UNIVERSITY OF SOUTH CAROLINA
UPSTATE ADMINISTRATION BUILDING
REPAIRS AND RENOVATONS

PROJECT # H34-9541-JV-B

MAY 28, 2015
CONSTRUCTION DOCUMENTS

A/E PROJECT # 11049.03

GMK
ASSOCIATES, INC.

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PROJECT NUMBER: H34-9541-JV-B

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SE-310
INVITATION FOR CONSTRUCTION SERVICES

PROJECT NAME: Upstate Administration Building Repairs and Renovations

PROJECT NUMBER: H34-9541-JV-B

PROJECT LOCATION: University of South Carolina - Upstate, Spartanburg, SC

BID SECURITY REQUIRED? Yes ☒ No ☐
PERFORMANCE BOND REQUIRED? Yes ☒ No ☐
PAYMENT BOND REQUIRED? Yes ☒ No ☐

NOTE: Contractor may be subject to a performance appraisal at the close of the project.

CONSTRUCTION COST RANGE: $ 300,000 - 400,000

DESCRIPTION OF PROJECT: The work consists of waterproofing repairs to the front and rear porches of the existing facility. Work includes, but is not limited to: sitework storm, grading, paving, exterior waterproofing systems, stone tiling, exterior wall modifications, and sheet metal flashings. Small and minority business participation is encouraged.

BIDDING DOCUMENTS/PLANS MAY BE OBTAINED FROM: http://purchasing.sc.edu (see Facilities Construction Solicitations & Awards)

PLAN 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. Only those Bidding Documents/Plans obtained from the above listed source(s) are official. Bidders that rely on copies of Bidding Documents/Plans obtained from any other source do so at their own risk. All written communications with official plan holders & bidders **WILL** ☒ **WILL NOT** ☐ be via email or website posting.

IN ADDITION TO THE ABOVE OFFICIAL SOURCE(S), BIDDING DOCUMENTS/PLANS ARE ALSO AVAILABLE AT:
Bidders are responsible for obtaining all updates to bidding documents from the USC Purchasing website. (http://purchasing.sc.edu)

All questions & correspondence concerning this Invitation shall be addressed to the A-E.

A-E NAME: GMK Associates, Inc.
A-E CONTACT: Thomas M. Weiland
A-E ADDRESS: **Street/PO Box**: 1201 Main St, Suite 2100
City: Columbia **State:** SC **ZIP**: 29201-
EMAIL: Tweiland@gmka.com
TELEPHONE: (803) 256-0000 **FAX:** (803) 255-7243

AGENCY: University of South Carolina
AGENCY PROJECT COORDINATOR: Juaquana Brookins
ADDRESS: **Street/PO Box**: 743 Greene Street
City: Columbia **State: SC** **ZIP:** 29208-
EMAIL: jbrookin@fmc.sc.edu
TELEPHONE: (803) 777-3596 **FAX:** (803) 777-7334

PRE-BID CONFERENCE: Yes ☒ No ☐ **MANDATORY ATTENDANCE:** Yes ☐ No ☒
PRE-BID DATE: 6/9/2015 **TIME:** 10:00 am **PLACE:** USC Upstate, Facilities Management Center, 155 American Way, Spartanburg, SC 29303, Room 110

BID CLOSING DATE: 6/23/2015 **TIME:** 3:00 pm **PLACE:** USC, Facilities Center, 743 Greene Street, Columbia SC 29208, Conference Room 53

BID DELIVERY ADDRESSES:

HAND-DELIVERY:
Attn: Juaquana Brookins (BID ENCLOSED)
743 Greene Street
Columbia, SC 29208

MAIL SERVICE:
Attn: Juaquana Brookins (BID ENCLOSED)
743 Greene Street
Columbia, SC 29208

IS PROJECT WITHIN AGENCY CONSTRUCTION CERTIFICATION? ***(Agency MUST check one)*** Yes ☒ No ☐

APPROVED BY:_____ **DATE:** _____
(OSE Project Manager)

AIA Document A701

Instructions to Bidders

Original AIA Document on file at:

Office of Facilities, Planning, and Construction

743 Greene Street

Columbia, SC 29208

OSE FORM 00201
STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

AGENCY: University of South Carolina

PROJECT NAME: Upstate Administration Building Repairs and Renovations

PROJECT NUMBER: H34-9541-JV-B

PROJECT LOCATION: University of South Carolina - Upstate, Spartanburg, SC

PROCUREMENT OFFICER: Juaquana Brookins

1. STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

1.1 These Standard Supplemental Instructions to Bidders amend or supplement Instructions to Bidders (AIA Document A701-1997) and other provisions of Bidding and Contract Documents as indicated below.

1.2 Compliance with these Standard Supplemental Instructions is required by the Office of State Engineer (OSE) for all State projects when competitive sealed bidding is used as the method of procurement.

1.3 All provisions of the A701-1997, which are not so amended or supplemented, remain in full force and effect.

1.4 Bidders are cautioned to carefully examine the Bidding and Contract Documents for additional instructions or requirements.

2. MODIFICATIONS TO A701-1997

2.1 *Delete Section 1.1 and insert the following:*

1.1 Bidding Documents, collectively referred to as the **Invitation for Bids**, include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement, Instructions to Bidders (A-701), Supplementary Instructions to Bidders, the bid form (SE-330), the Notice of Intent to Award (SE-370), and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda issued prior to execution of the Contract, and other documents set forth in the Bidding Documents. Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

2.2 *In Section 1.8, delete the words "and who meets the requirements set forth in the Bidding Documents".*

2.3 *In Section 2.1, delete the word "making" and substitute the word "submitting."*

2.4 *In Section 2.1.1:*
After the words "Bidding Documents," delete the word "or" and substitute the word "and."
Insert the following at the end of this section:
Bidders are expected to examine the Bidding Documents and Contract Documents thoroughly and should request an explanation of any ambiguities, discrepancies, errors, omissions, or conflicting statements. Failure to do so will be at the Bidder's risk. Bidder assumes responsibility for any patent ambiguity that Bidder does not bring to the Owner's attention prior to bid opening.

2.5 *In Section 2.1.3, insert the following after the term "Contract Documents" and before the period:*
and accepts full responsibility for any pre-bid existing conditions that would affect the Bid that could have been ascertained by a site visit. As provided in Regulation 19-445.2042(B), a bidder's failure to attend an advertised pre-bid conference will not excuse its responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the State.

2.6 *Insert the following Sections 2.2 through 2.6:*
2.2 CERTIFICATION OF INDEPENDENT PRICE DETERMINATION
GIVING FALSE, MISLEADING, OR INCOMPLETE INFORMATION ON THIS CERTIFICATION MAY RENDER YOU SUBJECT TO PROSECUTION UNDER SECTION 16-9-10 OF THE SOUTH CAROLINA CODE OF LAWS AND OTHER APPLICABLE LAWS.

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STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

A. By submitting an bid, the bidder certifies that—
- **1.** The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to—
  - **a.** Those prices;
  - **b.** The intention to submit an bid; or
  - **c.** The methods or factors used to calculate the prices offered.
- **2.** The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and
- **3.** No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit a bid for the purpose of restricting competition.

B. Each signature on the bid is considered to be a certification by the signatory that the signatory—
- **1.** Is the person in the bidder's organization responsible for determining the prices being offered in this bid, and that the signatory has not participated and will not participate in any action contrary to paragraphs A.1 through A.3 of this certification; or
- **2.** **a.** Has been authorized, in writing, to act as agent for the bidder's principals in certifying that those principals have not participated, and will not participate in any action contrary to paragraphs A.1 through A.3 of this certification [As used in this subdivision B.2.a, the term "principals" means the person(s) in the bidder's organization responsible for determining the prices offered in this bid];
  - **b.** As an authorized agent, does certify that the principals referenced in subdivision B.2.a of this certification have not participated, and will not participate, in any action contrary to paragraphs A.1 through A.3 of this certification; and
  - **c.** As an agent, has not personally participated, and will not participate, in any action contrary to paragraphs A.1 through A.3 of this certification.

C. If the bidder deletes or modifies paragraph (a)(2) of this certification, the bidder must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

2.3 DRUG FREE WORKPLACE

By submitting a bid, the Bidder certifies that Bidder will maintain a drug free workplace in accordance with the requirements of Title 44, Chapter 107 of South Carolina Code of Laws, as amended.

2.4 CERTIFICATION REGARDING DEBARMENT AND OTHER RESPONSIBILITY MATTERS

A. **1.** By submitting an Bid, Bidder certifies, to the best of its knowledge and belief, that-
- **a.** Bidder and/or any of its Principals-
  - **(i)** Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any state or federal agency;
  - **(ii)** Have not, within a three-year period preceding this bid, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of bids; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and
  - **(iii)** Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph A.1.a.(ii) of this provision.
- **b.** Bidder has not, within a three-year period preceding this bid, had one or more contracts terminated for default by any public (Federal, state, or local) entity.

2. "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

B. Bidder shall provide immediate written notice to the Procurement Officer if, at any time prior to contract award, Bidder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

C. If Bidder is unable to certify the representations stated in paragraphs A.1, Bidder must submit a written explanation regarding its inability to make the certification. The certification will be considered in connection with a review of the Bidder's responsibility. Failure of the Bidder to furnish additional information as requested by the Procurement Officer may render the Bidder nonresponsible.

Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph A. of this provision. The knowledge and information of a Bidder is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

D. The certification in paragraph A. of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Bidder knowingly or in bad faith rendered an erroneous certification, in addition to other remedies available to the State, the Procurement Officer may terminate the contract resulting from this solicitation for default.

2.5 ETHICS CERTIFICATE

By submitting a bid, the bidder certifies that the bidder has and will comply with, and has not, and will not, induce a person to violate Title 8, Chapter 13 of the South Carolina Code of Laws, as amended (ethics act). The following statutes require special attention: Section 8-13-700, regarding use of official position for financial gain; Section 8-13-705, regarding gifts to influence action of public official; Section 8-13-720, regarding offering money for advice or assistance of public official; Sections 8-13-755 and 8-13-760, regarding restrictions on employment by former public official; Section 8-13-775, prohibiting public official with economic interests from acting on contracts; Section 8-13-790, regarding recovery of kickbacks; Section 8-13-1150, regarding statements to be filed by consultants; and Section 8-13-1342, regarding restrictions on contributions by contractor to candidate who participated in awarding of contract. The state may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, contractor shall, if required by law to file such a statement, provide the statement required by Section 8-13-1150 to the procurement officer at the same time the law requires the statement to be filed.

