

PROJECT MANUAL

MEADOWFIELD ELEMENTARY SCHOOL PARKING ADDITION



RICHLAND ONE

ENGAGE • EDUCATE • EMPOWER

**June 10, 2026
Issued for Bidding**

Solicitation # 2026-010

PREPARED BY:
CHAO AND ASSOCIATES, INC
7 CLUSTERS COURT
COLUMBIA, SC 29210
TEL: 803-772-8420
C&A PROJECT # 398720E-24



TABLE OF CONTENTS**C&A-1****PROJECT NAME: MEADOWFIELD ELEMENTARY SCHOOL PARKING ADDITION****C&A PROJECT NUMBER: 398720E-24**

<u>SECTION</u>	<u>NUMBER OF PAGES</u>
C&A-1 Table of Contents	2
Richland One Invitation for Bids Construction Service	1
Richland One Company Information- Small/Women/Minority Business Enterprise Policy.....	2
Richland One Vendor Application.....	1
W-9 Request For Taxpayer Identification Number and Certification	1
C&A-310, Invitation for Design-Bid-Build Construction Services	1
AIA Document A701 Instructions to Bidders South Carolina Division of Procurement Services, Office of State Engineer Version	1
Bid Bond (AIA A310 reference)	1
C&A-330, Lump Sum Bid Form	6
AIA Document A101 Standard Form of Agreement between Owner and Contractor South Carolina Division of Procurement Services, Office of State Engineer Version	1
AIA Document A201 General Conditions of the Contract for Construction South Carolina Division of Procurement Services, Office of State Engineer Version	1
C&A-355, Performance Bond	2
C&A-357, Labor & Material Payment Bond.....	2
C&A-380, Change Order to Design-Bid-Build Construction Contract	2

TECHNICAL SPECIFICATIONS

Table of Contents-Design-Bid-Build Project Manual

Division 1

01110 - SUMMARY OF WORK
 01140 - WORK RESTRICTIONS
 01170 - SPECIAL PROVISIONS
 01291 - SCHEDULE OF VALUES
 01311 - PROJECT MEETINGS
 01320 - PROGRESS SCHEDULE
 01330 - SUBMITTAL PROCEDURES
 01400 - QUALITY CONTROL
 01420 - REFERENCE STANDARDS
 01500 - TEMPORARY FACILITIES
 01650 - PRODUCT DELIVERY AND HANDLING
 01720 - PROJECT LAYOUT AND FIELD ENGINEERING
 01730 - CUTTING AND PATCHING
 01740 - CLEANING
 01770 - CONTRACT CLOSE-OUT PROCEDURES

Division 2

02451 – REINFORCED CONCRETE PIPE
 02770 – CONCRETE CURB AND GUTTER
 02920 – GRASSING FOR SOIL STABILIZATION
 311000 - SITE CLEARING
 312000 - EARTH MOVING
 312300 - EXCAVATION AND BACKFILL
 312510 - EROSION AND SEDIMENT CONTROL
 321216 - ASPHALT PAVING
 321723 - PAVEMENT MARKINGS

Drawings

Cover

C1.0 - Existing Site Conditions & Demolition Plan
 C2.0 – Site Layout Plan
 C3.0 – Grading & Drainage Plan
 C3.1 – Erosion Prevention & Sediment Control Plan
 C4.0 - Construction Details
 C4.1 - Construction Details
 C4.2 - Construction Details
 C4.3 - Construction Details
 C4.4 – Underground Detention System
 C4.5 – Underground Detention System
 C4.6 – Underground Detention System
 C4.7 – Underground Detention System

	Richland County School District One INVITATION FOR BIDS FOR CONSTRUCTION SERVICE	Solicitation # Date Issued Procurement Officer Phone E-mail Address	2026-010 JUNE 11, 2026 Brittany Green 803.231.7052 brittany.green@richlandone.org
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Sealed bids Meadowfield Elementary School Parking Addition, will be received from qualified bidders that are properly licensed under the laws of the State of South Carolina. These bids will be opened and read aloud by the Owner at the office of the Procurement Services, Central Services Facility, 201 Park Street, Columbia, SC 29201. Bids received after the indicated times will be rejected and returned to the Bidder unopened. All questions must be submitted via email to: Brittany Green, Construction Contracts Manager (E-mail Above).

SCHEDULE OF EVENTS	DATE AND TIME
Site Visits held on: N/A	
Pre-Bid conference will be held on: Meadowfield Elementary - 525 Galway Ln, Columbia, SC 29209 (Please sign in at the front office)	JUNE 17, 2026 @ 10:00 AM
Bid Questions must be received by:	JUNE 18, 2026 @ 5:00 PM
Bid(s) must be received by:	JUNE 22, 2026 @ 2:00 PM
Bids will be opened on:	JUNE 22, 2026 @ 2:00 PM

PROJECT INFORMATION	
The name of the project is	Meadowfield Elementary School Parking Addition
Project Address:	525 Galway Lane, Columbia, SC 29209
The Owner is:	Richland County School District One 201 Park Street Columbia, SC 29201
The Architect/Engineer is:	Chao and Associates, Inc Mr. Gerald Lee 7 Clusters Ct Columbia, SC 29210
The Construction Manager is:	N/A

Description of the Project

The project is a parking lot addition to Meadowfield Elementary School.

Bid Documents

Bidding Documents are available for inspection at the following locations:

- **Chao and Associates, Inc – Contact Miss Ellie Chao | 803-772-8420 | elliec@chaoinc.com**

Bids will be binding for a period of 60 (sixty) calendar days from the date bids are opened.

Please submit 1 (Paper) and 1 (USB) copy of your bid.

COMPANY INFORMATION

1.) Name of Company:

Address:

Phone Number:

2.) Name of Assigned Contact: (Main)

Direct Phone Number:

Other Phone Number:

Email:

3.) Name of Assigned Contact: (Secondary)

Direct Phone Number:

Other Phone Number:

Email:

** If awarded the contract, these individuals cannot be switched for the duration of the contract unless permitted by the Richland County School District One.*

SIGNATURE

Name of Company

Printed Name of Firm Representative

Signature of Firm Representative

Date



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Procurement Services Vendor Application

201 Park St.

Columbia, SC 29201

PH: 803-231-7052

(Subject to any federal, state and local laws)

Vendor No: _____

****The District does not accept vendor applications directly from vendors. Vendor applications (new and updated) must be submitted internally through a Richland County School District One employee before being created. (i.e. **Bookkeepers, Administrative Assistants, or Department Heads**). ****

****Richland One employees will forward completed applications to the Procurement Services Department. ****

****NO APPLICATION WILL BE PROCESSED WITHOUT A COMPLETE W-9 ATTACHED****

Please check the appropriate boxes:

☐ M-Minority

☐ S-Small

☐ W-Woman

☐ O-Other

☐ W-9 Attached

* What services are being rendered? _____ (ex. Consulting, professional development, etc.).

Name of Company: _____	DBA: _____
Contact 1: _____	SSN or FEIN: _____
Contact 2: _____	Business License Number: _____
Telephone Number: _____	State: _____
Fax Number: _____	How long in present business: _____ Years
In the interest of protection for the District and its vendors, it is mandatory for vendors to have purchase authorization in the form of a signed Purchase Order BEFORE placing an order.	
Address To Which Bids/Quotes and Purchase Orders Are To Be Mailed: 	Remittance Address (If Different From Bids/Quotes/PO Mailing Address):
Email Address For Electronic Purchase Order Transmittals To Be Mailed: _____	P-Card Payment Preferred _____ Yes _____ No
Website: _____	An active application does not legally entitle a vendor to any particular solicitation, therefore, vendors are encouraged to check the District's website: www.richlandone.org for legal notices of Invitation to Bid (IFB). The Procurement Department may also be contacted for solicitation information.
Type of Organization (Check One) _____ Individual _____ Partnership _____ Corporation _____ Other	
RCSD One requires that no employee or Board of School Commissioners may have a special interest in any contract paid with funds belonging to or administered by the Board of School Commissioners. If you/your firm have such a relationship, attach a separate sheet explaining the relationship. All transactions are governed by the laws of the State of South Carolina and the Board of School Commissioners for RCSD One.	

I certify that information supplied herein is correct and neither the applicant nor any person in any connection with the applicant as a principal or officer, so far as known, now debarred, suspended or otherwise declared ineligible by any agency of Federal Government, agencies of the State of South Carolina or by Richland County School District One.

Person Authorized to Sign this Application, Title

Date

**Request for Taxpayer
Identification Number and Certification**

Go to www.irs.gov/FormW9 for instructions and the latest information.

Give form to the
requester. Do not
send to the IRS.

Before you begin. For guidance related to the purpose of Form W-9, see *Purpose of Form*, below.

Print or type. See Specific Instructions on page 3.	1	Name of entity/individual. An entry is required. (For a sole proprietor or disregarded entity, enter the owner's name on line 1, and enter the business/disregarded entity's name on line 2.)		
	2	Business name/disregarded entity name, if different from above.		
	3a	Check the appropriate box for federal tax classification of the entity/individual whose name is entered on line 1. Check only one of the following seven boxes. ☐ Individual/sole proprietor ☐ C corporation ☒ S corporation ☐ Partnership ☐ Trust/estate ☐ LLC. Enter the tax classification (C = C corporation, S = S corporation, P = Partnership) Note: Check the "LLC" box above and, in the entry space, enter the appropriate code (C, S, or P) for the tax classification of the LLC, unless it is a disregarded entity. A disregarded entity should instead check the appropriate box for the tax classification of its owner. ☐ Other (see instructions)	4	Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) Exemption from Foreign Account Tax Compliance Act (FATCA) reporting code (if any) (Applies to accounts maintained outside the United States.)
	3b	If on line 3a you checked "Partnership" or "Trust/estate," or checked "LLC" and entered "P" as its tax classification, and you are providing this form to a partnership, trust, or estate in which you have an ownership interest, check this box if you have any foreign partners, owners, or beneficiaries. See instructions ☐		
	5	Address (number, street, and apt. or suite no.). See instructions.	Requester's name and address (optional)	
6	City, state, and ZIP code			
7	List account number(s) here (optional)			

Part I Taxpayer Identification Number (TIN)																									
Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see <i>How to get a TIN</i> , later.	Social security number <table><tr><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td></tr></table> or Employer identification number <table><tr><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>					-			-										-						
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Note: If the account is in more than one name, see the instructions for line 1. See also <i>What Name and Number To Give the Requester</i> for guidelines on whose number to enter.																									

Part II Certification			
Under penalties of perjury, I certify that:			
1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and			
2. I am not subject to backup withholding because (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and			
3. I am a U.S. citizen or other U.S. person (defined below); and			
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.			
Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and, generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.			
Sign Here	<table><tr><td>Signature of U.S. person</td><td>Date</td></tr></table>	Signature of U.S. person	Date
Signature of U.S. person	Date		

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

What's New

Line 3a has been modified to clarify how a disregarded entity completes this line. An LLC that is a disregarded entity should check the appropriate box for the tax classification of its owner. Otherwise, it should check the "LLC" box and enter its appropriate tax classification.

New line 3b has been added to this form. A flow-through entity is required to complete this line to indicate that it has direct or indirect foreign partners, owners, or beneficiaries when it provides the Form W-9 to another flow-through entity in which it has an ownership interest. This change is intended to provide a flow-through entity with information regarding the status of its indirect foreign partners, owners, or beneficiaries, so that it can satisfy any applicable reporting requirements. For example, a partnership that has any indirect foreign partners may be required to complete Schedules K-2 and K-3. See the Partnership Instructions for Schedules K-2 and K-3 (Form 1065).

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS is giving you this form because they

C&A-310**INVITATION FOR DESIGN-BID-BUILD CONSTRUCTION SERVICES****OWNER/OWNER:** Richland School District One**PROJECT NAME:** Meadowfield Elementary School Parking Addition**PROJECT NUMBER:** 398720E-24 **CONSTRUCTION COST RANGE:** \$ 300,000.00 to \$ 500,000.00**PROJECT LOCATION:** 525 Galway Lane Columbia, SC 29209**DESCRIPTION OF PROJECT/SERVICES:** Parking lot addition to Meadowfield Elementary School**BID/SUBMITTAL DUE DATE:** 6/22/2026 **TIME:** 2:00 PM **NUMBER OF COPIES:** 1 (Paper) 1 (USB)**PROJECT DELIVERY METHOD:** Design-Bid-Build**PROJECT COORDINATOR:** Mr. O'Bryan Dais**EMAIL:** obrayn.dais@richlandone.org**TELEPHONE:** 803-600-0196**DOCUMENTS MAY BE OBTAINED FROM:** C&A Sharefile - Email elliec@chaoinc.com for access**BID SECURITY IS REQUIRED IN AN AMOUNT NOT LESS THAN 5% OF THE BASE BID.****PERFORMANCE AND LABOR & MATERIAL PAYMENT BONDS:** The successful Contactor will be required to provide Performance and Labor and Material Payment Bonds, each in the amount of 100% of the Contract Price.**DOCUMENT DEPOSIT AMOUNT:** \$ _____ **IS DEPOSIT REFUNDABLE** Yes ☐ No ☐ N/A ☒

Bidders must obtain Bidding Documents/Plans from the above listed source(s) to be listed as an official plan holder. Bidders that rely on copies obtained from any other source do so at their own risk. All written communications with official plan holders & bidders will be via email or website posting.

Owner **WILL NOT** accept Bids sent via email.*All questions & correspondence concerning this Invitation shall be addressed to the A/E.***A/E NAME:** Chao and Associates, Inc.**A/E CONTACT:** Gerald Lee, PE**EMAIL:** GeraldL@chaoinc.com**TELEPHONE:** (803) 772-8420**PRE-BID CONFERENCE:** Yes ☒ No ☐**MANDATORY ATTENDANCE:** ☐ No ☒**PRE-BID DATE:** 6/17/26**Yes TIME:** 10:00 AM**PRE-BID PLACE:** 525 Galway Ln, Columbia, SC 29209**BID OPENING PLACE:** 201 Park St., Columbia, SC 29201**BID DELIVERY ADDRESSES:****HAND-DELIVERY:****Attn:** Mr. O'Bryan Dais201 Park Street, Columbia SC, 29201**MAIL SERVICE:****Attn:** Mr. O'Bryan Dais201 Park Street, Columbia SC, 29201

AIA Document
A701-2017 (SCOSE Version)
“Instructions to Bidders”

Note:

This document is available for purchase from
<https://www.aiacontracts.com>

AIA Document

A310-2010

"Bid Bond"

Note:

This document is available for purchase from

<https://www.aiacontracts.com>

C&A -330

LUMP SUM BID FORM

Bidders shall submit bids on only Bid Form CA-330

BID SUBMITTED BY: _____
(Bidder's Name)

BID SUBMITTED TO: Richland School District One
(Owner's Name)

FOR: PROJECT NAME: Meadowfield Elementary School Parking Addition
PROJECT NUMBER: 398720E-24

OFFER

§ 1. In response to the Invitation for Construction Services and in compliance with the Instructions to Bidders for the above- named Project, the undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with the Owner on the terms included in the Bidding Documents, and to perform all Work as specified or indicated in the Bidding Documents, for the prices and within the time frames indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

§ 2. Pursuant to SC Code § 11-35-3030(1), Bidder has submitted Bid Security in the amount and form required by the Bidding Documents.

§ 3. Bidder acknowledges the receipt of the following Addenda to the Bidding Documents and has incorporated the effects of said Addenda into this Bid:

(Bidder, check all that apply. Note, there may be more boxes than actual addenda. Do not check boxes that do not apply)

ADDENDA: ☐ #1 ☐ #2 ☐ #3 ☐ #4 ☐ #5

§ 4. Bidder accepts all terms and conditions of the Invitation for Bids, including, without limitation, those dealing with the disposition of Bid Security. Bidder agrees that this Bid, including all Bid Alternates, if any, may not be revoked or withdrawn after the opening of bids, and shall remain open for acceptance for a period of 60 Days following the Bid Date, or for such longer period of time that Bidder may agree to in writing upon request of the Owner.

§ 5. Bidder herewith offers to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fees, permits, licenses and applicable taxes necessary to complete the following items of construction work:

§ 6.1 **BASE BID WORK** *(as indicated in the Bidding Documents and generally described as follows):* _____

\$ _____, which sum is hereafter called the Base Bid.

(Bidder to insert Base Bid Amount on line above)

C&A - 330

LUMP SUM BID FORM

Bidders shall submit bids on only Bid Form GMK-3.

§ 6.2 BID ALTERNATES as indicated in the Bidding Documents and generally described as follows:

ALTERNATE # 1 (Brief Description): _____

☐ ADD TO or ☐ DEDUCT FROM BASE BID: \$ _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 2 (Brief Description): _____

☐ ADD TO or ☐ DEDUCT FROM BASE BID: \$ _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 3 (Brief Description): _____

☐ ADD TO or ☐ DEDUCT FROM BASE BID: \$ _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

§ 6.3 UNIT PRICES:

BIDDER offers for the Owner's consideration and use, the following UNIT PRICES. The UNIT PRICES offered by BIDDER indicate the amount to be added to or deducted from the CONTRACT SUM for each item-unit combination. UNIT PRICES include all costs to the Owner, including those for materials, labor, equipment, tools of trades and labor, fees, taxes, insurance, bonding, overhead, profit, etc. The Owner reserves the right to include or not to include any of the following UNIT PRICES in the Contract and to negotiate the UNIT PRICES with BIDDER prior to including in the Contract.

<u>No.</u>	<u>ITEM</u>	<u>UNIT OF MEASURE</u>	<u>ADD</u>	<u>DEDUCT</u>
<u>1.</u>	<u>Asphalt Pavement</u>	<u>SY</u>	\$ _____	\$ _____
<u>2.</u>	<u>Pavement Striping</u>	<u>LF</u>	\$ _____	\$ _____
<u>3.</u>	_____	_____	\$ _____	\$ _____
<u>4.</u>	_____	_____	\$ _____	\$ _____
<u>5.</u>	_____	_____	\$ _____	\$ _____
<u>6.</u>	_____	_____	\$ _____	\$ _____

C&A-330

LUMP SUM BID FORM

§ 7. LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED

(See Instructions on the following page BF-2A)

Bidder shall use the below-listed Subcontractors in the performance of the Subcontractor Classification work listed:

(A) SUBCONTRACTOR LICENSE CLASSIFICATION or SUBCLASSIFICATION NAME <i>(Completed by Owner)</i>	(B) LICENSE CLASSIFICATION or SUBCLASSIFICATION ABBREVIATION <i>(Completed by Owner)</i>	(C) SUBCONTRACTOR and/or PRIME CONTRACTOR <i>(Required - must be completed by Bidder)</i>	(D) SUBCONTRACTOR'S and/or PRIME CONTRACTOR'S SC LICENSE NUMBER <i>(Requested, but not Required)</i>
BASE BID			
ASPHALT PAVING	AP		
CONCRETE PAVING	CP		
ALTERNATE #1			
ALTERNATE #2			
ALTERNATE #3			

If a Bid Alternate is accepted, Subcontractors listed for the Bid Alternate shall be used for the work of both the Alternate and the Base Bid work.

