for QPL listing.

(b) Thermoplastic Material. Thermoplastic material used shall meet all requirements of Section 719.02 of the AHTD Standard Specifications.

(c) Pavement Marking Tape. Pavement marking tape shall be a preformed tape conforming to Section 720.02 of the AHTD Standard Specifications for Type 5.

507.03 Construction Requirements.

(a) General Requirements. All pavement markings shall be applied to clean, dry surfaces. If necessary, the Contractor shall clean the surface of the pavement to receive markings before beginning marking operations. Cleaning of the pavement is considered subsidiary to other items of work and will not be paid for separately.

Pavement markings shall be placed at the locations shown on the plans, or as directed by the Engineer. All markings shall have well defined edges, shall be uniform in thickness, and shall be straight and true. No stripe shall be less than the specified width. Any corrections of variations in width or alignment of the stripes shall not be made abruptly. Markings that cannot be corrected to meet these requirements shall be removed at the Contractor's expense and will not be paid for.

Removal of markings shall be performed in such a manner that no conflicting pavement marking will be left in place. Removal of the pavement marking by a means that will gouge the surface will not be permitted.

(b) Reflectorized Paint. Reflectorized paint shall be applied at a minimum wet film thickness of 15 mils (a minimum of 16.5 gallons per mile of 4" line). The painted line shall be uniform in thickness and appearance across the width of the stripe. Glass beads shall be placed on the surface of the wet paint in the amount of not less than 6 pounds per gallon.

(c) Thermoplastic Markings. The thermoplastic compound shall be screed or ribbon extruded to the pavement surface unless a specific application method is specified.

The thermoplastic material shall be dispensed at a temperature recommended by the manufacturer. The applicator shall include a cutoff device remotely controlled to provide clean, square stripe ends and to provide a method for applying skip lines.

Beads applied to the surface of the completed stripe shall be applied by an automatic bead dispenser attached to the pavement marking equipment in such a manner that the beads are immediately dispensed upon the completed line. The bead dispenser shall be equipped with an automatic cutoff control, synchronized with the cutoff of the pavement marking equipment.

Thermoplastic markings shall not be applied to the pavement surface when the pavement surface temperature is less than 50° F or when the pavement shows evidence of moisture.

On pavements where no pavement markings exist or where the existing pavement markings are paint or thermoplastic and do not conflict with the proposed pavement markings, blasting with water or sand or a combination thereof will be required to remove any curing compound, oxidized paint or thermoplastic, or dirt to ensure a good bond. This blasting is considered surface preparation and will not be paid for separately.

Conflicting pavement markings that exist shall be removed by blasting with water and/or sand or by grinding. This blasting or grinding is considered pavement marking removal.

The thickness of all thermoplastic markings above the roadway surface shall be 90 mils (a minimum of 1584 pounds per mile of 4" line). The minimum thickness will be measured in the center of the line. The minimum ½" from the edges shall not be less than 75% of the thickness required in the center. Maximum thickness of markings is 3/16".

On concrete pavements, paint pavement markings meeting the requirements of this section shall be applied as a primer for the thermoplastic markings, except where thermoplastic markings are to be applied over existing thermoplastic markings. Paint applied to concrete pavement solely as a primer will not be measured or paid for separately, but full compensation therefore will be considered included in the contract unit prices bid for the various items of Thermoplastic Pavement Markings. A primer other than paint may be used when recommended by the thermoplastic manufacturer.

(d) Pavement Marking Tape. The placement of the pavement marking tape shall comply with the manufacturer's recommendations.

Air temperature shall be a minimum of 60° F and rising or the road temperature shall be a minimum of 70° F before installation of marking tape will be allowed.

The roadway surface shall be cleaned by the Contractor with high pressure air or by sweeping. The roadway shall then be marked where the pavement marking polymer is to be applied.

The polymer can then be applied by hand or with a manual or mechanical highway tape applicator designed for that purpose. Only butt splices will be allowed with no overlapping.

After application, the tape shall be firmly tamped with a minimum 200 lb. Load or by slowly (2-3 mph) driving over the tape with a vehicle tire. The Contractor shall ensure that all edges are firmly adhered.

507.04 Method of Measurement and Basis of Payment. Pavement markings will be measured as follows:

(a) 4" center lines, skip lines, lane lines, and edge lines will be measured by the linear foot (LF) of markings actually placed.

(b) Words, arrows, and other symbols will be measured by the unit.

(c) Crosswalks and stop bars will be measured by the linear foot (LF) of crosswalk markings actually placed.

(d) Pavement marking removal, when specified on the plans, will be measured by the square foot of marking actually removed.

Work completed, accepted, and measured as provided above will be paid for at the contract price bid per linear foot for 4" lines, per each for symbols, per linear foot for crosswalks, and per square foot for pavement marking removal.

Payment will be made under:

Pay Item	Pay Unit
4" Striping (Thermoplastic)	LF
Pavement Symbols (Thermoplastic)	EA
Crosswalks (Thermoplastic)	LF
Pavement Marking Removal	SF

Section 508. Street Signs

508.01 Description. This item shall consist of installing new signs and supports supplied by the Contractor, and relocating existing signs as shown on the plans, or as directed by the Engineer.

508.02 Materials.

(a) Signs. Materials used in the fabrication of street signs shall comply with the latest edition of the AHTD Standard Specifications, AHTD Standard Drawings, and the MUTCD. Signs and equipment manufactured in accordance with the above mentioned specification will not be required to be submitted for approval.

(b) Supports. Materials used for new and relocated street sign supports shall comply with the AHTD Standard Specifications and the AHTD Standard Drawings.

508.03 Construction Requirements. The Contractor will furnish any new signs and supports and the Contractor shall install the signs at the locations as shown in the plans or as directed by the Engineer. The Contractor will maintain existing signs during construction, and install the signs at the locations as shown in the plans or as directed by the Engineer. Should the sign or support become damaged during construction, the Contractor will furnish the replacement.

Any sign not indicated to be relocated as shown on the plans, or as directed by the Engineer shall be salvaged and delivered to the local street department.

508.04 Method of Measurement. Signs that are relocated or installed new shall be measured by a complete unit in place (including required footings).

No payment will be made for salvaged signs delivered to the local street department.

508.05 Basis of Payment. Work completed and accepted under this item and measured as provided above shall be paid for at the Contract unit price bid for each sign, which price

shall be full compensation for the relocation, or erection of each sign, including support and footing; and for tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Street Sign Installation	EA

Section 509. Erosion Control

509.01 Description. This item shall consist of Temporary Erosion Control Measures to limit, control, and contain fill materials, soil erosion, sedimentation, and other wastes resulting from construction activities that could result in harm to private properties as well as public properties, streams and waterways.

This item shall also include the requirement of the Contractor to produce, implement, and maintain a specific Stormwater Pollution Prevention Plan (SWP3/SWPPP) and to request, obtain and comply with all necessary approvals and permits.

509.02 Standards.

All work for this item shall comply with all Federal and State requirements including the Clean Water Act (33 U.S.C. 1251 et seq.), the National Pollutant Discharge Elimination System, and the Arkansas Water and Air Pollution Control Act (Act 472 of 1949 , as amended, Ark. Code Ann. 8-4-101 et seq.) and the regulations, orders or decrees issues pursuant thereto.

All work for this item shall further comply with all Local and Municipal requirements.

509.03 Application.

The requirements of this item shall apply to all construction activities under the Contract. The Contractor shall produce, implement and maintain a SWP3 for all construction activities under the contract without regard to size of land area disturbance.

The Contractor's operations on lands located off the right-of-way, such as borrow pits, plant sites, waste sites, or other facilities, may require compliance with this specification or NPDES permit. Determination may be based upon location, jurisdiction and area of land disturbance.

509.02 Responsibilities of the Contractor.

(A) General.

The Contractor shall comply with all applicable Federal, State, Local and Municipal regulations and requirements.

The Contractor shall implement and maintain a specific SWP3.

The Contractor shall stabilize the land and comply with all requirements in the permit including any additions or revisions thereto.

Upon completion of the construction activities the Contractor shall file a Notice of Termination with the proper authorities.

(B) NPDES Requirements.

Construction activities that will disturb soil or remove vegetation on one (1) or more acres of land during the life of the construction project shall also comply with the applicable NPDES Permit requirements as administrated by the Arkansas Department of Environmental Quality (ADEQ).

Construction activities authorized under NPDES GENERAL PERMIT NO. ARR150000 with the ADEQ shall comply with Section 509.02. "Responsibilities of the Contractor" (a) General (above), and the following:

The Contractor shall comply with applicable permit requirements which include, but are not limited to, Best Management Practices (BMP's) and Bi-Monthly Inspections.

The Contractor shall file the ADEQ Notice of Termination when the site has been finally stabilized and all storm water discharges from construction activates authorized by the permit are eliminated. The Contractor shall provide one copy of this Notice of Termination to the Engineer.

509.03 Construction Methods

The Contractor shall be responsible to prepare and submit for approval the detailed SWP3 (SWPPP) in compliance with this specification.

Where temporary erosion control measures are shown on the plans, such temporary erosion control measures are provided to the Contractor as minimum controls and guidance. The temporary erosion control measures where shown in the plans do not represent the extent of work and coordination required by the Contractor. The Contractor shall be responsible to incorporate and expand as necessary the temporary erosion control measures where shown in the plans for the Contractor's detailed SWP3 (SWPPP).

All work required due to the violation of provisions of Corps of Engineers (COE) Section 404 Permits, NPDES Permits, or other requirements of these specifications which results

from Contractor negligence, carelessness, or failure to perform work as scheduled, shall be performed by the Contractor at no cost to the Owner. In addition, the Contractor will be assessed the amounts of any and all fines and penalties assessed against and costs incurred by the Owner which are the result of the Contractor's failure to comply with a COE Section 404 Permit or NPDES Permit.

Failure to comply with the conditions of the COE Section 404 Permit may result in the Corps of Engineers issuing a cease and desist order for all permitted activities. To obtain a new COE Section 404 Permit may require 60-120 plus calendar days processing time.

The Owner will not be responsible for any delays or costs due to the Contractor's failure to comply with the conditions of the COE Section 404 Permit. The Contractor will not be granted additional compensation or contract time due to loss of Permits for noncompliance.

In the event that pollutant spills occur which are the result of the Contractor's actions or negligence, the clean up shall be performed by the Contractor at no cost to the Owner.

509.04 Method of Measurement and Basis of Payment.

No measurement of this item will be made.

Temporary erosion control acceptably completed will be paid for at the contract lump sum price bid for "Erosion Control", which prices shall be full compensation for furnishing all materials, tools, equipment, labor, incidentals and all other items necessary to implement, maintain and complete the work. Payment for "Erosion Control" shall also include producing, implementing, maintaining and compliance with the Stormwater Pollution Prevention Plan (SWP3/SWPPP) including design, inspections, fees, report preparation, housekeeping practices, cleaning, maintenance and all other actions outlined in the SWP3 (SWPPP) as prepared by the Contractor and necessary to execute the SWP3 (SWPPP). Periodic payments will be made under this item in proportion to the amount of work accomplished as determined by the Engineer.

Payment will be made under:

Pay Item	**Pay Unit**
Erosion Control	LS

Section 510. Traffic Control and Maintenance

510.01 Description. This work consists of furnishing, installing, and maintaining necessary traffic signs, barricades, lights, signals, cones, concrete barriers, pavement marking, and other traffic control devices and shall include flagging, pilot car operations, and other means for guidance of traffic through the work zone. The work shall be done according to the MUTCD, AHTD Standards, The Standard Specifications and the

Contractor's approved Traffic Control plan. An approved Traffic Control plan provided by the Contractor shall be required before any construction begins. This item shall also include maintenance of roadway surface.

This item shall also include the temporary relocation of traffic and street signs, the maintenance of the temporarily relocated signs through the construction of the project, and the permanent relocation of any sign relocated due to construction signage after the construction is complete. Permanent relocation of any salvaged signs shall consist of furnishing new sign post, new support hardware, and new concrete bases, where required, in accordance with the dimensions and details shown in the Plans and at the locations shown in the Plans, or as directed by the Engineer. New sign posts shall comply with the Standard Specifications and Standard Drawings.

(a) Contractor's Plan. Traffic Control or Maintenance of Traffic when shown in the Plans is provided to the Contractor as guidance. The Contractor shall prepare and submit for approval a detailed Traffic Control or Maintenance of Traffic Plan including adherence to the specified schedule of construction phases when so indicated in the Contract Documents to the Engineer and Owner. The Contractor's Traffic Control or Maintenance of Traffic Plan shall include and expand as necessary the Traffic Control or Maintenance of Traffic when indicated in the Plans and Specifications, and shall be complete with all proposed traffic control or traffic maintenance devices including proposed temporary roadway widening. The Contractor shall prepare and submit the detailed Maintenance of Traffic Plan to the Engineer and Owner 7 days prior to the preconstruction conference and in accordance with these Specifications.

Upon approval of the Contractor's Maintenance of Traffic Plan by the Owner in writing, the Contractor shall supply the local transportation authority, the Fire Chief and the Police Chief one (1) copy each for their files. Two (2) copies shall be supplied to the Engineer.

The Contractor shall initiate and maintain all necessary labor and materials necessary to construct the project in a manner which will guarantee public safety with a minimum of inconvenience. Additional work, at no additional costs to the Owner, shall be performed by the Contractor during construction as directed by the Owner or Engineer if necessary to insure the above standards.

(b) Contractor personnel. The Contractor shall designate a traffic control supervisor to furnish continuous surveillance over traffic control operations. This supervisor shall be available at night and weekends to respond to calls involving traffic control. The name of the traffic control supervisor shall be provided at the preconstruction conference and to local police.

The Contractor's personnel who are used to maintain traffic flow, such as flagmen or any other person, who verbally communicates with or gives directions to the motorized public, shall speak English fluently.

(c) Driveways. Maintenance of driveways shall be as approved by the Engineer. Unless indicated otherwise, it shall be the Contractor's responsibility to maintain adequate access to

private and commercial property at all times, except as required for construction across the driveway as approved by the Engineer. During the construction of driveways or at any time that a property owner cannot use his driveway, the Contractor shall notify the property owner (one week in advance, minimum) when the driveway will be closed and the approximate length of time that it will be closed. The intent of this section of the Specifications is to cause as little inconvenience as possible to private property owners.

(d) Relocation and replacement of Traffic Signs and Pavement Striping. During the construction of the project, the temporary relocation of street signs and traffic control signs will be performed by the Contractor. The Contractor shall maintain the signs at highly visible locations as near as practicable to the original locations. The latest edition of the Manual of Uniform Traffic Control Devices published by the Federal Highway Administration shall be used as a guide to the placement of signs during construction.

Immediately after the construction of any part of the project reaches a stage of completion such that the relocation of the street signs and traffic control signs is no longer necessary, the Contractor shall permanently relocate the street signs and traffic control signs. Removing any construction signage must be approved by the Engineer.

Street signs and traffic control signs shall be removed from such area of work as necessary to permit work on the project. Each sign shall be temporarily relocated in a secure manner by driving the sign into the ground with equipment approved by the Engineer, or otherwise installed as approved to prevent damage to underground utilities. Street signs no longer necessary shall be salvaged in good condition and restored to their original use or returned to the Owner if no longer needed.

Existing striping shall be removed and new temporary stripes and other pavement markings shall be provided by the Contractor. Work shall be performed in accordance with SECTION 720 (for Type 4) – PERMANENT PAVEMENT MARKING TAPE of the Standard Specifications. Pavement markings not necessary to the phased construction patterns shall be removed or obliterated with black paint, as approved by the Engineer. Striping shall be maintained and restored as necessary during construction.

(e) Suspension of Work. If the Owner or the Engineer determines that provisions for safe traffic control are not being provided or maintained, the work will be suspended. In cases of serious or willful disregard for safety of the public or construction workers, the Owner will place the traffic control devices in proper condition and deduct the costs from monies due the Contractor.