2.6 RESTRICTIONS APPLICABLE TO BIDDERS & GIFTS

Violation of these restrictions may result in disqualification of your bid, suspension or debarment, and may constitute a violation of the state Ethics Act. (a) After issuance of the solicitation, ***bidder agrees not to discuss this procurement activity in any way with the Owner or its employees, agents or officials.*** All communications must be solely with the Procurement Officer. This restriction may be lifted by express written permission from the Procurement Officer. This restriction expires once a contract has been formed. (b) Unless otherwise approved in writing by the Procurement Officer, ***bidder agrees not to give anything to the Owner, any affiliated organizations, or the employees, agents or officials of either, prior to award.*** (c) Bidder acknowledges that the policy of the State is that a governmental body should not accept or solicit a gift, directly or indirectly, from a donor if the governmental body has reason to believe the donor has or is seeking to obtain contractual or other business or financial relationships with the governmental body. Regulation 19-445.2165(C) broadly defines the term donor.

2.7 IRAN DIVESTMENT ACT CERTIFICATION

(a) The Iran Divestment Act List is a list published by the Board pursuant to Section 11-57-310 that identifies persons engaged in investment activities in Iran. Currently, the list is available at the following URL: http://procurement.sc.gov/PS/PS-iran-divestment.phtm(.) Section 11-57-310 requires the government to provide a person ninety days written notice before he is included on the list. The following representation, which is required by Section 11-57-330(A), is a material inducement for the State to award a contract to you. (b) By signing your Offer, you certify that, as of the date you sign, you are not on the then-current version of the Iran Divestment Act List. (c) You must notify the Procurement Officer immediately if, at any time before posting of a final statement of award, you are added to the Iran Divestment Act List.

2.7 *Delete Section 3.1.1 and substitute the following:*

3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement in the number and for the deposit sum, if any, stated therein. If so provided in the Advertisement, the deposit will be refunded to all plan holders who return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

2.8 *Delete the language of Section 3.1.2 and insert the word "Reserved."*

2.9 *In Section 3.1.4, delete the words "and Architect may make" and substitute the words "has made."*

2.10 *Insert the following Section 3.1.5*

3.1.5 All persons obtaining Bidding Documents from the issuing office designated in the Advertisement shall provide that office with Bidder's contact information to include the Bidder's name, telephone number, mailing address, and email address.

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STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

2.11 *In Section 3.2.2:*

Delete the words "and Sub-bidders"

Delete the word "seven" and substitute the word "ten"

2.12 *In Section 3.2.3:*
In the first Sentence, insert the word "written" before the word "Addendum."

Insert the following at the end of the section:
As provided in Regulation 19-445.2042(B), nothing stated at the pre-bid conference shall change the Bidding Documents unless a change is made by written Addendum.

2.13 *Insert the following at the end of Section 3.3.1:*
Reference in the Bidding Documents to a designated material, product, thing, or service by specific brand or trade name followed by the words "or equal" and "or approved equal" shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.

2.14 *Delete Section 3.3.2 and substitute the following:*

3.3.2 No request to substitute materials, products, or equipment for materials, products, or equipment described in the Bidding Documents and no request for addition of a manufacturer or supplier to a list of approved manufacturers or suppliers in the Bidding Documents will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids established in the Invitation for Bids. Any subsequent extension of the date for receipt of Bids by addendum shall not extend the date for receipt of such requests unless the addendum so specifies. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

2.15 *Delete Section 3.4.3 and substitute the following:*

3.4.3 Addenda will be issued no later than 120 hours prior to the time for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

2.16 *Insert the following Sections 3.4.5 and 3.4.6:*

3.4.5 When the date for receipt of Bids is to be postponed and there is insufficient time to issue a written Addendum prior to the original Bid Date, Owner will notify prospective Bidders by telephone or other appropriate means with immediate follow up with a written Addendum. This Addendum will verify the postponement of the original Bid Date and establish a new Bid Date. The new Bid Date will be no earlier than the fifth (5th) calendar day after the date of issuance of the Addendum postponing the original Bid Date.

3.4.6 If an emergency or unanticipated event interrupts normal government processes so that bids cannot be received at the government office designated for receipt of bids by the exact time specified in the solicitation, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal government processes resume. In lieu of an automatic extension, an Addendum may be issued to reschedule bid opening. If state offices are closed at the time a pre-bid or pre-proposal conference is scheduled, an Addendum will be issued to reschedule the conference.

2.17 *In Section 4.1.1, delete the word "forms" and substitute the words "SE-330 Bid Form."*

2.18 *Delete Section 4.1.2 and substitute the following:*

4.1.2 Any blanks on the bid form to be filled in by the Bidder shall be legibly executed in a non-erasable medium. Bids shall be signed in ink or other indelible media.

2.19 *Delete Section 4.1.3 and substitute the following:*

4.1.3 Sums shall be expressed in figures.

2.20 *Insert the following at the end of Section 4.1.4:*
Bidder shall not make stipulations or qualify his bid in any manner not permitted on the bid form. An incomplete Bid or information not requested that is written on or attached to the Bid Form that could be considered a qualification of the Bid, may be cause for rejection of the Bid.

2.21 *Delete Section 4.1.5 and substitute the following:*

4.1.5 All requested Alternates shall be bid. The failure of the bidder to indicate a price for an Alternate shall render the Bid non-responsive. Indicate the change to the Base Bid by entering the dollar amount and marking, as appropriate, the box for "ADD TO" or "DEDUCT FROM". If no change in the Base Bid is required, enter "ZERO" or "No Change." For add alternates to the base bid, Subcontractor(s) listed on page BF-2 of the Bid Form to perform Alternate Work shall be used for both Alternates and Base Bid Work if Alternates are accepted.

2.22 *Delete Section 4.1.6 and substitute the following:*

4.1.6 Pursuant to Title 11, Chapter 35, Section 3020(b)(i) of the South Carolina Code of Laws, as amended, Section 7 of the Bid Form sets forth a list of subcontractor specialties for which Bidder is required to identify only those subcontractors Bidder will use to perform the work of each listed specialty. Bidder must follow the Instructions in the Bid Form for filling out this section of the Bid Form. Failure to properly fill out Section 7 may result in rejection of Bidder's bid as non-responsive.

2.23 *Delete Section 4.1.7 and substitute the following:*

4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

2.24 *Delete Section 4.2.1 and substitute the following:*

4.2.1 If required by the Invitation for Bids, each Bid shall be accompanied by a bid security in an amount of not less than five percent of the Base Bid. The bid security shall be a bid bond or a certified cashier's check. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

2.25 *Delete Section 4.2.2 and substitute the following:*

4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney. The bid bond shall:

- **.1** Be issued by a surety company licensed to do business in South Carolina;
- **.2** Be issued by a surety company having, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty", which company shows a financial strength rating of at least five (5) times the contract price.
- **.3** Be enclosed in the bid envelope at the time of Bid Opening, either in paper copy or as an electronic bid bond authorization number provided on the Bid Form and issued by a firm or organization authorized by the surety to receive, authenticate and issue binding electronic bid bonds on behalf the surety.

2.26 *Delete Section 4.2.3 and substitute the following:*

4.2.3 By submitting a bid bond via an electronic bid bond authorization number on the Bid Form and signing the Bid Form, the Bidder certifies that an electronic bid bond has been executed by a Surety meeting the standards required by the Bidding Documents and the Bidder and Surety are firmly bound unto the State of South Carolina under the conditions provided in this Section 4.2.

2.27 *Insert the following Section 4.2.4:*

4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and performance and payment bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

2.28 *Delete Section 4.3.1 and substitute the following:*

4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall, unless hand delivered by the Bidder, be addressed to the Owner's designated purchasing office as shown in the Invitation for Bids. The envelope shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail or special delivery service (UPS, Federal Express, etc.), the envelope should be labeled "BID ENCLOSED" on the face thereof. Bidders hand delivering their Bids shall deliver Bids to the place of the Bid Opening as shown in the Invitation for Bids. Whether or not Bidders attend the Bid Opening, they

shall give their Bids to the Owner's procurement officer or his/her designee as shown in the Invitation for Bids prior to the time of the Bid Opening.

2.29 *Insert the following Section 4.3.6 and substitute the following:*

4.3.5 The official time for receipt of Bids will be determined by reference to the clock designated by the Owner's procurement officer or his/her designee. The procurement officer conducting the Bid Opening will determine and announce that the deadline has arrived and no further Bids or bid modifications will be accepted. All Bids and bid modifications in the possession of the procurement officer at the time the announcement is completed will be timely, whether or not the bid envelope has been date/time stamped or otherwise marked by the procurement officer.

2.30 *Delete Section 4.4.2 and substitute the following:*

4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be withdrawn in person or by written notice to the party receiving Bids at the place designated for receipt of Bids. Withdrawal by written notice shall be in writing over the signature of the Bidder.

2.31 *In Section 5.1, delete everything following the caption "OPENING OF BIDS" and substitute the following:*

5.1.1 Bids received on time will be publicly opened and will be read aloud. Owner will not read aloud Bids that Owner determines, at the time of opening, to be non-responsive. .

5.1.2 At bid opening, Owner will announce the date and location of the posting of the Notice of Intended Award.

5.1.3 Owner will send a copy of the final Bid Tabulation to all Bidders within ten (10) working days of the Bid Opening.

5.1.4 If Owner determines to award the Project, Owner will, after posting a Notice of Intended Award, send a copy of the Notice to all Bidders.

5.1.5 If only one Bid is received, Owner will open and consider the Bid.

2.32 *In Section 5.2, insert the section number "5.2.1" before the words of the "The Owner" at the beginning of the sentence.*

2.33 *Insert the following Sections 5.2.2 and 5.2.3:*

5.2.2 The reasons for which the Owner will reject Bids include, but are not limited to:

- **.1** Failure by a Bidder to be represented at a Mandatory Pre-Bid Conference or site visit;
- **.2** Failure to deliver the Bid on time;
- **.3** Failure to comply with Bid Security requirements, except as expressly allowed by law;
- **.4** Listing an invalid electronic Bid Bond authorization number on the bid form;
- **.5** Failure to Bid an Alternate, except as expressly allowed by law;
- **.6** Failure to list qualified Subcontractors as required by law;
- **.7** Showing any material modification(s) or exception(s) qualifying the Bid;
- **.8** Faxing a Bid directly to the Owner or their representative; or
- **.9** Failure to include a properly executed Power-of-Attorney with the bid bond.