C&A-330

LUMP SUM BID FORM

INSTRUCTIONS FOR SUBCONTRACTOR LISTING

1. Section 7 of the Bid Form sets forth an Owner-developed list of subcontractor license classifications or subclassifications for which Bidder is required to identify the entity (subcontractor(s) and/or himself) Bidder will use to perform this work.
 - a. **Columns A & B:** The Owner fills out these columns to identify the subcontractor license classification / subclassification and related license abbreviation for which the Bidder must list either a subcontractor or himself as the entity that will perform this work. In Column A, the subcontractor license classification/subclassification is identified by name and in Column B, the related contractor license abbreviation (per Title 40 of the SC Code of Laws) is listed. Abbreviations of licenses can be found at: <https://llr.sc.gov/clb/PDFFiles/CLBClassificationAbbreviations.pdf>. If the Owner has not identified a subcontractor license classification/subclassification, the Bidder does not list a subcontractor.
 - b. **Columns C and D:** In these columns, the Bidder identifies the subcontractors it will use for the work of each license listed by the Owner in Columns A & B. Bidder must identify only the subcontractor(s) who will perform the work and no others. Bidders must make sure that their identification of each subcontractor is clear and unambiguous. A listing that could be any number of different entities may be cause for rejection of the bid as non-responsive. For example, a listing of M&M without additional information may be problematic if there are multiple different licensed contractors in South Carolina whose names start with M&M.
2. **Subcontractor Defined:** For purposes of subcontractor listing, a subcontractor is an entity who will perform work or render service to the prime contractor to or about the construction site pursuant to a contract with the prime contractor. Bidder should not identify sub-subcontractors in the spaces provided on the bid form but only those entities with which Bidder will contract directly. Likewise, do not identify material suppliers, manufacturers, and fabricators that will not perform physical work at the site of the project but will only supply materials or equipment to the Bidder or proposed subcontractor(s).
3. **Subcontractor Qualifications:** Bidder must only list subcontractors who possess a South Carolina contractor's license that includes the license classification and/or subclassification identified by the Owner in Columns A & B. The subcontractor license must also be within the appropriate license group for the work. If Bidder lists a subcontractor who is not qualified to perform the work, the Bidder will be rejected as non-responsive.
4. **Use of Own forces:** If, under the terms of the Bidding Documents and SC Contractor Licensing laws, Bidder is qualified to perform the work of a listed subcontractor classification or subclassification and Bidder does not intend to subcontract such work but to use Bidder's own employees to perform such work, the Bidder must insert itself in the space provided.
5. **Use of Multiple Subcontractors:**
 - a. If Bidder intends to use multiple subcontractors to perform the work of a single license classification/subclassification, Bidder must insert the name of each subcontractor Bidder will use, preferably separating the name of each by the word "and". If Bidder intends to use both his own employees to perform a part of the work of a single license classification/subclassification and to use one or more subcontractors to perform the remaining work, Bidder must insert itself and each subcontractor, preferably separating them with the word "and". Bidder must use each entity listed for the work of a single license classification/subclassification in the performance of that work.
 - b. **Optional Listing Prohibited:** Bidder may not list multiple subcontractors for a license classification/subclassification in a form that provides the Bidder the option, after bid opening or award, to choose one or more but not all the listed subcontractors to perform the work for which they are listed. A listing, which on its face requires subsequent explanation to determine whether it is an optional listing, is non-responsive. If Bidder intends to use multiple entities to perform the work for a single listing, Bidder must clearly set forth on the bid form such intent. Bidder may accomplish this by simply inserting the word "and" between the names of each entity listed. Owner will reject as non-responsive a listing that contains the names of multiple subcontractors separated by a blank space, the word "or", a virgule (that is a /), or any separator that the Owner may reasonably interpret as an optional listing.
6. If Bidder is awarded the contract, Bidder must, except with the approval of the Owner for good cause shown, use the listed entities to perform the work for which they are listed.
7. If Bidder is awarded the contract, Bidder will not be allowed to substitute another entity as subcontractor in place of a subcontractor listed in Section 7 of the Bid except for one or more of the reasons allowed by the SC Code of Laws.
8. Bidder's failure to identify an entity (subcontractor or himself) to perform the work of a subcontractor listed in Columns A & B will render the Bid non-responsive.

C&A-330

LUMP SUM BID FORM

§ 8. LIST OF MANUFACTURERS, MATERIAL SUPPLIERS, AND SUBCONTRACTORS OTHER THAN SUBCONTRACTORS LISTED IN SECTION 7 ABOVE (*FOR INFORMATION ONLY*):

Pursuant to instructions in the Invitation for Construction Services, if any, Bidder will provide to Owner upon the Owner's request and within 24 hours of such request, a listing of manufacturers, material suppliers, and subcontractors, other than those listed in Section 7 above, that Bidder intends to use on the project. Bidder acknowledges and agrees that this list is provided for purposes of determining responsibility and not pursuant to the subcontractor listing requirements of SC Code § 11-35-3020(b)(i).

§ 9. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES

a) CONTRACT TIME

Bidder agrees that the Date of Commencement of the Work shall be established in a Notice to Proceed to be issued by the Owner. Bidder agrees to substantially complete the Work within 90 Calendar Days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b) LIQUIDATED DAMAGES

Bidder further agrees that from the compensation to be paid, the Owner shall retain as Liquidated Damages the amount of \$ 500.00 for each Calendar Day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

§ 10. AGREEMENTS

- a) Bidder agrees that this bid is subject to the requirements of the laws of the State of South Carolina.
- b) Bidder agrees that at any time prior to the issuance of the Notice to Proceed for this Project, this Project may be canceled for the convenience of, and without cost to, the State.
- c) Bidder agrees that neither the State of South Carolina nor any of its agencies, employees or agents shall be responsible for any bid preparation costs, or any costs or charges of any type, should all bids be rejected or the Project canceled for any reason prior to the issuance of the Notice to Proceed.

§ 11. ELECTRONIC BID BOND

By signing below, the Principal is affirming that the identified electronic bid bond has been executed and that the Principal and Surety are firmly bound unto the State of South Carolina under the terms and conditions of the AIA Document A310, Bid Bond, referenced in the Bidding Documents.

ELECTRONIC BID BOND NUMBER: _____

SIGNATURE AND TITLE: _____

C&A -330
LUMP SUM BID FORM

CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATION

SC Contractor's License Number(s):_____

Classification(s) & Limits:_____

Subclassification(s) & Limits:_____

By signing this Bid, the person signing reaffirms all representation and certification made by both the person signing and the Bidder, including without limitation, those appearing in Article 2 of the SCOSE Version of the AIA Document A701, Instructions to Bidders, is expressly incorporated by reference.

BIDDER'S LEGAL NAME:_____

ADDRESS:_____

TELEPHONE:_____

EMAIL:_____

SIGNATURE:_____ **DATE:**_____

PRINT NAME:_____

TITLE:_____

AIA Document

A101-2017 (SCOSE Version)

“Standard Form of Agreement Between Owner and Contractor”

Note:

This document is available for purchase from

<https://www.aiacontracts.com>

AIA Document

A201-2017 (SCOSE Version)

“General Conditions of The Contract for Construction”

Note:

This document is available for purchase from

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C&A -355

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____

Address: _____

hereinafter referred to as “Contractor”, and *(Insert full name and address of principal place of business of Surety)*

Name: _____

Address: _____

hereinafter called the “surety”, are jointly and severally held and firmly bound unto *(Insert full name and address of Owner)*

Name: Richland School District One

Address: 201 Park Street, Columbia, SC 29201

hereinafter referred to as “Owner”, or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Owner to construct

Project Name: Meadowfield Elementary School Parking Addition

Project Number: 398720E-24

Brief Description of Awarded Work: Parking addition to Meadowfield Elementary School

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: Chao and Associates Inc.

Address: 7 Clusters Court

Columbia, SC 29210

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ **day of** _____, **2** _____

(shall be no earlier than Date of Contract)

BOND NUMBER _____

CONTRACTOR

By: _____
(Seal)

Print Name: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____

SURETY

By: _____
(Seal)

Print Name: _____

Print Title: _____

Witness: _____

(Additional Signatures, if any, appear on attached page)

C&A -355**PERFORMANCE BOND****NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the full and faithful performance of the contract, which is incorporated herein by reference.
2. If the Contractor performs the contract, the Surety and the Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.
3. The Surety's obligation under this Bond shall arise after:
 - 3.1 The Owner has notified the Contractor and the Surety at the address described in paragraph 10 below, that the Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default; or
 - 3.2 The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the Contract.
 4. The Surety shall, within 15 days after receipt of notice of the Owner's declaration of a Contractor Default, and at the Surety's sole expense, take one of the following actions:
 - 4.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Contract; or
 - 4.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the Owner the amount of damages as described in paragraph 7 in excess of the Balance of the Contract Sum incurred by the Owner resulting from the Contractor Default; or
 - 4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and:
 - 4.4.1 After investigation, determine the amount for which it may be liable to the Owner and, within 60 days of waiving its rights under this paragraph, tender payment thereof to the Owner; or
 - 4.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons therefore.
 5. Provided Surety has proceeded under paragraphs 4.1, 4.2, or 4.3, the Owner shall pay the Balance of the Contract Sum to either:
 - 5.1 Surety in accordance with the terms of the Contract; or
 - 5.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.
 - 5.3 The balance of the Contract Sum due either the Surety or another contractor shall be reduced by the amount of damages as described in paragraph 7.
 6. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond 15 days after receipt of written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner.
- 6.1 If the Surety proceeds as provided in paragraph 4.4 and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, then without further notice the Owner shall be entitled to enforce any remedy available to the Owner.
- 6.2 Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the Dispute Resolution process defined in the Contract Documents and the laws of the State of South Carolina.
7. After the Owner has terminated the Contractor's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Owner shall be those of the Contractor under the Contract, and the responsibilities of the Owner to the Surety shall those of the Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Sum to mitigation of costs and damages on the Contract, the Surety is obligated to the Owner without duplication for:
 - 7.1 The responsibilities of the Contractor for correction of defective Work and completion of the Contract; and
 - 7.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and
 - 7.3 Damages awarded pursuant to the Dispute Resolution Provisions of the Contract. Surety may join in any Dispute Resolution proceeding brought under the Contract and shall be bound by the results thereof; and
 - 7.4 Liquidated Damages, or if no Liquidated Damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.
8. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Sum shall not be reduced or set-off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, or successors.
9. The Surety hereby waives notice of any change, including changes of time, to the contract or to related subcontracts, purchase orders and other obligations.
10. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page.
11. Definitions
 - 11.1 Balance of the Contract Sum: The total amount payable by the Owner to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts to be received by the Owner in settlement of insurance or other Claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.
 - 11.2 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

C&A -357

LABOR & MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____

Address: _____

hereinafter referred to as “Contractor”, and *(Insert full name and address of principal place of business of Surety)*

Name: _____

Address: _____

hereinafter called the “surety”, are jointly and severally held and firmly bound unto *(Insert full name and address of Owner)*

Name: Richland School District One

Address: 201 Park Street, Columbia SC, 29201

hereinafter referred to as “Owner”, or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Owner to construct

Project Name: Meadowfield Elementary School Parking Addition

Project Number: 398720E-24

Brief Description of Awarded Work: Parking addition to Meadowfield Elementary School

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: Chao and Associates, Inc

Address: 7 Clusters Court

Columbia, SC 29210

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Labor & Material Payment Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ **day of** _____, **2** _____ **BOND NUMBER** _____

(shall be no earlier than Date of Contract)

CONTRACTOR

By: _____

(Seal)

Print Name: _____

Print Title: _____

(Attach Power of Attorney)

Witness: _____

SURETY

By: _____

(Seal)

Print Name: _____

Print Title: _____

Witness: _____

(Additional Signatures, if any, appear on attached page)

C&A -357**LABOR & MATERIAL PAYMENT BOND****NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for all labor, materials and equipment required for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to the Owner, this obligation shall be null and void if the Contractor:
 - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants; and
 - 2.2 Defends, indemnifies and holds harmless the Owner from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract.
3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.
4. With respect to Claimants, and subject to the provisions of Title 29, Chapter 5 and the provisions of §11-35-3030(2)(c) of the SC Code of Laws, as amended, the Surety's obligation under this Bond shall arise as follows:
 - 4.1 Every person who has furnished labor, material or rental equipment to the Contractor or its subcontractors for the work specified in the Contract, and who has not been paid in full therefore before the expiration of a period of ninety (90) days after the date on which the last of the labor was done or performed by him or material or rental equipment was furnished or supplied by him for which such claim is made, shall have the right to sue on the payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute such action for the sum or sums justly due him.
 - 4.2 A remote claimant shall have a right of action on the payment bond upon giving written notice by certified or registered mail to the Contractor within ninety (90) days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material or rental equipment upon which such claim is made.
 - 4.3 Every suit instituted upon a payment bond shall be brought in a court of competent jurisdiction for the county or circuit in which the construction contract was to be performed, but no such suit shall be commenced after the expiration of one year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.
5. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
 - 5.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 5.2 Pay or arrange for payment of any undisputed amounts.
 - 5.3 The Surety's failure to discharge its obligations under this paragraph 5 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a claim. However, if the Surety fails to discharge its obligations under this paragraph 5, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs to recover any sums found to be due and owing to the Claimant.
6. Amounts owed by the Owner to the Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's prior right to use the funds for the completion of the Work.
7. The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Owner shall not be liable for payment of any costs or expenses of any claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.
9. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Owner or the contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
10. By the Contractor furnishing and the Owner accepting this Bond, they agree that this Bond has been furnished to comply with the statutory requirements of the South Carolina Code of Laws, as amended, and further, that any provision in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.
11. Upon request of any person or entity appearing to be a potential beneficiary of this bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
12. Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the laws of the State of South Carolina.

13. DEFINITIONS

- 13.1 Claimant: An individual or entity having a direct contract with the Contractor or with a Subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the Contractor and the Contractor's Subcontractors, and all other items for which a mechanic's lien might otherwise be asserted.
- 13.2 Remote Claimant: A person having a direct contractual relationship with a subcontractor of the Contractor or subcontractor, but no contractual relationship expressed or implied with the Contractor.
- 13.3 Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

AIA Document

G701-2017

“Change Order”

Note:

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SECTION 01110

SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. Parking lot addition to Meadowfield Elementary School

1.02 RELATED WORK

- A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these specifications.

1.03 SAFETY COMPLIANCE

- A. In addition to any detailed requirements of these specifications, the contractor shall meet the requirements of federal and state standards referenced in applicable publications, whichever is more restrictive. Matters of interpretation of these standards shall be submitted by the contractor to the respective administrative agency for resolution before starting work.

1.04 PRECAUTION AND SAFETY

SPECIAL REQUIREMENTS

- A. Accident Prevention and Safety: Comply with all applicable laws, ordinances, rules, regulations and orders of governing authorities having jurisdiction for the safety of persons and property to protect them from damage, injury or loss. Erect and maintain, as required by conditions and progress of the work, all necessary safeguards for safety and protection, including fences, railings, barricades, lighting, posting of danger signs and other warnings against hazards. Where prevention of construction accidents is not regulated by code or ordinances, comply with AGC's "Manual of Accident Prevention in Construction." Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Project. All scaffolds shall be built in accordance with all requirements of local, state and Federal laws and regulations.

1.05 COORDINATION OF WORK SEQUENCE

- A. Coordinate work for the various sections of the Specifications to ensure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.
- B. Verify characteristics that elements of interrelated operating equipment are compatible; coordinate work of various sections having interdependent responsibilities for installing, connection to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts and conduits, as closely as practicable; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- D. In finished areas conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

1.06 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. The Contract Performance Period shall be as on the SE-330, Lump Sum Bid Form and commence upon written Notice to Proceed.

1.07 SUBSTANTIAL COMPLETION INSPECTION AND PUNCH LIST:

- A. The contract has an established contract completion date. In order to avoid the assessment of liquidated damages, the contractor shall require in writing to the architect/engineer a substantial completion inspection on or prior to the established completion date. The contractor shall certify that all construction/installation is complete and has been checked out and is operating as designed. The architect/engineer shall notify the Owner in writing that the job is ready for inspection.
- B. The architect/engineer, Construction Manager, contractor, and all sub-contractors associated with the construction/installation of the building equipment shall be present during the substantial completion inspection to demonstrate the proper operations of the equipment. Removal/replacement of necessary covers for inspection shall be conducted by the contractor.

1.08 FINAL PUNCH LIST ITEMS:

- A. The contractor and sub-contractors shall have thirty (30) calendar days from the date of final inspection to complete the repair of any and all items listed on the final punch list.

END OF SECTION

SECTION 01140

WORK RESTRICTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included: This section applies to situations in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees and field engineers, enter upon the Owner's property.
- B. Related Work: Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.02 QUALITY ASSURANCE

- A. Promptly upon the award of the Contract, notify all pertinent personnel regarding requirements of this Section.
- B. Require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this section.

1.03 TRAFFIC CONTROL

- A. Contractor shall provide and maintain all regulatory construction signing, barricades, flagmen, etc. as needed to comply with the SCDOT standards during construction operations.

1.04 SECURITY

- A. Restrict the access of all persons entering upon the Owner's property in connection with the work to the Contractor's Entrance and to the actual site of the work.

1.05 CONTRACTOR USE OF PREMISES

- A. Confine operations at site to area permitted by Owner and Contract Documents.
- B. Do not unreasonably encumber site with materials or equipment.
- C. Assume full responsibility for protection and safekeeping of products stored on premises.
- D. Move any stored products, which interfere with operations of Owner.

1.07 OWNER OCCUPANCY

- A. N/A

1.08 WORK IN, OR ADJACENT TO, EXISTING OR OCCUPIED AREAS

- A. N/A

1.09 CONTRACTOR CONDUCT

- A. The possession and/or use of drugs and alcohol on district property are

prohibited.

END OF SECTION

SECTION 01170
SPECIAL PROVISIONS

TABLE OF CONTENTS

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
1.0	General	SP-3
2.0	Project Scope	SP-3
3.0	Contractor Qualifications	SP-3
4.0	Contractor's Obligation	SP-3
5.0	Supervision	SP-4
6.0	Covenant of Good Faith and Fair Dealing	SP-4
7.0	Injuries to Persons and Property	SP-4
8.0	Mobilization	SP-5
9.0	Video Taping of Project	SP-5
10.0	Photographs	SP-5
11.0	Construction Staking	SP-6
12.0	Sitework	SP-6
13.0	Safety Regulations	SP-6
14.0	Protection of Work	SP-6
15.0	Emergency Work	SP-6
16.0	Existing Utilities and Structures	SP-7
17.0	Relocation of Existing Utilities	SP-7
18.0	Erosion and Sediment Control	SP-8
19.0	Removal of Obstructions	SP-8
20.0	Construction Near or Under Drainage Pipes, Sewers, & Ditches	SP-8
21.0	Unclassified Excavation/Geotechnical Investigation	SP-8
22.0	Backfilling	SP-9
23.0	Construction Operations along Highways and Streets	SP-9
24.0	Traffic Control	SP-10

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
25.0	Submittals, Shop Drawings and Samples	SP-11
26.0	“Or Equal”	SP-11
27.0	Materials Not Specified	SP-11
28.0	Delivery, Storage, and Handling	SP-12
29.0	Inspection and Testing Materials, Quantity and Guarantees	SP-12
30.0	Utility Usage	SP-12
31.0	Unpaved Roads, Driveways and Parking Areas	SP-12
32.0	Signs, Lights, Mailboxes, Fences and Gates	SP-12
33.0	Access Roads	SP-12
34.0	Restoration and Clean Up	SP-13
35.0	Additional Restoration	SP-13
36.0	Relocation of Property Irons	SP-13
37.0	Sequence of Work	SP-13
38.0	Project Completion Time	SP-13
39.0	Submittals Prior to Final Payment Request	SP-13
40.0	Record Drawings	SP-14
41.0	Weather Conditions	SP-14
42.0	Substantial and Final Completion	SP-15
43.0	Construction Manager	SP-16

Francis Marion University
Def. Maint: Roads, Parking Lots, Sidewalks and Walkways – Parking Lot F

SECTION 01170
SPECIAL PROVISIONS

1.0 GENERAL

- 1.1 In case of conflict between the Special Provisions and the Technical Specifications (Divisions 1 & 2), the Technical Specifications will prevail.

2.0 PROJECT SCOPE

- 2.1 Work covered by these contract documents consists of asphalt pavement rehabilitation work for parking lot A. All repairs and pavement striping are to match the existing conditions.

3.0 CONTRACTOR QUALIFICATIONS

- 3.1 No bid will be considered unless the bidder is legally qualified under the provisions of the South Carolina Contractor's Licensing Law (South Carolina Code of Laws as amended on April 1, 1999, Chapter 11, Section 40-11-10 through 40-11-428).

- 3.2 Contractors shall have a classification of Asphalt Paving.

4.0 CONTRACTOR'S OBLIGATION

- 4.1 The Contractor shall, in a good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities, and means necessary or proper to perform and complete all the work required by these Special Provisions within the time herein specified, in accordance with the provision of these specifications, and in accordance with the directions of the Engineer as given from time to time during the progress of the work. He shall furnish, erect, and maintain such temporary work as may be required. The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the contract and specifications, and shall carry on and complete the entire work to the satisfaction of the Engineer and the University. The Contractor will at all times have one complete set of all contract documents (special provisions, specifications, drawings, bulletins, etc.) maintained at the project sites and the Contractor's person in charge must be familiar with all phases of the projects. All work, materials, methods, and procedures shall comply with the requirements of Storm Water Management and Sediment Reduction Act of 1991 and the SCDHEC permit to construct.

5.0 SUPERVISION

- 5.1 The work shall be conducted under the general direction of the Owner/Engineer and will be inspected by his appointed representatives. The Owner/Engineer through his representatives will maintain a record of work done and see that the location and limit marks are kept in proper order. The presence of the Owner/Engineer's representative(s) shall not relieve the Contractor of responsibility for the proper execution of the work. The contractor will have at least one representative on-site during the installation and after the installation during the curing process on any asphalt or concrete constructed on the campus.
- 5.2 The Contractor shall furnish at his own expense such labor, organization and materials as may be reasonably necessary in inspecting and supervising the work. Should the Contractor refuse, neglect, or delay compliance with this requirement, the specified facilities may be furnished and maintained by the Owner/Engineer and the cost thereof deducted from any amounts due, or to become due, the Contractor.
- 5.3 The work shall be entirely under the control of the Owner/Engineer, and the Owner/Engineer or his authorized representative(s) shall have access to the same at all times.