510.02 Maintenance Requirements. Unless approved otherwise by the local authority, the road, while undergoing improvements, shall be kept open by the Contractor to all traffic. When so provided on the plans, or the Contractor's approved plan, the Contractor may bypass traffic over an approved detour route. The Contractor shall keep the portion of the project being used by public traffic, whether it is through or local traffic, in such condition that will permit the safe, continuous flow of two-way traffic at all times. When a part of the plans or when approved by the local authority, areas where the nature of the work restricts or prohibits two-way flow, one-way operation may be maintained by using flaggers or timed

signalization. The Contractor shall also provide and maintain in a safe condition temporary approaches, crossings and intersections with trails, roads, streets, businesses, parking lots, residences, garages, farms, etc.

As part of regular traffic maintenance, the Contractor shall remove all snow and ice accumulated on the traveled roadway. Exposed soil that becomes muddy due to rains or other precipitation shall be removed or covered with aggregate base material to the satisfaction of the Engineer. Dust shall be controlled at all times. In the event that watering does not satisfactorily control the dust, other methods of dust control will be required.

Necessary traffic control devices shall be properly placed and in operation before starting construction. When work of a progressive nature is involved, such as resurfacing, the appropriate traffic control devices shall be kept current and placed only in the areas of actual work activities. All traffic control devices shall meet the requirements of the AHTD Standard Specifications Section 604.02 and the most current version of the MUTCD.

If the Engineer determines that provisions for safe traffic control are not being provided or maintained, the work will be suspended. In cases of serious or willful disregard for safety of the public or construction workers, the Owner will place the traffic control devices in proper condition and deduct the costs from monies due the Contractor.

Types of barricade supports or devices not specifically described in the MUTCD shall not be used. The methods used to control traffic for lane changes or other diversions shall meet the MUTCD and the traffic control plan.

Portable changeable message signs meeting the requirements of Section 604 of the AHTD Standard Specifications shall be used if and where directed by the Engineer.

510.03 Method of Measurement. Aggregate base for traffic maintenance, if specifically included as a bid item, will be measured by the ton of material placed for traffic control. No payment will be made under this item unless base placement is specifically directed by the Engineer. No base so directed shall be placed without the Engineer or authorized representative present. The tonnage of material placed shall be substantiated by truck tickets delivered along with the base material and presented to the Engineer at the time of base placement. If an item for aggregate base for traffic control is not included, it shall be considered subsidiary to other items.

When directed or approved for use by the Engineer, portable changeable message signs meeting the requirements of Section 604 of the AHTD Standard Specifications will be measured for payment by the number of days each sign is required and authorized by the Owner. Payment for a full day will be made for any portion of a day that the panel or sign is used, but the measurement shall not exceed one per sign on any calendar day.

No other traffic control items will be measured.

510.04 Basis of Payment. Payment for aggregate base for roadway maintenance as measured above will be made at the unit price bid per ton.

All other traffic control and maintenance materials and activities will be paid for at the lump sum price bid for traffic control.

Payment will be made under:

Pay Item	**Pay Unit**
Traffic Control	LS
Aggregate Base for Roadway Maintenance	Ton
Portable Changeable Message Sign	Day

Section 511. Mobilization

511.01 Description. This item shall consist of preparatory work and operations, including those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site.

This item shall also include other work and operations that must be performed, or for expenses incurred, before beginning work on the various Contract items on the project site. It shall also include 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 under the Contract.

511.02 Measurement and Payment. Mobilization will be measured as a complete unit and will be paid for at the contract lump sum price bid. In computing the allowable partial payments from the schedule below, the percentage of the original Contract earned will be based on all items exclusive of the item of Mobilization, and payment for this item at any of the listed stages of completion will be made on the basis of the percentage of the item allowed less all payments made.

PARTIAL PAYMENT SCHEDULE

Percent of Original Contract Amount Earned	Percent of Bid Price for Mobilization Allowed
First Pay Estimate	25%
10%	50%
25%	100%

This item will be paid for on regular estimates. Payments on percentages of the original Contract amount other than those set out above will not be considered. No adjustment in the amount bid for this item will be made for additional quantities or items of work required to satisfactorily complete the Contract.

IN NO CASE SHALL THE AMOUNT BID FOR THE ITEM OF "MOBILIZATION" EXCEED 5% OF THE TOTAL CONTRACT AMOUNT FOR ALL OTHER ITEMS LISTED IN THE PROPOSAL. Should the amount entered in the Proposal for this item

exceed 5%, the Engineer will reduce it to the maximum allowed amount to determine the correct total bid.

Payment will be made under:

Pay Item	Pay Unit
Mobilization	Lump Sum

Section 512. Fences

512.01 Description. This item shall consist of furnishing and erecting wire fence, chain link fence, wood privacy fence and gates according to the plans and these specifications, and in reasonably close conformity to the lines, grades, and alignment shown on the plans or as directed.

512.02 Materials.

(a) General. All materials used shall be new and shall comply with the requirements for the class and type of material specified. Previously used materials will be allowed for temporary fencing.

Concrete for setting posts shall comply with Section 601 for Class A Concrete.

(b) Wire Fence. Wood posts and braces shall be pressure treated, seasoned, sound, and reasonably straight southern pine or Douglas Fir of the West Coast Region. The posts shall be round and free from excessive end splits. Before pressure treatment, the posts and braces shall have the bark removed, the knots trimmed flush, and the ends cut square. Posts that are to be driven shall have the small end tapered. Posts shall be treated by a standard empty cell or full cell process according to AWPA practice using creosote and retaining a minimum of 8 pounds per cubic foot of wood; or using pentachlorophenol, or chromated copper arsenate and retaining a minimum of 0.4 pounds per cubic foot of wood.

Metal posts and braces shall be of good commercial quality iron or steel and may be tubular, T, U, Y, or other shape manufactured for use as fence posts or braces.

Woven Wire Farm Fence shall be AASHTO Design Number 1047-6-11 AASHTO M 279 or ASTM A116, Class 3 galvanizing.

Barbed wire shall be 12 ½ gauge with 4-point barbs and shall comply with AASHTO M 280, Class 3 galvanizing.

As an alternate to the barbed wire specified above, high tensile wire having the same galvanizing and breaking strength as Class 3, 12 ½ gauge wire, and complying with the remaining requirements of AASHTO M 280 for a four point barb may be used.

The minimum gage of the high tensile barbed wire shall be as follows:

Strand wire gage	15 ½
Barb wire gage	17

Staples used to attach the wire fencing to wood posts shall be galvanized 9 gage, 38 mm (1 ½") in length.

Steel line posts shall be galvanized or painted and comply with AASHTO M 281. Tubular steel posts shall comply with Grade 1 or Grade 2 of AASHTO M 181, or an approved alternate of Grade 2.

Hardware and fittings shall comply with ASTM F 626. Any miscellaneous hardware or fittings not mentioned in ASTM F 626 shall be galvanized according to the applicable requirements of AASHTO M 111 or M 232.

(c) Chain Link Fence. Material for chain link fence shall comply with AASHTO M 181 Types I, II, or III. Steel members for posts, rails, expansion sleeves, and gate frames may be either Grade 1 or Grade 2. The shape, size, and length of posts and rails, and the height of fabric shall be as shown on the plans.

Hardware and Fittings shall comply with ASTM F 626. Any miscellaneous hardware or fittings not mentioned shall be galvanized according to AASHTO M 111 or M 232. Tension wire shall be minimum 7 gauge.

Aluminum alloy fabric shall be used only with aluminum posts. Aluminum coated steel fabric and galvanized steel fabric, Class C, shall be used only with Grade 1 or Grade 2 steel posts. Fence fabric shall be minimum 9 gauge wire for 6' fencing and 12 gauge wire for 4' fencing.

Frames for gates shall be galvanized steel or aluminum of the type and length shown on the plans. Frames shall be Grade 1 or Grade 2. Welds shall be galvanized. Commercial gates may be used if they are equal to or better than the planned gates as determined and approved by the Engineer.

The gate fabric shall be of the same type material and be in accordance with the same specifications as the adjoining fence.

(d) Wood Privacy Fence All pine wood material shall be pressure treated with pentachlorophenol or chromated copper arsenate and shall retain a minimum of 0.4 pounds per cubic foot of wood. Cedar panels shall be reasonably straight and free from knots, warping, and other defects.

(e) Temporary Fencing Materials for temporary fencing shall be appropriate for the use intended.

512.03 Construction Requirements.

(a) General. The fence shall be erected parallel to the right-of-way line, or as directed. Unless otherwise specified, the fence shall be a minimum of 6" and a maximum of 1' behind the right-of-way line. The fence grade shall generally follow the ground contour, but shall present a uniform appearance. Minor grading along the fence line may be necessary to obtain the desired uniformity in fence grade. The fence alignment may be adjusted by the Engineer to preserve trees, land monuments, and property corner markers.

(b) Wire Fence. Line posts and pull assemblies shall be spaced as shown on the plans. Wood corner, gate, and pull posts may be driven in place provided the driving does not damage the post; or they may be set in dug holes and set in concrete. Metal corner, gate, end, and pull posts shall be set in concrete. Wire shall not be stretched onto posts set in concrete until seven days after placement of posts. Posts shall be set plumb.

The Contractor has the option of using wood or steel posts and braces unless otherwise specified, but shall use the same material on the entire project. Wood end, corner, and pull posts may be used with steel line posts.

When solid rock is encountered, the posts shall be set into the rock a minimum of 10" for line posts and 16" for end, corner, gate, and pull posts. The hole in the rock shall have a minimum cross section dimension 1" greater than the post to be set. The posts shall be cut before setting to give the proper length above ground surface. The hole shall be filled with Concrete or a grout consisting of 1 part portland cement and 3 parts concrete sand.

Wire tension braces for wood pull, end, and corner assemblies shall consist of a 9 gauge wire passed around the posts to form a double wire. The wire shall be fastened to each post and the ends fastened together to form a continuous wire. The wires shall then be twisted together until the wire is in tension.

Where the new fence joins an existing fence, the two shall be attached in a satisfactory manner, with end posts being set as directed. Where the proposed fence intersects an existing fence, the end post shall be set for the existing fence clear of the proposed fence line as shown on the plans. The wire of the existing fence shall be stapled to the end post.

Pull post assemblies shall be placed at intervals of not more than 300' in straight alignment on level or uniformly sloping ground. Pull posts shall also be placed at all sharp vertical angle points in the line.

Corner post assemblies shall be placed at all horizontal angle points of 15° or more in the fence. When the distance from a corner post to the next corner or pull post is less than 165', one approach span on the corner assembly may be omitted.

End post assemblies at fence ends, gates, bridge abutments, and on banks of streams shall be erected in the same manner as corner construction. Extra length posts shall be provided for

crossing small streams, ditches, ravines, or soft ground. Additional depth of set shall be secured in soft ground as directed.

The wire shall be attached to the face of the post away from the street. The wire shall be attached to wood line posts with staples driven at right angles to the grain and at a slight downward angle to attain the best anchorage. The staples shall not be driven tightly against the wire but shall leave free space for adjustment in tension due to changes in temperature. Wire shall be attached to steel line posts with approved galvanized clips. All barbed wire and alternate line wires of woven fabric shall be fastened to each line post. Barbed wire and all line wires of woven fabric shall be fastened to end, corner, and pull posts by wrapping the wire around the posts and tying the wire back on itself with not less than 3 tightly wrapped twists. Splicing of barbed wire and woven wire shall be done according to the plans. Gates of the same width and material type shall be placed at locations of existing gates as shown on the plans. Gates may be re-used if they have not been damaged during the construction period. If existing gates are not in satisfactory conditions for reuse, they shall be replaced at no cost to the Owner.

(c) Chain Link Fence. All posts shall be set in concrete as shown on the plans, plumb, and true to line and grade. Concrete shall comply with Section 601 for Class A and shall be thoroughly tamped around the posts. The posts shall be equally spaced in the line of fence not to exceed a spacing of 10 feet. The top of the footing shall be domed to drain water away from the post. Concrete in post footings shall be at least 7 days old before stretching and securing fabric to posts, bracing, or hanging gates.

Top rails shall pass through post caps and shall be securely fastened to end, brace, pull, and corner posts. Joints in top rails shall be made with expansion sleeve couplings to provide a substantial connection and allow for expansion and contraction of the rail.

Before the fence fabric is placed, the tension wire shall be placed at the proper location; stretched taut; securely anchored to each end, corner, or intermediate brace post; and satisfactorily fastened to each line post.

The fence fabric shall be attached to the face of the post facing the street.

The end of the fabric shall be attached to the posts by means of a stretcher bar threaded through the end loops of the fabric and secured to the posts with clamps and bolts. The fabric shall be stretched to remove all slack with approved stretching equipment. The stretched fabric shall be secured to line posts, top rail, braces, and tension wire with specified fabric fasteners. Fabric fasteners shall be placed on line posts at not greater than 24” centers. Stretching operations shall be repeated at approximately every 100’ for each run of fence. The use of trucks, tractors, and similar equipment will not be permitted in the stretching operation, except as anchors.

Splicing of the fabric shall be done by interweaving a wire picket through each end loop of each piece of fabric in a manner that will neatly and securely fasten the lengths of fabric together.

(d) Wood Privacy Fence Wood privacy fence shall be constructed at all locations where existing privacy fence is required to be removed, at other locations shown on the plans, or as directed by the Engineer.

Wood privacy fence shall be constructed as shown on the plans or shall match the existing fence in materials and configuration as closely as possible. Materials and workmanship of wood privacy fences, including gates, shall be of the same or better quality as the existing fence.

(e) Gates. Gates of the length and type of existing gates shall be constructed at the locations shown on the plans or as directed.

(f) Temporary Fencing. Temporary fencing shall be installed as required to contain livestock, pets, and to maintain safety and security of adjacent properties. Fences shall be installed and maintained that their intended purpose is accomplished.

512.04 Method of Measurement.

(a) Fence will be measured by the linear foot in place along the midpoint in height of the fence from outside to outside of the end posts. The lengths of gates will be excluded from this measurement.

(b) Gates will be measured by the Linear Foot.

(c) Temporary fencing, if included as a bid item, will be measured by the linear foot (LF). If this item is not included as a pay item, temporary fencing will be considered subsidiary to other items and will not be measured.

512.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for as follows:

Barbed Wire Fence will be paid for at the contract unit price bid per linear foot for Barbed Wire Fence. Barbed and Woven Wire Fence will be paid for at the unit contract price per linear foot for Woven and Barbed Wire Fence. Chain Link Fence will be paid for at the contract unit price bid per linear foot for Chain Link Fence of the height specified. Wood Privacy Fence will be paid for at the contract unit price bid per linear foot for Wood Privacy Fence of the height specified. Gates will be paid for at the contract unit price bid per linear foot for Gates of the type and dimensions specified. Temporary fencing will be for at the contract price per linear foot for temporary fencing of appropriate materials and heights.

The contract unit prices mentioned above shall be full compensation for clearing, grading, setting posts, erecting fence, and removing temporary fences; for excavation and backfill; for furnishing materials; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Barbed Wire Fence	LF
Woven and Barbed Wire Fence	LF
Woven Wire Fence	LF
Chain Link Fence	LF
Chain Link Gates	LF
Wood Privacy Fence	LF
Gates for Wood Privacy Fence	LF
Temporary Fencing	LF

Section 513. Handicap Ramps

513.01 Description. This item shall consist of the construction of handicap ramps in accordance with these specifications and the Standard Drawings at the locations shown on the plans or as directed by the Engineer.

513.02 Materials. Concrete used shall meet the requirements for Class A or B Concrete as provided in Section 601. The maximum allowable slump shall be 4 inches. The maximum water-cement ratio for the mix selected shall not be exceeded.

Cast-in-place tactile panels used shall be composed of a vitrified polymer composite material. The color of the tactile panels shall conform to Federal Color No. 33538, and shall be homogeneous throughout the product. The tactile panels shall be cast into the wet concrete. Surface applied products shall not be allowed. The cast-in-place tactile panels shall meet the size and spacing requirements shown in the plans.

513.03 Construction Requirements. When a ramp is to be constructed on an existing sidewalk, any items that are planned to be retained but are damaged during the removal or construction operations shall be repaired at no cost to the Owner.

Handicap Ramps shall be constructed in accordance with Section 502 and the local authority's current standard drawings. Cast-in-place tactile panels shall be installed into the wet concrete per the manufacturer's specifications.

513.04 Method of Measurement. Cast-in-place tactile panels will be measured by the square foot. Concrete used in Handicap Ramps will be measured by the square yard. Limits of measurement will be as shown on the Plans.