5.2.3 The Owner may reject a Bid as nonresponsive if the prices bid are materially unbalanced between line items or sub-line items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Owner even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

2.34 *Delete Section 6.1 and substitute the following:*

6.1 CONTRACTOR'S RESPONSIBILITY

Owner will make a determination of Bidder's responsibility before awarding a contract. Bidder shall provide all information and documentation requested by the Owner to support the Owner's evaluation of responsibility. Failure of Bidder to provide requested information is cause for the Owner, at its option, to determine the Bidder to be non-responsible

2.35 *Delete the language of Section 6.2 and insert the word "Reserved."*

2.36 *Delete the language of Sections 6.3.2, 6.3.3, and 6.3.4 and insert the word "Reserved" after each Section Number.*

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STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

2.37 *Insert the following Section 6.4*

6.4 CLARIFICATION

Pursuant to Section 11-35-1520(8), the Procurement Officer may elect to communicate with a Bidder after opening for the purpose of clarifying either the Bid or the requirements of the Invitation for Bids. Such communications may be conducted only with Bidders who have submitted a Bid which obviously conforms in all material aspects to the Invitation for Bids and only in accordance with Appendix D (Paragraph A(6)) to the Manual for Planning and Execution of State Permanent Improvement, Part II. Clarification of a Bid must be documented in writing and included with the Bid. Clarifications may not be used to revise a Bid or the Invitation for Bids. [Section 11-35-1520(8); R.19-445.2080]

2.38 *Delete Section 7.1.2 and substitute the following:*

7.1.2 The performance and payment bonds shall conform to the requirements of Section 11.4 of the General Conditions of the Contract. If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid.

2.39 *Delete the language of Section 7.1.3 and insert the word "Reserved."*

2.40 *In Section 7.2, insert the words "CONTRACT, CERTIFICATES OF INSURANCE" into the caption after the word "Delivery."*

2.41 *Delete Section 7.2.1 and substitute the following:*

7.2.1 After expiration of the protest period, the Owner will tender a signed Contract for Construction to the Bidder and the Bidder shall return the fully executed Contract for Construction to the Owner within seven days thereafter. The Bidder shall deliver the required bonds and certificate of insurance to the Owner not later than three days following the date of execution of the Contract. Failure to deliver these documents as required shall entitle the Owner to consider the Bidder's failure as a refusal to enter into a contract in accordance with the terms and conditions of the Bidder's Bid and to make claim on the Bid Security for re-procurement cost.

2.42 *Delete the language of Section 7.2.2 and insert the word "Reserved."*

2.43 *Delete the language of Article 8 and insert the following:*

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on South Carolina Modified AIA Document A101, 2007, Standard Form of Agreement Between Owner and Contractor as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor.

2.44 *Insert the following Article 9:*

ARTICLE 9 MISCELLANEOUS

9.1 NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING
IMPORTANT TAX NOTICE - NONRESIDENTS ONLY

Withholding Requirements for Payments to Nonresidents: Section 12-8-550 of the South Carolina Code of Laws requires persons hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within South Carolina to withhold 2% of each payment made to the nonresident. The withholding requirement does not apply to (1) payments on purchase orders for tangible personal property when the payments are not accompanied by services to be performed in South Carolina, (2) nonresidents who are not conducting business in South Carolina, (3) nonresidents for contracts that do not exceed $10,000 in a calendar year, or (4) payments to a nonresident who (a) registers with either the S.C. Department of Revenue or the S.C. Secretary of State and (b) submits a Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, Form I-312 to the person letting the contract.

For information about other withholding requirements (e.g., employee withholding), contact the Withholding Section at the South Carolina Department of Revenue at 803-898-5383 or visit the Department's website at: www.sctax.org

This notice is for informational purposes only. This Owner does not administer and has no authority over tax issues. All registration questions should be directed to the License and Registration Section at 803-898-5872 or to the South Carolina Department of Revenue, Registration Unit, Columbia, S.C. 29214-0140. All withholding questions should be directed to the Withholding Section at 803-898- 5383.

PLEASE SEE THE "NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING" FORM (Available through SC Department of Revenue).

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STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

9.2 CONTRACTOR LICENSING

Contractors and Subcontractors listed in Section 7 of the Bid Form who are required by the South Carolina Code of Laws to be licensed, must be licensed at the time of bidding.

9.3 SUBMITTING CONFIDENTIAL INFORMATION

For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "CONFIDENTIAL" every page, or portion thereof, that Bidder contends contains information that is exempt from public disclosure because it is either (a) a trade secret as defined in Section 30-4-40(a)(1), or (b) privileged & confidential, as that phrase is used in Section 11-35-410. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the words "TRADE SECRET" every page, or portion thereof, that Bidder contends contains a trade secret as that term is defined by Section 39-8-20 of the Trade Secrets Act. For every document Bidder submits in response to or with regard to this solicitation or request, Bidder must separately mark with the word "PROTECTED" every page, or portion thereof, that Bidder contends is protected by Section 11-35-1810. All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark your entire bid as confidential, trade secret, or protected! If your bid, or any part thereof, is improperly marked as confidential or trade secret or protected, the State may, in its sole discretion, determine it nonresponsive. If only portions of a page are subject to some protection, do not mark the entire page. By submitting a response to this solicitation, Bidder (1) agrees to the public disclosure of every page of every document regarding this solicitation or request that was submitted at any time prior to entering into a contract (including, but not limited to, documents contained in a response, documents submitted to clarify a response, & documents submitted during negotiations), unless the page is conspicuously marked "TRADE SECRET" or "CONFIDENTIAL" or "PROTECTED", (2) agrees that any information not marked, as required by these bidding instructions, as a "Trade Secret" is not a trade secret as defined by the Trade Secrets Act, & (3) agrees that, notwithstanding any claims or markings otherwise, any prices, commissions, discounts, or other financial figures used to determine the award, as well as the final contract amount, are subject to public disclosure. In determining whether to release documents, the State will detrimentally rely on Bidders's marking of documents, as required by these bidding instructions, as being either "Confidential" or "Trade Secret" or "PROTECTED". By submitting a response, Bidder agrees to defend, indemnify & hold harmless the State of South Carolina, its officers & employees, from every claim, demand, loss, expense, cost, damage or injury, including attorney's fees, arising out of or resulting from the State withholding information that Bidder marked as "confidential" or "trade secret" or "PROTECTED".

9.4 POSTING OF INTENT TO AWARD

Notice of Intent to Award, SE-370, will be posted at the following location:

Room or Area of Posting: Lobby

Building Where Posted: Facilities Management Center

Address of Building: 743 Greene Street, Columbia, SC 29208

WEB site address (if applicable): http://purchasing.sc.edu

Posting date will be announced at bid opening. In addition to posting the notice, the Owner will promptly send all responsive bidders a copy of the notice of intent to award and the final bid tabulation

9.5 PROTEST OF SOLICITATION OR AWARD

Any prospective bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the solicitation of a contract shall protest within fifteen days of the date of issuance of the applicable solicitation document at issue. Any actual bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the intended award or award of a contract shall protest within ten days of the date notification of intent to award is posted in accordance with Title 11, Chapter 35, Section 4210 of the South Carolina Code of Laws, as amended. A protest shall be in writing, shall set forth the grounds of the protest and the relief requested with enough particularity to give notice of the issues to be decided, and must be received by the State Engineer within the time provided.

Any protest must be addressed to the CPO, Office of State Engineer, and submitted in writing:

A. by email to protest-ose@mmo.sc.gov,

B. by facsimile at 803-737-0639, or

C. by post or delivery to 1201 Main Street, Suite 600, Columbia, SC 29201.

By submitting a protest to the foregoing email address, you (and any person acting on your behalf) consent to receive communications regarding your protest (and any related protests) at the e-mail address from which you sent your protest.

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STANDARD SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

9.6 SOLICITATION INFORMATION FROM SOURCES OTHER THAN OFFICIAL SOURCE

South Carolina Business Opportunities (SCBO) is the official state government publication for State of South Carolina solicitations. Any information on State agency solicitations obtained from any other source is unofficial and any reliance placed on such information is at the bidder's sole risk and is without recourse under the South Carolina Consolidated Procurement Code.

9.7 BUILDER'S RISK INSURANCE

Bidders are directed to Article 11.3 of the South Carolina Modified AIA Document A201, 2007 Edition, which, unless provided otherwise in the bid documents, requires the contractor to provide builder's risk insurance on the project.

9.8 TAX CREDIT FOR SUBCONTRACTING WITH MINORITY FIRMS

Pursuant to Section 12-6-3350, taxpayers, who utilize certified minority subcontractors, may take a tax credit equal to 4% of the payments they make to said subcontractors. The payments claimed must be based on work performed directly for a South Carolina state contract. The credit is limited to a maximum of fifty thousand dollars annually. The taxpayer is eligible to claim the credit for 10 consecutive taxable years beginning with the taxable year in which the first payment is made to the subcontractor that qualifies for the credit. After the above ten consecutive taxable years, the taxpayer is no longer eligible for the credit. The credit may be claimed on Form TC-2, "Minority Business Credit." A copy of the subcontractor's certificate from the Governor's Office of Small and Minority Business (OSMBA) is to be attached to the contractor's income tax return. Taxpayers must maintain evidence of work performed for a State contract by the minority subcontractor. Questions regarding the tax credit and how to file are to be referred to: SC Department of Revenue, Research and Review, Phone: (803) 898-5786, Fax: (803) 898-5888. The subcontractor must be certified as to the criteria of a "Minority Firm" by the Governor's Office of Small and Minority Business Assistance (OSMBA). Certificates are issued to subcontractors upon successful completion of the certification process. Questions regarding subcontractor certification are to be referred to: Governor's Office of Small and Minority Business Assistance, Phone: (803) 734-0657, Fax: (803) 734-2498. Reference: SC §11-35-5010 – Definition for Minority Subcontractor & SC §11-35-5230 (B) – Regulations for Negotiating with State Minority Firms.