6.0 COVENANT OF GOOD FAITH AND FAIR DEALING

- 6.1 This contract imposes an obligation of good faith and fair dealing in its performance and enforcement.
- 6.2 The Contractor and the Owner, with a positive commitment to honesty and integrity, agree to the following mutual duties:
- A. Each will function within the laws and statutes applicable to their duties and responsibilities.
 - B. Each will assist in the other's performance.
 - C. Each will avoid hindering the other's performance.
 - D. Each will proceed to fulfill its obligations diligently.
 - E. Each will cooperate in the common endeavor of the contract.

7.0 INJURIES TO PERSONS AND PROPERTY

- 7.1 The Contractor shall be held responsible for all injuries to persons and for all damages to the property of the Owner or others caused by or resulting from the negligence of himself, his employees or his agents, during the progress of or in connection with the prosecution of the work, whether within the limits of the work under the contract proper or as extra work.
- 7.2 The Contractor must protect and support all water and gas pipes or other conduits and buildings, walls, fences, or other properties, which are liable to be damaged during the execution of his work. The Contractor shall take all reasonable and proper precautions to

protect persons, animals, and vehicles of the public from injury and wherever necessary shall erect and maintain a fence or railing around any excavation and place a sufficient number of lights about the work and keep them burning from twilight to sunrise. The Contractor must, as far as practical and consistent with good construction, permit access to private and public property and leave fire hydrants, catch basins, streets, etc., free from encumbrances. The Contractor must restore at his own expense all injured property caused by any negligence of omission or commission on his part or on the part of his agent, including sidewalks, curbing, sodding, pipes, conduits, sewers, buildings, fences, retaining walls, tanks, power lines, or any other private or public property to a condition of equal or better comparison to the condition of the property when he entered upon the work.

7.3 In case of failure on the part of the Contractor to restore such property or make good such damage, the Owner may upon 48 hours notice proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any money due or which may become due under this contract.

7.4 The Contractor shall indemnify and hold harmless the Owner or the Engineer acting in behalf of the Owner from all suits and actions that may be brought against it by reason of any injury, or alleged injury, to the person or property of another resulting from negligence or carelessness in the execution of the work, or on account of any negligent act or omission, or improper methods or means of construction on the part of the Contractor, his representatives, or employees. The Contractor shall have the sole responsibility of determining the best and proper method or means of construction and the Owner or the Engineer acting in behalf of the Owner shall not be held responsible for determining or suggesting a method or means of construction, except as expressly indicated in the contract documents.

8.0 MOBILIZATION

8.1 Mobilization and demobilization include all work and cost associated necessary for obtaining all bonds, permits, and licenses; location and procurement of a staging area/storage yard; moving onto and off of the site of all equipment; furnishing and erecting construction facilities; cleanup; testing; and all preparatory work as required for the proper performance and completion of the project, including all work items not identified in a separate bid item.

8.2 Payment for mobilization shall be as shown in the bid form.

9.0 VIDEO TAPING OF PROJECT

9.1 Not required

10.0 PHOTOGRAPHS

10.1 The Contractor will be responsible for obtaining photographs of all work areas prior to

beginning construction. Each digital photograph shall be annotated with the date, location, approximate station number if applicable, and direction of view (i.e., "looking north", etc.). Provide the Owner and Engineer with a minimum of one (1) copy of each digital photograph electronically. Electronic copies of all original photographs are to be provided to the Engineer and Owner with a release statement. Provide a minimum of one (1) electronic copy of all photographs taken during the duration of the entire construction project.

11.0 CONSTRUCTION STAKING

- 11.1 The Contractor will be responsible for establishing all lines and grades and staking out all work on this project from the controls provided by the Engineer. Horizontal and vertical control points for the project are designated on the Drawings.

12.0 SITEWORK

- 12.1 Comply with Section 311000, Site Clearing.
- 12.2 Comply with Section 312000, Earth Moving.

13.0 SAFETY REGULATIONS

- 13.1 All methods of construction including, but not limited to, trenching, sheeting and bracing, jacking and auger boring, jacking and hand mining or micro-tunneling and pipeline construction shall be done in accordance with OSHA regulations. In accordance with OSHA's requirements, excavations greater than 20 feet shall be designed and certified by a Professional Engineer, registered in the State of South Carolina. Certified copies of all such excavation bracing design shall be submitted to the Engineer for review and approval. All cost for this work shall be included in other bid items. Design must be submitted to the Engineer before any pay requests will be approved.
- 13.2 The Contractor shall conform to OSHA's requirements and regulations while operating in a confined space that requires a permit.

14.0 PROTECTION OF WORK

- 14.1 The Contractor shall furnish and install all necessary temporary works for the protection of the work, including, but not limited to, barricades, warning signs, and lights at night.

15.0 EMERGENCY WORK

- 15.1 The Contractor shall at all times (nights, weekends and holidays) have a responsible person available whom the Owner may contact in the event emergency repairs become necessary. Upon notification of such emergency work, the Contractor's representative shall immediately take steps to make such repairs as may be required.

16.0 EXISTING UTILITIES AND STRUCTURES

- 16.1 The following may exist in the construction areas: water works, storm drainage, sewer mains, gas mains, telephone, fiber optics, power lines & power poles, sprinkler systems, and other utilities. The approximate location of certain known underground lines and structures are shown on the plans for information only. A concerted attempt was made to locate these utilities accurately; however, not all utility lines were field-located by the Engineer. Other underground utilities or structures may exist which are not shown. The Contractor shall familiarize himself with the existing conditions and be prepared to adequately care for and safeguard himself and the Owner from damage.
- 16.2 The Contractor shall proceed with caution in the excavation and preparation of the sidewalks and pavement so that the exact location of underground structures may be determined. Prior to proceeding with grading or trench excavation, the Contractor shall contact the Palmetto Utility Protection Service, telephone 1-800-922-0983 or 811 and such other utility companies in the area as necessary to aid in locating their underground services. The Contractor shall locate these and other possible unknown utility lines by use of an electronic pipe finder, or other means he may prefer, and shall excavate and expose all existing underground lines in advance of any excavation work under this contract.
- 16.3 The Contractor is responsible for exact location of all utilities within and adjacent to the project areas. The Contractor shall be solely responsible and liable for any damage (i.e. such as cutting or disturbing, etc.) to any utilities resulting from or incident to the Contractor's performance of these projects. The Contractor shall be responsible for notifying appropriate companies to protect or move the affected facilities, if any of the specified work is in the area of these affected facilities.
- 16.4 The power and phone companies may require that all poles within 5 feet of construction be held in place during construction by their own forces, and will bill time and expenses. These costs shall be included in the unit cost of pipe and no additional cost will be considered. The Contractor is advised to familiarize himself with the proposed routing and location of utility poles before the submittal of bid.
- 16.5 All costs associated with "Existing Utilities and Structures" shall be included in other bid items and no additional cost will be considered. Contractor is specifically advised to familiarize himself with the proposed routing and location of all utilities before the submittal bid.

17.0 RELOCATION OF EXISTING UTILITIES

- 17.1 The Contractor is responsible for contacting and coordinating utility relocations with the appropriate utility company prior to starting construction.
- 17.2 Utility companies may bill for time and expenses for the above items. All of the above costs, including potential repair should any utility be damaged during construction, shall

be the responsibility of the Contractor. The Contractor is specifically advised to familiarize himself with the proposed location of utilities before the submittal of the bid.

- 17.3 No direct payment will be made for this bid item, the cost of which shall be included in other bid items.

18.0 EROSION AND SEDIMENT CONTROL

- 18.1 During construction, protective measures shall be taken and maintained to minimize silting, soil erosion and dust in disturbed areas and adjacent to the work being performed during construction. The Contractor shall perform this control in accordance with the South Carolina Department of Health and Environmental Control's "Storm Water Management BMP Handbook," Section 312510 of the Specifications, and the Drawings.

19.0 REMOVAL OF OBSTRUCTIONS

- 19.1 The Contractor may, with the Owner's consent, remove obstructions to his operations, but they shall be removed and replaced at the Contractor's expense. **Trees that are an obstruction to the construction must be immediately notified to the Engineer and Owner prior to any disturbance.**
- 19.2 The Contractor shall be responsible for arranging for the temporary removal of the buildings, vehicles, trailers located in the vicinity of the proposed project.

- 19.3 There shall be no separate payment for this item.

20.0 CONSTRUCTION NEAR OR UNDER DRAINAGE PIPES, SEWERS AND DITCHES

- 20.1 Special attention shall be given to construction near any drain pipes, sewers or ditches to ensure that any proposed utility lines are installed so as to provide 18-inch minimum clearance between these pipes and the proposed sewer line. There will be no direct payment for any additional work, materials or depth of cut involved, the cost of which shall be included in other bid items. Any pumping/dewatering, if required, shall be provided by the Contractor, at no additional costs. All pumped water shall be properly disposed of.

21.0 UNCLASSIFIED EXCAVATION/GEOTECHNICAL INVESTIGATION

- 21.1 All excavation is unclassified. The Contractor shall assume all risks of unforeseen ground conditions encountered and shall be responsible for completing the project as specified regardless of these conditions. No direct payment will be made for varying ground conditions that may affect the Contractor's ability to complete the work. Rock excavation shall not be paid for separately as all excavation is unclassified although we do not anticipate rock being present within the construction limits. No direct payment will be made for any excavation condition, the cost of which shall be included in other

bid items.

21.2 A geotechnical report was prepared for this contract.

22.0 BACKFILLING

22.1 References to SCDOT requirements in the following paragraphs are applicable only when working within SCDOT rights-of-way.

22.2 The Contractor shall be solely responsible for determining all existing soil conditions. There will be NO direct payment for any backfill material, except flowable fill. Flowable fill shall be used only under pavement which includes driveways and streets. Select soil backfill can be used in all other areas where no pavement is constructed and there will be no direct payment for this material, the cost of which shall be included in other bid items. Thus, it is extremely critical that the Contractor takes whatever steps he deems necessary to determine all existing soils and conditions so that he can bid accordingly. All material used in backfilling shall be a select soil material or flowable fill, which meets all SCDOT specifications. Backfill within the SCDOT R/W under pavement shall be flowable fill from the bottom of the trench up to the bottom of the pavement section. Trench testing requirements are shown on the plan construction details.

22.3 All backfill material shall be placed in a maximum of 6-inch lifts and shall be tested by an approved Soils Testing Company to determine the compaction. A qualified technician shall acquire samples of soil to perform moisture - density tests according to ASTM D698. During backfill, a minimum of one moisture - density test and maximum of two moisture - density tests shall be performed per lift for every 500 feet of pressure sewer construction. If at any time a representative from the University and SCDOT arrives on site and finds the Contractor backfilling material in greater lifts than 6 inches, the Contractor shall remove all backfill material within the last 300 L.F. of the trench and begin proper backfilling again, all at the Contractor's expense.

23.0 CONSTRUCTION OPERATIONS ALONG HIGHWAYS AND STREETS

23.1 Perform all work along highways, streets, and roadways to minimize interference with traffic.

23.2 Stripping: Where the work is performed along road right-of-way, strip and stockpile all sod, topsoil, and other material suitable for right-of-way restoration.

23.3 Shaping: Reshape damaged slopes, side ditches, and ditch lines immediately after completing backfilling operations. Replace topsoil, sod, and any other materials removed from shoulders.

23.4 Excavated Materials: Do not place excavated material along highways, streets, and roadways in a manner that obstructs traffic. Sweep all scattered excavated material off the pavement in a timely manner.

- 23.5 Drainage Structures: Keep all side ditches, culverts, cross drains, and other drainage structures clear of excavated material. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
- 23.6 Landscaping Features: Landscaping features shall include, but are not necessarily limited to: fences; property corners; cultivated trees and shrubbery; manmade improvements; subdivision and other signs within the right-of-way and easement. The Contractor shall take extreme care in moving landscape features and promptly re-establishing these features.
- 24.0 TRAFFIC CONTROL
- 24.1 The Contractor shall: provide, erect and maintain all necessary barricades; suitable and sufficient lights and other traffic control devices; provide qualified flagmen where necessary to direct traffic; take all necessary precautions for the protection of the work and the safety of the public.
- 24.2 Construction traffic control devices and their installation shall be in accordance with the current *Manual on Uniform Traffic Control Devices for Streets and Highways*.
- 24.3 The Contractor shall provide the Owner and Engineer a detailed Traffic Control plan at least one week prior to beginning work.
- 24.4 Placement and removal of construction traffic control devices shall be coordinated with all applicable governing State, County, and/or Municipal agencies.
- 26.5 Placement of construction traffic control devices shall be scheduled ahead of associated construction activities. Construction time in street right-of-way shall be conducted to minimize the length of time traffic is disrupted. Construction traffic control devices shall be removed immediately following their useful purpose.
- 24.6 Existing traffic control devices within the construction work zone shall be protected from damage. Traffic control devices requiring temporary relocation shall be located as near as possible to their original vertical and horizontal locations. Temporary locations shall provide the same visibility to affected traffic as the original location.
- 24.7 Construction traffic control devices shall be maintained in good repair and shall be clean and visible to affected traffic for daytime and nighttime operation. Traffic control devices affected by the construction work zone shall be inspected daily.
- 24.8 Channelization devices shall be positioned preceding an obstruction at a taper length as required by the current *Manual on Uniform Traffic Control Devices for Streets and Highways*, as appropriate for the speed limit at that location. Channelization devices shall be patrolled to insure that they are maintained in the proper position throughout their period of use.

- 24.9 Maintain streets, highways, roadways and driveways in suitable condition for movement of traffic until completion and final acceptance of the work.
- 24.10 During the time period between pavement removal and completing permanent pavement replacement, maintain highways, streets and roadways by the use of steel running plates. The edges of running plates shall have asphalt placed around their periphery to minimize vehicular impact. The backfill above the pipe shall be compacted, as specified elsewhere up to the existing pavement surface to provide support for the steel running plates.
- 24.11 Immediately repair all driveways that are cut or damaged. Maintain them in a suitable condition for use until completion and final acceptance of the work.
- 24.12 No street or roadway may be closed for unloading of pipe without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for the protection of traffic along highways, streets and roadways upon which pipe is distributed.

25.0 SUBMITTALS, SHOP DRAWINGS AND SAMPLES

- 25.1 Submit to the Engineer for approval, in accordance with the requirements of Section 01330.

26.0 “OR EQUAL”

- 26.1 Any item which the bidder desires to substitute as an “or-equal” in preparing his bid shall be presented to the Engineer in writing, with all necessary information required to make an evaluation, at least 15 days prior to the bid date. This will allow time for evaluation and the issuing of an addendum. Any modification required due to the proposed “or equal” and not in the plans shall be the responsibility of the Contractor.
- 26.2 For additional information refer to the specifications.
- 26.3 Use of any substitute or equivalent procedures, methods, or materials must be approved by the Owner in writing prior to the bid date.
- 26.4 Should the Contractor wish to use any brand of material other than that specified herein, he shall submit to the Owner for review, complete descriptive literature naming the proposed substitution and manufacturer.

27.0 MATERIALS NOT SPECIFIED

- 27.1 The Contractor shall provide all materials and equipment required to complete the project as shown on the plans and in accordance with the Contract Documents. Materials not specified elsewhere shall be of such manufacture as is generally accepted for the portion of the work to which they pertain, and shall be installed in accordance with industry standards and the manufacturer’s recommendations.

28.0 DELIVERY, STORAGE AND HANDLING

28.1 Refer to Section 01650.

29.0 INSPECTION AND TESTING MATERIALS, QUANTITY AND GUARANTEES

29.1 The inspection and testing of materials and finished articles to be incorporated in the work shall be made by persons, laboratories, or agencies approved by the Engineer and Owner (refer to section 01400). The cost of such testing shall be paid by the Contractor.

30.0 UTILITY USAGE

30.1 The Contractor shall make his own arrangements for all temporary utilities (e.g. water service connection, temporary electrical service, etc.) required for the work.

30.2 In order to use water from a fire hydrant, the Contractor shall apply for a temporary hydrant meter. The Contractor shall be responsible for all application fees.

31.0 UNPAVED ROADS, DRIVEWAYS AND PARKING AREAS

31.1 The Contractor shall restore all dirt and/or gravel roads, driveways and parking areas disturbed during installation of the sidewalks or pavements to their preconstruction condition, or better, as indicated on the Drawings.

32.0 SIGNS, LIGHTS, MAILBOXES, FENCES AND GATES

32.1 The Contractor shall be required to remove and replace all signs, lights, mailboxes, brick walls, fences and gates, landscaping structures, storm drains, etc., at no additional cost to the university, the cost of which shall be included in other bid items. New fencing shall be erected as shown on the Civil Plans as the work progresses near the completion of construction. Any fencing damaged shall be replaced at the Contractor's expense.

32.2 At all locations where existing fences must be removed to permit construction of any proposed items, the Contractor shall remove such fences as the work progresses, reset the fences in their original location and condition. The Contractor shall provide temporary fencing, or employ other safeguards, as required to prevent unapproved access into the affected property.

33.0 ACCESS ROADS

33.1 Streets, roads, and drives used by the Contractor for access to and from the site of his work shall be protected from damage in excess of that caused by the normal traffic of vehicles used in connection with construction work. Any such damage done shall be repaired immediately, and left in good condition at the end of the construction period at no additional cost to the University.

34.0 RESTORATION AND CLEAN UP

- 34.1 All areas disturbed by, during or as a result of construction activities shall be restored to their pre-existing or better condition. As the work progresses, disturbed areas shall be completely restored at a rate consistent with the rate of pavement installation. This includes keeping parking lot areas clean and well kept.
- 34.2 See Specification Section 312510 for seeding requirements.

35.0 ADDITIONAL RESTORATION

- 35.1 Additional Restoration outside of the scope of work covered in the contract documents may be deemed appropriate by the Engineer. The Contractor shall take all precautions to avoid disturbing areas outside of the scope of work covered in the contract documents. If it is found the Contractor damaged areas outside of the work covered in the contract documents due to negligence, the Contractor shall be solely responsible for the repairs, and will not be reimbursed by the University.

36.0 RELOCATION OF PROPERTY IRONS

- 36.1 Any property iron disturbed during construction shall be re-established by a registered land surveyor; there shall be no additional cost for this item.

37.0 SEQUENCE OF WORK

- 37.1 The sequence of work may dictate temporary installation until final and complete installation can be made. Summary of Work, Section 01110, Construction and Schedule Constraints, is an attempt to address major steps in the order of construction but in no way should be considered as a complete and comprehensive guide through the construction phase. The Contractor is encouraged to make suggestions for modifications to this construction sequence to simplify or streamline the construction process. Any suggestions are to be presented to the Engineer for consideration and approval. Items of work not specifically stated herein that are required to accomplish the project construction and keep the system in service (or on bypass) will not be considered as extra work and change orders for such will not be granted.
- 37.2 The construction sequence shall be as approved by the Engineer; however, this shall in no way affect the responsibility of the Contractor.
- 37.3 Coordinate all work with the Owner to minimize disruption of ongoing operations. Work may be required to be performed on weekends and/or at night to minimize disruption of normal operations.

38.0 PROJECT COMPLETION TIME

- 38.1 The Contractor shall substantially complete the project as outlined in the contract documents.
- 38.2 Attention is called section 01320 Progress Schedule concerning unforeseen project delays.
- 39.0 SUBMITTALS PRIOR TO FINAL PAYMENT REQUEST
- 39.1 Prior to submission of final payment request, the Contractor shall submit the following to the Engineer:
- A. Record drawings of newly installed concrete slab and building.
 - B. Certified copy of the Engineer's Substantial Completion Punch List.
 - C. Affidavit that payrolls, bills for materials & equipment and any other indebtedness are satisfied.
 - D. A certificate evidencing that insurance required by the Contract Documents remains in force after final payment and will not cancel or expire until at least 30 days prior to written notice has been given to the University.
 - E. A written statement that the Contractor knows of no substantial reason that the Contractor's insurance will not be renewable to cover the period required by the Contract Documents.
 - F. Two copies of each required warranty.
- 40.0 RECORD DRAWINGS
- 40.1 The Contractor shall furnish to the Engineer, two sets of marked-up drawings for record drawings showing all modifications from the contract drawings. These mark-up sets shall include actual dimensions from permanent markers, accurately locating structures, and appurtenances. The Contractor shall place on the drawing sets a certificate stating that all locations, dimensions, and facilities are accurately shown or indicated on these Record Drawings. The statement shall be signed by the Contractor and witnessed. The Contractor shall provide the Engineer with Record Drawing plans prior to submission of final payment request.
- 40.2 The Contractor shall provide a detailed sketch with at least two dimensions from permanent objects to all utilities that are replaced, relocated or added. These sketches are to be done and submitted to the University as the project proceeds. The University reserves the right to keep all of the retainage if this activity is not performed satisfactory. The Contractor shall note on the sketches a certification that all dimensions are accurately shown. There will be no direct payment for this item, the cost of which shall be included in other bid items.