513.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per square foot for Cast-in-Place Tactile Panels and per square yard for Handicap Ramp Concrete of the type specified, which price shall be full compensation for excavation and backfilling; for furnishing materials including

joint filler; for constructing the ramp, for furnishing and placing cast-in-place tactile panels; and for all equipment, tools, labor, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Cast-in-Place Tactile Panel	SF
Handicap Ramp Concrete	SY

Section 514. Project Signs

514.01 Description. This item shall consist of installing new project signs and supports furnished by the Contractor as shown on the plans, or as directed by the Engineer. The layout of the sign must be submitted to the Engineer for approval prior to installation.

514.02 Materials and Construction Requirements. (a) Signs. Materials used in the fabrication of project signs shall comply with the latest edition of the AHTD Standard Specifications, AHTD Standard Drawings, and the MUTCD. Signs and equipment manufactured in accordance with the above mentioned specification will not be required to be submitted for approval.

(b) Supports. Materials used for new project sign supports shall comply with the AHTD Standard Specifications and the AHTD Standard Drawings.

Installation of the signs shall be according to the Standard Details included in the Plans. The signs shall be maintained, cleaned, repaired and/or refinished as necessary throughout the project so that they are easily readable from the traveled way. Any damage to the project signs shall be repaired immediately at no additional cost to the Owner.

514.03 Construction Requirements. The Contractor will furnish new project signs and supports and shall install the signs at the locations as shown in the plans or as directed by the Engineer. The Contractor will maintain the signs during construction. Should the sign or support become damaged during construction, the Contractor will furnish the replacement. The project signs shall be installed within two days after commencement of mobilization. Project signs are to be removed following the announcement of the project's Final Completion by the Engineer. Final payment will be withheld until project signs have been removed.

514.04 Method of Measurement and Basis of Payment. Projects signs will be measured on a per each basis. Payment will be made for each sign constructed and installed according to the Plans and Specifications in the locations designated by the Engineer. The price bid for each sign will be full compensation for all construction, installation, and maintenance of the signs.

Payment will be made under:

Pay Item	Pay Unit
Project Signs	EA

Section 515. Handrail

515.01 Description. This item shall consist of furnishing and erecting galvanized steel handrail on box culverts, headwalls, retaining walls, sidewalks, or steps, where shown on the Plans, or as directed by the Engineer, in accordance with the details shown on the Plans and with these specifications.

515.02 Materials.

(a) General. All materials used shall be new and shall comply with the requirements for the class and type of material specified.

All handrail materials shall be galvanized steel, coated at the rate of 2.0 ounces of zinc per square foot of surface coated, and in accordance with the current provisions of the following ASTM Designations:

Galvanize – A 123.

Pipe – A53, Type E or S, Grade B

Plates – A36

515.03 Construction Requirements.

(a) General. All welding shall be in accordance with current provisions of Specifications for Welded Highway and Railroad Bridges, American Welding Society. Welding shall be done by the shielded arc method and shall be done only by certified welders. Welding rods shall be low hydrogen suitable for use with the metal being welded. Welds joining sections of handrail shall be ground smooth prior to field galvanizing. All welds shall be field galvanized, and all galvanized areas which have been damaged shall be repaired as follows: All galvanizing that has been chipped off or damaged in handling or transporting or in welding or riveting shall be repaired by field galvanizing by the application of a paste compound of approved zinc powder and flux with a minimum amount of water. The places to be coated shall be thoroughly cleaned, including removal of slag on welds before the paste is applied. The surface to be coated shall first be heated with a torch to a sufficient temperature so that all metallics in the paste are melted when applied to the heated surface. Extreme care shall be taken to see that the galvanized surfaces are not damaged by the torch. The flux in the paste will cause a black substance to appear on the surface of the coated parts, and this black substance shall be removed by wiping off with waste or by quick application of cold water.

Other galvanizing methods may be used if approved by the Engineer.

Prior to installation, the Contractor shall contact the Engineer for his inspection of the Handrail.

515.04 Method of Measurement.

(a) Galvanized steel handrail will be measured by the linear foot, completed and accepted.

515.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for as follows:

Galvanized steel handrail acceptably completed and measured as provided above, will be paid for at the contract unit price per linear foot bid for "Galvanized Steel Handrail," which price shall be full compensation for furnishing and installing all materials, including sleeves with plates, grout; and for all equipment, tools, labor, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Galvanized Steel Handrail	LF

Section 516. Cold Milling Asphalt Pavement

516.01 Description. This item shall consist of cold milling the asphalt pavement at the locations designated on the plans or by the Engineer and removing the resulting material from the street right-of-way. Unless otherwise provided, the reclaimed pavement shall become the property of the Contractor. The pavement remaining after milling shall provide a surface suitable for maintaining traffic.

516.02 Equipment.

(a) General. The Contractor shall provide self-propelled equipment with sufficient power, traction, and stability to maintain an accurate depth of cut and slope. The equipment shall be capable of accurately and automatically establishing profile grade along each edge of the machine by referencing from the existing pavement by means of a ski or matching shoe, or from and independent grade control and shall have an automatic system for controlling cross slope at a given rate. The milling machine shall have an effective means for preventing dust resulting from the operation from escaping into the air.

Provision shall be made, either integrally with the milling machine, or by the use of additional equipment, to remove the material being cut from the surface of the roadway.

516.03 Construction Requirements.

(a) General. The existing pavement shall be cold milled to a minimum depth as shown on the plans.

516.04 Method of Measurement.
(a) Cold Milling Asphalt Pavement will be measured by the square yard (SY) of pavement milled to the depth specified.

No separate payment will be made for repair or replacement of manholes, valve boxes, or other appurtenances which are located and identified in advance of the cold milling operation and which are damaged by the Contractor.

516.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per square yard for Cold Milling Asphalt Pavement, which price shall be full compensation for all work as prescribed herein, and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Cold Milling Asphalt Pavement	SY

DIVISION 600. MATERIALS

Section 601. Cast-in-Place Concrete

601.01 Description. This item shall consist of concrete in pavements, culverts, and miscellaneous structures, prepared and constructed in accordance with these specifications and conforming to the lines, grades, dimensions, and designs shown on the plans. Concrete shall consist of approved portland cement, fine aggregate, coarse aggregate, water, and any approved chemical admixtures mixed in the proportions specified for the various classes of concrete. All concrete shall be from a supplier approved by the Arkansas State Highway and Transportation Department.

601.02 Materials. The materials used in concrete shall conform to the requirements of AHTD Standard Specifications Section 802.02. Coarse aggregate gradation shall conform to the requirements for Class A, S, S(AE), and Seal Concrete in Section 802.02.

Admixtures shall be used to improve certain characteristics of the concrete when specified on the plans. They may also be used when requested by the Contractor and approved by the Engineer. The Contractor's request shall be supported with the manufacturer's certified formulation of the proposed admixture and with sufficient evidence that the proposed admixture has given satisfactory results on other similar work. Permission to use the admixture may be withdrawn at any time by the Engineer when satisfactory results are not being obtained.

Admixtures shall be approved by the Engineer. Admixtures shall be compatible with each other, as advised by the manufacturer. The admixture dosage rate range as recommended by the manufacturer shall be used. Should the dosage rate for any admixture not yield desirable

characteristics in the concrete, the dosage of admixture used shall be based on test results obtained by trial batches.

Admixtures shall be added to the mixing water by means of a mechanical dispenser that will accurately meter the additive throughout the mix water cycle. The dispenser shall be constructed and connected so that the Engineer can readily determine the amount of admixture entering the mixing water.

Fly ash may be used as a partial cement replacement not exceeding 20% by weight of the cement when approved by the Enigneer. When fly ash is used, the total weight of both cement and fly ash will be used in design calculations. Fly ash used in concrete shall meet the requirements of ASTM C 618, Class C or F. Mixing of Class C and Class F fly ashes will not be permitted. Use of fly ash shall be discontinued immediately, as directed by the Engineer, when such use is determined to be causing the production of concrete that does not meet Specifications.

601.03 Classes of Concrete. Two classes of concrete are provided for in these specifications. The appropriate class of concrete shall be used as specified below or where designated by the Engineer.

The following requirements shall govern unless otherwise shown on the plans:

Class A concrete shall be used in miscellaneous concrete items that are not exposed to de-icing chemicals and are non-traffic bearing.

Class B concrete shall be used in curb and gutter, sidewalks, drop inlets, junction boxes, box culverts, bridges and concrete pavement.

These classes of concrete shall not be used if concrete is to be placed underwater. Concrete to be placed under water shall meet AHTD Specifications for Seal Concrete.

601.04 Classification and Proportioning. The concrete mixture shall be proportioned to insure a workable and durable concrete, as specified in the following table:

Characteristic	**Class A**	**Class B**
Minimum Compressive Strength (psi at 28 days)	3000	4000
Minimum Cement Content (bags per cu. yd.)	5.5	6.0
Maximum Net Water Content Per Bag (94 lb.) of Cement (Gallons)	6.5	5.5
Slump Range (Inches)	1-4*	1-4*
Air Content Range (%)	4-7	4-7
Maximum Fly Ash Content	20%	20%

*Maximum slump shall be 2” when slip form paving methods are used.

For all classes of concrete, the concrete materials shall be using the Absolute Volumes method in accordance with the requirements for the class specified.

The Contractor shall submit a mix design meeting the requirements of these Specifications. Certification that all materials used in the concrete mix meet the requirements of these Specifications shall be included with the mix design. No concrete shall be placed until a mix design is approved by the Engineer.

Compressive strengths for all classes of concrete will be determined from test cylinders made in accordance with AASHTO T 23. If the strength required for the class of concrete being produced is not obtained with the minimum cement content specified, additional cement shall be used at no extra cost to the Owner.

601.05 Sampling and Testing. During the progress of work, concrete test specimens will be made by the Owner or its authorized representative in accordance with American Concrete Institute testing procedures. Sampling frequency will be as specified in Section 103.04.

Slump will be determined using AASHTO T 119. Air content will be determined using AASHTO T 152. Compressive strength specimens will be made in accordance with AASHTO T 23 and tested in accordance with AASHTO T 22.

Specimens for determining when forms may be removed, when a structure may be put in service, or when concrete piling may be driven will be cured, as nearly as practicable, in the same manner as the concrete in the structure and in accordance with AASHTO T 23.

601.06 Measurement of Materials. Materials will be measured by weighing, except as otherwise specified or where other methods are specifically authorized by the Engineer. Aggregates shall be measured separately and accurately by weight. Measuring devices shall be operated in a manner that will consistently weigh the cement within ± 1% and the individual aggregates within ± 2% of the required weight. Measuring devices shall be so designed and plainly marked that the weights can be accurately and conveniently verified for the quantities of each component actually being used.

Cement in standard packages (sack) need not be weighed, but bulk cement shall be weighed.

The mixing water shall be measured by weight or by volume. The water measuring device shall be accurate to within 1%.

When the aggregates contain more water than the quantity necessary to produce a saturated surface-dry condition, representative samples shall be taken and the moisture content determined for each kind of aggregate.

601.07 Mixing Concrete. Concrete shall be thoroughly mixed in a mixer of an approved size and type that will insure a uniform distribution of the materials throughout the mass.

The concrete shall be mixed only in the quantity required for immediate use. Concrete that has developed an initial set shall not be used. Re-tempering concrete will not be permitted.

Mixers and agitators shall not be charged in excess of the manufacturer's rated capacity. Concrete shall be delivered and discharged from the truck mixer or agitator into the forms within 1½ hours after the introduction of the mixing water to the cement. In hot weather, or

under other conditions contributing to quick setting of the concrete, the maximum allowable time may be reduced by the Engineer. Each mixture shall be accompanied by a truck ticket issued at the batch plant. This ticket shall include the following information:

Unique ticket number.
Identification of the truck.
Date and time of batching.
Total weights and/or volumes of each component.
Total volume of mix.
Total quantity of water added after batching.
Time of discharge.

Plants and transit mix trucks shall be equipped with adequate water storage and a device for accurately measuring and controlling the amount of water used in each batch.

Truck mixers shall be capable of combining the ingredients of the concrete into a thoroughly mixed and uniform mass, and of discharging the concrete within the specified range of consistency. The concrete shall be mixed not less than 70 nor more than 100 revolutions of the drum or blades at the rate of rotation specified by the manufacturer as the mixing speed. The pick-up and throw-over blades in the drum of all mixers shall be maintained in satisfactory condition to assure thoroughly mixed concrete.

If additional mixing water is required to maintain the specified slump, approximately 20 revolutions of the mixer drum at mixing speed shall be required before discharge of any concrete. No additional water shall be added without approval of the Engineer.

601.08 Handling and Placing Concrete.

(a) General. The Contractor shall provide sufficient supervision, manpower, equipment, tools, and materials and shall assure proper production, delivery, placement, and finishing of the concrete for each placement in accordance with the specifications.

The time interval between batches of concrete in a continuous placement shall not exceed 20 minutes. The minimum placement rate shall be 20 cubic yards per hour in bridges, box culverts, and retaining walls.

In preparation for the placing of concrete, construction debris and extraneous matter shall be removed from the interior of forms. Struts, stays, and braces, serving temporarily to hold the forms in correct shape and alignment pending the placing of concrete, shall be removed when the concrete placement has reached an elevation rendering their service unnecessary.

(b) Conveying. Concrete shall be placed to avoid segregation of the materials and the displacement of the reinforcement. The use of long troughs, chutes, and pipes for conveying the concrete to the forms will be permitted only when authorized by the Engineer. In case an inferior quality of concrete is produced by the use of such conveyors, the Contractor shall cease the use of that conveyor until such corrections in procedure are made to insure work of the quality specified.

Open troughs and chutes shall be of metal or metal lined. Where steep slopes are required, the chutes shall be equipped with baffles or be in short lengths that reverse the direction of movement. Aluminum chutes, troughs, and pipes shall not be used for depositing concrete.

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', it shall be deposited through approved pipes. Walls of 10" thickness or less may be placed without the use of pipes, provided the concrete can be placed without segregation.

(c) Placing. Concrete shall be placed in horizontal layers not more than 18" thick except as hereinafter provided. When less than a complete layer is placed, it shall be terminated in a vertical bulkhead. Each layer shall be placed and consolidated before the preceding batch has taken initial set to prevent injury to the green concrete and avoid surfaces of separation between the batches. Each layer shall be consolidated so as to avoid the formation of a construction joint with a preceding layer that has not taken initial set.

Concrete in footings shall be placed in the dry unless natural conditions prohibit. In that case, concrete shall be placed in accordance with Subsection 601.10. In order to separate water from the concrete, it will be permissible to utilize polyethylene sheeting or tarpaulins to maintain a physical barrier between the water and the concrete.

When the placing of concrete 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 as far 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, an inset form shall be used to produce an edge thickness of not less than 6 inches.

Immediately following the discontinuance of placing concrete, accumulations of mortar splashed upon the reinforcing steel and the surfaces of forms should be removed. Dried mortar chips and dust shall not be puddled into the concrete. If the accumulations are not removed prior to the concrete becoming set, care shall be exercised not to damage or break the concrete-steel bond at or near the surface of the concrete while cleaning reinforcing steel.

After initial set of the concrete, the forms shall not be jarred and no strain shall be placed on the ends of projecting reinforcing bars.

Concrete in walls and top slabs of box culverts shall not be placed less than 24 hours after the concrete in previous placements has set. Provision shall be made for bonding the walls to the bottom slab or footing and the top slab to the walls by means of roughened longitudinal keys. Before concrete is placed in the walls or top slabs, the bottom slab, footing, or walls shall be thoroughly cleaned of extraneous material. No horizontal construction joints will be allowed in any wall of a box culvert unless provided on the plans or approved by the Engineer.

(d) Consolidating. All concrete, during and immediately after depositing, shall be thoroughly consolidated. This shall be accomplished by mechanical vibration subject to the following provisions:

The vibration shall be internal unless special authorization of other methods is given by the Engineer.

Vibrators shall be of a type and design approved by the Engineer. They shall be capable of transmitting vibration to the concrete at rated frequencies of not less than 4500 impulses per minute.

The intensity of vibration shall be such as to visibly affect a mass of concrete over a radius of at least 18 inches.