9.9 OTHER SPECIAL CONDITIONS OF THE WORK

None

END OF DOCUMENT

Note: AIA Document A310

Contractor to Provide

Bid Bond

In the form of

AIA A310

SE-330
LUMP SUM BID FORM

Bidders shall submit bids on only Bid Form SE-330.

BID SUBMITTED BY: _____

(Bidder's Name)

BID SUBMITTED TO: University of South Carolina

(Owner's Name)

FOR: PROJECT NAME: Upstate Administration Building Repairs and Renovations

PROJECT NUMBER: H34-9541-JV-B

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 Section 11-35-3030(1) of the SC Code of Laws, as amended, Bidder has submitted Bid Security as follows in the amount and form required by the Bidding Documents:

☐ **Bid Bond with Power of Attorney** ☐ **Electronic Bid Bond** ☐ **Cashier's Check**

(Bidder check one)

§ 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)*****:** The work consists of waterproofing repairs to the front and rear porches of the existing facility. Work includes, but is not limited to: sitework storm, grading, paving, exterior waterproofing systems, stone tiling, exterior wall modifications, and sheet metal flashings.

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

(Bidder - insert Base Bid Amount on line above)

SE-330
LUMP SUM BID FORM

§ 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 Agency'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 Agency, including those for materials, labor, equipment, tools of trades and labor, fees, taxes, insurance, bonding, overhead, profit, etc. The Agency 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.

No.	ITEM	Unit of Measure	ADD	DEDUCT
1.			$	$
2.			$	$
3.			$	$
4.			$	$
5.			$	$
6.			$	$

SE-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:

SUBCONTRACTOR CLASSIFICATION **By License Classification and/or Subclassification** *(Completed by Owner)*	**SUBCONTRACTOR'S PRIME CONTRACTOR'S NAME** *(Must be completed by Bidder)*	**SUBCONTRACTOR'S PRIME CONTRACTOR'S SC LICENSE NUMBER** *(Requested, but not Required)*
BASE BID		
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.

SE-330
LUMP SUM BID FORM

INSTRUCTIONS FOR SUBCONTRACTOR LISTING

1. Section 7 of the Bid Form sets forth a list of subcontractor classifications for which Bidder is required to identify by name the subcontractor(s) Bidder will use to perform the work of each listed classification. Bidder must identify only the subcontractor(s) who will perform the work and no others.

2. 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. 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) are not subcontractors and Bidder should not insert their names in the spaces provided on the Bid Form. Likewise, Bidder should not insert the names of sub-subcontractors in the spaces provided on the Bid Form but only the names of those entities with which Bidder will contract directly.

3. Bidder must only insert the names of subcontractors who are qualified to perform the work of the listed classifications as specified in the Bidding Documents and South Carolina Licensing Laws.

4. If under the terms of the Bidding Documents, Bidder is qualified to perform the work of a classification listed and Bidder does not intend to subcontract such work, but to use Bidder's own employees to perform such work, the Bidder must insert its own name in the space provided for that classification.

5. If Bidder intends to use multiple subcontractors to perform the work of a single classification listing, 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 classification listing and to use one or more subcontractors to perform the remaining work for that classification listing, Bidder must insert his own name and the name of each subcontractor, preferably separating the name of each with the word **"and"**.

6. Bidder may not list subcontractors in the alternative nor in a form that may be reasonably construed at the time of bid opening as a listing in the alternative. A listing that requires subsequent explanation to determine whether or not it is a listing in the alternative is non-responsive. If Bidder intends to use multiple entities to perform the work for a single classification 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 for that classification. 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 a listing in the alternative.

7. 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.

8. 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 Form except for one or more of the reasons allowed by the SC Code of Laws.

9. Bidder's failure to insert a name for each listed classification will render the Bid non-responsive.

SE-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 Ann § 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 **150** 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 $ **200.00** 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, included in the Bidding Documents.

ELECTRONIC BID BOND NUMBER: _____

SIGNATURE AND TITLE: _____

SE-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 Instructions to Bidders, is expressly incorporated by reference.

BIDDER'S LEGAL NAME: _____

ADDRESS: _____

_____

TELEPHONE: _____

EMAIL: _____

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____

TITLE: _____

AIA Document A101

Standard Form of Agreement Between Owner and Contractor

Original AIA Document on file at:

Office of Facilities, Planning, and Construction

743 Greene Street

Columbia, SC 29208

OSE FORM 00501
STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

AGENCY: University of South Carolina
PROJECT NAME: Upstate Administration Building Repairs and Renovations
PROJECT NUMBER: H34-9541-JV-B

1. STANDARD MODIFICATIONS TO AIA A101-2007

1.1 These Standard Modifications amend or supplement the *Standard Form of Agreement Between Owner and Contractor* (AIA Document A101-2007) and other provisions of Bidding and Contract Documents as indicated below.

1.2 All provisions of A101-2007, which are not so amended or supplemented, remain in full force and effect.

2. MODIFICATIONS TO A101

2.1 *Insert the following at the end of Article 1:*
Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement Between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

2.2 *Delete Section 3.1 and substitute the following:*

3.1 The Date of Commencement of the Work shall be the date fixed in a Notice to Proceed issued by the Owner. The Owner shall issue the Notice to Proceed to the Contractor in writing, no less than seven days prior to the Date of Commencement. Unless otherwise provided elsewhere in the contract documents, and provided the contractor has secured all required insurance and surety bonds, the contractor may commence work immediately after receipt of the Notice to Proceed.

2.3 *Delete Section 3.3 and substitute the following:*

3.3 The Contract Time as provided in Section 9(a) of the Bid Form (SE-330) for this Project shall be measured from the Date of Commencement. Contractor agrees that if the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, the Owner shall be entitled to withhold or recover from the Contractor Liquidated Damages in the amounts set forth in Section 9(b) of the Bid Form (SE-330), subject to adjustments of this Contract Time as provided in the Contract Documents.

2.4 *In Section 5.1.1, insert the words "and Owner" after the phrase "Payment submitted to the Architect."*

2.5 *Delete Section 5.1.3 and substitute the following:*

5.1.3 The Owner shall make payment of the certified amount to the Contractor not later than 21 days after receipt of the Application for Payment.

2.6 *In Section 5.1.6, insert the following after the phrase "Subject to other provisions of the Contract Documents":*
and subject to Title 12, Chapter 8, Section 550 of the South Carolina Code of Laws, as amended (Withholding Requirements for Payments to Non-Residents).

In the spaces provided in Sub-Sections 1 and 2 for inserting the retainage amount, insert "three and one-half percent (3.5%)."

2.7 *In Section 5.1.8, delete the word "follows" and the colon and substitute the following:*
set forth in S.C. Code Ann. § 11-35-3030(4).

2.8 *In Section 5.1.9, delete the words "Except with the Owner's prior approval, the" before the word " Contractor."*

2.9 *In Section 5.2.2, delete the number 30 and substitute the number 21, delete everything following the words "Certificate for Payment" and place a period at the end of the resulting sentence.*

2.10 *Delete the language of Sections 6.1 and 6.2 and substitute the word "Reserved" for the deleted language of each Section.*

2.11 *Delete the language of Section 8.2 and substitute the word "Reserved."*

OSE FORM 00501
STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

2.12 *In Section 8.3, make the word "Representative" in the title plural, delete everything following the title, and substitute the following:*

8.3.1 Owner designates the individual listed below as its Senior Representative ("Owner's Senior Representative"), which individual has the responsibility for and, subject to Section 7.2.1 of the General Conditions, the authority to resolve disputes under Section 15.6 of the General Conditions:

Name: Tom Opal

Title: Assistant Director of USC Facilities Design & Construction

Address: 743 Greene Street, Columbia, SC 29208

Telephone: (803) 777-5500 **FAX:** n/a

Email: tnopal@fmc.sc.edu

8.3.2 Owner designates the individual listed below as its Owner's Representative, which individual has the authority and responsibility set forth in Section 2.1.1 of the General Conditions:

Name: Ann Derrick

Title: Project Manager

Address: 743 Greene Street, Columbia, SC 29208

Telephone: (803) 777-5811 **FAX:** n/a

Email: aderrick@fmc.sc.edu

2.13 *In Section 8.4, make the word "Representative" in the title plural, delete everything following the title, and substitute the following:*

8.4.1 Contractor designates the individual listed below as its Senior Representative ("Contractor's Senior Representative"), which individual has the responsibility for and authority to resolve disputes under Section 15.6 of the General Conditions:

Name: TBD

Title:

Address:

Telephone: **FAX:**

Email:

8.4.2 Contractor designates the individual listed below as its Contractor's Representative, which individual has the authority and responsibility set forth in Section 3.1.1 of the General Conditions:

Name: TBD

Title:

Address:

Telephone: **FAX:**

Email:

2.14 *Add the following Section 8.6.1:*

8.6.1 The Architect's representative:

Name: Thomas M. Weiland

Title: Architect - GMK Associates, Inc.

Address: 1201 Main Street, Suite 2100, Columbia, SC 29201

Telephone: (803) 256-0000 **FAX:** (803) 255-7243

Email: Tweiland@gmka.com

OSE FORM 00501
STANDARD MODIFICATIONS TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

2.15 *In Section 9.1.7, Sub-Section 2, list the following documents in the space provided for listing documents:*

Invitation for Construction Services (SE-310)
Instructions to Bidders (AIA Document A701-1997)
Standard Supplemental Instructions to Bidders (OSE Form 00201)
Contractor's Bid (Completed SE-330)
Notice of Intent to Award (Completed SE-370)

2.16 *In Article 10, delete everything after the first sentence.*

END OF DOCUMENT

AIA Document A201

General Conditions of the Contract for Construction

Original AIA Document on file at:

Office of Facilities, Planning, and Construction

743 Greene Street

Columbia, SC 29208

OSE FORM 00811
STANDARD SUPPLEMENTARY CONDITIONS

AGENCY: University of South Carolina

PROJECT NAME: Upstate Administration Building Repairs and Renovations

PROJECT NUMBER: H34-9541-JV-B

1. GENERAL CONDITIONS

The *General Conditions of the Contract for Construction,* AIA Document A201, 2007 Edition, Articles 1 through 15 inclusive, is a part of this Contract and is incorporated as fully as if herein set forth. For brevity, AIA Document A201 is also referred to in the Contract Documents collectively as the "General Conditions."