40.3 As-Built (Record) Drawings shall be furnished by the contractor to the Engineer and certified by a Land Surveyor licensed to practice in South Carolina. The Contractor shall use GPS to locate all structures within the project area (including new construction and existing utilities uncovered during excavation for new work). Locations shall be collected using survey grade GPS. Collected data will be delivered to the Engineer in a digital format using an AutoCAD compatible format on CD or Flash Drive. Contractor to coordinate digital format type and other specifics with the Engineer and the University before collection of data is to begin (section 01720 for all details).

41.0 WEATHER CONDITIONS

41.1 In the event of temporary suspension of work or during inclement weather, or whenever the Construction Administrator shall direct, the Contractor will, and will cause his subcontractors to protect carefully his and their work and materials against damage or injury from the weather. If, in the opinion of the Construction Administrator, any work or materials are damaged or injured by reason of failure of the Contractor or his subcontractors to protect their work, such materials shall be removed and replaced at the expense of the Contractor.

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

- A. Precipitation (rain, snow, or ice) in excess of 0.10 inch liquid measure.
- B. Temperatures which do not rise above 32 degrees Fahrenheit by 10:00 AM.
- C. Temperatures which do not rise above that specified for the day's construction activity by 10:00 AM, if any are specified.
- D. Sustained wind in excess of 25 MPH.
- E. Standing snow in excess of 1 inch.
- F. Any day that the Owner has requested no work to be performed.

41.3 A Weather Delay Day may be counted if adverse weather prevents work on the project for 50 percent or more of the Contractor's scheduled work day, including a weekend day or holiday if Contractor has scheduled construction activity that day.

41.4 All weather data used to determine Adverse Weather for the project site during the course of work shall be data from the NOAA station at the Florence Regional Airport. Therefore, the contractor shall on a monthly basis submit to the Construction Administrator a summary showing the Adverse Weather incurred for the month and the supporting documentation from the NOAA station at the Florence Regional Airport

confirming the Adverse Weather experienced.

42.0 SUBSTANTIAL AND FINAL COMPLETION

42.1 Substantial Completion – The time at which the Work has progressed to the point where, in the opinion of the Owner and Engineer, the Work is sufficiently complete, in accordance with the Contract, so that the Work can be utilized by the Owner for the purposes for which it is intended. The Work shall be considered substantially complete after the new canopy and slab is in full operation. Liquidated damages may be assessed for Contractor's failure to meet the Substantial Completion date.

42.2 Final Completion – The time at which the Work has been fully completed to include clean-up and ability to use the new facility, completion of punchlist items, paving, final sitework and landscaping, and full demobilization.

43.0 CONSTRUCTION MANAGER

43.1 Various Specifications make reference to a Construction Manager. This reference shall mean the Owner's authorized representative who is responsible for project oversight during construction. The Construction Manager may be a university employee, or a professional engineer/construction manager retained by the University. The Construction Manager will be identified prior to the pre-construction meeting.

END OF SECTION

SECTION 01291

SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Schedule of Values is required to be compatible with the continuation sheet and accompanying applications for payment, as described in Section 01290.

1.2 QUALITY ASSURANCE

- A. Use required means to assure arithmetical accuracy of the sums described.
- B. When so required by the Construction Manager and/or Architect, provide copies of the subcontractor's Schedule of Values or other data acceptable to the Construction Manager and/or Architect, substantiating the sums described.

1.3 SUBMITTALS

- A. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Architect.
 - c. Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
 - 3. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
 - 4. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 - 5. Schedule Updating: Update the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum.

- B. Prior to first application for payment, submit a proposed schedule of values to the Construction Manager.
1. Meet with the Construction Manager and determine additional data, if any required to be submitted.
 2. Secure the Construction Manager's approval of the schedule of values prior to submitting first application for payment. NO APPLICATIONS FOR PAYMENT WILL BE PROCESSED PRIOR TO APPROVAL OF THE SCHEDULE OF VALUES.
 3. AIA Form G703 and "Form A" provided by the Construction Manager shall be submitted with all columns and spaces completed.

END OF SECTION

SECTION 01311

PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems and to coordinate all phases of the Project toward completion in accordance with the Contract Documents, the Construction Manager will conduct project meetings throughout the construction period.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. The Contractor's relations with his subcontractors and materials suppliers are the Contractor's responsibility and normally are not part of project meeting content.
 - 3. This Section specifies administrative and procedural requirements for project meetings including, but not limited to:
 - a. Pre-construction conferences.
 - b. Progress meetings.
 - c. Coordination meetings.
 - d. Pre-installation conferences.

1.2 QUALITY ASSURANCE

- A. For those people designated by the Contractor to attend and participate in project meetings, provide the required authority to commit the Contractor to solutions agreed upon in the project meetings. Any change in personnel by a Contractor will be forwarded in writing to the Construction Manager before the change.

1.3 SUBMITTALS

- A. Agenda Items: To the maximum extent practical, advise the Construction Manager at least 24 hours in advance of project meetings regarding items to be added to the agenda.
- B. Minutes:
 - 1. The Construction Manager will compile meeting minutes of each monthly project meeting and will furnish one copy to the General Contractor and engineer and the required copies to the Owner. The General Contractor shall compile minutes of each weekly project meeting and will furnish one copy to the Engineer, Owner, and Construction Manager.
 - 2. Recipients of copies may make and distribute such other copies as they wish.

PART 2 - PRODUCTS

(No products are required in this Section)

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

- A. Except as noted for Pre-construction Meeting, formal job site meetings with on site job superintendents will be held weekly.
- B. Except as noted for Pre-construction Meeting, formal project meetings with attendance of each Contractor's office Project Manager will be held monthly.
- C. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.2 MEETING LOCATION

- A. The Construction Manager will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.3 PRECONSTRUCTION MEETING

- A. Pre-construction Meeting will be scheduled to be held within 15 working days after the Owner has issued the Notice to Proceed.
 - 1. Provide attendance by authorized representatives of the Contractor.
 - 2. The Construction Manager will advise other interested parties, including the Owner, and request their attendance, as necessary.
- B. Minimum Agenda: Data will be distributed and discussed on at least the following items:
 - 1. Organizational arrangement of Contractor's forces and personnel, subcontractors, material suppliers, the Construction Manager, and the Architect.
 - 2. Channels and procedures for communication.
 - 3. Construction schedule, including sequence of critical work.
 - 4. Contract Documents, including distribution of required copies of original Documents and revisions.
 - 5. Processing of Shop Drawings and other data submitted to the Construction Manager for transmittal to Architect for review.
 - 6. Processing of Bulletins, field decisions, Change Orders, and Payment Applications.
 - 7. Rules and regulations governing performance of the Work.
 - 8. Procedures for safety and first aid, security, quality control, housekeeping and related matters.
 - 9. Preparation of record drawings.
 - 10. Use of the premises.
 - 11. Office, work and storage areas.
 - 12. Equipment deliveries and priorities.
 - 13. Working hours.

14. Request for Information format.
15. Notification of Defective and Non-Conforming Work format.
16. Rejection of Work format.
17. Building and Special Inspections

3.4 PROJECT MEETINGS

A. Attendance:

1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work.
2. Conduct progress meetings at the Project site at regularly scheduled intervals. Notify the Owner and Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
3. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at the meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

B. Minimum Agenda:

1. Review, revise as necessary, and approve minutes of previous meetings.
2. Review progress of the Work since last meeting, including status of submittals for approval. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
3. Identify problems which impede planned progress.
4. Develop corrective measures and procedures to regain planned schedule.
5. Complete other current business.
6. Update as-built documents as required.
7. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.
8. Review the present and future needs of each entity present, including such items as:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Deliveries
 - e. Off-site fabrication problems.
 - f. Access.
 - g. Site utilization.
 - h. Temporary facilities and services.

- l. Hours of work.
- j. Hazards and risks.
- k. Cleaning and site conditions.
- l. Quality and work standards.
- m. Change Orders.
- n. Documentation of information for payment requests.

9. Building and Special Inspections

C. Revisions to minutes:

- 1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
- 2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
- 3. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

D. Reporting: No later than 5 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

END OF SECTION

SECTION 01320

PROGRESS SCHEDULE

PART 1 - GENERAL

1.0.1 WORK INCLUDED

- A. To assure adequate planning and execution of the Work so that the Work is completed within the number of calendar days allowed in the Contract, and to assist the Architect in evaluating progress of the Work, prepare and maintain the schedules and reports described in this Section.
- B. It should be noted by all Contractors and material suppliers the extremely critical nature of this project and time being allowed for its completion.
- C. Work shall be performed in accordance with the Pre-Bid Construction Schedule.

1.0.2 RELATED WORK

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these specifications.
- B. Requirements for progress schedule: General Conditions.
- C. Construction period: Form of Agreement

1.0.3 DEFINITIONS

- A. "Day", as used throughout the Contract unless otherwise stated, means "calendar day".

1.0.4 QUALITY ASSURANCE

- A. Employ a scheduler who is thoroughly trained and experienced in compiling construction schedule, and in preparing and issuing periodic updates and reports as required.
- B. Perform data preparation, analysis, charting and updating in accordance with standards approved by the Architect.

1.0.5 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300, Submittals.
- B. Construction schedule: After the Contractor has received the Owner's Notice to Proceed, the Contractor shall provide the Construction Manager with sufficient information on his plan for completing all work under this Contract. The Contractor shall provide a detailed bar chart (CPM Method) of this work clearly showing how his schedule integrates with the total construction duration. This bar chart schedule must include subcontract awards, material purchase dates and delivery dates, manpower levels broken down by trades and plant and equipment to be used. All interface activities and tasks which must be completed by other trades prior to proceeding with the work must be shown on the bar chart schedule. Submit one (1) reproducible copy and four (4) prints of a construction schedule for review.

- C. Periodic revisions and reports: Submit four (4) prints of the construction schedule updated along with the monthly payment request.

PART 2 - PRODUCTS

1.0.1 CONSTRUCTION ANALYSIS

- A. Graphically show by bar-chart the order and interdependence of all activities necessary to complete the work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors.

PART 3 - EXECUTION

3.0.1 CONSTRUCTION SCHEDULE

- A. Immediately after receipt of Notice to Proceed meet with the Construction Manager, review contents of the proposed construction schedule, and make all revisions agreed upon.
- B. The information on the Contractor's plan of action for performing the work under this Contract shall be based on the allotted construction duration for this work. The Construction Schedule shall indicate the key points of interface between the work under this contract and the other work of the project and the major project milestones. Sequencing and coordinating of miscellaneous activities will be discussed and agreed upon in the weekly meetings. It is agreed and understood that the schedule dates shown in the Construction Schedule for the indicated interface points and project milestones may change during the course of the Contract and such changes, in and of themselves, will not entitle the Contractor to any additional compensation or be deemed to constitute an extension of time or to constitute a change under Article 7 of the General Conditions for the Contract for Construction.
- C. Every effort will be made to make progress on the work as expeditiously as possible and if critical path activities can be improved during the course of the work, the Construction Schedule shall be revised to reflect improved dates on all work activities.
- D. The Contractor shall award all subcontracts, purchase materials, arrange for deliveries, furnish sufficient forces, plant and equipment and work such hours as necessary to insure execution of the work in conformity with the project duration.
- E. In the event of material procurement delays, the Contractor shall immediately notify the Construction Manager. However, it will be assumed that the Contractor has checked material deliveries as specified prior the Bid, as submission of a Bid for work will be assumed to be an agreement to the time frame allocated for that work as noted per the total project duration.
- F. If the Contractor falls behind the Construction Schedule, or current approved revision of the Construction Schedule, and is not entitled to any time extension as determined by the Construction Manager, he shall, upon request of the Construction Manager, submit within forty-eight (48) hours his plan for bringing his work back up to schedule. This plan shall include a commitment for immediate implementation, unless otherwise approved by the Construction Manager, and must include a time commitment, acceptable to the Construction Manager, for bringing the work up to schedule. If the Contractor fails to provide an acceptable plan within the requested time, he will be given a mandatory plan by the Construction Manager.
- G. The Contractor's plan shall illustrate his proposed methods for bringing his work back up to schedule, whether by a normal 40-hour work week, or by working 24 hours a day if necessary. If other measures will not be sufficient to make up the lag, the

Contractor's plans and implementation thereof shall include increasing the number of shifts, days of work and/or instituting or increasing overtime, all at his own expense.

- H. If a Contractor fails or refuses to implement such measures as will bring his work back up to conformity with the approved Schedule, his right to proceed with any or all portions of the Contract requirements may be terminated pursuant to Article 14 of the General Conditions for the Contract for Construction.

3.0.2 PERIODIC REVISIONS AND REPORTS

- A. The approved construction schedule shall be updated monthly and submitted along with each monthly payment application.
 - 1. Indicate "actual" progress in percent completion for each activity.
 - 2. Provide written narrative summary of revisions causing delay in the program, and an explanation of corrective actions taken or proposed.

3.0.4 REVISIONS

- A. The Contractor will be given ample notice on any schedule changes that may affect the starting dates of his work. Periodic schedule review and revision meetings will be held with the Contractors who will be expected to provide input to the scheduling activities. The latest approved revision of the Construction Schedule shall be part of the Contract Documents and shall be complied with by the Contractor at no extra cost to the Owner. Activity duration period shown on the Construction Schedule will not be reduced without the approval of the Contractor nor will they be increased without the approval of the Construction Manager.
- B. Make only those revisions to approved construction schedule as are approved in advance by the Construction Manager.

3.0.5 REQUEST FOR EXTENSION DUE TO DELAYS

- A. It is understood that the Owner, Construction Manager or Architect/Engineer shall not in any event be liable to the Contractor for delays of any kind whatsoever and the Contractor shall be fully responsible for making up lost time of all delays except to the extent that extensions of time are granted. If completion of the work is delayed by any act of neglect of the Owner, or by the Construction Manager or the acts of the Construction Manager or Architect/Engineer, by strikes or by other exceptional conditions over which the Contractor has no reasonable control, the time of completion shall upon receipt of the Contractor's written request, be extended by such period as the Construction Manager may consider reasonable. No extension shall be allowed unless a claim is presented in writing to the Construction Manager within seven (7) days after the commencement of such delay. In case of continued cause of delay, only one claim is necessary. Nothing in this clause shall be construed to release the Contractor from the obligation to perform at his own expense all overtime necessary to maintain the Contract completion date where delays have occurred which are not excused. If the Contractor, delayed by any acts of the Owner, Construction Manager, Architect/Engineer, and is granted an extension of time by the Construction Manager, the Contractor shall comply with the extended schedule with no additional compensation from the Owner.

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 - GENERAL

- A. The Contractor shall submit for review by the Architect/Engineer, Shop Drawings and schedules required by the Specifications, or that may be requested by the Architect/Engineer, and no work shall be fabricated by the Contractor, except at his own risk, until such review has been completed.

1.1 FORM OF SUBMISSION MATERIALS

A. SHOP DRAWING SCHEDULE

1. Immediately after date of Notice to Proceed, each Contractor shall submit to the Construction Manager a Shop Drawing Submittal Schedule, which shall include the following minimum information:
 - a. List all items to be submitted for review referenced to the specific specifications section.
 - b. Name of subcontractor if applicable.
 - c. Supplier and date of purchase order.
 - d. Total fabrication and delivery time from time submittals are returned to the Contractor.
 - e. Scheduled delivery date.

(NOTE): No applications for payment will be processed unless the above listed information has been submitted.

B. SHOP DRAWINGS

1. Scale and Measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the work.
2. Review comments of the Architect will be shown on submittal when it is returned to the Contractor. The Contractor may make and distribute such copies as are required for his purposes.

C. MANUFACTURER'S LITERATURE

1. Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.

D. SAMPLES

1. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of Submittals" below.
2. Number of Samples required:

- a. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus three which will be retained by the Architect and Construction Manager.
- b. By prearrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Architect.

E. COLORS AND PATTERNS

- 1. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect for selection.
- 2. No colors will be selected by the Architect until all colors are submitted. If a color selection is needed prior to final approval of the color schedule, Contractor shall notify Architect of which items need early color selection, provide color charts and date that selection must be made to keep project on schedule.

1.2 SUBMISSION PROCEDURE

A. IDENTIFICATION OF SUBMITTALS

- 1. Multiple submittals on a single transmittal are not acceptable. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
- 2. Consecutively number all submittals.
 - a. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
 - b. On re-submittals, cite the original submittal number for reference.
- 3. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- 4. Maintain an accurate submittal log for duration of the Work, showing current status of all submittals at all times. Make the submittal log available to the Architect and Construction Manager for their review, upon request.
- 5. Provide number of copies required by Contractor plus two copies for Architect/Engineer and two copies for the Construction Manager files. The Construction Manager will maintain one copy of each submittal to deliver to Owner at project close-out.

B. GROUPING OF SUBMITTALS

- 1. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
 - a. Partial submittals may be rejected as not complying with the provisions of the Contract.
 - b. The Contractor may be held liable for delays so occasioned.

2. Provide a separate transmittal and drawing number for each item to be reviewed.

C. CHECKING SUBMITTALS PRIOR TO SUBMISSION

1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
3. The drawings submitted shall be marked with the name of the project, numbered consecutively and bear the signed and dated stamp of the approval of that Contractor as evidence that the drawings have been checked by the Contractor. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for re-submission. If the shop drawings show variation from the requirements of the Contract because of standard shop practice or with reasons, the Contractor shall make specific mention of such variations in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise, that Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though such shop drawings have been approved.

D. DELIVERY AND TIMING OF SUBMITTALS

1. All submittals shall be transmitted to the Construction Manager for forwarding to the Architect/Engineer for review based upon their relative position in the Construction Schedule, or as follows:
 - a. Prior to Mobilizing On-Site
 1. Performance Bond
 2. Labor and Material Bonds
 3. Insurance Certificate
 - b. Following Notice to Proceed
 1. Shop Drawing Submittal Schedule (immediately)
 2. Schedule of Values (within 10 days)
 3. Superintendent's Resume (within 10 days)
 4. Detailed Construction Schedule (within 21 days)
 5. Subcontractor Listing (within 30 days)
 6. All Equipment & Furnishings submittals (within 90 days) UNO.
2. Shop drawing submittals shall be made far enough in advance, based on the approved Construction Schedule, to meet all installation dates as scheduled. This will require that sufficient lead time be allowed to address an adequate review period, securing necessary approvals, possible revisions and re-submittals, placing orders and securing delivery dates. A detailed Shop Drawing Submittal Schedule is included as part of the Pre-Bid Construction Schedule.
3. In scheduling, allow at least ten (10) working days for review by the Architect following his receipt of the submittal (plus transit time).

E. ARCHITECT'S REVIEW

1. Review by the Architect does not relieve the Contractor from responsibility for errors which may exist in the submitted data.
2. The review of Shop Drawings will be general and shall not be construed as:

- a. Permitting any departure from the Contract Requirements.
 - b. Relieving the Contractor of the responsibility for any error in details, dimensions or otherwise that may exist.
 - c. Approving departures from additional details or instruction previously furnished by the Architect/Engineer.
3. Revisions:
- a. Make revisions required by the Architect.
 - b. If the Contractor considers any required revisions to be a change, he shall notify the Construction Manager and/or Architect as provided for in Paragraph 4.7.7 of the General Conditions.
 - c. Make only those revisions directed or approved by the Architect.
4. If a drawing, as submitted, indicates a departure from the Contract requirements which the Architect/Engineer finds to be in the interest of the Owner and to be minor as not to involve a change in the Contract Price or time for performance, the Architect/Engineer may approve the drawing.

F. FINAL DISTRIBUTION OF SUBMITTALS

- 1. The Construction Manager will retain one set at the project site. Each Contractor shall be responsible for the distribution of the Shop Drawings and schedules within his own organization and to his subcontractors.
- 2. The Contractor will advise the Construction Manager of the date that reviewed shop drawings are forwarded to the manufacturers or fabricators. Un-priced copies of purchase orders placed with suppliers or fabricators are to be forwarded to the Construction Manager when orders are placed.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.01 SCOPE

- A. DESCRIPTION OF REQUIREMENTS: Required inspection and testing services are intended to assist in the determination of probable compliance of the work with requirements specified or indicated. These required services do not relieve the Contractor of responsibility for compliance with these requirements or for compliance with requirements of the contract documents. See Chapter 7 of the OSE Manual for additional requirements regarding inspections and testings.

1. Definitions: The requirements of this section relate primarily to customized fabrication and installation procedures, not to the production of standard products. Quality control services include inspections and tests and related actions including reports, performed by independent agencies and governing authorities, as well as directly by the Contractor. These services do not include observation activities performed directly by the Project Manager or Engineer.