The Contractor shall provide a sufficient number of vibrators to properly compact each batch immediately after it is placed in the forms and shall have in reserve at all times sufficient vibratory equipment to guard against shut down of the work because of the failure of the equipment in operation.

Vibrators shall be manipulated 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 and withdrawn out of the concrete slowly. The vibration shall be of sufficient duration and intensity to thoroughly consolidate 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.

Vibration shall not be applied directly or through the reinforcement to sections or layers of concrete that have hardened to the degree that the concrete ceases to be plastic under vibration. 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.

Vibration shall be supplemented by such spading as is necessary to insure smooth surfaces and dense concrete along form surfaces and in corners and locations impossible to reach with the vibrators.

These provisions shall apply to precast products except that, if approved by the Engineer, the manufacturer's methods of vibration may be used.

601.09 Pumping. Concrete may be placed by pumping. The equipment for pumping shall be arranged and operated so that no vibrations result that might damage freshly placed concrete.

The Contractor will be permitted to furnish coarse aggregate for concrete that is to be pumped in a size smaller than that specified provided that a suitable mix can be produced that will conform to the requirements for the class specified.

Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall be 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 pipe, 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.

Concrete for slump and air content requirements shall be obtained at the discharge end of the pipe.

The use of aluminum pipe as a conveyance for the concrete will not be permitted.

601.10 Depositing Concrete Under Water. Concrete shall not be deposited in water except when shown on the plans or with the approval of the Engineer. No concrete shall be placed underwater without an approved mix design which meets the AHTD requirements for Seal Concrete.

The supply of concrete shall be maintained at the rate necessary to raise the elevation over the entire seal by a minimum of 1' per hour or an approved retarder shall be used as necessary for lesser placement rates.

For parts of structures under water, seal concrete shall be placed continuously from start to finish. The surface of the concrete shall be kept as nearly horizontal as practicable. The Contractor shall provide equipment and personnel to sound the top of the seal in the presence of the Inspector in order to verify the location of the seal at all times. Previously placed seal concrete shall not have taken its initial set prior to the placement of adjacent concrete.

Concrete shall be carefully placed by means of a tremie or other approved method. Still water shall be maintained at the point of deposit. Concrete shall be deposited in such a manner that the planned horizontal concrete flow shall be no more than 15 feet.

A tremie shall consist of a tube having a diameter of not less than 10", constructed in sections having flanged couplings fitted with gaskets and an approved foot valve. The tremie shall be supported so as to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be closed at the start of the work so as to prevent water from entering the tube and shall be entirely sealed. The tremie tube shall be kept sufficiently full to prevent the loss of the concrete seal. When a batch is dumped into the tube, the flow of concrete shall be induced by slightly raising the discharged end, always keeping it in the deposited concrete. If at any time the seal is lost, the tremie shall be raised, the discharge end closed for a new start, and then lowered into position with the discharge end in the previously deposited concrete. Aluminum tremies will not be permitted.

Dewatering may proceed when the seal concrete has been allowed to cure for a minimum of 72 hours at a water temperature above 45 degrees F. All laitance or other unsatisfactory

materials shall be removed from the exposed surfaces that are to support other structural loads.

601.11 Joints.

(a) Construction joints. Construction joints shall be made only where located on plans or shown in the placement schedule, unless otherwise approved by the Engineer.

The placing of concrete shall be carried continuously from joint to joint. The face edges of all joints that are exposed to view shall be carefully finished true to line and elevation.

The surface of the hardened concrete shall be roughened in a manner that will not leave loosened particles of aggregates or damaged concrete at the surface. It shall be thoroughly cleaned of foreign matter and laitance and saturated with water.

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 bond the two sections together. When shear keys or inclined reinforcement is not provided, the concrete shall be roughened as directed.

(b) Expansion and Fixed Joints. Joints shall be constructed according to the details shown on the plans.

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 specified on the plans.

2) **Filled Joints.** Poured expansion joints shall be constructed similar to open joints. When premolded types are specified, the filler shall be in the correct position when the concrete on the second side of the joint is placed. An approved joint sealer meeting the requirements of Subsection 601.11(d) is required in addition to the joint filler. The cavity for the sealer shall be formed by the insertion and subsequent removal of a wood strip, metal plate, or other approved material.

All faces of the joint to be sealed shall be thoroughly cleaned by sand blasting, water blasting, or other approved methods prior to placing the joint seal material.

Preformed expansion joint filler, non-extruding and resilient types, shall meet the requirements of AASHTO M 153. Type 2 (sponge rubber) shall be required to have a minimum expansion of 125% and be within ± 0.1” of the specified plan thickness.

Other types of joint fillers may be allowed if approved by the Engineer.

(c) Contraction Joints. Contraction joints shall be constructed according to the dimensions specified in the plans and these specifications. The joints shall continue continuously across the full width of the concrete surface. Contraction joints shall be 1/8” to 3/8” wide and shall

extend to a depth equal to ¼ to 1/3 of the thickness of the concrete being placed. All contraction joints shall be sealed with an approved sealant meeting the requirements of Subsection 601.11(d) for types 3, 4 or 5.

(d) Joint Materials. Materials for filling and sealing joints shall be as shown on the plans and shall comply with the following requirements, as applicable:

Type 1. A joint filler that is a uniform mixture of sawdust and asphalt material in the proportion of one part asphalt to four parts sawdust, by volume. Asphalt material used shall be either MC-250 or SS-1. When this material is specified, the joint shall be filled to within 25 mm (1") of the pavement surface. The top 1" shall be sealed with a material complying with the requirements of AASHTO M 173.

Type 2. A joint filler that is preformed, non-extruding, and resilient type, complying with AASHTO M 153 Type I (sponge rubber).

The material for filling and sealing longitudinal, warping, contraction, and other specified joints shall be as shown on the plans and shall comply with the following requirements:

Backer rod filler for Types 3, 4, and 5 joint shall be of resilient material approximately 3 mm (1/8") larger in diameter than the width of the joint to be sealed. All components of the joint sealant system, including the backer rod, shall be compatible. No bond shall occur between the backup material and the sealant system for types 3 and 4 joint sealer.

Type 3. A joint sealer that is a one part silicone formulation that does not require a primer for bond to concrete. The compound shall be compatible with concrete. Acetic acid cure sealants are not acceptable. The material shall be one that has been approved by the Engineer.

Type 4. A joint sealer that is a one part silicone formulation that does require a primer for bond to concrete. The compound shall be compatible with concrete. Acetic acid cure sealants are not acceptable. The material shall be one that has been approved by the Engineer.

Type 5. A joint sealer that is a hot poured elastomeric joint sealant. The material shall comply with AASHTO M 282. The appendix of that specification shall be considered a part of this specification.

Type 6. A joint sealer that is a 2 component, cold poured, synthetic polymer, complying with ASTM D 1850 with the exception of penetration, which shall not exceed 100, and resilience, both original cured sample and oven aged, which shall be a minimum of 70%.

Type 7. A joint sealer that is a hot poured elastic type complying with AASHTO M 173.

601.12 Forms. Forms shall be mortar-tight and of sufficient rigidity to prevent distortion due to the 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 of the lumber.

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.

Forms for exposed surfaces shall be made of dressed lumber or plywood of uniform thickness, steel, or other approved materials that will provide a smooth surface, and shall be mortar-tight. Forms shall have a ¾" chamfer at all sharp corners unless otherwise directed. In the case of projections, such as girders and copings, forms shall be given a bevel or draft to insure easy removal.

Metal snap-ties within the forms shall be so constructed as to permit their removal to a depth of at least 1" from the face of the concrete. Metal inserts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 1" from the face of the concrete or be covered by being embedded a minimum of 1" in the concrete. In case ordinary wire ties are permitted, all wires, upon removal of the forms, shall be cut back at least ¼" from the face of the concrete. All cavities shall be filled with cement mortar and the surface left sound, smooth, even, and uniform in color.

Forms shall be set and maintained true to the line designated until the concrete is sufficiently hardened. Before depositing new concrete on or against concrete that has hardened, the forms shall be re-tightened. Forms shall remain in place for the periods specified in Subsection 601.13. When forms appear to be unsatisfactory in any way, either before or during the placing of concrete, the Engineer shall order the work stopped until the defects have been corrected.

The shape, strength, rigidity, watertightness, and surface smoothness of re-used forms shall be maintained at all times. Any warped or bulged lumber must be re-sized before being re-used.

Forms shall be cleaned before being set to line and grade and shall be oiled prior to placing reinforcing steel in the vicinity of the forms. Materials or methods used in oiling the forms shall not result in the discoloration of the concrete.

601.13 Removal of Forms. In the determination of the time for the removal of forms 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.

Removal of forms shall be in accordance with the following schedule:

Item	Minimum Time	Strength Requirement
Top Slabs of RC Box Culverts	7 days	80% Specified
Forms for Columns and Vertical Walls	24 hours	N /A
Side Forms for Parapets, Median Barriers, and Curb Faces	6 hours	N/A

Forms on surfaces that will require a Class 2 finish in accordance with Subsection 601.16 shall be removed at the earliest time permitted under these Specifications in order to begin finishing operations.

Forms and their supports shall not be removed without the approval of the Engineer. 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. Methods of form removal likely to cause overstressing of or damage to the concrete shall not be used.

601.14 Weather and Temperature Limitations.

(a) Hot Weather. When the internal temperature of the plastic concrete reaches 85° F, the Contractor shall take the necessary precautions to insure that the temperature of succeeding batches does not exceed 90° F. Concrete batches with temperatures in excess of 90° F will be rejected. The method used to control the concrete temperature shall be approved in writing by the Engineer. The temperature of the plastic concrete shall be determined immediately prior to its being deposited in the forms by inserting a thermometer to a depth consistent with the capabilities of the thermometer being used to obtain a true reading. Prior to beginning placement, the Contractor shall insure that sufficient materials, labor, and equipment are available during placement to implement the previously approved cooling process.

(b) Cold Weather. Concreting operations will not be permitted when a descending air temperature falls below 40° F nor resumed until an ascending air temperature reaches 35° F without specific authority from the Engineer. Under no circumstances will the placing of concrete on a frozen subgrade be permitted. No concrete shall be placed unless the temperature of the concrete is more than 50° F when placed. If heating of the ingredients is necessary to meet this criterion, it shall be accomplished by a method such as dry heat or steam and not by direct flame. Water shall not be heated to more than 180 degrees F, and shall be combined with the aggregate before the addition of cement. Frozen aggregates may not be used.

After concrete is placed, it shall be protected by insulated forms, blankets, enclosing and heating, and/or any other method approved by the Engineer that will maintain the temperature adjacent to the concrete at a minimum of 50° F for at least 5 days. Concrete that has been frozen or damaged due to weather conditions shall be removed and replaced by the Contractor at no cost to the Owner.

(c) Protection Against Rain. In order that concrete may be properly protected against the effects of rain before the concrete is sufficiently hardened, the Contractor shall have available at all times materials for the protection of the edges and surface of the unhardened concrete. Such protective materials shall consist of standard metal forms or wood planks having a nominal thickness of not less than 2” and a nominal width of not less than the thickness of the pavement at its edge for the protection of the pavement edges, and covering material such as burlap or cotton mats, or plastic sheeting material for the protection of the surface of the pavement. When rain appears imminent, all paving operations shall stop and all available personnel shall begin protection of the sides of the pavement and covering the surface of the

unhardened concrete with the protective covering. Any surface finish damaged by rain shall be repaired or replaced to the satisfaction of the Engineer at no cost to the Owner.

601.15 Curing Concrete.

(a) Materials. Materials used in curing concrete shall conform to one of the following types:

Burlap-polyethylene sheeting shall meet the requirements of AASHTO M 171.

Polyethylene sheeting shall meet the requirements of AASHTO M 171.

Copolymer/synthetic blanket shall meet the requirements of AASHTO M 171. Copolymer/synthetic blankets shall be a composite of a copolymer membrane material coated over a layer of absorbent nonwoven synthetic fabric weighing at least 6 ounces per square yard, uniform in appearance, and free from visible defects.

Other approved sheeting materials shall meet the requirements of AASHTO M 171.

Membrane curing compound shall meet the requirements of AASHTO M 148, Type 1-D or Type 2.

(b) Application. The exposed concrete, immediately after finishing, shall be covered with one of the curing materials listed above and shall be kept continuously and thoroughly wet for a period of not less than 5 days after the concrete is placed. Membrane curing does not require the application of additional moisture.

Membrane curing compound shall not be used on surfaces requiring a Class 2 finish.

When membrane curing is used, the exposed concrete shall be thoroughly sealed by applying the membrane curing solution immediately after the free water has left the surface. The concrete inside the forms shall be sealed immediately after the forms are removed and necessary finishing has been done. For uniform application in the field on vertical concrete surfaces, the specified rate of application may be achieved by two coats applied at an interval of approximately 1 hour.

The Contractor shall provide satisfactory equipment and means to properly control and assure the direct application of the curing solution on the concrete surface so as to result in a uniform coverage at the rate of 1 gallon for each 125 square feet of area.

If rain falls on the newly coated concrete before the film has dried sufficiently to resist damage, or if the film is damaged in any other manner, a new coat of the solution shall be applied to the affected portions equal in curing value to that specified above.

601.16 Finishing Concrete Surfaces.

Surface finishes shall be classified as follows:

Class 1. Ordinary Surface finish.
Class 2. Rubbed finish.
Class 3. Sprayed finish.

Class 4. Exposed Aggregate finish.
Class 5. Tined Surface finish.
Class 6. Broomed finish.
Class 7. Grooved finish.

All concrete shall be given a Class 1, Ordinary Surface Finish. In addition, if further finishing is required, such other types of finish will be as specified herein.

Payment for finishes will be considered a part of the applicable item of concrete used.

The following surfaces shall be given a Class 2 finish except when a Class 3 finish is specified in the plans:

Exposed surfaces of retaining walls and box culvert wingwalls, surfaces of concrete rails, rail posts, rail end posts, rail bases, and parapets, including the outside face.

At the option of the Contractor, a Class 3 finish may be used on all surfaces requiring a Class 2 finish provided the same class of finish is used on the entire job.

Sidewalks, curbs, exposed horizontal surfaces of inlets and junction boxes, and exposed horizontal faces of miscellaneous concrete items shall be given a Class 6 finish.

Concrete pavement surfaces shall be given a Class 5 finish.

The various classes of surface finish are defined as follows:

(1) Class 1, Ordinary Surface Finish. Immediately following the removal of forms, fins and irregular projections shall be removed from all surfaces except from those that are not to be exposed or are not to be waterproofed. On all surfaces, the cavities produced by form ties and all other holes, broken corners or edges, and other defects shall be thoroughly cleaned, and after having been thoroughly saturated with water, shall be carefully pointed and trued with a mortar of cement and fine aggregate mixed in the proportion of 1:2. Mortar used in pointing shall be not more than 1 hour old. The concrete shall then be rubbed or sprayed, if required, and cured as specified under Subsection 601.15. Construction and expansion joints in the completed work 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. Repaired surfaces, the appearance of which is not satisfactory to the Engineer, shall be rubbed as specified under Class 2 finish.

Exposed surfaces not protected by forms shall be struck off with a straightedge and finished with a wood float to a true and even surface. The use of additional mortar to provide a plastered or grout finish will not be permitted.

The tops of caps in the area of the bridge seat shall be finished with a steel trowel or by grinding to a smooth finish and true slope at the proper elevation.

(2) Class 2, Rubbed Finish. After removal of forms, the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work the concrete shall be thoroughly saturated with water. Sufficient time shall have elapsed before the wetting down to allow the mortar used in the pointing of rod holes and defects to thoroughly set. Surfaces to be finished 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 fine sand mixed in proportions used in the concrete being finished. Rubbing shall be continued until form marks, projections, and irregularities have been removed, voids filled, and a uniform surface has been obtained. The paste produced by this rubbing shall be left in place at this time.

After 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 be continued until the entire surface is of a smooth texture and uniform color.

After the final rubbing is complete and the surface has dried, it shall be rubbed with burlap to remove loose powder and shall be left free from all unsound patches, paste, powder, and objectionable marks.