2. STANDARD SUPPLEMENTARY CONDITIONS

2.1 The following supplements modify, delete and/or add to the General Conditions. Where any portion of the General Conditions is modified or any paragraph, Section or clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of the General Conditions shall remain in effect.

2.2 Unless otherwise stated, the terms used in these Standard Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

3. MODIFICATIONS TO A201-2007

3.1 *Insert the following at the end of Section 1.1.1:*

Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101, 2007 Edition as modified by OSE Form 00501 – Standard Modification to Agreement between Owner and Contractor. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201, 2007 Edition as modified by OSE Form 00811 – Standard Supplementary Conditions.

3.2 *Delete the language of Section 1.1.8 and substitute the word "Reserved."*

3.3 *Add the following Section 1.1.9:*

1.1.9 NOTICE TO PROCEED

Notice to Proceed is a document issued by the Owner to the Contractor, with a copy to the Architect, directing the Contractor to begin prosecution of the Work in accordance with the requirements of the Contract Documents. The Notice to Proceed shall fix the date on which the Contract Time will commence.

3.4 *Insert the following at the end of Section 1.2.1:*

In the event of patent ambiguities within or between parts of the Contract Documents, the contractor shall 1) provide the better quality or greater quantity of Work, or 2) comply with the more stringent requirement, either or both in accordance with the Architect's interpretation.

3.5 *Delete Section 1.5.1 and substitute the following:*

1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as a violation of the Architect's or Architect's consultants' reserved rights.

3.6 *Delete Section 2.1.1 and substitute the following:*

2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, except as provided in Section 7.1.2. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's Representative. [Reference § 8.2 of the Agreement.]

3.7 *Delete Section 2.1.2 and substitute the following:*

2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to post Notice of Project Commencement pursuant to Title 29, Chapter 5, Section 23 of the South Carolina Code of Laws, as amended.

3.8 *Delete Section 2.2.3 and substitute the following:*

2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. Subject to the Contractor's obligations, including those in Section 3.2, the Contractor shall be entitled to rely on the accuracy of information furnished by the Owner pursuant to this Section but shall exercise proper precautions relating to the safe performance of the Work.

3.9 *Replace the period at the end of the last sentence of Section 2.2.4 with a semicolon and insert the following after the inserted semicolon:*

"however, the Owner does not warrant the accuracy of any such information requested by the Contractor that is not otherwise required of the Owner by the Contract Documents. Neither the Owner nor the Architect shall be required to conduct investigations or to furnish the Contractor with any information concerning subsurface characteristics or other conditions of the area where the Work is to be performed beyond that which is provide in the Contract Documents."

3.10 *Delete Section 2.2.5 and substitute the following:*

2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor with ten copies of the Contract Documents. The Contractor may make reproductions of the Contract Documents pursuant to Section 1.5.2. All copies of the drawings and specifications, except the Contractor's record set, shall be returned or suitably accounted for to the Owner, on request, upon completion of the Work.

3.11 *Add the following Sections 2.2.6 and 2.2.7:*

2.2.6 The Owner assumes no responsibility for any conclusions or interpretation made by the Contractor based on information made available by the Owner.

2.2.7 The Owner shall obtain, at its own cost, general building and specialty inspection services as required by the Contract Documents. The Contractor shall be responsible for payment of any charges imposed for reinspections.

3.12 *Delete Section 2.4 and substitute the following:*

2.4 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect, including but not limited to providing necessary resources, with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Directive shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

3.13 *Insert the following at the end of Section 3.2.1:*

The Contractor acknowledges that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Owner.

3.14 *In the third sentence of Section 3.2.4, insert the word "latent" before the word "errors."*

3.15 *In the last sentence of Section 3.3.1, insert the words "by the Owner in writing" after the word "instructed."*

3.16 *Delete the third sentence of Section 3.5 and substitute the following sentences:*
Work, materials, or equipment not conforming to these requirements shall be considered defective. Unless caused by the Contractor or a subcontractor at any tier, the Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage.

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3.17 *Insert the following at the end of Section 3.6:*
The Contractor shall comply with the requirements of Title 12, Chapter 9 of the South Carolina Code of Laws, as amended, regarding withholding tax for nonresidents, employees, contractors and subcontractors.

3.18 *In Section 3.7.1, delete the words "the building permit as well as for other" and insert the following sentence at the end of this section:*

Pursuant to Title 10, Chapter 1, Section 180 of the South Carolina Code of Laws, as amended, no local general or specialty building permits are required for state buildings.

3.19 *Delete the last sentence of Section 3.7.5 and substitute the following:*

Adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 7.3.3.

3.20 *Delete the last sentence of Section 3.8.2.3 and substitute the following:*

The amount of the Change Order shall reflect the difference between actual costs, as documented by invoices, and the allowances under Section 3.8.2.1.

3.21 *In Section 3.9.1, insert a comma after the word "superintendent" in the first sentence and insert the following after the inserted comma:*

acceptable to the Owner,

3.22 *Delete Section 3.9.2 and substitute the following:*
3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the name and qualifications of a proposed superintendent. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner has reasonable objection to the proposed superintendent or (2) that the Owner requires additional time to review. Failure of the Owner to reply within the 14-day period shall constitute notice of no reasonable objection.

3.23 *After the first sentence in Section 3.9.3, insert the following sentence:*

The Contractor shall notify the Owner, in writing, of any proposed change in the superintendent, including the reason therefore, prior to making such change.

3.24 *Delete Section 3.10.3 and substitute the following:*

3.10.3 Additional requirements, if any, for the constructions schedule are as follows:
(Check box if applicable to this Contract))

☒ The construction schedule shall be in a detailed precedence-style critical path management (CPM) or primavera-type format satisfactory to the Owner and the Architect that shall also (1) provide a graphic representation of all activities and events that will occur during performance of the work; (2) identify each phase of construction and occupancy; and (3) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as "Milestone Dates"). Upon review and acceptance by the Owner and the Architect of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents and attached to the Agreement as Exhibit "A." If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted for acceptance. The Contactor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. Whenever the approved construction schedule no longer reflects actual conditions and progress of the work or the Contract Time is modified in accordance with the terms of the Contract Documents, the Contractor shall update the accepted construction schedule to reflect such conditions. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

3.25 *Add the following Section 3.10.4:*

3.10.4 Owner's review and acceptance of Contractor's schedule is not conducted for the purpose of either determining its accuracy and completeness or approving the construction means, methods, techniques, sequences or procedures. The Owner's approval shall not relieve the Contractor of any obligations. Unless expressly addressed in a Modification, the Owner's approval of a schedule shall not change the Contract Time.

3.26 *Add the following Section 3.12.5.1:*

3.12.5.1 The fire sprinkler shop drawings shall be prepared by a licensed fire sprinkler contractor and shall accurately reflect actual conditions affecting the required layout of the fire sprinkler system. The fire sprinkler contractor shall certify the accuracy of his shop drawings prior to submitting them for review and approval. The fire sprinkler shop drawings shall be reviewed and approved by the Architect's engineer of record who, upon approving the sprinkler shop drawings will submit them to the State Fire Marshal or other authorities having jurisdiction for review and approval. The Architect's engineer of record will submit a copy of the State Fire Marshal's approval letter to the Contractor, Architect, and OSE. Unless authorized in writing by OSE, neither the Contractor nor subcontractor at any tier shall submit the fire sprinkler shop drawings directly to the State Fire Marshal or other authorities having jurisdiction for approval.

3.27 *In the fourth sentence of Section 3.12.10, after the comma following the words "licensed design professional," insert the following:*

who shall comply with reasonable requirements of the Owner regarding qualifications and insurance and

3.28 *In Section 3.13, insert the section number "3.13.1" before the before the opening words "The Contractors shall."*

3.29 Add the following Sections 3.13.2 and 3.13.3:

3.13.2 Protection of construction materials and equipment stored at the Project site from weather, theft, vandalism, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall perform the work in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions.

3.13.3 The Contractor and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner.

3.30 *In the first sentence of Section 3.18.1, after the parenthetical "...(other than the Work itself),..." and before the word "...but...", insert the following:*

including loss of use resulting therefrom,

3.31 *Delete Section 4.1.1 and substitute the following:*

4.1.1 The Architect is that person or entity identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

3.32 *Insert the following at the end of Section 4.2.1:*

Any reference in the Contract Documents to the Architect taking action or rendering a decision with a "reasonable time" is understood to mean no more than fourteen days, unless otherwise specified in the Contract Documents or otherwise agreed to by the parties.

3.33 *Delete the first sentence of Section 4.2.2 and substitute the following:*

The Architect will visit the site as necessary to fulfill its obligation to the Owner for inspection services, if any, and, at a minimum, to assure conformance with the Architect's design as shown in the Contract Documents and to observe the progress and quality of the various components of the Contractor's Work, and to determine if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents.

3.34 *Delete the first sentence of Section 4.2.3 and substitute the following*:

On the basis of the site visits, the Architect will keep the Owner informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work.

3.35 *In Section 4.2.5, after the words "evaluations of the" and before the word "Contractor's," insert the following:*

Work completed and correlated with the

3.36 *Delete the first sentence of Section 4.2.11 and substitute the following:*

4.2.11 The Architect will, in the first instance, interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. Upon receipt of such request, the Architect will promptly provide the non-requesting party with a copy of the request.

3.37 *Insert the following at the end of Section 4.2.12:*

If either party disputes the Architects interpretation or decision, that party may proceed as provided in Article 15. The Architect's interpretations and decisions may be, but need not be, accorded any deference in any review conducted pursuant to law or the Contract Documents.

3.38 *Delete Section 4.2.14 and substitute the following:*

The Architect will review and respond to requests for information about the Contract Documents so as to avoid delay to the construction of the Project. The Architect's response to such requests will be made in writing with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. Any response to a request for information must be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. Unless issued pursuant to a Modification, supplemental Drawings or Specifications will not involve an adjustment to the Contract Sum or Contract Time.

3.39 *Delete Section 5.2.1 and substitute the following:*

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, within fourteen days after posting of the Notice of Intent to Award the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (excluding Listed Subcontractors but including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Owner may reply within 14 days to the Contractor in writing stating (1) whether the Owner has reasonable objection to any such proposed person or entity. Failure of the Owner to reply within the 14 day period shall constitute notice of no reasonable objection.