Specific quality control requirements for individual units of work are specified in the sections of these specifications that specify the individual element of the work. These requirements, including inspections and tests, cover both production of standard products, and fabrication of customized work. These requirements also cover quality control of the installation procedures.

Inspections, tests and related actions specified in this section and elsewhere in the contract documents are not intended to limit the Contractor's own quality control procedures which facilitate overall compliance with requirements of the contract documents.

Requirements for the Contractor to provide quality control services as required by the Project Manager/Engineer, the Owner, governing authorities or other authorized entities are not limited by the provisions of this section.

1.02 RESPONSIBILITIES

- A. Responsibilities:
1. Agency's responsibilities: It shall be the Agency's responsibility to engage and pay for testing and inspections and similar quality control services.
 2. Contractor's responsibilities: It shall be the Contractor's responsibility for proper notification when an inspection or test is required, to provide access to facilitate the inspection / test and shall be responsible to make corrections necessary when work is not in compliance with the Contract Documents.
- B. Retest Responsibility: Where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance of related work with the requirements of the contract documents, then retesting/reinspection is required. Retesting/reinspection fees shall be withheld from the contractor's pay app, regardless of whether the original test was the Contractor's responsibility. In no instance shall the contractor pay for testing or inspections. Same agency that performed original tests shall perform re-tests.
- C. Responsibility 3rd party for Associated Services: The Contractor is required to cooperate with the independent agencies performing required inspections, tests and similar services. Provide such auxiliary services as are reasonably requested. Notify the testing agency sufficiently in advance of operations to permit assignment of personnel. These auxiliary services include, but are not necessarily limited to, the following:

Providing access to the work.
Taking samples or assistance with taking samples.
Delivery of samples to test laboratories.
Security and protection of samples and test equipment at the project site.

- D. Coordination: The Contractor and each independent 3rd party agency engaged to perform inspections, tests and similar services for the project shall coordinate the sequence of their activities so as to accommodate required services with a minimum of delay in the progress of the work. In addition the Contractor and each independent testing agency shall coordinate their work so as to avoid the necessity of removing and replacing work to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections, tests, taking of samples and similar activities.
- E. Qualification for Service Agencies: Except as otherwise indicated, engage inspection and test service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which are recognized in the industry as specialized in the types of inspections and tests to be performed. Testing agency shall be approved by the Project Manager and the Building Official. Third party inspector shall be hired by the agency and the requirements refer to OSE Manual.

1.03 SUBMITTALS

- A. General: Refer to Division - 1 section on "Submittals" for the general requirements on submittals. See Appendix G of OSE Manual for specific reporting requirements for Special Inspections. Submit a certified written report of each inspection, test or similar service, to the Project Manager, Owner, Building Official, and Contractor.
1. Inspection / testing firm shall be responsible to notify the Contractor, Project Manager and Owner immediately of all failed tests in writing. If deficiency is not corrected, the inspection / testing firm shall notify the Owner and Building Official.
 2. Report Data: Written reports of such inspection, test or similar service shall include, but not be limited to the following:
 - Name of Project.
 - Name of testing agency or test laboratory.
 - Dates and locations of samples and tests or inspections.
 - Names of individuals making the inspection or test.
 - Designation of the work and test method.
 - Complete inspection or test data.
 - Test results.
 - Interpretations of test results.
 - Notation of significant ambient conditions at the time of sample-taking and testing.
 - Comments or professional opinion as to whether inspected or tested work complies with requirements of the contract documents.
 - Recommendations on corrections necessary, if applicable.
 - Recommendation on retesting, if applicable.
 3. A copy of each report shall be kept in the job trailer.
- B. Test report submittals are for Project Manager's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.01 TESTING AND INSPECTION

- A. See individual specification sections and Appendix G of OSE Manual for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Project Manager and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Project Manager and Contractor of observed irregularities or non-conformance of Work or products.
 - 6. Perform additional tests and inspections required by Project Manager.
 - 7. Attend preconstruction meetings and progress meetings.
 - 8. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.

3.02 MANUFACTURERS' FIELD SERVICES:

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, and test, adjust and balance equipment, as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Project Manager 30 days in advance of required observations.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.03 REPAIR AND PROTECTION:

- A. General: Upon completion of inspection, testing, sample-taking and similar services performed on the work, Contractor shall repair damaged work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed finishes. Comply with the contract document requirements for "Cutting and Patching". Protect work exposed by or for quality control service activities, and protect repaired work. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION

SECTION 01420

REFERENCE STANDARDS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Throughout the Project Documents, reference is made to specifications and standards issued by nationally recognized professional and/or trade organizations.
1. Unless otherwise specifically stated, all manufacturer's catalogs, specifications, instructions or other information or literature that are referred to in the specifications shall be considered as the latest edition and/or revision of such publication that is in effect on the date of the Invitation or Advertisement for Bids.
 2. When standard specifications such as the American Society for Testing and Materials, Federal specifications, Department of Commerce (Commercial Standards), American Institute of Steel Construction, or other well-known public or trade associations, are cited as a standard to govern materials and/or workmanship, such specifications or portions thereof as referred to shall be equally as binding and have the full force and effect as though it were copied into these specifications. Such standards as are mentioned are generally recognized by and available to the trades concerned. The Construction Manager will, however, upon request of a bidder or Contractor, furnish for inspection a copy of any standard specifications mentioned or direct the bidder or Contractor to an easily available copy. Unless otherwise specifically stated, the standard specifications referred to shall be considered as the latest edition and/or revision of such specifications that is in effect on the date of the Invitation for Bids. In case of any conflicts between standard specifications and the written portion of the Specifications, the specifications as actually written herein will govern.
 3. The referenced standards are generally identified by abbreviating the name of the organization following with the specification/standard number.
 4. Unless specifically indicated otherwise, all references to standards refer to the latest edition available at the time of bidding.

1.2 ABBREVIATIONS

- A. Wherever the following abbreviations are used in these Project Documents, they are to be construed the same as the respective expressions represented:

AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AGA	American Gas Association
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ALS	American Lumber Standards
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
ARI	Air Conditioning and Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers

ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing Materials
AWI	Architectural Woodwork Institute
AWWA	American Water Works Association
AWPA	American Wood Preservers Association
AWS	American Welding Society
BIA	Brick Institute of America
CE	Corps of Engineers
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
CTI	Ceramic Tile Institute of America
DOT	Department of Transportation
EPA	Environmental Protection Agency
FSS	Federal Specifications and Standards, General Services Administration
GA	Gypsum Association
IEEE	Institute of Electrical and Electronics Engineers
MBMA	Metal Building Manufacturer's Association
MCAA	Mechanical Contractors Association of America
MFMA	Marble Flooring Manufacturers Association
MIA	Marble Institute of America
ML/SFA	Metal Lath/Steel Framing Association
NAAMM	National Association of Architectural Metal Manufacturers
NAPA	National Asphalt Pavement Association
NBHA	National Builders Hardware Association
NCMA	National Concrete Masonry Association
NEC	National Electric Code (Now NFPA)
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NPCA	National Paint and Coating Association
NRCA	National Roofing Contractors Association
NTMA	National Terrazzo and Mosaic Association
OSHA	Occupational Safety and Health Administration
OSF	Office of School Facilities
PCA	Portland Cement Association
PCI	Pre-stressed Concrete Institute
SDI	Steel Deck Institute
S.D.I.	Steel Door Institute
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPIB	Southern Pine Inspection Bureau
SSPC	Steel Structures Painting Council
TCA	Tile Council of America, Inc.
UL	Underwriters Laboratories, Inc.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 1 Specifications, apply to this Section.

1.2 SUMMARY

- A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.
- B. Temporary utilities required include but are not limited to:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Telephone service and fax machine.
 - 4. Storm and sanitary sewer.
- C. Temporary construction and support facilities required include but are not limited to:
 - 1. Temporary heat.
 - 2. Field offices and storage sheds.
 - 3. Temporary roads and paving.
 - 4. Sanitary facilities, including drinking water.
 - 5. Dewatering facilities and drains.
 - 6. Temporary enclosures.
 - 7. Temporary Project identification signs and bulletin boards as described at the end of this section.
 - 8. Waste disposal services.
 - 9. Rodent and pest control.
 - 10. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities required include but are not limited to:
 - 1. Temporary fire protection.
 - 2. Barricades, warning signs, lights.
 - 3. Sidewalk bridges or enclosure fence for the site.
 - 4. Environmental protection.

1.3 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility within 15 days of the date established for commencement of the Work.

1.4 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations if authorities having jurisdiction, including but not limited to:
 - 1. Building Code requirements.

2. Health and safety regulations.
 3. Utility company regulations.
 4. Police, Fire Department, and Rescue Squad rules.
 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."
1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services," prepared jointly by AGC and ASC, for industry recommendations.
 2. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. If acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Electrical Outlets: Provide properly configured NEMA polarized to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- C. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.
- D. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- E. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- F. Temporary Offices: Provide prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for loading required.

- G. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated re-circulation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.
- H. First Aid Suppliers: Comply with governing regulations.
- I. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination or extinguishers of NFPA recommended classes for the exposures.
 - 1. Comply with NFPA 10 and 214 for classification, extinguishing agent and size required by location and class of fire exposure.
- J. Security Fencing: Provide temporary 6' high chain link security fencing as indicated along construction limit lines.
- K. Temporary Project Sign: Provide construction sign as described by the Contract Documents. Locate as directed by Architect/Owner.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.
- C. Temporary Facilities to be by General Construction Contractor unless noted otherwise or needed by the respective prime contractors to commence, install or complete their required work.
- D. Once installed the cost of maintenance and monthly service charge for all utilities shall be borne by the general contractor.

3.2 TEMPORARY UTILITY INSTALLATION

- A. Unless otherwise noted the general contractor shall be responsible for providing and maintaining all temporary utilities and support facilities.
- B. Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.
 - 1. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
 - 3. Temporary (construction) power supplied by contractor and water may be

obtained from the existing school facilities; however, the Owner must be consulted and approve exact location(s) and details prior to the taps. The Owner reserves the right to revoke this "privilege" if it is being abused and require the contractor(s) to obtain these services from other (off-site) means.

4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Architect, and will not be accepted as a basis of claims for a Change Order.
- C. Water Service (Plumbing Contractor): Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
1. Sterilization: Sterilize temporary water piping prior to use.
 2. Permanent Tap: Tap fees and all materials and labor associated with permanent water service shall be provided by the plumbing contractor and coordinated and approved by governing authorities.
- D. Temporary Electric Power Service (Electrical Contractor): Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
1. Except where underground service must be used, install electric power service overhead.
 2. Power Distribution System: Install wiring overhead, and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, AC 20 ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- E. Temporary Lighting (Electrical Contractor): Whenever overhead floor or roof deck has been installed, provide temporary lighting with local switching.
1. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions.
 2. The electrical contractor shall be responsible for all maintenance of temporary lighting.
- F. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period. Install telephone on a separate line for each temporary office and first aid station. Where an office has more than two occupants, install a telephone for each additional occupant or pair of occupants. Long distance charges will be paid for by the responsible prime contractor.
1. At each telephone, post a list of important telephone numbers.
- G. Sewers and Drainage: If sewers are available, providing temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.

1. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge.
 2. Connect temporary sewers to the municipal system as directed by the sewer department officials.
 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- H. Provide earthen embankments and similar barriers in and around excavations and sub-grade construction, sufficient to prevent flooding by runoff of storm-water from heavy rains.

3.3 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
1. Maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
- B. Provide incombustible construction for offices, shops and sheds located within the construction area, or within 30 feet of building lines. Comply with requirements of NFPA 241.
- C. Temporary Heat: Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low/high temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient conditions required and minimize consumption of energy. The general contractor shall not rely upon the permanent HVAC system being available during the construction period and shall be responsible for the heat required to install and maintain finishes and finish material until such time as permanent heat is available. The general contractor will be responsible for any cost associated with warrantee extension due to this action.
- D. Heating Facilities: Except where use of the permanent system is authorized, provide vented self-contained LP gas or fuel oil heaters with individual space thermostatic control.
1. Use of gasoline-burning space heaters, open flame, or salamander type heating units is prohibited.
- E. Contractor and Construction Manager Field Offices: Provide insulated, weather tight temporary offices of sufficient size to accommodate required office personnel at the Project site. Include in the base bid office space for the Architects, Construction Manager, and Owners use. Space must have indoor plumbing, HVAC, and be equipped with desks, table, and chairs as required. Keep the office clean and orderly for use for progress meetings. Furnish and equip offices as required but most importantly, plan table shall have most up-to-date set of plans and specs which shall serve as the "control set." Field Office shall have a conference room area for holding weekly and monthly project meetings with the Owner, Architect, Contractor and Construction Manager.

- F. Storage and Fabrication Sheds: Install storage and fabricated sheds, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on the site. Each contractor shall provide for their own storage requirements.
- G. Temporary Paving: Construct and maintain temporary roads and paving to adequately support the indicated loading and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Architect.
 - 1. Paving: Comply with Division - 2 Section "Asphalt Concrete Paving" for construction and maintenance of temporary paving.
 - 2. Coordinate temporary paving development with sub-grade grading, compaction, installation and stabilization of sub-base, and installation of base and finish courses of permanent paving.
 - 3. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas that are without damage to deterioration when occupied by the Owner.
 - 4. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.
 - 5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration and supervision.
- H. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.
- I. Dewatering facilities and drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division - 2 sections. Where feasible, utilize the same facilities. Maintain the site, excavations and construction free of water.
- J. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.
 - 1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Install tarpaulins securely, with incombustible wood framing and other materials.
 - 3. Close openings through floor or roof deck and horizontal surfaces with load-bearing wood-framed construction.

- K. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered “tools and equipment” and not temporary facilities.
- L. Project Identification and Temporary Signs: Prepare project identification and other signs of the size indicated; install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative treated wood to steel. Do not permit installation of unauthorized signs.
 - 1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.
 - 2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
- M. Temporary Exterior Lighting: Install exterior yard and sign lights so that signs are visible when work is being performed.
- N. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner. The general contractor shall provide a dumpster for the use of all contractors on the job. Each prime shall reimburse the general for the disposal cost associated with their debris.
- O. Rodent and Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be relatively free of pests and their residues at Substantial Completion. Perform control operations in a lawful manner using environmentally safe materials.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer as requested by the Architect.
- B. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 “Standard for Portable Fire Extinguishers,” and NFPA 241 “Standard for Safeguarding Construction, Alterations and Demolition Operations.”
 - 1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 - 2. Store combustible materials in containers in fire-safe locations.
 - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access route for fighting fires. Prohibit

smoking in hazardous fire exposure areas.

4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
- C. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements of erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.
- E. Enclosure Fence: Prior to beginning construction, install an enclosure fence with lockable entrance gates. Locate where indicated, or enclose the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
 1. Provide 6' high open-mesh, chain-link fencing with posts set in a compacted mixture of gravel and earth.
- F. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
 1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
- G. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways, and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.5 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve results and to avoid possibility of damage.
 2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by

authorized use of a permanent facility, or no later than Substantial Completion. Complete, or if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.
2. Remove temporary paving that is not intended or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that does not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt, other petrochemical compounds, and other substances, which might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.
3. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts that have been subject to unusual operating conditions.
 - c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

END OF SECTION

SECTION 01650

PRODUCT DELIVERY AND HANDLING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Protect products scheduled for use in the work by means including, but not necessarily limited to, those described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Sections in Division 1 of these specifications.
 - 2. Additional procedures also may be prescribed in other Sections of these specifications.

1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURERS' RECOMMENDATIONS

- A. Except as otherwise approved by the Engineer, determine and comply with manufacturer's recommendations on product handling, storage and protection.

1.4 PRODUCT DELIVERY

- A. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

1.5 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. Promptly remove damaged material and unsuitable items from the job site and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.
- B. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to manufacturer, grade, quality and other pertinent information.

1.6 PROTECTION OF MATERIAL AND WORK

- A. General

1. Carefully and properly protect all materials of every description, both before and after installation.
 2. Provide any enclosing or special protection from weather as deemed necessary by the Engineer at no additional cost to the Owner.
- B. Partial payments under the Contract will not relieve the Contractor from responsibility.
1. When materials and work at the site which have been partially paid for are not adequately protected by the Contractor, such materials will be protected by the Owner at the expense of the Contractor and no further partial payment thereon will be made.
- C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.7 STORAGE

- A. Store all items of equipment, component parts, etc. in accordance with the manufacturers' recommendations or as may otherwise be necessary to prevent damage or deterioration of any sort.

1.8 REPAIRS AND REPLACEMENTS

- A. In the event of damage, promptly make replacements and repairs to the approval of the Engineer and at no additional cost to the Owner.
- B. Additional time required to secure replacements and to make repairs will not be considered by the Engineer to justify an extension in the contract time of completion.

END OF SECTION

SECTION 01720

PROJECT LAYOUT AND FIELD ENGINEERING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide such field engineering services, including survey and civil engineering, as are required for proper completion of the Work including, but not necessarily limited to:
 - 1. Establish and maintain all horizontal and vertical reference points, grades, lines and planes as required to construct project as indicated, specified, or both.
 - 2. Structural design of shores, forms and similar items provided by the Contractor as part of his means and methods of Construction.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Additional requirements for field engineering also may be described in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary craft and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of the Section.
 - 1. Surveyor: Engage a Registered Land Surveyor registered in the State where the project is located, to perform land surveying services required.
 - 2. Engineer: Engage a Professional Engineer of the discipline required, registered in the State in which the project is located, to perform required engineering services.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01330 - Submittal Procedures.
- B. Upon request of the Construction Manager and/or Architect, submit:
 - 1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
 - 2. Documentation verifying accuracy of field engineering work.
 - 3. Certification, signed by a registered land surveyor, certifying that elevations and locations of improvements are in conformance with requirements of the Contract Documents. The cost for registered land surveyors shall be included in the Contractors bid.

C. Final Property Survey: Prior to Substantial Completion, prepare a final property survey

Meadowfield Elementary School Parking Addition 01720-1

Project Layout and Field Engineering

showing significant features that have resulted from construction of the project. Include a certification signed by the surveyor that lines and levels of the project are accurately positioned as shown on the survey and in accordance with the contract documents.

PART 2 - PRODUCTS

2.01 ENGINEERING EQUIPMENT

- A. Transit and measuring devices shall be calibrated to layout site and building work indicated.

2.02 OTHER LAYOUT EQUIPMENT

- A. Provide stakes and batter boards of size and quality to execute the work indicated, Use wire and non-stretching cord to establish lines for site, paving and building work.

PART 3 - EXECUTION

3.01 BENCHMARKS

- A. The contractor shall maintain carefully all benchmarks, monuments and other reference points throughout execution of this work. If these are disturbed or destroyed, same shall be replaced and rest as directed by the Architect at Contractor's expense.

3.02 LAYOUT

- A. Stake building and site improvements relative to reference lines indicated on plan.
- B. Locate storage sheds, temporary office and topsoil stockpile so as to best advance progress of work and as approved by architect.

3.03 SITE CONDITIONS

- A. Before commencing work, verify benchmarks, reference points, and conditions where new work ties into existing work.

3.04 ADDITIONAL PROCEDURES

- A. In addition to procedures necessary for proper performance of the Contractor's responsibilities:
 - 1. Locate and protect control points before starting work on the site.
 - 2. Preserve a minimum of two permanent reference points during progress of the Work and through completion of the Work. Locate permanent reference points on as-built documents.
 - 3. Do not change or relocate reference points or items of the Work without specific approval from the Architect.
 - 4. Promptly advise the Construction Manager when a reference point is lost or destroyed, or required relocation because of other changes in the Work.

- a. Upon direction of the Construction Manager, require the field engineer to

replace reference stakes or markers.

- b. Locate such replacements according to the original survey control.
5. Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning any work, investigate and verify the existence and location of underground utilities and other construction.
- a. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.

END OF SECTION

SECTION 01730

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 Description

- A. Work included: This Section establishes general requirements pertaining to cutting (including excavating), fitting and patching of the work required to:
 - 1. Make the several parts fit properly;
 - 2. Uncover work to provide for installing, inspection, both, of ill-timed work;
 - 3. Remove and replace work not conforming to requirements of the Contract Documents; and
 - 4. Remove and replace defective work.
- B. Related Work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, NCLC, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. In addition to other requirements specified, upon the Construction Managers and/or Architect's request to uncover work to provide for inspection by the Construction Manager and/or Architect of covered work, and remove samples of installed materials for testing.
 - 3. Do not cut or alter work performed under separate contracts without the Construction Manager's and Architect's written permission.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

1.3 SUBMITTALS

- A. Request for Construction Manager's and/or Architect's consent:
 - 1. Prior to cutting which effects structural safety, submit written request to the Construction Manager and/or Architect for permission to proceed with cutting.
 - 2. Should conditions of the Work, or schedule indicate a required change of materials or methods for cutting and patching, so notify the Construction Manager and/or Architect and secure his written permission and the required Change Order prior to proceeding.
- B. Notices to the Construction Manager and/or Architect:
 - 1. Prior to cutting and patching performed pursuant to the Construction Manager's and/or Architect's instructions, submit cost estimate to the Construction Manager and Architect. Secure the Construction Manager's and the Architect's approval of cost estimates and type of reimbursement before proceeding with cutting and patching.