(3) Class 3, Sprayed Finish. The material furnished for sprayed finish shall be a commercial paint type texturing product produced specifically for this purpose, and shall consist of a synthetic non-alkyd resin containing mica, perlite, non-biodegradable fibers, and durable tinting pigments. The material shall be approved by the Engineer. Unless otherwise specified in the Contract, the color of the sprayed finish shall be concrete gray, equal or close to Shade 36622 of the Federal Color Standard 595 A.

Surfaces to be coated shall be free from efflorescence, flaking, coatings, dirt, oil, and other foreign substances. The sprayed finish shall not be applied over surfaces cured with membrane curing compound until 30 days has elapsed from application of the membrane. Prior to application of 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 shall be applied at a rate as recommended by the manufacturer and as approved by the Engineer. The spray finish shall be applied with heavy duty spray equipment capable of maintaining a constant pressure as necessary for proper application.

The completed finish shall be tightly bonded to the structure and shall present a uniform appearance and texture equal to or better than that required for rubbed finish. If necessary, an additional coat or coats shall be applied 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 coating shall be removed from the structure and the surface given a rubbed finish, or another approved finish satisfactory to the Engineer.

(4) Class 4, Exposed Aggregate Finish. This type of finish shall be produced by scrubbing the surface of green concrete with stiff wire or fiber brushes, using a solution of muriatic acid in the proportion of 1 part acid to 4 parts water, or by sand blasting, until the cement film or

surface is completely removed and the aggregate particles are exposed. The amount of aggregate exposure will be specified on the plans or designated by the Engineer. Any surface treated with muriatic acid shall be thoroughly washed with water to which a small amount of ammonia has been added to remove all traces of the acid. The resulting surface shall be an even pebbled texture.

(5) Class 5, Tined Roadway Surface Finish. The concrete roadway surface shall be given a finish with a burlap drag, followed by tining.

The surface shall be finished by dragging a seamless strip of damp burlap over the full width of the roadway surface. The burlap drag shall consist of sufficient layers of burlap and have sufficient length in contact with the concrete to slightly groove the surface, and shall be moved forward with a minimum bow of the lead edge. The drag shall be kept damp, clean, and free of particles of hardened concrete.

The final finish shall be accomplished by using the drag finish as described above with the further application of a metal tine finishing device. The tine shall be approximately 0.032" by 0.125" of steel flat wire, 2" to 5" in length, and spaced on ½" to ¾" centers. The grooves produced in the concrete shall be substantially from 1/8" to 3/16" in depth. The grooves shall be transverse to the centerline of the surface. The metal tine device shall be operated by approved mechanical or manual means. Other texturing equipment may be approved by the Engineer provided it produces a texture equivalent to that produced by the metal tine.

The tining shall be terminated with a transition in depth 18" from the gutter line. The outer 18" of the tined surface shall receive a Class 6, broomed finish.

(6) Class 6, Broomed 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, floated, and broomed. An edging tool shall be used on edges and expansion joints. The surface shall not vary more than ¼" under a 10' straightedge. The surface shall have a granular or matte texture.

(7) Class 7, Grooved Finish. The roadway surface shall be grooved perpendicular to the centerline with grooves extending across the slab to within 18" of the gutter line. The grooves shall be cut using a mechanical sawing device that will leave grooves 1/8" to 3/16" in depth and spaced on ½" to ¾" centers.

Section 602. Reinforcing Steel

602.01 Description. This item shall consist of reinforcing steel and miscellaneous accessories of the quality, type, size, and quantity designated, which shall be furnished and placed in concrete according to these specifications and in conformity with the details shown on the plans, or as directed.

602.02 Materials.

(a) Bar Reinforcement. Bar reinforcement for concrete in sizes up to and including #18 shall conform to the requirements of AASHTO M 31 or M 53.

(b) Wire and Wire Fabric. Wire, when used as reinforcement in concrete, shall conform to the requirements of AASHTO M 32 or M 225.

(c) Bar Mat Reinforcement. Bar mat reinforcement for concrete shall conform to the requirements of AASHTO M 54.

(d) Epoxy Coating. When specified, reinforcing steel bars shall be coated according to AASHTO M 284 using a coating material that meets the requirements of Annex A1 of AASHTO M 284.

The Contractor shall supply to the Engineer a written certification that properly identifies the number of each batch of coating material used in the order; the material, quantity represented, date of manufacture, and name and address of the manufacturer; and a statement that the supplied coating material meets the requirements of Annex A1 of AASHTO M 284.

Patching material, compatible with coating material, inert in concrete, and meeting the requirements of Annex A1 of AASHTO M 284, shall be provided by the epoxy coating manufacturer.

602.03 Bar Lists and Bending Diagrams. All reinforcing steel shall be fabricated to conform to the details shown on the plans. Pins used for bending reinforcing steel shall be equal to or larger than that shown on the plans. Bar lists and bending diagrams for reinforcing steel and bar supports will not be reviewed or approved by the Engineer. The Contractor shall be responsible for the accuracy of the fabricated reinforcing steel.

602.04 Fabrication. Bar reinforcement shall be bent to the shapes shown on the plans.

Bars shall be bent cold, unless otherwise permitted by the Engineer. No bars partially embedded in concrete shall be field bent, except as shown on the plans or specifically permitted by the Engineer.

Radii for bends shall be as shown on the plans. When not shown on the plans, radii bends on the inside of bars shall be as specified below.

Bar Number	Minimum Radii
Stirrups and Ties	4 bar diameters
3,4,5,6,7, or 8	6 bar diameters
9,10, or 11	8 bar diameters
14 or 18	10 bar diameters

The Engineer or his representative shall have free access to the shop for inspection, and every facility shall be extended to him for this purpose. On a random basis, samples of bars, other than the additional test bars, may be taken by the Engineer.

Epoxy coating applicators shall be CRSI certified. The Contractor shall inform the Engineer, in writing, at least 10 days prior to performing any of the cleaning or coating operations. The Contractor shall furnish to the Engineer the coating applicator's certification certifying that all materials used, the preparation of the bars, coating, and curing were done according to these specifications and that no bars contain more than six holidays per yard. The certification shall include or have attached specific results of tests of coating thickness and flexibility of coating.

602.05 Shipping, Handling, and Protection of Material. Bar reinforcement shall be shipped in standard bundles, tagged and marked according to the *Code of Standard Practice* of the Concrete Reinforcement Steel Institute.

Steel reinforcement shall be protected from damage. When placed in the work, it shall be free from dirt, detrimental rust or scale, paint, oil, or other foreign substance. Steel reinforcement shall be stored above the ground on skids, platforms, or other supports. Epoxy coated reinforcing steel that is not incorporated into the work within 90 calendar days after delivery to the project shall be protected from exposure to the sun.

Epoxy coating damaged during fabrication, shipping, or installation shall be repaired according to AASHTO M 284. Damaged areas less than 0.10 square inch need not be repaired but all areas larger than 0.10 square inch shall be repaired. The maximum amount of damage shall not exceed 2% of the surface area of each bar. All damaged areas shall be repaired according to the manufacturer's instructions. Repairs will be required on all sheared or cut ends of bars, end areas left bare during the coating process, and any areas where the entire coating is removed. All repairs shall be completed as soon as practicable and, in the case of bare end areas and sheared ends, before visible oxidation of the surface occurs. Epoxy coated bars shall not be flame cut.

The Contractor shall exercise caution when placing and vibrating concrete to prevent any damage to epoxy coated bars. In order to prevent the vibrator from damaging the coated bars, the head shall be covered with a sheet of rubber or a similar material as approved by the Engineer.

602.06 Placing and Fastening. Steel 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 12" in each direction, in which case alternate intersections shall be tied. Bundled bars shall be tied together at not more than 6' centers.

Bar positions or clearances from the forms shall be maintained by means of stays, ties, hangers, or other approved devices. Reinforcing steel shall not be welded unless detailed on the plans or authorized in writing by the Engineer. Metal bar supports that are in contact with the exterior surface of the concrete shall have protection conforming with the CRSI

Specifications, Class 1 for Plastic Protected Bar Supports or Class 2 for Stainless Steel Bar Supports, with the further provision that the plastic protection may be applied either by a dipping operation or by the addition of premolded plastic tips to the legs of the supports. Epoxy Coated Bar Supports that are coated according to the provisions of AASHTO M 284 using a coating material meeting the requirements of Annex A1 of AASHTO M 284 may be substituted for Plastic Protected Bar Supports or Stainless Steel Bar Supports. All high chairs and bar bolsters shall be metal. Any bar supports that deform under foot traffic or other construction activities shall not be used.

When concrete is to rest on an excavated surface, layers of bars shall be supported above the surface by metal chairs or by precast mortar or concrete blocks. The use of rocks, pieces of stone or brick, pipe, wooden blocks, or chunks of concrete will not be permitted as bar supports or spacers.

Reinforcement shall be placed by the Contractor and inspected and approved by the Engineer before the placing of concrete begins. Concrete placed in violation of this provision may be rejected and removal required. Unless otherwise shown on the plans, the spacing of supports shall conform to the recommendations of CRSI.

Epoxy coated bars shall be placed on plastic coated or epoxy coated metal supports and shall be held in place by use of plastic coated tie wires or molded plastic clips especially fabricated for this purpose. Bar supports for epoxy coated bars shall be fully coated metal supports. Epoxy coated bar supports shall be coated according to the provisions of AASHTO M 284 using a coating material meeting the requirements of Annex A1. In placing epoxy coated bars, care shall be maintained to prevent coated bars from being damaged.

After the coated bars are secured to bar supports, a final visual inspection shall be made and all uncoated or damaged areas coated or repaired as required by the Engineer.

602.07 Splicing. Reinforcing steel shall be furnished in the full lengths specified on the plans. Bars spliced as a result of unforeseen construction conditions or sequences will require the written approval of the Engineer. Splices shall meet the requirements of the current edition of the AASHTO *Standard Specifications for Highway Bridges.*

Secondary reinforcing used for distribution of loads, such as longitudinal bars in box culverts and retaining walls may be lapped 32 bar diameters minimum if bars are #6 or smaller. Primary reinforcing for columns and retaining walls which require splicing as a result of the lowering of footings shall be spliced at the upper end of the original bars. Required lengths of splices for primary reinforcing will be determined by the Engineer.

In lapped splices, the bars shall be placed in contact and fastened together in such a manner as to maintain the minimum distance to the surface of the concrete as shown on the plans.

Sheets of wire fabric 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 lap shall be not less than one space of wire fabric or bar.

DIVISION 700. TRAFFIC CONTROL FACILITIES

Section 701. Actuated Controller

701.01 Description. This item shall consist of furnishing and installing an actuated controller and other associated equipment according to these specifications and at the locations shown on the plans or as directed. All requirements of **Standard Specifications for Highway Construction, AHTD Edition of 2003** Division 700 Traffic Control Facilities, and specifically Section 701 Actuated Controller, shall apply. Subject to approval of Engineer. Portions of the AHTD Standard Specifications may be superseded by these provisions.

The Contractor shall pretest all electronic equipment before installing any such electronic equipment.

701.02 Materials. Materials shall be in accordance with the AHTD Standard Specifications with the following exceptions:

(a) General. Controller and radio equipment supplied shall match the brand, type, and configuration currently used by the governing authority. System software is currently licensed to the local and state authorities. All equipment shall be completely compatible with existing hardware and software.

(b) Fan and Ventilation. The second sentence of the third paragraph of Subsection 701.02 Materials (c) Cabinet (5) Fan and Ventilation is hereby deleted and the following substituted therefore:

> The fan shall be thermostatically controlled and shall be manually adjustable to turn on between 70^{o}F (32^{o}C) and 150^{o}F (66^{o}C).

(c) Power Panel. Subsection 701.02 Materials (d) Cabinet Auxiliary Equipment (7) Power Panel is hereby deleted and the following substituted therefore:

> The cabinet shall have a power distribution panel containing a 50 amp radio interference suppressor, a 30 amp main circuit breaker, a 15 amp auxiliary equipment circuit breaker, a 15 amp circuit breaker for a GFCI receptacle, fan, and light, and a 15 amp circuit breaker for a non-GFCI protected receptacle.

(d) Subsection 701.02 (d) (10) Wiring Diagrams and Controller Manual. is hereby deleted and the following substituted therefore:

> Three copies of the Cabinet wiring Diagram and one copy of the controller manual shall be supplied with each cabinet. One diagram and the manual shall be placed in the "Cabinet Drawer Assembly". The "Cabinet Drawer Assembly" shall be fabricated to the approximate dimensions shown on the plans. Included with the "Cabinet Drawer Assembly" will be all hardware necessary to fasten and install the Assembly to the underside of a cabinet shelf roughly at the midpoint of the Cabinet vertically.

One diagram shall be delivered to the local or state authority before final inspection of the intersection. One diagram shall be given to the Engineer.

701.03 Construction Requirements.

(a) General. Construction shall be in accordance with the AHTD Standard Specifications.

(b) Pretesting. The Contractor shall pretest all electronic equipment before installing any such electronic equipment. Unless approved otherwise by the Owner, the pretesting shall include a minimum of seven (7) consecutive days of test operation. No separate payment shall be made for any and all pretesting but such pretesting shall be considered subsidiary to the applicable equipment.

701.04 Method of Measurement. Actuated Controllers will be measured by the unit. One unit shall include the controller, the controller cabinet; the pad on which the cabinet is installed, when required; and all hardware required for installing the cabinet.

701.05 Basis of Payment. Work competed and accepted and measured as provided above will be paid for at the contract unit price bid per each Actuated Controller of the phases and the NEMA TS type specified, which price shall be full compensation for furnishing the Actuated Controller and mounting the controller cabinet; for installing, wiring and testing the controller; for excavation and backfilling; for construction of the mounting pad; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Actuated Controller TS1 (___ Phases)	EA
Actuated Controller TS2-Type 2 (___ Phases)	EA

Section 702. Traffic Signal Head

702.01 Description. This item shall consist of furnishing and installing 300 mm (12") diameter Traffic Signal Heads and components based on Light Emitting Diode (LED) technology according to these specifications as well as **SECTION 706, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

702.02 Materials. The LED modules shall be suitable for span wire and mast arm mounted signals. Units must meet the following specifications to be accepted.

(a) General. Acceptable units shall be pre-approved as indicated on the Arkansas Highway and Transportation Department's most current "Qualified Products List" (QPL). The LED

modules shall be suitable for span wire and mast arm mounted signals. Units must meet the following specifications to be accepted.

(b) Physical and Mechanical. LED traffic signal modules designed shall not require special tools for installation. Retrofit replacement LED signal modules shall fit into existing traffic signal housings built to the VTCSH Standard without modification to the housing. Installation of a retrofit replacement LED signal module into an existing signal housing shall only require the removal of the existing optical unit components, i.e., lens, lamp, and gaskets; shall be weather tight and fit securely in the housing; and shall connect directly to existing electrical wiring utilizing spade connectors. It shall not be necessary to remove reflector or lamp module. Reflector and lamp module is not required where new housings are provided.

(c) Optical Requirements. The RED and GREEN modules shall be measured per ITE specifications, and are required to meet luminous values that are a minimum of 115 percent greater than the required minimum values in the specifications at the time of production. The YELLOW modules shall be tested for luminous output at 25°C, allowing the modules to achieve thermal equilibrium for 60 minutes, while the modules are energized at nominal operating voltage, at a 8.3% (or 1/12) duty cycle or 5 sec on/55 sec off). The yellow modules shall meet all other ITE specifications.

(d) Optical Unit. LED signal modules shall meet the following requirements:

1) **Optical Unit Replacement.** The LED module shall be constructed to allow the replacement of the outer lens and/or the light engine when needed.

2) **Lens Surface.** The external lens shall be smooth on the outside to prevent excessive dirt/dust buildup.

3) **Tinting.** The RED, YELLOW and optionally on GREEN lens shall be tinted or shall use transparent film or materials with similar characteristics.

4) **Chromaticity.** The measured coordinates of LED signal modules shall conform to the chromaticity requirements of Section 8.04 and Figure 1 of the VTCSH standard.

5) **Environment.** The LED signal module shall be rated for use in the ambient operating temperature range, measured at the exposed rear of the module, of -40° C (-40° F) to +74°C (+165° F). The LED sign module shall be protected against dust and moisture intrusion per the requirements of NEMA Standard 250-1991, sections 4.7.2.1 and 4.7.3.2, for Type 4 enclosures to protect all internal LED, electronic, and electrical components. The LED signal module lens shall be UV Stabilized.