3.40 *Delete Section 5.2.2 and substitute the following:*

5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection. The Owner shall not direct the Contractor to contract with any specific individual or entity for supplies or services unless such supplies and services are necessary for completion of the Work and the specified individual or entity is the only source of such supply or services.

3.41 *In the first sentence of Section 5.2.3, delete the words "…or Architect…" in the two places they appear.*

3.42 *Delete the words "…or Architect…" in the in the first sentence of Section 5.2.4 and insert the following sentence at the end of Section 5.2.4:*

The Contractor's request for substitution must be made to the Owner in writing accompanied by supporting information.

3.43 *Add the following Section 5.2.5:*

5.2.5 A Subcontractor identified in the Contractor's Bid in response the specialty subcontractor listing requirements of Section 7 of the Bid Form (SE-330) may only be substituted in accordance with and as permitted by the provisions of Title 11, Chapter 35, Section 3021 of the South Carolina Code of Laws, as amended. A proposed substitute for a Listed Subcontractor shall be subject to the Owner's approval as set forth is Section 5.2.3.

3.44 *Add the following Section 5.2.6:*

5.2.6 The Iran Divestment Act List is a list published by the Board pursuant to Section 11-57-310 that identifies persons engaged in investment activities in Iran. Currently, the list is available at the following URL: http://procurement.sc.gov/PS/PS-iran-divestment.phtm(.) Consistent with Section 11-57-330(B), the Contractor shall not contract with any person to perform a part of the Work, if, at the time you enter into the subcontract, that person is on the then-current version of the Iran Divestment Act List.

3.45 *In Section 5.3, delete everything following the heading "SUBCONTRACTUAL RELATIONS" and insert the following Sections 5.3.1, 5.3.2, 5.3.3, and 5.3.4:*

5.3.1 By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise herein or in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract

Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

5.3.2 Without limitation on the generality of Section 5.3.1, each Subcontract agreement and each Sub-subcontract agreement shall include, and shall be deemed to include, the following Sections of these General Conditions: 3.2, 3.5, 3.18, 5.3, 5.4, 6.2.2, 7.3.3, 7.5, 7.6, 13.1, 13.12, 14.3, 14.4, and 15.1.6.

5.3.3 Each Subcontract Agreement and each Sub-subcontract agreement shall exclude, and shall be deemed to exclude, Sections 13.2.1 and 13.6 and all of Article 15, except Section 15.1.6, of these General Conditions. In the place of these excluded sections of the General Conditions, each Subcontract Agreement and each Sub-subcontract may include Sections 13.2.1 and 13.6 and all of Article 15, except Section 15.1.6, of AIA Document A201-2007, Conditions of the Contract, as originally issued by the American Institute of Architects.

5.3.4 The Contractor shall assure the Owner that all agreements between the Contractor and its Subcontractor incorporate the provisions of Subparagraph 5.3.1 as necessary to preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed by Subcontractors so that the subcontracting thereof will not prejudice such rights. The Contractor's assurance shall be in the form of an affidavit or in such other form as the Owner may approve. Upon request, the Contractor shall provide the Owner or Architect with copies of any or all subcontracts or purchase orders.

3.46 *Delete the last sentence of Section 5.4.1.*

3.47 *Add the following Sections 5.4.4, 5.4.5 and 5.4.6:*

5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

5.4.5 Each subcontract shall specifically provide that the Subcontractor agrees to perform portions of the Work assigned to the Owner in accordance with the Contract Documents.

5.4.6 Nothing in this Section 5.4 shall act to reduce or discharge the Contractor's payment bond surety's obligations to claimants for claims arising prior to the Owner's exercise of any rights under this conditional assignment.

3.48 *Delete the language of Section 6.1.4 and substitute the word "Reserved."*

3.49 *Insert the following at the end of Section 7.1.2:*

If the amount of a Modification exceeds the limits of the Owner's Construction Change Order Certification (reference Section 9.1.7.2 of the Agreement), then the Owner's agreement is not effective, and Work may not proceed, until approved in writing by the Office of State Engineer.

3.50 *Delete Section 7.2.1 and substitute the following:*

7.2.1 A Change Order is a written instrument prepared by the Architect (using State Form SE-480 "Construction Change Order") and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- **.1** The change in the Work;
- **.2** The amount of the adjustment, if any, in the Contract Sum; and
- **.3** The extent of the adjustment, if any, in the Contract Time.

3.51 *Add the following Sections 7.2.2, 7.2.3, 7.2.4, and 7.2.5:*

7.2.2 If a Change Order provides for an adjustment to the Contract Sum, the adjustment must be calculated in accordance with Section 7.3.3.

7.2.3 At the Owner's request, the Contractor shall prepare a proposal to perform the work of a proposed Change Order setting forth the amount of the proposed adjustment, if any, in the Contract Sum; and the extent of the proposed adjustment, if any, in the Contract Time. Any proposed adjustment in the Contract sum shall be prepared in accordance with Section 7.2.2. The Owner's request shall include any revisions to the Drawings or Specifications necessary to define any changes in the Work. Within fifteen days of receiving the request, the Contractor shall submit the proposal to the Owner and Architect along with all documentation required by Section 7.6.

7.2.4 If the Contractor requests a Change Order, the request shall set forth the proposed change in the Work and shall be prepared in accordance with Section 7.2.3. If the Contractor requests a change to the Work that involves a revision to either the Drawings or Specifications, the Contractor shall reimburse the Owner for any expenditure associated with the Architects' review of the proposed revisions, except to the extent the revisions are accepted by execution of a Change Order.

7.2.5 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, any adjustments to the Contract Sum or the Contract Time.

3.52 *Delete 7.3.3 and substitute the following:*

7.3.3 PRICE ADJUSTMENTS

7.3.3.1 If any Modification, including a Construction Change Directive, provides for an adjustment to the Contract Sum, the adjustment shall be based on whichever of the following methods is the most valid approximation of the actual cost to the contractor, with overhead and profit as allowed by Section 7.5:

- **.1** Mutual acceptance of a lump sum;
- **.2** Unit prices stated in the Contract Documents, except as provided in Section 7.3.4, or subsequently agreed upon;
- **.3** Cost attributable to the events or situations under applicable clauses with adjustment of profits or fee, all as specified in the contract, or subsequently agreed upon by the parties, or by some other method as the parties may agree; or
- **.4** As provided in Section 7.3.7.

7.3.3.2 Consistent with Section 7.6, costs must be properly itemized and supported by substantiating data sufficient to permit evaluation before commencement of the pertinent performance or as soon after that as practicable. All costs incurred by the Contractor must be justifiably compared with prevailing industry standards. Except as provided in Section 7.5, all adjustments to the Contract Price shall be limited to job specific costs and shall not include indirect costs, overhead, home office overhead, or profit.

3.53 *Delete Section 7.3.7 and substitute the following:*

7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall make an initial determination, consistent with Section 7.3.3, of the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.5. In such case, and also under Section 7.3.3.1.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- **.1** Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- **.2** Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- **.3** Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others; and
- **.4** Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work.

3.54 *Delete Section 7.3.8 and substitute the following:*

7.3.8 Using the percentages stated in Section 7.5, any adjustment to the Contract Sum for deleted work shall include any overhead and profit attributable to the cost for the deleted Work.

3.55 *Add the following Sections 7.5 and 7.6:*

7.5 AGREED OVERHEAD AND PROFIT RATES

7.5.1 For any adjustment to the Contract Sum for which overhead and profit may be recovered, other than those made pursuant to Unit Prices stated in the Contract Documents, the Contractor agrees to charge and accept, as full payment for overhead and profit, the following percentages of costs attributable to the change in the Work. The percentages cited below shall be considered to include all indirect costs including, but not limited to: field and office managers, supervisors and assistants, incidental job burdens, small tools, and general overhead allocations. The allowable percentages for overhead and profit are as follows:

.1 To the Contractor for work performed by the Contractor's own forces, 17% of the Contractor's actual costs.

.2 To each Subcontractor for work performed by the Subcontractor's own forces, 17% of the subcontractor's actual costs.

.3 To the Contractor for work performed by a subcontractor, 10% of the subcontractor's actual costs (not including the subcontractor's overhead and profit).

7.6 PRICING DATA AND AUDIT

7.6.1 Cost or Pricing Data.

Upon request of the Owner or Architect, Contractor shall submit cost or pricing data prior to execution of a Modification which exceeds $500,000. Contractor shall certify that, to the best of its knowledge and belief, the cost or pricing data submitted is accurate, complete, and current as of a mutually determined specified date prior to the date of pricing the Modification. Contractor's price, including profit, shall be adjusted to exclude any significant sums by which such price was increased because Contractor furnished cost or pricing data that was inaccurate, incomplete, or not current as of the date specified by the parties. Notwithstanding Subparagraph 9.10.4, such adjustments may be made after final payment to the Contractor.

7.6.2 Cost or pricing data means all facts that, as of the date specified by the parties, prudent buyers and sellers would reasonably expect to affect price negotiations significantly. Cost or pricing data are factual, not judgmental; and are verifiable. While they do not indicate the accuracy of the prospective contractor's judgment about estimated future costs or projections, they do include the data forming the basis for that judgment. Cost or pricing data are more than historical accounting data; they are all the facts that can be reasonably expected to contribute to the soundness of estimates of future costs and to the validity of determinations of costs already incurred.

7.6.3 Records Retention.

As used in Section 7.6, the term "records" means any books or records that relate to cost or pricing data that Contractor is required to submit pursuant to Section 7.6.1. Contractor shall maintain records for three years from the date of final payment, or longer if requested by the chief procurement officer. The Owner may audit Contractor's records at reasonable times and places.

3.56 Delete Section 8.2.2 and substitute the following:

8.2.2 The Contractor shall not knowingly commence operations on the site or elsewhere prior to the effective date of surety bonds and insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such surety bonds or insurance.

3.57 *Delete Section 8.3.1 and substitute the following:*

8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the control of the Contractor and any subcontractor at any tier; or by delay authorized by the Owner pending dispute resolution; or by other causes that the Architect determines may justify delay, then to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and provided the delay (1) is not caused by the fault or negligence of the Contractor or a subcontractor at any tier and (2) is not due to unusual delay in the delivery of supplies, machinery, equipment, or services when such supplies, machinery, equipment, or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery, the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

3.58 *Insert the following at the end of Section 9.1:*

All changes to the Contract Sum shall be adjusted in accordance with Section 7.3.3.