2. Submit written notice to the Construction Manager and/or Architect designating the time the Work will be uncovered, to provide for the Construction Manager's and/or Architect's observation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. For replacement of items removed, use materials complying with pertinent Sections of these Specifications.

2.2 PAYMENT FOR COSTS

- A. The Owner will reimburse the Contractor for cutting and patching performed pursuant to the written Change Order, after claim for such reimbursement is submitted by the Contractor and approved by the Construction Manager and Architect. Perform other cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.

PART 3

3.1 SURFACE CONDITIONS

- A. Inspection:
 1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching, and backfilling.
 2. After uncovering the work, inspect conditions affecting the installation of new work.
- B. Discrepancies:
 1. If uncovered conditions are not as anticipated, immediately notify the Construction Manager and/or Architect and secure needed directions.
 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION PRIOR TO CUTTING

- A. Provide required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the Work.
- B. Provide required fire protection including, but not necessarily limited to, fire blankets, fire extinguishing equipment, prior to consent from Construction Manager.

3.3 PERFORMANCE

- A. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.
 1. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new work.

2. Perform fitting and adjusting of products to provide finished installation complying with the specified tolerances and finishes.
3. All penetrations made by the Contractor through walls, ceilings, and/or floors shall be sealed by the Contractor to meet the requirements of all building codes, fire codes, applicable to this project.
4. Extent of Cutting and Patching: Cut areas in new or existing work only to the extent required to perform the work. Cutting shall be in a manner that will not disturb adjoining work as much as possible and will facilitate patching in a sound and durable manner with invisible seams between the patched areas and the existing adjoining work. Patching shall restore area to match original finish to the satisfaction of the Architect. All rejected patched areas shall be removed and replaced to provide visually acceptable and durable work as directed by the Architect.
5. General: Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Architect, proceed with cutting and patching at the earliest feasible time and complete work without delay.
6. Cutting: Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.

In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

Comply with requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.

- a. Generally, unless other specified, work that requires cutting shall be performed by the tradesman performing the work.

7. Patching: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

Where feasible, inspect and test patched areas to demonstrate integrity of work.

Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

- a. Responsibility For Patching: The subcontractor will pay the masons on site to patch masonry walls that have to be cut for ductwork and any other larger opening. Holes in walls for pipe and conduit shall be drilled and grouted as required. Any damage to the fire rated construction will be the responsibility of the subcontractor to have properly repaired to meet the UL rating and meet approval of the Architect. The ultimate responsibility for all patching shall be on the General Contractor to provide an acceptable patch as determined by the Architect. All patching determined by the Architect to be unacceptable shall be corrected by personnel skilled and qualified in installing the material to be patched.

- b. All patching shall be performed by personnel skilled in patching the substrate that has been disturbed. The subcontractor who performed the cutting shall be responsible to pay the appropriate personnel to install the patching material.
- 8. Cleaning: Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 01740

CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

- 1.1.1 Work included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this section.
- 1.1.2 Related work:
 - A. Documents affecting work of this section include but are not necessarily limited to General Conditions, Supplemental Conditions, and Sections in Division 1 of these Specifications.
 - B. In addition to standards described in this section, comply with requirements for cleaning as described in pertinent other sections of these Specifications.

1.2 QUALITY ASSURANCE

- 1.2.1 Conduct daily inspection and more often if necessary, to verify that requirements for cleanliness are being met.
- 1.2.2 In addition to the standards described in this section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

- 2.1.1 Provide required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

- 2.2.1 Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

3.1.1 General

- A. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage and providing required protection of materials.
- B. Do not allow accumulation of scrap, debris, waste material and other items not required for construction of this work.
- C. At least twice each month and more often if necessary, completely remove all scrap, debris and waste material from the job site. Provide adequate storage for all items waiting removal from the job site, observing requirements for fire protection and protection of the ecology.

3.1.2 Site

- A. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
- B. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph 3.1.1A above.
- C. Maintain the site in a neat and orderly condition at all times.

3.2 FINAL CLEANING

- 3.2.1 "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- 3.2.2 Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in paragraph 3.1 above.
- 3.2.3 Schedule final cleaning as approved by the Architect/Engineer to enable the Owner to accept a completely clean work.

END OF SECTION

SECTION 01770

CONTRACT CLOSE-OUT PROCEDURES

PART 1.0 GENERAL

1.0.1 Deficiency Lists

- A. During the construction of the work, the Construction Manager and/or Architect/Engineer shall inspect the work for conformance to the Contract Documents.
- B. Should an inspection reveal work that is not in conformance with the Contract Documents, and if the nature of the non-conformance warrants, at the sole discretion of the Construction Manager and/or Architect/Engineer, a written list of deficiencies will be issued.
- C. The "deficiency list" as hereinafter called, shall stipulate the item or items of work that are in non-conformance and shall specify a reasonable time for the deficient work to be brought into conformance with the Contract Documents.
- D. Upon receipt of the deficiency list the Contractor shall by any and all means at his disposal, endeavor to correct the work within the time stipulated. The Contractor shall notify the Construction Manager in writing when the work has been corrected and request an inspection.
- E. If the inspection reveals the deficiency has been corrected, then the deficiency list shall be rescinded.
- F. During the period that the deficiency list is in effect, the Construction Manager may, at his option, not authorize the payment of progress billings until the deficiency list is rescinded or, in the opinion of the Construction Manager, the Contractor is making a good faith effort to correct the deficiency.

1.0.2 Punch Lists/Final Inspection

- A. When the Contractor determines that his work or portions of his work are sufficiently near completion to warrant a preliminary inspection, he shall request in writing to the Construction Manager a preliminary inspection.
- B. At a mutually agreeable time, the Construction Manager and Contractor shall conduct a preliminary inspection of the work for completeness and conformance of work. Any items noted as incomplete shall be listed on a preliminary punch list, a copy of which shall be forwarded to the Contractor for completion and correction.
- C. The Construction Manager shall establish a reasonable time period for the completion or correction of all items on the preliminary inspection punch list. At the end of this time period a pre-final inspection shall be conducted.
- D. The substantial completion inspection shall include the Architect/Engineer, Owner, Construction Manager and Contractor. The Contractor shall present to the Architect/Engineer a written list of all work incomplete, a reason why the item of work is incomplete and give a date when the work will be complete. The

substantial completion inspection shall not be conducted unless the Contractor presents the list of incomplete items.

- E. Should the Architect/Engineer find any item of work to be unacceptable he shall prepare a punch list of those items. The Contractor shall complete all items on the list within fourteen (14) days of the inspection.
- F. At the conclusion of the substantial completion inspection and if the completeness of the work allows, the Architect/Engineer shall issue a Certificate of Substantial Completion. OSE issues the certificate of occupancy. Should the amount of incomplete work be such that a Certificate of Substantial Completion cannot be issued, another substantial completion inspection shall be scheduled.
- G. Upon completion of the substantial completion punch list and provided a Certificate of Substantial Completion has been issued, a final inspection shall be held with the Owner, Architect/Engineer, Construction Manager and Contractor. Provided the inspection reveals work to be complete and all punchlist items are corrected, the Architect/Engineer shall establish the date of substantial completion.

1.0.3 Project Close-Out

A. Final Close-Out and Payment

- 1. The Contractor may make Application for Final Payment after the Certificate of Substantial Completion has been issued. The following items must be submitted to the Construction Manager prior to processing of the Final Application for Payment:
 - a. Affidavit of Payment of Debts and Claims, (AIA-G706);
 - b. Consent of Surety, (AIA-G707);
 - c. Release of Liens, (AIA-G706A) from: Contractors, Sub-Contractors, and Material Suppliers;
 - d. Letter on company letterhead stating all temporary facilities, services, debris and surplus materials have been removed;
 - e. Final "Project Record Documents" as specified in Section 01780, Project Record Documents;
 - f. Operations & Maintenance Manuals as specified in Section 01780, Project Record Documents;
 - g. Final "As Built" surveyor's drawings verifying dimensions noted on stake-out plan sheet;
 - h. Guarantees, Warranties, and Bonds as specified in Section 01780, Project Record Documents;
 - i. Spare parts and replacement items as required by the Specifications;
 - j. Letter on company letterhead stating no asbestos containing material has been installed in the project;
 - k. Certificate of Final Occupancy;
 - l. Demonstration and testing of equipment has been scheduled or is completed.
 - m. Property survey as required in Section 01720.
- 2. **No final payment application will be processed for payment until final inspection and final acceptance.**

3. Close-out time encompasses a large amount of work during a short period of time. Therefore, the Contractor is encouraged to begin to submit close-out items as soon as possible so that the Contract may be completed, thus allowing the Architect/Engineer to recommend approval of the final payment to the Owner.
4. The Construction Manager may continue to withhold 3.5% retainage from the Contractor until all outstanding close-out materials are submitted to the Construction Manager. It shall be at the discretion of the Construction Manager, upon consultation with the Architect, to reduce the amount of retainage on a project by project basis, upon a favorable review of the status of completion of the final punch list, the status of close-out submittals, and above all, the total amount listed on the Release of Liens submitted by the Contractor for all Sub-Contractors and Material Suppliers contracted with by the General Contractor. At no time shall the retainage be reduced to an amount less than the total of the Release of Liens submitted by the Contractor. Final payment may then be made once all remaining outstanding close-out requirements are met.

1.0.4 Responsibility

- A. It shall be the Contractor's responsibility to see that all requirements of this Section of the Specifications are executed and complete in a timely manner.
- B. No provisions of this section of the Specifications shall in any way relieve the Contractor of completing his work on time and in accordance with the Project Schedule.

END OF SECTION

SECTION 02451 – REINFORCED CONCRETE PIPE

Description Of Work: The work includes the installation and testing of all reinforced concrete pipe shown on the Drawings.

Quality Assurance

Referenced Standards: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards. Comply with the provisions of the following codes and standards, except as otherwise indicated.

ASTM C 76	Specification for Reinforced Concrete Culvert, Storm Drain Sewer Pipe.
ASTM C 150	Specification for Portland Cement.
ASTM C 443	Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

Manufacturer's Qualifications: Only the products of a manufacturer regularly engaged in the manufacture of pipe used for the conveyance of storm water will be acceptable.

Inspection And Acceptance Of Pipe: Acceptance will be on the basis of plant load-bearing tests, material tests, and inspection of manufactured pipe for visual defects and imperfections. The quality of all materials used in the pipe, the process of manufacture, and the finished pipe shall be subject to inspection by the Engineer. Inspection may be made at the place of manufacture, or on the job site after delivery, or at both places and the pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though sample pipe units may have been accepted as satisfactory at the place of manufacture. All pipe which is rejected must be immediately removed from the project site by the Contractor.

Submittals

Shop Drawings; Pipe: Before fabrication, submit for approval drawings showing pipe dimensions, joints, reinforcement and other details.

Products

Manufacture Of Pipe: Provide new pipe complying with ASTM C 76, and with the additional requirements specified herein. Unless otherwise noted on the Drawings, provide Class III pipe with Wall B. Provide pipe with an interior surface which is free from roughness, projections, indentations, offsets or irregularities of any kind.

Pipe Lengths: Provide pipe in nominal 4 foot lengths. Shorter lengths may be used where required by Construction details or when approved by the Engineer.

Lift Holes: Lift holes will not be permitted in pipe.

Reinforcement: Reinforce pipe in accordance with ASTM C 76.

Cement: Use Type I cement conforming to ASTM C 150.

Admixtures: Do not use admixtures without prior written approval of the Engineer.

Curing: Steam cure pipe in accordance with ASTM C 76.

Repairs: Pipe may be repaired, if necessary, because of occasional minor imperfections in manufacture or accidental injury during handling and will be acceptable if, in the opinion of the Engineer, the repairs are sound, properly finished and cured, and the repaired pipe conforms to the requirements of ASTM C 76. Use mortar for repairs which has a compressive strength of 6,000 psi at the end of 28 days.

Marking: Mark all pipe in accordance with ASTM C 76; no pipe will be accepted unless these markings appear on all pipe.

Jointing: Use rubber gaskets for flexible watertight joints. Conform to ASTM C 443.

Adapters: Provide flexible coupling adapters for connecting reinforced concrete pipe to pipe of other materials. Provide adapters equal to the 1000 Series as manufactured by Fernco and distributed by Jones Manufacturing Co., Inc., Birmingham, AL.

Execution

Inspection: Examine the areas and conditions under which the pipe is to be installed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

Excavation: Excavate trenches in accordance with Section 02220, EXCAVATION AND BACKFILL.

Pipe Handling: Transport pipe to the job site and handle in such a manner as not to damage the pipe.

Stockpiling: Stockpile within the rights-of-way so that no dangerous conditions will exist to life or property. Store pipe so that damage to surfaces and/or structures will be prevented. Provide suitable devices to support pipe when it is lifted.

Pipe Installation: Adhere to the rules, regulations and requirements of OSHA, Occupational Safety and Health Act.

Precautions: Lay pipe in dry trenches only. Keep all trenches completely free of water during bedding, laying and jointing of pipe. Dewater and use sheeting where required by field conditions. Pump or drain all water away from the work and dispose of in a suitable manner so that no damage occurs outside the construction easement. Do not permit water to rise in an unbackfilled trench after pipe has been placed. Promptly repair any damage within the construction easement.

Tolerances: Unless otherwise directed by the Engineer in writing, lay all pipe straight between changes in alignment and at uniform grade between change in grade. When jointed in the trench, the pipe shall form a true and smooth line.

Pipe Lengths: Lay pipe in nominal 4 foot lengths; except the joints adjacent to any manhole which is not cast integrally with the horizontal conduit shall have a maximum length of 2 feet.

Placing Pipe In Trench: After delivery alongside the trench, visually inspect each length of pipe for damaged surfaces, breakage and conformance to specifications.

Pipe may be marked with paint or other permanent marking material so that the marks are plainly visible after installation in the trench and before the pipe is covered. Reject, stockpile, and remove from the site all pipe not conforming to specifications.

Where no other bedding is indicated, place pipe on a shaped bed of undisturbed material. Before pipe is placed on the bedding material, excavate suitable bell holes so that after placement of the pipe, only the barrel receives bearing pressure from the supporting material. Support the entire length of the unit.

Place pipe into its position in the trench in such manner and by such means as approved by the Engineer. Furnish approved devices to support all parts of the pipe unit when it is lifted. Protect pipe during handling against impact shocks and free falls. Do not permit hooks to come in contact with premoulded joint surfaces. Lower pipe into position in the trench and joint without disturbing the bedding or adjoining section of pipe.

Handle pipe having premoulded joint rings or attached couplings so that no weight, including the weight of the pipe itself, will bear on or be supported by the jointing material. Take care to avoid dragging the spigot ring on the ground or allowing it to be damaged by contact with gravel, crushed stone, or other hard objects. Do not subject the bell and spigot sections to direct stress of any kind except that required to effect the jointing.

Pipe Laying: Unless otherwise shown on the Drawings, lay all pipe in open trench construction. Start laying pipe at the lowest point and install the pipe so that the spigot end points in the direction of flow. Lay pipe to conform to the lines and grades indicated on the Drawings, unless otherwise directed by the Engineer in writing.

Clean all joint surfaces after the pipe units are aligned in the trench and are ready to be joined. Immediately before jointing the pipe, lubricate the bell or groove in accordance with the manufacturer's recommendations. Then carefully push pipe unit into place without damage to the pipe or gasket. Use suitable devices to force the pipe together so that they will fit with a minimum open recess inside or outside and so that they will have tightly sealed joints. Lay each pipe unit to form a close joint with the next adjoining pipe and bring the inverts continuously to the required grade.

Immediately after the pipe units are put together, inspect the position of the gasket in the joint using an approved feeler gauge to make sure it is properly positioned. Pull apart and remake all joints, using new gaskets, if the gasket has become damaged or improperly positioned.

Make all joints in accordance with manufacturer's recommendations which are subject to approval by the Engineer. Prior to backfill, fill bell holes with bedding materials and compact so that the spigot will not move in the bell of the adjoining pipe under backfill load. Do not permanently support pipe on saddles, blocking or boulders.

Temporary Plugs: At all times when pipe laying is not actually in progress, close the open end of pipe by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, do not remove the plug until all danger of earth or other material entering the pipe has passed.

Stoppers: Close open ends of pipe or fittings to be used for future connections as shown on the Drawings.

Backfill: When pipe has been properly bedded and all joints have been grouted, backfill trenches in accordance with Section 02220, EXCAVATION AND BACKFILL.

Clean Up: Follow backfill, as closely as conditions will allow, with clean up operations.

Prior to final acceptance, clean interior of all pipe of debris and silting.

End Of Section 02451

SECTION 02770 - CONCRETE CURB AND GUTTER

References: ACI 304 - Recommended Practice for measuring, Mixing, Transporting and Placing Concrete.

ANSI/ASTM D1751 - Performed Expansion Joint Fillers for Concrete Paving and Structural Construction.

ANSI/ASTM D1752 - Performed Sponge Rubber and Cork Expansion Joint fillers for Concrete Paving and Structural Construction.

ASTM C33 - Concrete Aggregates.

ASTM C94 - Ready Mix Concrete.

ASTM C150 - Portland Cement

ASTM C260 - Air-Entraining Admixtures for Concrete.

ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

ASTM C494 - Chemical Admixtures for Concrete.

FS TT-C-800 - Curing Compound, Concrete, for New and Existing Surfaces.

Section Description: The Contractor shall perform all work necessary for or incidental to the performance and completion of concrete curb, concrete gutter and combination curb and gutter. This work shall be completed as shown on the drawings and as specified in the contract documents.

This work shall include the furnishing of all labor, materials and equipment. The Contractor shall be responsible for coordinating the work to assure that the work is completed in an orderly manner. Although such work may not be specifically shown or specified, all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation shall be furnished and installed as part of this work.

Products

Materials:

The Contractor will submit the names of suppliers of all concrete materials. Materials supplied on the project will meet the requirements of ACI 301-72, "Specifications for Structural Concrete for Buildings." Concrete will be a minimum of 3,000 psi standard 28 cylinder strength as shown on the plans with a maximum design slump of four (4) inches. Ready Mix Concrete must meet the requirements of ASTM C 94 "Specifications for Ready Mix Concrete". Concrete form work will meet the requirements of ACI 347 "Recommended Practice for Concrete Form Work."

Aggregate base course material will comply with Section 321216 - Asphalt Paving.

Part 3 Execution

Preparation: Verify that survey bench mark and intended elevations for the Work are as indicated.

Identify required lines, levels, contours, and datum.

Stake and flag locations of known utilities.

Locate, identify, and protect utilities that remain, from damage.
Protect above and below grade utilities that remain.
Protect plant life, lawns, and other features remaining as a portion of final landscaping.
Protect bench marks, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
Notify Architect/Engineer minimum 24 hours prior to commencement of concreting operations.
The Contractor shall verify suitability of the subgrade prior to placing the curb and gutter.

Installation: This work shall consist of grading for setting of forms, placing of concrete, finishing and curing of Portland Cement curb, gutter and combination curb and gutter constructed on a prepared base course and subgrade, in one course, in conformity with the typical section shown on the plans and these specifications.

The subgrade shall be excavated to the required depth below the finished surface in accordance with the cross-section shown on the plans. All soft, yielding or other unsuitable material shall be removed and replaced with suitable materials and the finished subgrade left in a thoroughly compacted smooth condition.

All forms used shall be metal forms manufactured to the shape of the cross section given on the plans and designed so as to be set to the true line and grade given on the plans anchored securely in positions.

After forms have been accurately set to the lines and grades, joints shall be formed in the curb and gutter at ten foot (10') uniform spacings by use of steel templates one-eighth inch (1/8") in thickness and cut to the section of the curb and gutter.

These templates shall be placed ahead of pouring of concrete and left in place during the pouring operation and until the concrete has set sufficiently to hold its shape but shall be removed while the forms are still in place.

Concrete shall be mixed and placed as specified in Section 02520. The base course material shall be kept moistened ahead of placing concrete and the concrete shall be placed in the forms and tamped sufficiently to bring the mortar to the surface, after which it shall be finished smooth and even by means of a wooden float.

The edges of the curb and gutter shall be finished with an approved edging tool of three-quarter inch (3/4") radius; and upon removal of steel templates in joints, these joints shall be finished by use of a double edging tool with a one-quarter inch (1/4") radius.

Contractor is advised that curb and gutter may be constructed by use of extruding machine in lieu of formed pours as previously specified; however, all work shall comply with current specifications of the South Carolina Department of Transportation.