6) **Pre assembly**. The LED signal module shall be a single, self-contained device, not requiring on-site assembly for installation into an existing traffic signal housing. The power supply for the LED signal module may be either integral or packaged as a separate module. The power supply may be designed to fit and mount inside the traffic signal housing adjacent to the LED signal module. The assembly and manufacturing process for the LED signal assembly shall be designed to assure all

internal LED and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

7) **LED Drive Circuitry (parallel).** The individual LED light sources shall be wired so that a catastrophic failure of one LED light source will result in the loss of only that one LED light source, and the loss of no more than 1% of the total LED'S within the LED signal module.

8) **Material Composition.** Materials used for the lens and signal module construction shall conform to ASTM specification for the materials where applicable. Enclosures containing either the power supply or electronic components of the signal modules shall be made of UL94VO flame retardant materials. The lens of the signal module is excluded from this requirement.

9) **Identification Markings.** Each individual LED signal module shall be identified for warranty purposes. Each LED signal module shall be identified on the backside with the manufacturer's name and serial number. The following operating characteristics shall be identified: nominal operating voltage, power consumption, and Volt-Ampere. Modules shall have a prominent and permanent vertical indexing indicator, i.e. UP ARROW or the word UP or TOP, for correct indexing and orientation inside a signal housing. Modules conforming to this specification may have the following statement: "Manufactured in Conformance with the Interim Purchase Specification of the ITE for LED vehicle Traffic Signal Modules" on an attached label.

(e) Manufacturer's Warranty. The standard contract warranty shall apply with time extensions applied to materials. The contractor shall provide a written manufacturer's guarantee to the Owner. Warranty shall provide the following stipulations:

- Isolated Failures Warranty Period not less than 7 Years
- Design Failure Warranty Period not less than 5 Years

Warranty for isolated lens failure shall include replacement LED module at no cost for materials and shipping for a period of 7 years from the date the intersection is considered substantially complete by the engineer. An LED module shall be considered failed when the luminosity drops below the ITE requirements listed above.

A product "Design Failure" is considered to have occurred if, within a period of 5 years or less, a total of ten percent (10%) of the LED modules supplied on a particular Job are considered failed as described above. The supplier shall then "recall" the entire shipment at no cost to the agency maintaining the equipment. This shall include labor and equipment necessary to replace the units.

702.03 Construction Requirements. Construction shall be in accordance with the AHTD Standard Specifications.

702.04 Method of Measurement. LED Traffic Signal Heads will be measured by the unit. One unit shall include the number of faces and sections specified, together with all mounting brackets and hardware; signs, where required; and other incidentals to provide a

signal head complete in place.

702.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Traffic Signal Head of the type and size specified, which price shall be full compensation for furnishing and installing all materials and signs; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Traffic Signal Head, LED (3-Section)	EA
Traffic Signal Head, LED (5-Section)	EA

Section 703. Pedestrian Signal Head

703.01 Description. This item shall consist of furnishing and installing 300 mm (12") diameter Traffic Signal Heads and components based on Light Emitting Diode (LED) technology according to these specifications as well as **SECTION 707, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

703.02 Materials. The LED modules shall be suitable for span wire and mast arm mounted signals. Units must meet the following specifications to be accepted.

(a) Physical and Mechanical. LED pedestrian signal modules designed shall not require special tools for installation. Retrofit replacement LED signal modules shall fit into existing pedestrian signal housings built to the VTCSH Standard without modification to the housing. Installation of a retrofit replacement LED signal module into an existing signal housing shall only require the removal of the existing optical unit components, i.e., lens, lamp, and gaskets; shall be weather tight and fit securely in the housing; and shall connect directly to existing electrical wiring utilizing spade connectors. It shall not be necessary to remove reflector or lamp module. Reflector and lamp module is not required where new housings are provided.

(b) Optical Requirements. The modules shall be measured per ITE specifications, and are required to meet luminous values that are a minimum of 115 percent greater than the required minimum values in the specifications at the time of production. The YELLOW modules shall be tested for luminous output at 25°C,, allowing the modules to achieve thermal equilibrium for 60 minutes, while the modules are energized at nominal operating voltage, at a 8.3% (or 1/12) duty cycle or 5 sec on/55 sec off). The yellow modules shall meet all other ITE specifications.

(c) Optical Units. LED signal modules shall meet the following requirements:

1) **Optical unit replacement.** The LED module shall be constructed to allow the replacement of the outer lens and/or the light engine when needed.

2) **Lens Surface.** The external lens shall be smooth on the outside to prevent excessive dirt/dust buildup.

3) **Chromaticity.** The measured coordinates of LED signal modules shall conform to the chromaticity requirements of Section 8.04 and Figure 1 of the VTCSH standard.

4) **Environment.** The LED signal module shall be rated for use in the ambient operating temperature range, measured at the exposed rear of the module, of -40° C (-40 ° F) to +74 ° C (+165 ° F). The LED sign module shall be protected against dust and moisture intrusion per the requirements of NEMA Standard 250-1991, sections 4.7.2.1 and 4.7.3.2, for Type 4 enclosures to protect all internal LED, electronic, and electrical components. The LED signal module lens shall be UV Stabilized.

5) **Pre assembly.** The LED signal module shall be a single, self-contained device, not requiring on-site assembly for installation into an existing pedestrian signal housing. The power supply for the LED signal module may be either integral or packaged as a separate module. The power supply may be designed to fit and mount inside the pedestrian signal housing adjacent to the LED signal module. The assembly and manufacturing process for the LED signal assembly shall be designed to assure all internal LED and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

6) **LED Drive Circuitry (parallel).** The individual LED light sources shall be wired so that a catastrophic failure of one LED light source will result in the loss of only that one LED light source, and the loss of no more than 1% of the total LED'S within the LED signal module.

7) **Material Composition.** Materials used for the lens and signal module construction shall conform to ASTM specification for the materials where applicable. Enclosures containing either the power supply or electronic components of the signal modules shall be made of UL94VO flame retardant materials. The lens of the signal module is excluded from this requirement.

8) **Identification Markings.** Each individual LED signal module shall be identified for warranty purposes. Each LED signal module shall be identified on the backside with the manufacturer's name and serial number. The following operating characteristics shall be identified: nominal operating voltage, power consumption, and Volt-Ampere. Modules shall have a prominent and permanent vertical indexing indicator, i.e. UP ARROW or the word UP or TOP, for correct indexing and orientation inside a signal housing. Modules conforming to this specification may have the following statement: "Manufactured in Conformance with the Interim Purchase Specification of the ITE for LED vehicle Pedestrian signal Modules" on an attached label.

(d) Manufacturer's Warranty. The standard contract warranty shall apply with time extensions applied to materials. The contractor shall provide a written manufacturer's guarantee to the Owner. Warranty shall provide the following stipulations:

- Isolated Failures Warranty Period not less than 7 Years
- Design Failure Warranty Period not less than 5 Years

Warranty for isolated lens failure shall include replacement LED module at no cost for materials and shipping for a period of 7 years from the date the intersection is considered substantially complete by the engineer. An LED module shall be considered failed when the luminosity drops below the ITE requirements listed above.

A product "Design Failure" is considered to have occurred if, within a period of 5 years or less, a total of ten percent (10%) of the LED modules supplied on a particular Job are considered failed as described above. The supplier shall then "recall" the entire shipment at no cost to the agency maintaining the equipment. This shall include labor and equipment necessary to replace the units.

703.03 Construction Requirements. Construction shall be in accordance with the AHTD Standard Specifications. No distinction is made for span-wire installations, post mount, mast arm mount, or other mounting methods as described on the plan sheet(s).

703.04 Method of Measurement. LED Pedestrian Signal Heads will be measured by the unit. One unit shall include one complete signal assembly; pedestrian actuated push button detectors and signs; and all wiring except signal cable necessary to provide a complete functioning unit.

703.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each LED Pedestrian Signal Head, which price shall be full compensation for furnishing and installing all materials and signs; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Pedestrian Signal Head w/ Push Button, LED	EA

Section 704. Countdown Pedestrian Signal Head

704.01 Description. This item shall consist of furnishing and installing Countdown Pedestrian Signal Heads and components based on Light Emitting Diode (LED) technology according to these specifications as well as **SECTION 707 , Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department of the latest edition.** Subject to approval of the Engineer. The basic configuration consists of

the “filled”, symbolic single section design. Portions of the AHTD Standard Specifications will be superseded by these provisions.

704.02 Materials. The LED modules shall be suitable for span wire and mast arm mounted signals. Units must meet the following specifications to be accepted.

(a) Physical and Mechanical. LED pedestrian signal modules designed shall not require special tools for installation. Retrofit replacement LED signal modules shall fit into existing pedestrian signal housings built to the VTCSH Standard without modification to the housing. Installation of a retrofit replacement LED signal module into an existing signal housing shall only require the removal of the existing optical unit components, i.e., lens, lamp, and gaskets; shall be weather tight and fit securely in the housing; and shall connect directly to existing electrical wiring utilizing spade connectors. It shall not be necessary to remove reflector or lamp module. Reflector and lamp module is not required where new housings are provided.

The countdown feature will be displayed only during the flashing “Don’t Walk” segment of the pedestrian phase. This feature should be able to restart at the correct part of the signal cycle after a power outage or a signal pre-emption has been activated.

(b) Optical Requirements. The modules shall be measured per ITE specifications, and are required to meet luminous values that are a minimum of 115 percent greater than the required minimum values in the specifications at the time of production. The YELLOW modules shall be tested for luminous output at 25°C, allowing the modules to achieve thermal equilibrium for 60 minutes, while the modules are energized at nominal operating voltage, at a 8.3% (or 1/12) duty cycle or 5 sec on/55 sec off). The yellow modules shall meet all other ITE specifications.

(c) Optical Unit. LED signal modules shall meet the following requirements:

Optical unit replacement -- The LED module shall be constructed to allow the replacement of the outer lens and/or the light engine when needed.

Lens Surface – The external lens shall be smooth on the outside to prevent excessive dirt/dust buildup.

Chromaticity – The measured coordinates of LED signal modules shall conform to the chromaticity requirements of Section 8.04 and Figure 1 of the VTCSH standard.

Environment -- The LED signal module shall be rated for use in the ambient operating temperature range, measured at the exposed rear of the module, of -40° C (-40° F) to +74°C (+165° F). The LED sign module shall be protected against dust and moisture intrusion per the requirements of NEMA Standard 250-1991, sections 4.7.2.1 and 4.7.3.2, for Type 4 enclosures to protect all internal LED, electronic, and electrical components. The LED signal module lens shall be UV Stabilized.

Pre assembly -- The LED signal module shall be a single, self-contained device, not requiring on-site assembly for installation into an existing pedestrian signal housing. The power supply for the LED signal module may be either integral or packaged as a separate module. The power supply may be designed to fit and mount inside the pedestrian signal

housing adjacent to the LED signal module. The assembly and manufacturing process for the LED signal assembly shall be designed to assure all internal LED and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

LED Drive Circuitry (parallel) – The individual LED light sources shall be wired so that a catastrophic failure of one LED light source will result in the loss of only that one LED light source, and the loss of no more than 1% of the total LED'S within the LED signal module.

Material Composition -- Materials used for the lens and signal module construction shall conform to ASTM specification for the materials where applicable. Enclosures containing either the power supply or electronic components of the signal modules shall be made of UL94VO flame retardant materials. The lens of the signal module is excluded from this requirement.

Identification Markings -- Each individual LED signal module shall be identified for warranty purposes. Each LED signal module shall be identified on the backside with the manufacturer's name and serial number. The following operating characteristics shall be identified: nominal operating voltage, power consumption, and Volt-Ampere. Modules shall have a prominent and permanent vertical indexing indicator, i.e. UP ARROW or the word UP or TOP, for correct indexing and orientation inside a signal housing. Modules conforming to this specification may have the following statement: "Manufactured in Conformance with the Interim Purchase Specification of the ITE for LED vehicle Pedestrian signal Modules" on an attached label.

(d) Manufacturer's Warranty. The standard contract warranty shall apply with time extensions applied to materials. The contractor shall provide a written manufacturer's guarantee to the Agency (City, County or etc.) who provides electrical service and maintenance of the intersection. Warranty shall provide the following stipulations:

- Isolated Failures Warranty Period not less than 7 Years
- Design Failure Warranty Period not less than 5 Years

Warranty for isolated lens failure shall include replacement LED module at no cost for materials and shipping for a period of 7 years from the date the intersection is considered substantially complete by the engineer. An LED module shall be considered failed when the luminosity drops below the ITE requirements listed above.

A product "Design Failure" is considered to have occurred if, within a period of 5 years or less, a total of ten percent (10%) of the LED modules supplied on a particular Job are considered failed as described above. The supplier shall then "recall" the entire shipment at no cost to the agency maintaining the equipment. This shall include labor and equipment necessary to replace the units.

704.03 Construction Requirements. Construction shall be in accordance with the AHTD Standard Specifications. No distinction is made for span-wire installations, post mount, mast arm mount, or other mounting methods as described on the plan sheet(s).

704.04 Method of Measurement.

(a). COUNTDOWN PEDESTRIAN SIGNAL HEAD, LED. Work completed and accepted and measured as provided above will be measured by each unit.

(b) PEDESTRIAN SIGNAL LED LENS RETROFIT (RET). Work completed and accepted and measured as provided above will be measured by each unit.

704.05 Basis of Payment.

(a) COUNTDOWN PEDESTRIAN SIGNAL HEAD, LED. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for PEDESTRIAN SIGNAL HEAD LED of the type, display and size specified, which price shall be full compensation for furnishing and installing all materials and signs; and for all labor, equipment, tools, and incidentals necessary to complete the work.

(b) LED PEDESTRIAN SIGNAL LENS RET. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for PEDESTRIAN SIGNAL LED LENS RET of the type, number of sections, color and display specified, which price shall be full compensation for removing existing unnecessary hardware and modifying existing housing; and for furnishing and installing all materials; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Countdown Pedestrian Signal Head, LED	EA
Pedestrian Signal LED lens RET	EA

Section 705. Traffic Signal Cable

705.01 Description. This item shall consist of furnishing and installing traffic signal cable according to these specifications and at the locations shown on the plans or as directed.

705.02 Materials. The cable shall be #14 AWG copper with the number of conductors as shown on the plans and shall comply with the *International Municipal Signal Association Specification* 20-1 or 20-3 for 600 volt polyethylene insulated and jacketed signal cable.

The Contractor shall furnish and install acceptable bands, ties, and other supports for the cable in poles and control boxes according to the best modern practice.

Cables shall be marked for phase identification according to the manufacturer's standards.

705.03 Construction Requirements.

(a) General. Connections to signal heads shall be made with a polyethylene jacketed stranded wire cable. The Contractor will be allowed to make connections to the signal heads by the "line tapping" method.

Splices shall be moisture proof and have a dielectric strength at least equal to that of the original insulation. The sweating or soldering shall be accomplished by pouring, using solder hot enough to run properly. Splices shall be made according to the best modern practice and may be accomplished by methods approved by the Engineer. Splices will be allowed only at pole bases.

705.04 Method of Measurement. Traffic Signal Cable will not be measured and will be paid at a lump sum price.

705.05 Basis of Payment. Work completed and accepted as provided above will be paid for at the contract unit price bid per lump sum for Traffic Signal Cable, which price shall be full compensation for furnishing and installing all materials; making all splices and connections; and for all labor, equipment, tools, and incidentals necessary to complete the work:

Payment will be made under:

Pay Item	Pay Unit
Traffic Signal Cable	LS

Section 706. Galvanized Steel Conduit

706.01 Description. This item shall consist of furnishing and installing hot dipped galvanized steel conduit of the size and at the locations shown on the plans and according to these specifications as well as **SECTION 709, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

706.02 Materials. Materials shall be in accordance with the AHTD Standard Specifications.

706.03 Construction Requirements.

Construction shall be in accordance with the AHTD Standard Specifications.

706.04 Method of Measurement. Galvanized Steel Conduit will be measured by the linear foot (meter) measured along the axis of the conduit in its final position. It will not be considered complete until backfill and compaction have been satisfactorily performed. All

necessary conduit fittings will be included as part of the conduit run and will not be measured separately.