3.59 *Delete Section 9.2 and substitute the following:*

9.2 SCHEDULE OF VALUES

9.2.1 The Contractor shall submit to the Architect, within ten days of full execution of the Agreement, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. As requested by the Architect, the Contractor and each Subcontractor shall prepare a trade payment breakdown for the Work for which each is responsible, such breakdown being submitted on a uniform standardized format approved by the Architect and Owner. The breakdown shall be divided in detail, using convenient units, sufficient to accurately determine the value

of completed Work during the course of the Project. The Contractor shall update the schedule of values as required by either the Architect or Owner as necessary to reflect:

.1 the description of Work (listing labor and material separately);

.2 the total value;

.3 the percent and value of the Work completed to date;

.4 the percent and value of previous amounts billed; and

.5 the current percent completed and amount billed.

9.2.2 Any schedule of values or trade breakdown that fails to include sufficient detail, is unbalanced, or exhibits "front-loading" of the value of the Work shall be rejected. If a schedule of values or trade breakdown is used as the basis for payment and later determined to be inaccurate, sufficient funds shall be withheld from future Applications for Payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Work.

3.60 *Delete Section 9.3.1 and substitute the following:*

Monthly, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require (such as copies of requisitions from Subcontractors and material suppliers) and shall reflect retainage and any other adjustments provided in Section 5 of the Agreement. If required by the Owner or Architect, the Application for Payment shall be accompanied by a current construction schedule.

3.61 *In Section 9.3.2, add the following words to the end of the second sentence:*

provided such materials or equipment will be subsequently incorporated in the Work

Insert the following at the end of Section 9.3.2:

The Contractor shall 1) protect such materials from diversion, vandalism, theft, destruction, and damage, 2) mark such materials specifically for use on the Project, and 3) segregate such materials from other materials at the storage facility. The Architect and the Owner shall have the right to make inspections of the storage areas at any time.

3.62 *In Section 9.4.2, in the first sentence, after the words "Work has progressed to the point indicated," insert the following:*

in both the Application for Payment and, if required to be submitted by the Contractor, the accompanying current construction schedule

In the last sentence, delete the third item starting with "(3) reviewed copies" and ending with "Contractor's right to payment,"

3.63 *In Section 9.5.1, in the first sentence, delete the word "may" after the opening words "The Architect" and substitute the word "shall."*

In Section 9.5.1, insert the following sentence after the first sentence:

The Architect shall withhold a Certificate of Payment if the Application for Payment is not accompanied by the current construction schedule required by Section 3.10.1.

3.64 *In Section 9.6.2,* d*elete the word "The…" at the beginning of the first sentence and substitute the following:*

Pursuant to Chapter 6 of Title 29 of the South Carolina Code of Laws, as amended, the

3.65 *Delete Section 9.7 and substitute following:*

9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment to the Owner, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the time established in the Contract Documents the amount certified by the Architect or awarded by a final dispute resolution order, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased, in accordance with the provisions of Section 7.3.3, by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

3.66 *Insert the following words at the end of the sentence in Section 9.8.1:*

and when all required occupancy permits, if any, have been issued and copies have been delivered to the Owner.

3.67 *In Section 9.8.2, insert the word "written" after the word "comprehensive" and before the word "list."*

3.68 *Delete Section 9.8.3 and substitute the following:*

9.8.3.1 Upon receipt of the Contractor's list, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, to determine whether the Work or designated portion thereof is substantially complete. The Contractor shall furnish access for the inspection and testing as provided in this Contract. The inspection shall include a demonstration by the Contractor that all equipment, systems and operable components of the Work function properly and in accordance with the Contract Documents. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. If more than one Substantial Completion inspection is required, the Contractor shall reimburse the Owner for all costs of reinspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.

9.8.3.2 If the Architect and Owner concur in the Contractor's assessment that the Work or a portion of the Work is safe to occupy, the Owner and Contractor may arrange for a Certificate of Occupancy Inspection by OSE. The Owner, Architect, and Contractor shall be present at OSE's inspection. Upon verifying that the Work or a portion of the Work is substantially complete and safe to occupy, OSE will issue, as appropriate, a Full or Partial Certificate of Occupancy.

3.69 *In the second sentence of Section 9.8.5, delete the words "and consent of surety, if any."*

3.70 *In the first sentence of Section 9.9.1, delete the words "Section 11.3.1.5"and substitute the words "Section 11.3.1.3."*

3.71 *Delete Section 9.10.1 and substitute the following:*

9.10.1 Unless the parties agree otherwise in the Certificate of Substantial Completion, the Contractor shall achieve Final Completion no later than thirty days after Substantial Completion. Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. If more than one Final Completion inspection is required, the Contractor shall reimburse the Owner for all costs of reinspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor. If the Contractor does not achieve final completion within thirty days after Substantial Completion or the timeframe agreed to by the parties in the Certificate of Substantial Completion, whichever is greater, the Contractor shall be responsible for any additional Architectural fees resulting from the delay.

3.72 *Delete the first sentence of Section 9.10.2 and substitute the following:*

Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, (6) required Training Manuals, (7) equipment Operations and Maintenance Manuals, (8) any certificates of testing, inspection or approval required by the Contract Documents and not previously provided (9) all warranties and guarantees required under or pursuant to the Contract Documents, and (10) one copy of the Documents required by Section 3.11.

3.73 Delete the first sentence of Section 9.10.3 and substitute the following:

If, after Substantial Completion of the Work, final completion thereof is delayed 60 days through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted.

3.74 *Delete Section 9.10.5 and substitute the following:*

9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those specific claims in stated amounts that have been previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

3.75 *Add the following Section 9.10.6:*

9.10.6 If OSE has not previously issued a Certificate of Occupancy for the entire Project, the Parties shall arrange for a representative of OSE to participate in the Final Completion Inspection. Representatives of the State Fire Marshal's Office and other authorities having jurisdiction may be present at the Final Completion Inspection or otherwise inspect the completed Work and advise the Owner whether the Work meets their respective requirements for the Project.

3.76 *Delete Section 10.3.1 and substitute the following:*

10.3.1 If the Contractor encounters a hazardous material or substance which was not discoverable as provided in Section 3.2.1 and not required by the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons or serious loss to real or personal property resulting from such material or substance encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing. Hazardous materials or substances are those hazardous, toxic, or radioactive materials or substances subject to regulations by applicable governmental authorities having jurisdiction, such as, but not limited to, the S.C. Department of Health and Environmental Control, the U.S. Environmental Protection Agency, and the U.S. Nuclear Regulatory Commission.

3.77 *Insert the following at the end of Section 10.3.2:*

In the absence of agreement, the Architect will make an interim determination regarding any delay or impact on the Contractor's additional costs. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15. Any adjustment in the Contract Sum shall be determined in accordance with Section 7.3.3.

3.78 *Delete Section 10.3.3 and substitute the following:*

10.3.3 The Work in the affected area shall be resumed immediately following the occurrence of any one of the following events: (a) the Owner causes remedial work to be performed that results in the absence of hazardous materials or substances; (b) the Owner and the Contractor, by written agreement, decide to resume performance of the Work; or (c) the Work may safely and lawfully proceed, as determined by an appropriate governmental authority or as evidenced by a written report to both the Owner and the Contractor, which is prepared by an environmental engineer reasonably satisfactory to both the Owner and the Contractor.

3.79 *In Section 10.3.5, delete the word "The" at the beginning of the sentence and substitute the following:*

In addition to its obligations under Section 3.18, the

3.80 *Delete the language of Section 10.3.6 and substitute the word "Reserved."*

3.81 *Insert the following at the end of Section 10.4:*

The Contractor shall immediately give the Architect notice of the emergency. This initial notice may be oral followed within five days by a written notice setting forth the nature and scope of the emergency. Within fourteen days of the start of the emergency, the Contractor shall give the Architect a written estimate of the cost and probable effect of delay on the progress of the Work.

3.82 *Delete 11.1.2 and substitute the following:*

11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified below or required by law, whichever coverage is greater. Coverages shall be written on an occurrence basis and shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

(1) COMMERCIAL GENERAL LIABILITY:
- **(a)** General Aggregate (per project) $1,000,000
- **(b)** Products/Completed Operations $1,000,000
- **(c)** Personal and Advertising Injury $1,000,000
- **(d)** Each Occurrence $1,000,000
- **(e)** Fire Damage (Any one fire) $50,000
- **(f)** Medical Expense (Any one person) $5,000

(2) BUSINESS AUTO LIABILITY (including All Owned, Non-owned, and Hired Vehicles):
- **(a)** Combined Single Limit $1,000,000

(3) WORKER'S COMPENSATION:
- **(a)** State Statutory
- **(b)** Employers Liability ..... $100,000 Per Acc.
  ..... $500,000 Disease, Policy Limit
  ..... $100,000 Disease, Each Employee

In lieu of separate insurance policies for Commercial General Liability, Business Auto Liability, and Employers Liability, the Contractor may provide an umbrella policy meeting or exceeding all coverage requirements set forth in this Section 11.1.2. The umbrella policy limits shall not be less than $3,000,000.

3.83 *Delete Section 11.1.3 and substitute the following:*

11.1.3 Prior to commencement of the Work, and thereafter upon replacement of each required policy of insurance, Contractor shall provide to the Owner a written endorsement to the Contractor's general liability insurance policy that:

- **(i)** names the Owner as an additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations;
- **(ii)** provides that no material alteration, cancellation, non-renewal, or expiration of the coverage contained in such policy shall have effect unless all additional insureds have been given at least ten (10) days prior written notice of cancellation for non-payment of premiums and thirty (30) days prior written notice of cancellation for any other reason; and
- **(iii)** provides that the Contractor's liability insurance policy shall be primary, with any liability insurance of the Owner as secondary and noncontributory.