End Of Section 02770

SECTION 02920 – GRASSING FOR SOIL STABILIZATION

Summary: Work outlined in this section includes:

- Fertilizing
- Seeding or Hydroseeding
- Mulching
- Maintenance

References: FS O-F-241 - Fertilizers, Mixed, Commercial

Definition of Weeds: Includes Dandelion, Jimsonweed, Quack Grass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambs quarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy, Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

Regulatory Requirements: Comply with regulatory agencies for fertilizer and herbicide composition.

Quality Assurance: Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

Maintenance Data: Supply maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

Delivery, Storage, And Handling: Deliver packaged materials in container showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

Maintenance: Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition for two (2) cuttings.

Products

Acceptable Seed: Standard grade seed of current or latest season's crop with 99% pure live seed by weight with weed seed not exceeding 0.5% by weight.

Seed Mixture: See plans for seed specifications and application rates. All seed shall conform to all state laws and to all requirements and regulations of the South Carolina Department of Agriculture. The several varieties of seed shall be individually packaged or bagged and shall display all information required by the department of agriculture. The owner reserves the right to test and reject or approve all seed before seeding .

Accessories:

Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Wood cellulose fiber, free of growth or germination inhibiting ingredients is acceptable.

Lime: Pelletized, natural, ground agricultural grade limestone combined with soluble binder containing not less than eighty-eight (88) percent of total carbonates, so that not less than ninety (90) percent passes a 100-mesh sieve. Apply at the rate of 60 lbs. per 1,000 square feet. If slacked lime is used, apply at 2/3 as much as of ground limestone. Lime shall conform to the current regulations of the Standards of the Fertilizer Board of Control and with Section 16 of the South Carolina Liming Materials Act.

Peat Humus: Natural product conforming to ASTM D-2607 shredded and granulated to pass a 1/2 inch mesh screen.

Commercial Fertilizer: Complete fertilizer of neutral character, with some elements derived from organic sources and containing following percentages of available plant nutrients. Provide fertilizer with not less than ten (10) percent potassium, and not less than ten (10) percent nitrogen. Provide nitrogen in a form that will be available to lawns during initial period of growth.

Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.

Erosion Fabric: Photodegradeable / biodegradable jute matting, open weave.

Herbicide: Mixed commercial.

Stakes: Softwood lumber, chisel pointed.

String: Inorganic Fiber.

Execution

Preparation: After loosening subgrade of lawn to a minimum depth of four (4) inches work in soil mixture to a depth of four (4) inches. Remove stones, sticks, roots, rubbish and other extraneous matter over 1-1/2 inches in any dimension. Limit preparation to areas which will be planted promptly after preparation. Work in fertilizer.

Grade lawn areas to smooth, even surface with loose, uniformly fine texture, void of footprints or other depressions. Roll and rake and remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.

Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.

Contractor's Inspection: Verify that prepared soil base is ready to receive the work of this Section and that the beginning of installation means acceptance of existing site conditions.

Fertilizing: The contractor shall obtain soil samples from areas to be seeded and submit them to the Clemson Extension Service for analysis. Obtain and submit one sample for each soil type found within the areas to be seeded. Fertilizer rates shall follow those recommendations made on the soil sample analysis for the seed being grown. Apply fertilizer in accordance with manufacturer's instructions. Apply after smooth raking of topsoil and prior to roller compaction. Do not apply fertilizer at same time or with same machine as will be used to apply seed. Mix thoroughly into upper two (2) inches of topsoil. Lightly water to aid the dissipation of fertilizer.

Seeding: See plans for seed specifications and application rates.

Do not sow immediately following rain or when ground is frozen or too dry.

Immediately following seeding and compacting, apply mulch to a thickness of 1/2 inch. Maintain clear of shrubs and trees.

Apply water with a fine spray immediately after each area has been mulched. Saturate to four (4) inches of soil.

Do not use wet seed or seed which is moldy or otherwise damaged in transit or storage.

Seeds shall be sown within thirty (30) days of disturbing contours. The Contractor shall coordinate seeding with the construction of cut and fill slopes. In order to limit the area of erodible material, the owner may require that partially completed slopes be brought to the required slope and that the Contractor perform seeding operations at that time.

Sow seed using a spreader or seeding machine. Do not seed when wind velocity exceeds five (5) miles per hour. Distribute seed evenly over entire area by sowing equal quantity in two (2) directions at right angles to each other.

Sow not less than the quantity of seed specified or scheduled.

Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with a fine spray.

Limestone shall be broadcast after establishment of the stand of grass.

Hydroseeding: Apply seeded slurry with a hydraulic seeder. Do not hydroseed area in excess of that which can be mulched on same day.

Immediately following seeding, apply a mulch to a thickness of 1/2 inch. Maintain clear of shrubs and trees.

Apply water with a fine spray immediately after each area has been mulched. Saturate to four (4) inches of soil.

Seed Protection: Identify seeded areas with stakes and strings around periphery. Set string height to eighteen (18) inches.

Cover seeded slopes where grade is four (4) inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

Lay fabric smoothly on surface, bury top end of each section in six (6) inch deep excavated topsoil trench. Provide twelve (12) inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.

Secure outside edges and overlaps at 36 inch intervals with stakes.

Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum six (6) inches.

Maintenance: Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing. Do not mow when soil and weather conditions are such that rutting or other damage to the establishment of seeding may occur.

Neatly trim edges and hand clip where necessary.

Immediately remove clippings after mowing and trimming.

Water to prevent grass and soil from drying out.

Roll surface to remove minor depressions or irregularities.

Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

Immediately reseed areas which show bare spots.

Protect seeded areas with warning signs during maintenance period.

Schedule: Seed all disturbed areas within the limits of work not receiving landscaping. Do not seed wetlands or any wetland buffer areas as defined on the drawing.

Payment: Before acceptance of the grassed areas, the Contractor shall be required to produce a stand of perennial grass sufficient to survive dry periods and winter weather and capable of re-establishment in the spring. Grasses shall be strongly growing of good color, disease free and of a density sufficient to provide visible evidence of strong resistance to erosion. Strands of grass shall not be satisfactory if the bare spots exceed the following limits: more than 10% of any 1,000 square feet area with bare spots larger than 6 square inches; more than 15% of any 1,000 square feet area with bare spots larger than 4 square inches; any bare spots larger than 2 square feet. Payment to the Contractor shall not exceed 90% of the contract unit price for seeding until a satisfactory stand of grass meeting the requirements of this section has been obtained.

End Of Section 02920

SECTION 311000 – SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing site utilities.
7. Temporary erosion- and sedimentation-control measures.

1.2 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.
- E. The following practices are prohibited within protection zones:
1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 31 20 00 "Earth Moving."
1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

2.2 SILT FENCE

- A.
- B. Silt fence shall consist of woven filter fabric attached to steel posts with wire or nylon ties. Fence shall be a minimum of two (2) ft. high measured from the ground surface, and shall have eight (8) inches of the woven fabric embedded in the ground per the details on the plans. The posts shall be five (5) feet long 1.25 lb per foot steel "T" section fence posts with stabilization plate spaced welded to the post near the bottom. Posts shall be installed at a maximum of six (6) feet apart. Filter fabric shall be selected from one of the products listed on SCDOT's Qualified Products List 34, or an approved equal.
- C. Silt fence shall be supported by steel posts, driven a minimum of 18 inches into the ground. Posts shall be spaced 6 feet. o.c. maximum.
- D. Fencing other than that specified above shall be subject to review and acceptance by the Engineer.

2.3 SEEDING

- A.
- B. Grass seed for temporary cover and permanent cover shall be previous year's crop. Not more than 0.5% by weight shall be weed seed and not more than 1.75% by weight crop seed. Seed shall be delivered to site in sealed containers, labeled with name of seed grower and seed formula, in form stated below. Seed shall be dry and free of mold. Seed and application rates shall meet the requirements of SCDOT Standard Specifications for Seeding.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction, in accordance with Drawings and requirements of authorities having jurisdiction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 SILT FENCE

- A.
- B. Silt fence shall be constructed and installed as shown on the plans, prior to start of clearing and grubbing operations.

3.4 TREE AND PLANT PROTECTION

- A. General: Protect trees and plants remaining on-site
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.5 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Removal of underground utilities is included in earthwork sections and with applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security and utilities sections.

3.6 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction following the procedures indicated in section 015639 Tree and Plant Protection.
 - 1. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
 - 2. Use only hand methods for grubbing within protection zones.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.7 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.8 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 – EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing subgrades for walks, pavements, turf and grasses.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete walks.
5. Subbase course and base course for asphalt paving.
6. Excavating and backfilling for utility trenches.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

- I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 PROJECT CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.
- B. Do not commence earth moving operations until plant-protection measures are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- I. Flowable Fill: Self-compacting, low-density, flowable concrete material produced from the followings:
 - 1. Portland Cement: ASTM C 150, Type I, Type II, or Type III.
 - 2. Fly Ash: ASTM C 618, Class C or F.
 - 3. Normal-Weight Aggregate: ASTM C 33, 3/8-inch nominal maximum aggregate size.
 - 4. Water: ASTM C94/C 94M.
 - 5. Air-Entraining Admixture: ASTM C 260.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.
- B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
 1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit.
 1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material, 4 inches deeper elsewhere, to allow for bedding course.
- D. Trenches in Tree- and Plant-Protection Zones:
 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3.6 SUBGRADE INSPECTION

- A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.
 - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.8 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finished grade including, where applicable, sub drainage, damp proofing, waterproofing, and perimeter insulation.
 - 2. Testing and inspecting underground utilities.
 - 3. Removing temporary shoring and bracing, and sheeting.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.10 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Footings: After installing and testing, completely encase piping or conduit in polyethylene wrap and backfill with flowable fill to bottom of footings.
- D. Trenches under Roadways: After installing and testing, completely encase piping or conduit in polyethylene wrap and backfill with flowable fill to within 4-inches of surface of roadways. Remaining 4-inches shall be of specified base course and surface course for roadway system.

- E. Place and compact initial backfill of subbase material or bedding course material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.11 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.

3.12 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 98 percent.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
 - 4. For utility trenches, compact each layer of initial and final backfill soil material at 98 percent.

3.14 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Fill low spots and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1/2 inch.
 - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch.

3.15 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 - 1. Shape subbase course and base course to required crown elevations and cross-slope grades.
 - 2. Place subbase course and base course (that exceeds 6 inches in compacted thickness) in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 (subbase) and 100 (base course) percent of maximum dry unit weight according to ASTM D 698.

3.16 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Place drainage course (that exceeds 6 inches in compacted thickness) in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

3.17 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall provide results of field tests and inspections.
- B. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

- C. When testing reports indicate that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.18 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 312300 – EXCAVATION AND BACKFILL

PART 1 – GENERAL

- 1.1 Description Of Work: The extent of excavation and backfill is limited to the areas of construction, and includes (but is not necessarily limited to) stockpiling of topsoil, site grading, excavation of footings and trenches, filling, backfilling, compaction, finish grading, and spreading of topsoil. Perform all excavation, dewatering, sheeting, bracing, and backfilling in such a manner as to eliminate all possibility of undermining or disturbing the foundations of existing structures.
- 1.2 QUALITY ASSURANCE
 - A. Referenced Standards: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards. Comply with the provisions of the following codes and standards, except as otherwise shown in report of geotechnical exploration.
 1. ASTM D 698 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. (2.49Kg) Rammer and 12 inch (305 mm) Drop.
 2. ASTM D 3282 Recommended Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.
- 1.3 Soil Testing And Inspection Service: All compaction tests of all fill areas will be made by an independent testing laboratory.
- 1.4 Rework any fill areas which fail to meet the compaction requirements as herein specified and perform this work at no additional cost to the Owner. Testing of fill areas will be provided by owner, except that tests which reveal nonconformance with the Specifications and all succeeding tests for the same area, until conformance with the Specifications is established, shall be at the expense of the Contractor.
- 1.5 JOB CONDITIONS
 - A. Existing Utilities: Locate existing underground utilities in the areas of work. Verify all utility locations with authorities providing utilities and a utility location service. Provide adequate means of protection for utilities during earthwork operations.
 - B. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, notify the Engineer immediately. Coordinate with Owner and utility provider in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of the owner or utility provider at no additional cost to the owner.
 - C. Do not interrupt existing utilities serving facilities occupied and used by others, except when permitted in writing by the Owner, and then only after acceptable temporary utility services have been provided.
 - D. Demolish, and completely remove from site, existing underground utilities noted for removal. All other existing utilities encountered shall remain in place. If conflicts are found between existing and proposed utilities, relocate the existing utility at no additional cost to the owner.
 - E. Temporary Protection: Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

- F. Sheeting and Bracing: Make all excavations in accordance with the rules and regulations promulgated by the Department of Labor, Occupational Safety and Health Administration, "Safety and Health Regulations for Construction." Furnish, put in place, and maintain such sheeting, bracing, etc., as may be necessary to support the sides of the excavation and to prevent any movement of earth which could in any way diminish the width of the excavation to less than that necessary for proper construction, or could otherwise injure or delay the work, or endanger adjacent structures, roads, utilities, or other improvements.

PART 2 - PRODUCTS

2.1 DEFINITIONS

- A. Satisfactory Subgrade Soil Materials: Soils complying with ASTM D 3282, soil classification Groups A-1, A-2-4, A-2-5, and A-3.
- B. Unsatisfactory Subgrade Soil Materials: Soils described in ASTM D 3282, soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also peat and other highly organic soils, unless otherwise acceptable to the Engineer.
- C. Cohesionless Soil Materials: Gravels, sand-gravel mixtures, sands, and gravelly-sands.
- D. Cohesive Soil Materials: Clayey and silty gravels, sand-clay mixtures, gravel-silt mixtures, clayey and silty sands, sand-silt mixtures, clays, silts, and very fine sands.

2.2 SOIL MATERIALS

- A. Backfill and Fill Materials: Provide satisfactory soil materials for backfill and fill, free of masonry, rock, or gravel larger than 2 inches in any dimension, and free of metal, gypsum, lime, debris, waste, frozen materials, organics, vegetable, and other deleterious matter. Use only excavated material that has been sampled, tested, and certified as satisfactory soil material.
- B. Topsoil: 3" of topsoil shall be provided in all areas to be grassed and/or landscaped. Material shall be obtained from a local provider and shall be weed and debris free screened topsoil.

PART 3 - EXECUTION

- 3.1 Inspection: Examine the areas and conditions under which excavating and backfilling is to be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.
- 3.2 Excavation: Excavation consists of the removal and disposal of all materials encountered for pipework, and other construction as shown on the Drawings. Perform all excavation work in compliance with applicable requirements of governing authorities having jurisdiction. Existing unmapped utilities may be encountered during excavation. Hand excavation will be required around existing utilities and directly adjacent to the existing building. All existing utilities encountered shall be preserved or relocated and reconnected as required at no additional cost to the owner.
- 3.3 Stripping: Remove all topsoil and organic materials over proposed excavations. Stockpile the stripped materials which are suitable for reuse and preserve for respreading on completed surfaces. Protect and maintain topsoil stockpile until needed.
- 3.4 Excavation Classification: All excavation will be performed as unclassified excavation and includes excavation to required subgrade elevations regardless of the character of material encountered with the exception of "Rock" as defined herein.

- 3.5 Rock excavation includes removal and disposal of rock material and obstructions encountered that cannot be removed by a single toothed ripper drawn by a crawler tractor having a minimum draw bar pull rated at 36,000 lbs. and occupying an original volume of at least one cubic yard. For trench excavations, this includes rock materials or obstructions which cannot be excavated with a backhoe having a break-out force of not less than 26,000 lbs. and occupying an original volume of at least one half cubic yard without systematic drilling, blasting, or ripping. Contact Architect or Engineer if rock excavation is required at the site.
- 3.6 Site Grading: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finish the surface within specified tolerances; compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- 3.7 Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface. Shape the subgrade as needed by forking, furrowing, or plowing so that the first layer of new material placed thereon will be well bonded to it.
- 3.8 Placement and Compaction: Place backfill and fill materials in layers not more than 6 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to the required percentage of maximum density for each area classification. Do not place backfill or material on surfaces that are muddy, frozen, or contain frost or ice.
- 3.9 In areas not accessible to rollers or compactors, compact the fill with mechanical hand tampers. If the mixture is excessively moistened by rain, aerate the material by means of blade graders, harrows, or other approved equipment, until the moisture content of the mixture is satisfactory. Finish the surface of the layer by blading or rolling with a smooth roller, or a combination thereof, and leave the surface smooth and free from waves and inequalities.
- 3.10 Place backfill and fill materials evenly adjacent to structures, to the required elevations. Take care to prevent wedging action of backfill against structures. Carry the material uniformly around all parts of the structure to approximately the same elevation in each lift.
- 3.11 When existing ground surface has a density less than that specified under the subsection entitled COMPACTION for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
- 3.12 Grading Outside Building Lines: Grade to drain away from structures to prevent ponding of water. Finish surfaces free from irregular surface changes.
- 3.13 Planting Areas: Finish areas to receive topsoil to within not more than one inch above or below the required subgrade elevations, compacted as specified, and free from irregular surface changes. See construction drawings for additional topsoil, planting, and mulching requirements.
- 3.14 Walks: Shape the surface of areas under walks to line, grade, and cross-section, with the finish surface not more than zero inches above or one inch below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains.
- 3.15 Pavements: Shape the surface of the areas under pavement to line, grade and cross section, with finish surface not more than 1/2-inch above or below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains. Include such operations as plowing, discing, and any moisture or aerating required to provide the optimum moisture content for compaction.

- 3.16 Fill low areas resulting from removal of unsatisfactory soil materials, obstructions, and other deleterious materials, using satisfactory soil material. Shape to line, grade, and cross section as shown on the Drawings.
- 3.17 Protection Of Graded Areas: Protect newly graded areas from traffic and erosion, and keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- 3.18 Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather prior to acceptance of work, scarify surface, reshape, and compact to required density prior to further construction.
- 3.19 Unauthorized Excavation: Unauthorized excavation consists of the removal of materials beyond indicated elevations without the specific direction of the Engineer. Under footings, foundations, bases, etc., fill unauthorized excavation by extending the indicated bottom elevation of the concrete to the bottom of the excavation, without altering the required top elevation. Lean concrete fill may be used to bring elevations to proper position only when acceptable to the Engineer. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.
- 3.20 Dewatering: Prevent surface water and subsurface or ground water from flowing into excavated areas by using berms or drainage ditches. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations. Dispose of all water pumped or drained from the work in a suitable manner without undue interference with other work, damage to pavements, other surfaces or property. Provide suitable temporary pipes, flumes or channels for water which may flow along or across the site of the work.
- 3.21 Material Storage: Stockpile satisfactory excavated materials where directed by engineer, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
- 3.22 Locate and retain soil materials away from edge of excavations.
- 3.23 Excavation Around Structures: Use caution when excavation around existing structure/foundations and utilize hand tools to excavate directly around the existing structure/foundations.
- 3.24 Backfill Around Structures: Unless otherwise specified or indicated on the Drawings, use suitable material for backfill which was removed in the course of making the construction excavations. Do not use frozen material for the backfill and do not place backfill upon frozen material. Remove previously frozen material before new backfill is placed.
- 3.25 Material: Approved selected materials available from the excavations may be used for backfilling around structures. Obtain material needed in addition to that of construction excavations from approved banks or other approved deposits. Furnish all borrow material needed on the work. Place and compact all material, whether from the excavation or borrow, to make a dense, stable fill. Use fill material which contains no vegetation, masses of roots, individual roots over 18 inches long or more than 1/2-inch in diameter, stones over 2 inches in diameter, or porous matter. Organic matter must not exceed minor quantities.
- 3.26 Placing Backfill: Do not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, without distortion, cracking, or other damage. Make special leakage tests, if required, as soon as practicable after the structures are structurally adequate and other necessary work has been done. Use the best of the excavated

materials in backfilling within 2 feet of the structure. Avoid unequal soil pressures by depositing the material evenly around the structure.