706.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per linear foot for Galvanized Steel Conduit of the size specified which price shall be full compensation for furnishing and installing conduit fittings, and drag rope; for jacking, drilling, excavation, backfill, compaction, removal of surplus material, and replacement of existing surfaces; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
____" Galvanized Steel Conduit	LF

Section 707. Non-Metallic Conduit

707.01 Description. This item shall consist of furnishing and installing PVC (polyvinyl chloride) or PE (polyethylene) conduit according to these specifications as well as **SECTION 710, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

707.02 Materials. Materials shall be in accordance with the AHTD Standard Specifications.

707.03 Construction Requirements. Construction shall be in accordance with the AHTD Standard Specifications with the following exceptions.

(a) Depth. The first sentence of the first paragraph of Subsection 710.03 Construction Requirements is hereby deleted and the following substituted therefore:

> Conduit shall be installed in trenches or predrilled tunnels not less than 24" below final grade except where otherwise indicated on the plans or as directed by the Engineer.

707.04 Method of Measurement. Non-Metallic Conduit will be measured by the linear foot along the axis of the conduit in its final position. It will not be considered complete until backfill and compaction have been satisfactorily performed. All necessary conduit fittings will be included as part of the conduit run and will not be measured separately.

707.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per linear foot for Non-Metallic Conduit, of the size specified, which price shall be full compensation for furnishing and installing the

conduit, fittings, and drag rope; for excavation, backfill, compaction, removal of surplus material, and replacement of existing surfaces; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
____" Non-Metallic Conduit	LF

Section 708. Concrete Pull Box

708.01 Description. This item shall consist of furnishing and installing at locations shown on the plans or as directed, a Concrete Pull Box of the type specified and according to these specifications as well as **SECTION 711, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

708.02 Materials. Materials shall be in accordance with the AHTD Standard Specifications.

Section 711 of the AHTD Standard Specification for Highway Construction, Edition of 2003, is hereby amended as follows:

Subsection 711.02 Materials, is hereby deleted and the following substituted therefore:

The pull boxes shall be constructed with portland cement concrete reinforced with welded wire or shall be polymer concrete reinforced with heavyweave fiberglass. No fiberglass shall be exposed. All exposed portions of the pull box shall be non-electrically conductive.

The minimum inside dimensions measured horizontally across the center of the box just below the lid support lip shall be as follows:

Concrete Pull Box -- Type 1 and 1 HD:

8 ¾" (220 mm) wide x 14 ¼" (360 mm) long

Concrete Pull Box -- Type 2 and 2 HD:

11" (280 mm) wide x 21" (530 mm) long

Concrete Pull Box -- Type 3 and 3 HD:

15 ¼" (385 mm) wide x 28" (710 mm) long

The depth measured from the top of the lid shall be a minimum of 11 ½" (290 mm).

A non-metal electrically insulated cover shall be provided for each pull box. The covers shall have a skid resistant surface on top and a lifting eye.

The pull box and cover shall be constructed in such a manner that the assembly will support light vehicular traffic. The cover with pull box shall meet or exceed the following test loading:

Type	Load		Load Area	
	pounds	kg	Sq. inch	sq mm
1	3800	1720	10 (3.16" x 3.16")	6400 (80 mm square)
1 HD	7500	3400	10	6400
2	3800	1720	20 (4" x 5")	13,000 (100 mm x 130 mm)
2 HD	7500	3400	20	13,000
3	3800	1720	20	13,000
3 HD	7500	3400	20	13,000

Pull box with cover in place shall comply with the National Electric Code for exposed boxes rated at voltages up to 480 VAC.

All Type HD concrete pull boxes are to be installed as shown on the plans with a surrounding apron of concrete 12" (305 mm) wide and 6" (152 mm) in depth. The concrete shall comply with subsection 601, "Cast-in-Place Concrete" of these Standard Specifications for Class S Concrete. Acceptance testing shall be as specified elsewhere within these Standard Specifications. Reinforcing steel shall comply with subsection 602, "Reinforcing Steel" of these Standard Specifications for the size and grade shown in the plans and shall be placed as shown in the plans and in conformance with Subsection 602.

Pull boxes located within AHTD right-of-ways shall be permanently labeled with "AHTD", the manufacturer's name and model identifier. The permanent label "AHTD" shall be placed on the outside of the pull box lid.

Pull boxes located within the Owner's right-of-ways shall be permanently labeled with the jurisdiction's name, the manufacturer's name and model identifier. The permanent label with the jurisdiction's name shall be placed on the outside of the pull box lid.

708.03 Construction Requirements. Construction shall be in accordance with the AHTD Standard Specifications.

708.04 Method of Measurement. Concrete Pull Boxes, in place with lids, will be measured by the unit.

708.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Concrete Pull Box of the type specified, which price shall be full compensation for furnishing and installing the pull box; for excavation, backfill, compaction, removal of surplus materials and replacement of the existing surface; for furnishing and placing the bedding material; for furnishing and placing reinforcing steel and concrete for the HD pull box aprons; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
Concrete Pull Box (Type ___)	EA

Section 709. Traffic Signal Mast Arm with Pole and Foundation

709.01 Description. This item shall consist of furnishing and erecting steel traffic signal mast arms and poles with foundations according to these specifications as well as **SECTION 714, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

709.02 Materials. Materials shall be in accordance with the AHTD Standard Specifications with the following exceptions:

a) Poles and Mast arms. Paragraph (a) of subsection 714.02 is hereby deleted and the following substituted therefore:

(a) Poles and mast arms shall be ASTM A 1011, SS, Grade 50 (345), AASHTO M 270, Grade 50 (345), ASTM A 595 Grade A, or ASTM A 572 Grade 50 or Grade 65. Galvanizing shall comply with AASHTO M 111, Thickness Grade 100.

(b) Ground Rods. The first sentence of the first paragraph of Subsection 714.02 Materials (j) Ground Rods is hereby deleted and the following substituted therefore:

Ground rods shall be 3/4" x 10’ or larger with cad welded ground wire.

709.03 Construction Requirements. Construction shall be in accordance with the AHTD Standard Specifications and as follows:

a) Structural Design. Structural design must be certified by a registered engineer representing the manufacturer:

(1) that the design complies with the plans and specifications and

(2) that the design meets or exceeds the standards found in the 1994 Edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals”, and interims, for the specific site conditions and as follows:

(a) Minimum wind load requirements shall be 80 MPH wind zone.

709.04 Method of Measurement. Traffic Signal Mast Arm and Pole with Foundation will be measured by the unit.

709.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Traffic Signal Mast Arm and Pole With Foundation of the arm length specified, which price shall be full compensation for furnishing and installing the pole and arm; for excavation, backfill, compaction, and removal of surplus material; for furnishing and placing reinforcing steel and concrete; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	**Pay Unit**
___’ Traffic Signal Mast Arm and Pole With Foundation	EA

Section 710. Traffic Signal Pedestrian Pole with Foundation

710.01 Description. This item shall consist of furnishing and erecting steel traffic signal mast arms and poles with foundations according to these specifications as well as **SECTION 715, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

710.02 Materials. Materials shall be in accordance with the AHTD Standard Specifications with the following exceptions:

(a) Ground Rods. The first sentence of the first paragraph of Subsection 715.02 Materials (g) Ground Rods is hereby deleted and the following substituted therefore:

Ground rods shall be 3/4" x 10’ or larger with cad welded ground wire.

710.03 Construction Requirements. Construction shall be in accordance with the AHTD Standard Specifications and as follows:

a) Structural Design. Structural design must be certified by a registered engineer representing the manufacturer:

(1) that the design complies with the plans and specifications and

(2) that the design meets or exceeds the standards found in the 1994 Edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals”, and interims, for the specific site conditions and as follows:

(a) Minimum wind load requirements shall be 80 MPH wind zone.

710.04 Method of Measurement. Traffic Signal Pedestal Poles with Foundation will be measured by the unit.

710.05 Basis of Payment. Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Traffic Signal Pedestal Pole With Foundation, which price shall be full compensation for furnishing and installing the pole; for excavation, backfill, compaction, and removal of surplus material; for furnishing and placing reinforcing steel and concrete; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Traffic Signal Pedestal Pole With Foundation	EA

Section 711. Traffic Signal Equipment Performance Test

711.01 Description. This item shall consist of providing a 6 month guarantee and proving the soundness of all traffic signal equipment and related electrical components installed at each location according to these specifications and at locations shown on the plans or as directed.

The Contractor shall conduct a performance test, which shall consist of a continuous 30 day period of operation without a major malfunction. A major malfunction is considered to be any occurrence, other than a power failure beyond the Contractor’s control, that renders the installation inoperative either momentarily or for a longer period. Lamp burnouts are not considered a major malfunction unless 2 or more bulbs in the same socket burn out within a 30 day period.

The contractor shall obtain and assign to the Owner transferable manufacturer's warranties or guarantees on all electrical and mechanical equipment, consistent with those provided as customary practice. The Contractor shall guarantee satisfactory in-service operation of the mechanical and electrical equipment and related components for a period of 6 months following completion of the 30 day performance test, at no cost to the Owner.

Defective equipment or accessories shall be repaired or replaced according to applicable specifications and to the satisfaction of the Engineer, within a reasonable period of time during the 30 day performance test and the 6 month guarantee period. Any equipment repaired or replaced within the 30 day performance test or the 6 month guarantee period shall have a 6 month guarantee period from the date that the equipment is repaired or replaced.

711.04 Method of Measurement. Work completed and accepted under this item will not be measured and paid for directly but will be considered a part of the traffic signal equipment involved at each installation.

Section 712. Video Detector with Radio Interface

712.01 Description. This item shall consist of furnishing and installing a Video Detector, Video Processor, Cable, Video Monitor, Radio Interface and other hardware and software in accordance with these specifications as well as **SECTION 733, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

The Contractor shall pretest all electronic equipment before installing any such electronic equipment.

712.02 Materials. Materials shall be in accordance with the AHTD Standard Specifications and as supplemented or modified as follows:

Section 733 of the Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003, is hereby amended as follows:

Subsection 733.02 Materials is hereby amended by adding the following:

(i) Video Processor, Edge Card -- Unit shall insert into a standard NEMA Vehicle Detector Rack taking the position of **two-two channel rack mount vehicle loop detector card**. Unit shall output to the standard vehicle channels with the provision to add extender cards for additional detector channels. Units shall be available for one or two video detector (camera) inputs.

(j) Video Edge Card Extender –- Unit shall insert into a standard NEMA Vehicle Detector Rack taking the position of **one-two channel rack mount vehicle loop detector card**. Unit shall output to standard vehicle channels utilizing output channels from Video Processor Edge Card.

(k) Vehicle Detector Rack – Unit consists of a standard NEMA TS2 Type 2 card rack unit with power supply, of the number of channels specified. Unit shall be configured with two (2) channels occupying one card slot of the rack. Unit shall be wired to be suitable for use with two (2) or four (4) channel card rack loop detectors, edge card video detectors, or video edge card extenders.

(l) Multi Port Edge Card Switch – In lieu of providing a multi channel processor, contractor may utilize Video Processor, Edge Card with Extender Cards mounted in a Vehicle Detector Rack. When two or more Edge Cards are utilized, in order to achieve full functionality, the control and display of the Edge cards shall be combined into a single point switch allowing dial up, direct connect, and programming of the individual Edge Cards through a single unit.

(m) Video Detector Alignment Unit – One programming module per job, for Zoom and focus of camera, shall be provided for alignment and setup of Detector. The module shall be given to the local government upon completion of the installation. The price for this unit shall be considered included in other items of the contract.

712.03 Construction Requirements.

(a) General. Construction shall be in accordance with the AHTD Standard Specifications.

(b) Pretesting. The Contractor shall pretest all electronic equipment before installing any such electronic equipment. Unless approved otherwise by the Owner, the pretesting shall include a minimum of seven (7) consecutive days of test operation. No separate payment shall be made for any and all pretesting but such pretesting shall be considered subsidiary to the applicable equipment.

(c) Subsection 733.03 Construction Requirements (C) is hereby deleted and the following substituted:

Software -- Software required for monitoring, setup and programming of the system shall be supplied as subsidiary to this special provision for the item "Video Processor" or "Video Processor, Edge Card", of the number of channels specified. Two licensed copies shall be required for the job. Software shall be windows based and operate from an IBM compatible, laptop with Intel Pentium II processor and Windows 98 or later operating system. If other programming device is required, one unit shall be supplied and it shall be considered subsidiary to this special provision.

712.04 Method of Measurement. Work completed and accepted under this item will be measured as follows:

(a) Video Detector shall be measured by the unit.

(b) Video Detector-RX shall be measured by the unit.

(c) Video Detector Relocation shall be measured by the unit.

(d) Video Radio Receiver of the number channels specified, shall be measured by the unit.

(e) Video Processor, of the number of channels specified, shall be measured by the unit.

(f) Video cable shall be measured by the lump sum.

(g) Video monitor of the type specified will be measured by the unit.

(h) Remote Video Site Modification shall be measured by the unit.

(i) Video Processor, Edge Card of the number of inputs specified shall be measured by the unit.

(j) Video Edge Card Extender shall be measured by the unit.

(k) Vehicle Detector Rack of the number channels specified shall be measured by the unit.

(l) Multi Port Edge Card switch is included in other items of the contract.

712.05 Basis of Payment.

(a) Video Detector. Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each Video Detector; which price shall be full compensation for providing and installing the device, wiring and testing, aligning the zones; and shall also be for all labor, equipment, tools and incidentals necessary to complete the work.

(b) Video Detector-RX. Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each for Video Detector-RX; which price shall be full compensation for providing and installing the device, brackets and extensions, wiring; for programming and testing the device; for furnishing and installing cabinet for separate radio transmitter unit installations; for furnishing and installing the antenna, antenna cable, wire and all necessary wiring; and for all labor, equipment, tools and incidentals necessary to complete the work.

(c) Video Detector Relocation. Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each Video Detector Relocation; which price shall be full compensation for removing the device from present site, installing the device at the new location, and for furnishing and installing brackets and extensions, wiring and testing, and for all labor, equipment, tools, and incidentals necessary to complete the work.

(d) Video Radio Receiver. Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each for Video Radio Receiver of the number of channels specified; which price shall be full compensation for providing and installing the device, brackets and extensions, wiring and testing the device; and for furnishing and installing the antenna, antenna cable, wire and all necessary wiring; and for all labor, equipment, tools and incidentals necessary to complete the work.

(e) Video Processor. Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each Video Processor of the number channels specified; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; furnishing and installing wiring and wiring harness from the video processor unit to the traffic signal controller; and for all labor, equipment, tool and incidentals necessary to complete the work.

(f) Video Cable. Work completed and accepted under this item will not be measured and shall be paid for at the contract price bid per lump sum for Video Cable; which price shall be full compensation for providing and installing all cable, including video, power supply and data cable from the Video Processor to the Video Detector and shall include all labor, equipment, tools and incidentals necessary to complete the work.

(g) Video Monitor. Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each for Video Monitor of the type specified; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; and for all labor, equipment, tools and incidentals necessary to complete the work.

(h) Remote Video Site Modification. Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid for Remote Video Site Modification; which price shall be full compensation for removing all unnecessary equipment; modifying existing cabinet, wiring and conduit as needed; and for providing and installing any incidental devices, suppressors, brackets and wiring; and for programming and testing the device.

(i) Video Processor, Edge Card -- Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price for Video Processor, Edge Card of the number inputs specified; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; and shall also be for all labor, equipment, tools and incidentals necessary to complete the work.

(j) Video Edge Card Extender -- Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price for Video Edge Card Extender; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; and shall also be for all labor, equipment, tools and incidentals necessary to complete the work.

(k) Vehicle Detector Rack – Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price for Vehicle Detector Rack of the number channels specified; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; and shall also be for all labor, equipment, tools and incidentals necessary to complete the work. Controller cabinet modifications, and removal of equipment inside the cabinet, and other work necessary for installation of the device shall be considered included in the price of this item.

(l) Multi Port Edge Card Switch – Work completed and accepted under this item will not be paid separately, but shall be included in the cost of other items of the contract where two or more Video Processors, Edge Card are utilized in the cabinet.

(m) Video Detector Alignment Unit — Work completed and accepted under this item will not be paid separately, but shall be included in the cost of other items of the contract.

Payment will be made under:

Pay Item	**Pay Unit**
Video Detector	EA
Video Detector-RX	EA
Video Detector Relocation	EA
Video Radio Receiver (__ Channel)	EA
Video Processor (__ Channel)	EA
Video Cable	LS
Video Monitor (clr)	EA
Video Monitor (B/W)	EA
Remote Video Site Modification	EA
Video Processor, Edge Card (2 Camera)	EA
Video Edge Card Extender	EA
Vehicle Detector Rack (16 channel)	EA

Section 713. Radio Communication System

713.01 Description. Radio Communication System shall be provided and installed by the Contractor.

713.02 Materials.

713.03 Construction Requirements.

(a) General. Contractor shall coordinate installation of the signal with the applicable local or state authorities.

713.04 Method of Measurement. Work required for coordination of this item will not be measured and will be considered incidental to the other items.

Section 714. Electrical Conductors in Conduit

714.01 Description. This item consists of furnishing and installing electrical conductors from point to point as indicated on the plan sheets.

714.02 Materials. The electrical conductors shall consist of cables of the gauge and number of conductors specified on the plan sheets, and shall be USE rated (single conductor) or UF rated, suitable for underground duct installation in wet or dry locations. Electrical conductors shall be solid or stranded copper unless otherwise approved by the Engineer.

Where specified "Equipment Ground Conductor" (EGC), conductor shall be a copper safety ground of either bare copper or green insulated of the size and quantity shown.

714.03 Construction Requirements.

(a) General. Splices are allowed at pole bases or as approved by the Engineer. Unless waterproof quick disconnects are used, Splicing methods considered acceptable are: Soldered, compression connectors of proper size employing cyclic crimping devices, terminal strips, or other method approved by the Engineer. Splices on terminal strips shall utilize proper spade lugs. All splices shall be waterproof. When taping is required, the wire shall be covered with six (6) layers of plastic electrical tape and sealed with "Scotch-Coat" or other similar electrical sealing material. Where wire nuts are used, soldering, taping and sealing is still required. Electrical insulating putty may be used to round off sharp corners of wire or connectors before applying tape. Slack cable (3 ft. min.) shall remain at each splice location.

714.04 Method of Measurement. The work required by this item will be paid for at the lump sum price for “Electrical Conductors-In-Conduit”.

714.05 Basis of Payment. Work completed and accepted as provided above will be paid for at the contract unit price bid per lump sum for Electrical Conductors-In-Conduit, which price shall be full compensation for furnishing materials, splicing and connections and for all tools, equipment, labor, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Electrical Conductors-In-Conduit	LS

Section 715. Luminaire Assemblies for Traffic Signals

715.01 Description. This work shall consist of furnishing and installing luminaire assemblies on traffic signal poles, including the accessories, in accordance with these specifications and at the locations shown on the plans or as directed. Arms for luminaire assemblies at traffic signals shall be subsidiary to subsection 709, “Traffic Signal Mast Arm with Pole and Foundation”.

Unless indicated otherwise a minimum of two (2) luminaire assemblies shall be provided at each intersection.

715.02 Materials and Construction Requirements.

(a) Luminaire. Each luminaire assembly shall consist of a "Cobra Head", power door style; "Cutoff" type flat glass refractor, 250-watt high-pressure sodium lamp with 27,500 lumens, and optics to produce a Medium Cutoff Type-III light distribution. As a minimum, 40% of Light Flux values shall be maintained on the Downward Street Side; with greater than 0.002 foot-candles per 1000 lamp lumens at a point of " 1 x 4 " mounting heights on the downward street side.

The luminaries shall be all aluminum die cast hinged construction with an "Alzak" aluminum reflector, single element refractor or sealed optical system design for tilted or level operation. Each luminaire assembly shall have a photocell and receptacle in top of the luminaire housing near the center and shall meet the requirements of the local utility company.

All luminaries shall contain built-in ballasts with power door assembly, and be of an approved streamlined design. Ballasts shall be of the auto regulated, 10 KV BIL type, multi-tap wired for line voltage as indicated on the plan sheets (plus or minus 10% line voltage, variation), 60-cycle, single phase, multiple circuit operation, with high power factor (90% or higher). The ballast shall be suitable for the proper operation of one 250-watt high pressure sodium lamp with a minimum open circuit voltage as specified on the plan sheets, and shall be an easily replaceable part of the luminaire assembly.

Luminaire assemblies (with accessories) shall be supplied in one style or model number from one manufacturer only. The contractor shall submit manufacturer's brochures with illustration and data to the Engineer for approval of luminaries, accessories and installation details.

(b) Photo Cell. Each luminaire assembly shall have a photocell and receptacle in the top of the luminaire housing. Photocell shall be Fisher-Pierce Model #7790-B (105-285 VAC) or as approved. Photocell shall operate at the same voltage rating as the luminaire ballast.

715.03 Method of Measurement. Completed and accepted Luminaire Assembly will be measured by the unit. Arms for luminaries at traffic signals shall be not measured for separate payment but shall be subsidiary to subsection 709, "Traffic Signal Mast Arm with Pole and Foundation".

715.04 Basis of Payment. Work completed and accepted under this item and measured as provided above shall be paid for at the contract unit price bid for each Luminaire Assembly, which price shall be full compensation for furnishing and installing the luminaries, lamps of the type described herein, ballast, photocell, and all materials, equipment, tools, labor and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Luminaire Assembly	Each

Section 716. Electrical Conductors for Luminaires

716.01 Description. This item shall consist of furnishing and installing electrical conductors as noted on the plans. This shall include conductors from the luminaire service point to the luminaire disconnect point and from the luminaire disconnect point to luminaires mounted on the traffic signal poles. Circuit breakers and weatherproof breaker boxes are considered subsidiary to "Electrical Conductors for Luminaires" and shall be provided and installed by the Contractor at the luminaire disconnect point.

716.02 Materials

The electrical conductors shall consist of two conductor cables (#12 AWG). Electrical conductors shall be stranded or solid copper UF rated 600 volt, suitable for underground duct installation in wet or dry locations. Electrical conductors shall comply with ASTM Specification B3. The insulation and sheath shall comply with ASTM Specifications D754 and D752. Circuit breakers shall be rated at 20 amps.

716.03 Construction Requirements.

The Contractor shall furnish and install a luminaire disconnect (20 amp circuit breaker assembly and weatherproof box) at the location designated on the plans that meets the requirements of the local utility company. The Contractor shall connect the circuit breaker assembly to the line side of the service point supplying the controller. Conductors for luminaires shall run directly from load side of luminaire disconnect to luminaires mounted on signal poles. Disconnect or trip of luminaire disconnect shall not effect power to controller. Luminaire disconnect shall be clearly labeled as "Street Light" circuit.

Splices are allowed at pole bases or as approved by the Engineer. Splicing methods considered acceptable are: Soldered, compression connectors of proper size employing cyclic crimping devices, terminal strips, or other method approved by the Engineer. Splices on terminal strips shall utilize proper spade lugs. All splices shall be waterproof. When taping is required, the wire shall be covered with six (6) layers of plastic electrical tape and sealed with "Scotch-Coat" or other similar electrical sealing material. Where wire nuts are used, soldering, taping and sealing is still required. Electrical insulating putty may be used to round off sharp corners of wire or connectors before applying tape. Slack cable of 0.7 meters

(2 ft. min.) shall remain at each splice location or at end of luminaire arm when luminaire is not to be installed by contractor. Final connection of power from the local utility to the service point will be made by others.

716.04 Method of Measurement

Electrical Conductors for Luminaires will be measured by the linear foot. Multiple conductors shall be measured together, not measured singularly.

716.05 Basis for Payment.

Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per linear foot for Electrical Conductors for Luminaires of the type and size called for on the plans, which price shall be full compensation for furnishing materials, splicing and connections and for all tools, equipment, labor, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Electrical Conductors for Luminaires	Linear Foot

Section 717. Roadway Illumination Pole

717.01 Description

This item shall consist of furnishing all materials, constructing and erecting same to insure a properly operating roadway lighting system in accordance with the plans and specifications.

717.02 Materials

Pole and arm may be of either steel or aluminum. Pole may be either round tapered, multisided tapered, square tapered, or as required by the Plans.

Pole and hardware, unless superseded by special provision, shall meet the minimum requirements under the Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003

> Section 714 "Traffic Signal Mast Arm and Pole with Foundation" of the AHTD Standard Specifications shall apply to all units of steel design as well as hardware and foundation requirements for units of other material.
>
> Section 721 "Overhead, Bridge Mount, and Cantilever Sign Structure" of the AHTD Standard Specifications shall apply to poles and mast arms for units of aluminum design.

Aluminum alloy surfaces contacting concrete foundations and steel surfaces shall be coated with or bedded in, an aluminum caulking compound such as alumilastic or other suitable material approved by the Engineer.

717.03 Construction Requirements.

(a) Structural Design. Structural design must be certified by a registered engineer representing the manufacturer to conform to the 1994 Edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals", and interims, for the specific site conditions and as follows:

> Minimum wind load requirements shall be 80 MPH wind zone with a 1.3 Gust Factor. The minimum diameter of the lower end of the shaft shall not be less than 8.0 inches with taper to a diameter of at least 3.4 inches at the top. Poles may be two-piece, slip-fitted of adequate design.

Nut Covers - - required for "shoe base" only.

Hand Hole, Size(Inside Dim.)- - 4in. wdt.x 6in. ht.

Anchor Bolts. Anchor bolts shall be of sufficient size and strength, and meet the requirements of Section 714 of the Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003

(b) Transformer Base. Where designated in the Unit Items as "T-Base", a breakaway transformer base shall be furnished and installed as per manufacturer's recommendation. Transformer base shall be permanent mold casting of Aluminum Alloy 356-T6 or equal as specified by the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Bases shall be a minimum of 16 inches high and basically square in cross section. The dimensions shall be approximately those dimensions shown on the plans. Any change in dimension, approved by the Engineer, shall not lessen the design load strength of the base.

A detail sheet illustrating the proper installation of the transformer base shall be supplied to the Engineer.

A written certification shall be supplied to the Department that the transformer base meets the minimum requirements for AASHTO 1994 breakaway specifications.

Poles not requiring T-Base shall be designated in the unit items as "Shoe Base".

(c) Luminaire Wind Loading. Design shall support the maximum luminaire properties for the pole type specified for attachment of the following luminaire(s):

Cobra Head (where required)

Luminaire Arm - All arms must be single member (no truss) and tapered if greater than 10 ft.
Length - - - - variable (see plan sheet)
Taper, arms 10 ft. or less - - - - optional
Taper, arms greater than 10 ft. - 0.14 in./ft.
Slip fit for luminaire - - 2 in. OD.

Upsweep angle, minimum - - 3^{o}
Material - - - same as pole shaft
Luminaire
Effective area - - 1.35 sq. ft.
Weight - - - - - 51 lb.

Interstate (where required)
Luminaire Arm -- NONE
Luminaire
Effective area - 2.30 sq.ft.
Weight - - - - - 53 lb.

SHOEBOX (where required)
Luminaire Arm -- NONE
Effective area - 2.44 sq. ft.
Weight - - - - - 58 lb.
Weight offset - - - 11 inches

(d). Luminaire. Luminaire shall be of the High Pressure Sodium Design (HPS) meeting the following requirements:

1. Cobra Head Luminaire. Each unit designated as "Cobra Head" in the unit item table shall include a luminaire assembly of the Cobra Head style of the wattage specified. The luminaire(s) shall be all-aluminum die cast hinged construction with an Alzak reflector, single element refractor of sealed optical system designed for tilted or level operation. Unit shall meet the photometric requirements of the Illumination Engineering Society (IES): Type III Medium Cutoff (M-C-III) unless otherwise designated on the plans.

2. Interstate Luminaire. Each unit designated as "Interstate" in the unit item table shall include a luminaire assembly of the "Interstate " style of the wattage specified. The luminaire(s) shall be all-aluminum die cast hinged construction with an Alzak reflector, single element Refractor of sealed optical system. Unit shall meet the photometric requirements of the Illumination Engineering Society (IES): Type II Medium Non-cutoff (M-N-II) or as designated on the plans, and be designed for use in a 45 degree tilt position.

Bracket assembly for interstate luminaire shall consist of an adjustable slip-fitter accommodating pipe tendons of 2-3/8" to 3" outside diameter. The assembly shall provide for 360 degree horizontal adjustment and 30 to 50 degree below level vertical adjustment of luminaire. The bracket shall be equipped with external leveling nuts for horizontal and vertical leveling. A pipe tendon shall be used to connect the luminaire bracket to the pole.

3. Shoe Box Luminaire. Each unit designated as **"**Shoe Box**"** in the unit item table shall include a luminaire assembly of the Shoe Box style of the wattage specified.

The luminaire(s) shall be all-aluminum die cast hinged construction with an Alzak reflector, single element refractor of sealed optical system designed for tilted or level operation. Unit

shall meet the photometric requirements of the Illumination Engineering Society (IES): Type II Medium Cutoff (M-C-II) unless otherwise designated on the plans.

Bracket assembly for shoe box luminaire shall consist of an adjustable slip-fitter accommodating pipe tendons of 2-3/8" to 3" outside diameter.

4. Lamp. Luminaire shall include a clear lamp of the specified wattage. Where specified to be 250 watt high pressure sodium (250 HPS) shall provide not less than 27,500 lumens.

5. Photo Cell. Each luminaire assembly shall have a photo cell and receptacle in the top of the luminaire housing. Photo cell shall be Fisher-Pierce Model #7790-B (105-285 VAC) or as approved. Photo cell shall operate at the same voltage rating as the luminaire ballast.

6. Ballasts. All luminaires shall contain built-in ballast and be of an approved streamlined design. Blasts shall be of the constant wattage (regulated output) type for 60-cycle electrical service of the voltage as specified on the plans (plus or minus 13% input range), multi-tap circuit operation, with high power factor (95% or higher) and shall start lamps at temperature of -20 degrees Fahrenheit. Ballasts shall have a minimum 10 kV BIL rating. Ballasts shall be easily replaceable part of the luminaire assembly.

Each luminaire type (with accessories) shall be supplied in one style or model number from one manufacturer only. The Contractor shall submit manufacturer's brochures with illustrations and data to the Engineer for approval of luminaires, accessories as well as manufacturer's recommended installation details.

E. Wiring. Poles with luminaires shall include wiring and connection of the source by means of two (2) #12 AWG copper or #10 AWG aluminum wires as shown in the details which shall run through the shaft to 10 ampere fused connectors located in the pull box. Wire shall be of a UF (underground feeder) or USE (underground service entrance) rating.

Service shall be connected by means of fused quick-disconnect plug-in type connectors which shall be of rubber, water-tight construction enclosing a cartridge type 10 ampere fuse and suitable for 240 volt (or greater) service. The leads for the connectors shall be attached in accordance with the connector manufacturer's instructions. All connectors shall be located in the pull box near the base of the pole.

When taping is required, contractor shall submit a detail to the engineer for approval. This shall include proper application of an electrical sealing compound, insulating putty or rubberized tape to round off corners, or other material to insure the connection is completely watertight.

All wire and wiring requirements for poles with luminaires shall be considered subsidiary to the special provision Roadway Illumination Pole.

717.04 Method of Measurement

Work completed and accepted under this item shall be measured by the unit. Pole "Type" shall refer to the requirement to furnish unit with Cobra Head Luminaire and Arm (Cobra

Head), Interstate Luminaire (Interstate) or Shoe Box Luminaire (Shoe Box); of the wattage specified, and all associated hardware and wiring. Poles will be designated as either T-Base or Shoe Base meeting the requirements of this special provision. Height (Ht.) shall refer to the nominal height of the pole including base.

717.04 Basis of Payment

Equipment and labor supplied under this item shall be measured separately by the unit; which price shall be full compensation for furnishing and installing the pole and arm (where required), luminaire (where required), and T-Base (where required); for excavation, backfill, compaction, and removal of surplus material; for furnishing and placing reinforcing steel and concrete; and for all materials, equipment, tools, labor, and incidentals necessary to complete the work.

Pay Item	**Pay Unit**
Roadway Illumination Pole (Type, Base, Height)	Each