- 3.27 Place fill and backfill in layers not more than 6 inches thick, except as specified otherwise herein, and compact each layer evenly to the specified density. Do not backfill against concrete without Engineer's approval.
- 3.28 Trench Excavation: Perform all excavation of every description and of whatever substance encountered so that pipe can be laid to the alignment and depth shown on the Drawings.
- 3.29 Brace and shore all trenches, where required, in accordance with the rules and regulations, promulgated by the Department of Labor, Occupational Safety and Health Administration, "Safety and Health Regulations for Construction".
- 3.30 Make all excavations by open cut unless otherwise specified or indicated on the Drawings.
- 3.31 Width Of Trenches: Excavate trenches sufficiently wide to allow proper installation of pipe, fittings and other materials and not more than 12 inches clear of pipe on either side at any point, unless otherwise indicated on the drawings. Do not widen trenches by scraping or loosening materials from the sides. Where supports, and sheeting and bracing are required, trench may be of extra width so as to permit the placing of the trench supporting material.
- 3.32 Trench Excavation In Earth: Earth excavation includes all excavation of whatever substance encountered. In locations where pipe is to be bedded in earth excavated trenches, fine grade the bottoms of such trenches to allow firm bearing for the bottom of the pipe on undisturbed earth. Where any part of the trench has been excavated below the grade of the pipe, fill the part excavated below such grade with pipe bedding material and compact at the Contractor's expense.
- 3.33 Trench Excavation In Fill: If pipe is to be laid in embankments or other recently filled material, first place the fill material to the finish grade or to a height of at least one foot above the top of the pipe, whichever is the lesser. Take particular care to ensure maximum consolidation of material under the pipe location. Excavate the pipe trench as though in undisturbed material.
- 3.34 Trench Bottom In Poor Soil: Excavate and remove unstable or unsuitable soil to a width and depth, as directed by the Engineer, and refill with a thoroughly compacted gravel bedding.
- 3.35 Bell Holes: Provide bell holes at each joint to permit the joint to be made properly and to provide a continuous bearing and support for the pipe.
- 3.36 Trench Backfill: Unless otherwise specified or indicated on the Drawings, use suitable material for backfill which was removed in the course of making the construction excavations. Do not use frozen material for the backfill and do not place backfill on frozen material. Remove previously frozen material before new backfill is placed. Start backfilling as soon as practicable after the pipes have been laid and inspected by the engineer, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, and proceed until its completion.
- 3.37 Should the Contractor wish to minimize the maintenance of lights, and barricades, and the obstruction of traffic, he may, at his own risk, backfill the entire trench as soon as practicable after installation of pipe, and the related structures have acquired a suitable degree of strength. He shall, however, be responsible for removing and later replacing such backfill, at his own expense, should he be ordered to do so in order to locate and repair or replace leaking or defective joints or pipe.
- 3.38 Materials: The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. Both are subject to the approval of the Engineer.

Do not place stone or rock fragments larger than 2 inches in greatest dimension in the backfill. Do not drop large masses of backfill material into the trench in such a manner as to endanger the pipe line. Use a timber grillage to break the fall of material dropped from a height of more than 5 feet. Exclude pieces of bituminous pavement from the backfill unless their use is expressly permitted.

- 3.40 Zone Around Pipe: Place bedding material to the level shown on the Drawings and work material carefully around the pipe to ensure that all voids are filled, particularly in bell holes. For backfill up to a level of 2 feet over the top of the pipe, use only selected materials containing no rock, clods or organic materials. Place the backfill and compact thoroughly under the pipe haunches and up to the mid-line of the pipe in layers not exceeding 6 inches in depth. Place each layer and tamp carefully and uniformly so as to eliminate the possibility of lateral displacement. Place and compact the remainder of the zone around the pipe and to a height of one foot above the pipe in layers not exceeding 6 inches and compact to a maximum density of at least 100 percent as determined by ASTM D 698.
- 3.41 Tamping: Deposit and spread backfill materials in uniform, parallel layers not exceeding 12 inches thick before compaction. Tamp each layer before the next layer is placed to obtain a thoroughly compacted mass. Furnish and use, if necessary, an adequate number of power driven tampers, each weighing at least 20 pounds for this purpose. Take care that the material close to the bank, as well as in all other portions of the trench, is thoroughly compacted. When the trench width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe, backfill may, on approval, be compacted by the use of suitable rollers, tractors, or similar powered equipment instead of by tamping. For compaction by tamping (or rolling), the rate at which backfilling material is deposited in the trench shall not exceed that permitted by the facilities for its spreading, leveling and compacting as furnished by the Contractor.
- 3.42 Wet the material by sprinkling, if necessary, to ensure proper compaction by tamping (or rolling). Perform no compaction by tamping (or rolling) when the material is too wet either from rain or applied water to be compacted properly.
- 3.43 Trench Compaction: Compact backfill in pipe trenches to the maximum density as shown on the Drawings, or as listed in the subsection entitled COMPACTION, with a moisture content within the range of values of maximum density as indicated by the moisture-density relationship curve.
- 3.44 Compaction: Control soil compaction during construction providing at least the minimum percentage of density specified for each area classification.
- 3.45 Percentage Of Maximum Density Requirements: After compaction, all fill will be tested in accordance with Method "C" of ASTM D 698, unless specified otherwise. Except as noted otherwise for the zone around pipe, provide not less than the following percentages of maximum density of soil material compacted at optimum moisture content, for the actual density of each layer of soil material-in-place:

Trench Backfill (Paved Areas):	Top 18" - 100%; Remainder-95%.
Trench Backfill (Unpaved Areas):	Compact Full Depth To 95%.
All Other Backfill:	Top 24"- 100%; Remainder - 95%.
- 3.46 Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until moisture content is reduced to a satisfactory value, as determined by moisture-density relation tests.

3.47 Disposal Of Surplus Material: Upon approval of the Engineer, haul all surplus materials not needed or acceptable for backfill and legally dispose of it offsite.

3.48 Excavation Near Existing Utilities And Structures

- A. Existing Utilities: Attention is directed to the fact that there are pipes, drains, and other utilities in locations adjacent to the proposed work. Where information is available as to the location of existing pipes, drains, and other utilities, the approximate locations have been indicated on the Drawings; however, the completeness or accuracy of the information given is not guaranteed.
- B. As the excavation approaches pipes, conduits, or other underground structures, discontinue digging by machinery and excavate by means of hand tools, as directed. Such manual excavation shall be included in the work to be done under this project.
- C. Where determination of the exact location of a pipe or other underground structure is necessary, the Contractor shall be required to excavate test pits to determine such locations utilizing hand excavation around existing utilities and the building perimeter.
- D. Existing Structures: Support and protect from damage all existing pipes, poles, wires, fences, guard rails, curbing, catch basins, manholes, property line markers, and other structures which do not require temporary or permanent relocation.
- E. Restore or replace damaged items, without compensation, to the condition in which they were found immediately before the work under this project was begun.
- F. Fences: Remove fences which interfere with the Contractor's operation and (unless otherwise specified) later restore them to a condition at least as good as that in which they were found immediately before the work was begun, all without additional compensation. Restore fences as promptly as possible and do not leave until the end of the construction period.
- G. Property Markers: Replace property line markers which are disturbed or removed. Have this work performed by a Registered Land Surveyor.
- H. Care And Restoration Of Property: Enclose the trunks of trees which are to remain adjacent to the work with substantial wooden boxes of such height as may be necessary to protect them from piled material, equipment or equipment operation. Use excavating machinery and cranes of suitable type and operate the equipment with care to prevent injury to remaining tree trunks, roots, branches and limbs.
- I. Do not cut branches, limbs, and roots except by permission of the Engineer. Cut smoothly and neatly without splitting or crushing. In case of cutting or unavoidable injury to branches, limbs, and trunks of trees, neatly trim the cut or injured portions and cover with an application of grafting wax or tree healing paint as directed.
- J. Protect by suitable means all cultivated hedges, shrubs and plants which might be injured by the Contractor's operations. Promptly heel in any such trees or shrubbery necessary to be removed and replanted. Perform heeling in and replanting under the direction of a licensed and experienced nurseryman. Replant in their original position all removed shrubbery and trees after construction operations have been substantially completed and care for until growth is reestablished.
- K. Replace cultivated hedges, shrubs, and plants injured to such a degree as to affect their growth or diminish their beauty or usefulness, by items of kind and quality at least equal to the kind and quality existing at the start of the work.
- L. Do not operate tractors, bulldozers or other power-operated equipment on paved surfaces if the treads or wheels of the equipment are so shaped as to cut or otherwise injure the surfaces.

- M. Restore all surfaces, including lawns, grassed, and planted areas which have been injured by the Contractor's operations, to a condition as good as or better than that in which they were found immediately before the work was begun. Use suitable materials and methods for such restoration. Maintain all restored plantings by cutting, trimming, fertilizing, etc., until acceptance. Restore existing property or structures as promptly as practicable. Restoration and repair activities shall not be deferred until the end of the construction period.
- N. Protection Of Streams: Exercise reasonable precaution to prevent the silting of streams. Provide at Contractor's expense temporary erosion and sediment control measures to prevent the silting of offsite areas and existing drainage facilities.

3.49 EROSION CONTROL

- A. General: Exercise precaution to prevent the erosion of disturbed surfaces. Provide temporary erosion and sediment control measures to prevent the silting of existing drainage facilities.
- B. Air Pollution: Comply with all pollution control rules, regulations, ordinances, and statutes which apply to any work performed under the Contract, including any air pollution control rules, regulations, ordinances and statutes, or any municipal regulations pertaining to air pollution.
- C. During the progress of the work, maintain the area of activity, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. If the Engineer decides that it is necessary to use calcium chloride or more effective dust control, furnish and spread the material, as directed, and without additional cost to the owner.
- D. Bridging Trenches: Provide suitable and safe bridges and other crossings where required for the accommodation of travel; provide access to private property during construction, and remove said structures thereafter.
- E. Bridge or backfill trenches in any portion of the travel lanes of public or private roads, or drives, at the end of each day's operation to provide for safe travel. No additional compensation will be made for this work.

END OF SECTION 312300

SECTION 312510 – EROSION AND SEDIMENT CONTROL

PART 1 – GENERAL

1.1 SUMMARY: WORK OUTLINED IN THIS SECTION INCLUDES:

Installation of various types of inlet protection.
Installation of tree protection.
Installation of concrete washout.
Removal of erosion control devices.

1.2 REFERENCED STANDARDS:

South Carolina State Department of Transportation (SCDOT): Standard Specification for Highway Construction, 2007 Edition.
South Carolina Code of Regulations, Chapter 72, Article 2
(Erosion & Sediment Reduction & Stormwater Management Regulations)
South Carolina Department of Health and Environmental Control, Storm Water Management BMP Handbook
Guide to Site Development and Best Management Practices for Storm Water Management and Sediment Control (SCLRCC).

1.3 Submittals: Proposed materials to be employed, for siltation control and preventing erosion damage shall be submitted for approval. Submittals shall include a list of proposed materials including manufacturer's product data.

1.4 Erosion Control Principles: The following erosion control principles shall apply to the land grading and construction phases:

- A. Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion.
- B. Whenever feasible, natural vegetation shall be retained and protected.
- C. Extent of area which is exposed and free of vegetation shall be kept within practical limits.
- D. Temporary seeding, mulching, or other suitable stabilization measures shall be used to protect exposed critical areas during prolonged construction or other land disturbance.
- E. Drainage provisions shall accommodate increased runoff resulting from modifications of soil and surface conditions during and after development or disturbance. Such provisions shall be in addition to existing requirements.
- F. Sediment shall be retained on-site.
- G. Erosion control devices shall be installed as early as possible in the construction sequence prior to start of clearing and grubbing operations and excavation work.
- H. Cut and fill slopes and stockpiled materials shall be protected to prevent erosion. Slopes shall be protected with permanent erosion protection when erosion exposure period is expected to be greater than or equal to two (2) weeks, and temporary erosion protection when erosion exposure period is expected to be less than two (2) weeks
- I. Permanent erosion protection shall be in accordance with landscaping drawings.

- J. Temporary erosion protection shall be accomplished by covering with erosion protection materials, as appropriate for prevailing conditions.
- K. Except where specified slope is indicated on Drawings, fill slopes shall be limited to a grade of 3:1 (horizontal: vertical) cut slopes shall be limited to a grade of 1.5:1.

PART 2 – PRODUCTS

- 2.1 General: Provide all equipment and materials, and do all work necessary to construct a complete erosion and sediment control program for minimizing erosion and siltation during the construction phase of the project. The Contractor shall provide additional erosion and sediment control materials and methods as required to effect the erosion and siltation control principles specified herein.
- 2.2 Silt Fence: Shall be composed of fibers consisting of long chain synthetic polymers composed of at least 85% by weight of polyolefins, polyesters, or polyamides. Shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other. Free of any treatment or coating which might adversely alter its physical properties after installation. Shall be free of defects or flaws that significantly affect its physical and/or filtering properties. Shall be cut to a minimum width of 36-inches.

Filter fabric shall be one of the following, or approved equal:

<u>Product</u>	<u>Manufacturer</u>
Beltech 940	Belton Industries, Belton, SC 29627
GTF-180SF	Thrace-LINQ, Summerville, SC 29483

Silt fence shall be supported by 1.25-lb/linear foot steel posts, driven a minimum of 18 inches. into the ground. Posts shall be spaced 6 ft. o.c. maximum.

Fencing other than that specified above shall be subject to review and acceptance by the Engineer.

- 2.3 Sediment Tubes: Sediment tubes shall meet the following requirements:
 - A. Use sediment tubes as designated on the plans to control erosion along contours, around inlets, and in drainage conveyance swales.
 - B. Use sediment tubes manufactured by an experienced manufacturer producing tubes for erosion control.
 - C. Tube fill is to be composed of 100% weed free materials consisting of a mix of some or all of the following: curled excelsior wood, natural coconut fibers, hardwood mulch and agricultural straw.
 - D. Tubular netting is to be constructed of a flexible outer netting that will contain the fill materials and sediment. Netting is to be constructed from seamless high density polyethylene, polyester, and/or ethyl vinyl acetate, photodegradable materials, treated with ultraviolet stabilizers.
 - E. Tubes are to be minimum 12-inches in diameter.
- 2.4 Temporary Seed Cover: Grass seed for temporary seed cover shall be previous year's crop. Not more than 0.5% by weight shall be weed seed and not more than 1.75% by weight crop seed. Seed shall be delivered to site in sealed containers, labeled with name of seed grower and seed formula, in form stated below. Seed shall be dry and free of mold. Seed shall meet the requirements of SCDOT Standard Specifications Sections 810.03 and 810.04 for temporary vegetation.

Seed for temporary seed cover shall conform to the following requirements:

All seed must meet the requirements of the state seed laws including the labeling requirements for showing pure live seed, (PLS - purity x germination), name and type of seed.

Seed furnished shall be of the previous season's crop and the date of analysis shown on each bag shall be within nine months of the time of use on the project. Each variety of seed shall be furnished and delivered in separate bags or containers.

A sample of each variety of seed shall be furnished for analysis and testing when directed by the Architect/Engineer. The amount and type of seed planted per acre shall be as specified below.

All seed shall be treated with fungicide approved by the Engineer.

Seed application rate shall conform to SCDOT Standard Specifications Section 810.04.

PART 3 – EXECUTION

- 3.1 Temporary Seed Cover: Grass seed shall be spread by mechanical spreader at the specified rate. Following seeding, area shall be lightly raked to mingle seed with the top 1/8 to 1/4 in. of soil. Areas shall then be smoothed and rolled.

Following rolling, entire area shall be watered until equivalent of a 2 in. depth of water has been applied to entire seeded surface, at a rate which will not dislodge seed. Watering shall be repeated thereafter as frequently as required to prevent drying of surface, until grass attains an average height of 1-1/2 in.

At the Contractor's option, seed may be spread by the hydroseeding method, utilizing power equipment commonly used for that purpose. Seed and mulch shall be mixed and applied to achieve application quantities specified herein for the conventional seeding method, with mulch applied at the rate of 2700 lb. dry weight of mulch per acre. A mulching machine, acceptable to the Engineer, shall be equipped to eject the thoroughly wet mulch material at a uniform rate to provide the mulch coverage specified. Other provisions specified above for conventional seeding shall apply to hydroseeding.

If the results of hydroseeding application are unsatisfactory, the mixture and/or application rate and methods shall be modified to achieve the required results.

After the grass has appeared, all areas and parts of areas which fail to show a uniform stand of grass, for any reason whatsoever, shall be re-seeded and such areas and parts of areas seeded repeatedly until all areas are covered with a satisfactory growth of grass.

- 3.2 Silt Fence: Silt fence shall be constructed and installed as shown on the plans, prior to start of clearing and grubbing operations.
- 3.3 Catch Basin Inlet Protection: Catch basin inlet protection designed to fit each specific inlet shall be placed at all inlets to drainage structures as structures are installed. The type of inlet protection used may be above or below grade, but each shall remain in place at all times during construction operations to prevent sediment intrusion into the drainage system. Inlet protection devices shall be inspected and repaired or replaced in accordance with SCDHEC minimum erosion control notes.
- 3.4 Sediment Tubes: Sediment tubes shall be staked or stapled in place and shall be installed to form a continuous sediment barrier. This may require overlapping, double rows, or stacking of the sediment tubes to achieve the proper sediment control for the site.
- 3.5 Maintenance And Removal Of Erosion Control Devices: Wetland areas, water courses, and drainage swales adjacent to construction activities shall be monitored twice each month for evidence of silt intrusion and other adverse environmental impacts, which shall be corrected immediately upon discovery.

3.6 Culverts and drainage ditches shall be kept clean and clear of obstructions during construction period.

3.7 Erosion Control Devices

Sediment behind the erosion control device shall be checked once per week and removed as appropriate.

Condition of erosion control device shall be checked once per week. Damaged and/or deteriorated items shall be replaced. Erosion control devices shall be maintained in place and in effective condition.

Sediment deposits shall be disposed of on-site or hauled off-site to an approved fill location, in a manner which will not cause adverse impacts elsewhere.

3.8 Removal of Erosion Control Devices

Erosion control devices shall be maintained until all disturbed earth has been paved or vegetated, at which time they shall be removed. After removal, areas disturbed by these devices shall be re-graded and seeded.

Erosion protection material shall be kept securely anchored in accordance with these specifications until acceptance of completed soil stabilization.

END OF SECTION 312510

SECTION 321216 – ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cold milling of existing asphalt pavement.
 - 2. Hot-mix asphalt patching.
 - 3. Hot-mix asphalt paving.
 - 4. Hot-mix asphalt overlay.
 - 5. Asphalt curbs.
- B. Related Requirements:
 - 1. Section 31 20 00 "Earth Moving" for subgrade preparation, fill material, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - 1. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located.
- B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of SCDOT for asphalt paving work.
 - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- B. Fine Aggregate: ASTM D 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
- C. Mineral Filler: AASHTO M 17, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: AASHTO M 320, PG 64-22.
- B. Tack Coat: AASHTO M 140 emulsified asphalt, or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

2.3 AUXILIARY MATERIALS

- A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled tires, asphalt shingles, or glass from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.
- B. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

2.4 MIXES

- A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by SCDOT; designed according to procedures 2007 Standard Specifications for Highway Construction and complying with the following requirements, unless otherwise noted on the drawings:
 - 1. Refer to Construction Details or Geotechnical Report.
 - 2. Surface Course: 2" SCDOT Type C.

PART 3 - EXECUTION

3.1 COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
 - 1. Mill to a depth of 2 inches.
 - 2. Patch surface depressions deeper than 1 inch after milling, before wearing course is laid.

3.2 PATCHING

- A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseal concrete pieces firmly.
 - 1. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.
- C. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.15 gal./sq. yd..
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- D. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.3 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- C. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
- D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- 3.4 PLACING HOT-MIX ASPHALT
- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 1. Spread mix at a minimum temperature of 250 deg F.
 2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
 - B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
 - C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.
- 3.5 JOINTS
- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 1. Clean contact surfaces and apply tack coat to joints.
 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
- 3.6 COMPACTION
- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 1. Complete compaction before mix temperature cools to 185 deg F.
 - B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
 - C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent.
 - D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
 - E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
 - F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
 - G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.
- 3.7 ASPHALT CURBS
- A. Construct hot-mix asphalt curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust. Spread mix at a minimum temperature of 250 deg F.
 1. Asphalt Mix: Same as pavement surface-course mix.
 - B. Place hot-mix asphalt to curb cross section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

3.8 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: Plus or minus 1/2 inch.
 - 2. Surface Course: Plus 1/4 inch, no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: 1/4 inch.
 - 2. Surface Course: 1/8 inch.
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Replace and compact hot-mix asphalt where core tests were taken.
- C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.10 WASTE HANDLING

- A. General: Handle asphalt-paving waste according SCDOT 2007 Construction Specifications.

END OF SECTION 321216

SECTION 321723 – PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes painted markings applied to asphalt pavement.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Aexcel Inc.
 - 2. Benjamin Moore & Co.

2.2 PAVEMENT-MARKING PAINT

- A. Pavement-Marking Paint: Alkyd-resin type, waterborne emulsion, lead and chromate free, ready mixed, complying with AASHTO M248 and FS TT-P-1952.
 - 1. Color: White, Yellow, Blue.
- B. Glass Beads: AASHTO M 247, Type 1.
- C. VOC Content: Pavement markings used on building interior shall have a VOC content of 150 g/L or less.

PART 3 - EXECUTION

3.1 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow paving to age for a minimum of 30 days before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 - 1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils. Apply paint so that it cannot run beneath the stencil.
 - 2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal.

END OF SECTION 321723