Prior to commencement of the Work, and thereafter upon renewal or replacement of each required policy of insurance, Contractor shall provide to the Owner a signed, original certificate of liability insurance (ACORD 25). Consistent with this Section 11.1, the certificate shall identify the types of insurance, state the limits of liability for each type of coverage, name the Owner a Consultants as Certificate Holder, provide that the general aggregate limit applies per project, and provide that coverage is written on an occurrence basis. Both the certificates and the endorsements must be received directly from either the Contractor's insurance agent or the insurance company. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, naming the Owner as an additional insured for claims made under the Contractor's completed operations, and otherwise meeting the above requirements, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

3.84 *Delete Section 11.1.4 and substitute the following:*

11.1.4 A failure by the Owner either (i) to demand a certificate of insurance or written endorsement required by Section 11.1, or (ii) to reject a certificate or endorsement on the grounds that it fails to comply with Section 11.1 shall not be considered a waiver of Contractor's obligations to obtain the required insurance.

3.85 *In Section 11.3.1, delete the first sentence and substitute the following:*

Unless otherwise provided in the Contract Documents, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis.

3.86 *Delete the language of Section 11.3.1.2 and substitute the word "Reserved."*

3.87 *Delete the language of Section 11.3.1.3 and substitute the word "Reserved."*

3.88 *Delete Section 11.3.2 and substitute the following:*

11.3.2 BOILER AND MACHINERY INSURANCE
The Contractor shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall both be named insureds.

3.89 *Delete Section 11.3.3 and substitute the following:*

11.3.3 LOSS OF USE INSURANCE
The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. To the extent any losses are covered and paid for by such insurance, the Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

3.90 *Delete Section 11.3.4 and substitute the following:*

11.3.4 If the Owner requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Contractor shall, if possible, include such insurance, and the cost thereof shall be charged to the Owner by appropriate Change Order.

3.91 *Delete the language of Section 11.3.5 and substitute the word "Reserved."*

3.92 *Delete Section 11.3.6 and substitute the following:*

11.3.6 Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Owner.

3.93 *Delete the first sentence of Section 11.3.7 and substitute the following:*

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent the property insurance provided by the Contractor pursuant to this Section 11.3 covers and pays for the damage, except such rights as they have to proceeds of such insurance held by the Contractor as fiduciary.

3.94 *Delete the first sentence of Section 11.3.8 and substitute the following:*

A loss insured under the Contractor's property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10.

3.95 *Delete Section 11.3.9 and substitute the following:*

11.3.9 If required in writing by a party in interest, the Contractor as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor.

3.96 *Delete Section 11.3.10 and substitute the following:*

11.3.10 The Contractor as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Contractor's exercise of this power; if such objection is made, the dispute shall be resolved in the manner provided in the contract between the parties in dispute as the method of binding dispute resolution. The Contractor as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with a final order or determination issued by the appropriate authority having jurisdiction over the dispute.

3.97 *Delete Section 11.4.1 and substitute the following:*

11.4.1 Before commencing any services hereunder, the Contractor shall provide the Owner with Performance and Payment Bonds, each in an amount not less than the Contract Price set forth in Article 4 of the Agreement. The Surety shall have, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty". In addition, the Surety shall have a minimum "Best Financial Strength Category" of "Class V", and in no case less than five (5) times the contract amount. The Performance Bond shall be written on Form SE-355, "Performance Bond" and the Payment Bond shall written on Form SE-357, "Labor and Material Payment Bond", and both shall be made payable to the Owner.

3.98 *Delete Section 11.4.2 and substitute the following:*

11.4.2 The Performance and Labor and Material Payment Bonds shall:

.1 be issued by a surety company licensed to do business in South Carolina;

.2 be accompanied by a current power of attorney and certified by the attorney-in-fact who executes the bond on the behalf of the surety company; and

.3 remain in effect for a period not less than one (1) year following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer.

3.99 *Add the following Sections 11.4.3 and 11.4.4:*

11.4.3 Any bonds required by this Contract shall meet the requirements of the South Carolina Code of Laws and Regulations, as amended.

11.4.4 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

3.100 *Delete Section 12.1.1 and substitute the following:*

12.1.1 If a portion of the Work is covered contrary to the to requirements specifically expressed in the Contract Documents, including inspections of work-in-progress required by all authorities having jurisdiction over the Project, it must, upon demand of the Architect or authority having jurisdiction, be uncovered for observation and be replaced at the Contractor's expense without change in the Contract Time.

3.101 *In Section 12.2.2.1, delete the words "and to make a claim for breach of warranty" at the end of the third sentence.*

3.102 *In Section 12.2.2.3, add the following to the end of the sentence:*

unless otherwise provided in the Contract Documents.

3.103 *Insert the following at the end of Section 12.2.4:*

If, prior to the date of Substantial Completion, the Contractor, a Subcontractor, or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

3.104 *Delete Section 13.1 and substitute the following:*

13.1 GOVERNING LAW

The Contract, any dispute, claim, or controversy relating to the Contract, and all the rights and obligations of the parties shall, in all respects, be interpreted, construed, enforced and governed by and under the laws of the State of South Carolina, except its choice of law rules.

3.105 *Delete Section 13.2, including its Sub-Sections 13.2.1 and 13.2.2, and substitute the following:*

13.2 SUCCESSORS AND ASSIGNS

The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole, or in part, without written consent of the other and then only in accordance with and as permitted by Regulation 19-445.2180 of the South Carolina Code of Regulations, as amended. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

3.106 *Delete Section 13.3 and substitute the following:*

13.3 WRITTEN NOTICE

Unless otherwise permitted herein, all notices contemplated by the Contract Documents shall be in writing and shall be deemed given:

.1 upon actual delivery, if delivery is by hand;

.2 upon receipt by the transmitting party of confirmation or reply, if delivery is by electronic mail, facsimile, telex or telegram;

.3 upon receipt, if delivery is by the United States mail.

Notice to Contractor shall be to the address provided in Section 8.3.2 of the Agreement. Notice to Owner shall be to the address provided in Section 8.2.2 of the Agreement. Either party may designate a different address for notice by giving notice in accordance with this paragraph.

3.107 *In Section 13.4.1, insert the following at the beginning of the sentence:*

Unless expressly provided otherwise,

3.108 *Add the following Section 13.4.3:*

13.4.3 Notwithstanding Section 9.10.4, the rights and obligations which, by their nature, would continue beyond the termination, cancellation, rejection, or expiration of this contract shall survive such termination, cancellation, rejection, or expiration, including, but not limited to, the rights and obligations created by the following clauses:

1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service;
3.5 Warranty
3.17 Royalties, Patents and Copyrights
3.18 Indemnification
7.6 Cost or Pricing Data
11.1 Contractor's Liability Insurance
11.4 Performance and Payment Bond
15.1.6 Claims for Listed Damages
15.1.7 Waiver of Claims Against the Architect
15.6 Dispute Resolution
15.6.5 Service of Process

3.109 *Delete Section 13.6 and substitute the following:*

13.6 INTEREST

Payments due to the Contractor and unpaid under the Contract Documents shall bear interest only if and to the extent allowed by Title 29, Chapter 6, Article 1 of the South Carolina Code of Laws. Amounts due to the Owner shall bear interest at the rate of one percent a month or a pro rata fraction thereof on the unpaid balance as may be due.

3.110 *Delete the language of Section 13.7 and substitute the word "Reserved."*

3.111 *Add the following Sections 13.8 through 13.16:*

13.8 PROCUREMENT OF MATERIALS BY OWNER

The Contractor accepts assignment of all purchase orders and other agreements for procurement of materials and equipment by the Owner that are identified as part of the Contract Documents. The Contractor shall, upon delivery, be responsible for the storage, protection, proper installation, and preservation of such Owner purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. Unless the Contract Documents specifically provide otherwise, all Contractor warranty of workmanship and correction of the Work obligations under the Contract Documents shall apply to the Contractor's installation of and modifications to any Owner purchased items,.

13.9 INTERPRETATION OF BUILDING CODES

As required by Title 10, Chapter 1, Section 180 of the South Caroline Code of Laws, as amended, OSE shall determine the enforcement and interpretation of all building codes and referenced standards on state buildings. The Contractor shall refer any questions, comments, or directives from local officials to the Owner and OSE for resolution.

13.10 MINORITY BUSINESS ENTERPRISES
Contractor shall notify Owner of each Minority Business Enterprise (MBE) providing labor, materials, equipment, or supplies to the Project under a contract with the Contractor. Contractor's notification shall be via the first monthly status report submitted to the Owner after execution of the contract with the MBE. For each such MBE, the Contractor shall provide the MBE's name, address, and telephone number, the nature of the work to be performed or materials or equipment to be supplied by the MBE, whether the MBE is certified by the South Carolina Office of Small and Minority Business Assistance, and the value of the contract.

13.11 SEVERABILITY
If any provision or any part of a provision of the Contract Documents shall be finally determined to be superseded, invalid, illegal, or otherwise unenforceable pursuant to any applicable Legal Requirements, such determination shall not impair or otherwise affect the validity, legality, or enforceability of the remaining provision or parts of the provision of the Contract Documents, which shall remain in full force and effect as if the unenforceable provision or part were deleted.

13.12 ILLEGAL IMMIGRATION
Contractor certifies and agrees that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide to the State upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractors language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at www.procurement.sc.gov)

13.13 SETOFF
The Owner shall have all of its common law, equitable, and statutory rights of set-off.

13.14 DRUG-FREE WORKPLACE
The Contractor certifies to the Owner that Contractor will provide a Drug-Free Workplace, as required by Title 44, Chapter 107 of the South Carolina Code of Laws, as amended.

13.15 FALSE CLAIMS
According to the S.C. Code of Laws § 16-13-240, "a person who by false pretense or representation obtains the signature of a person to a written instrument or obtains from another person any chattel, money, valuable security, or other property, real or personal, with intent to cheat and defraud a person of that property is guilty" of a crime.

13.16 NON-INDEMNIFICATION:
Any term or condition is void to the extent it requires the State to indemnify anyone. It is unlawful for a person charged with disbursements of state funds appropriated by the General Assembly to exceed the amounts and purposes stated in the appropriations. (§ 11-9-20) It is unlawful for an authorized public officer to enter into a contract for a purpose in which the sum is in excess of the amount appropriated for that purpose. It is unlawful for an authorized public officer to divert or appropriate the funds arising from any tax levied and collected for any one fiscal year to the payment of an indebtedness contracted or incurred for a previous year. (§ 11-1-40)

3.112 *Delete Section 14.1.1 and substitute the following:*

14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 45 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires substantially all Work to be stopped; or

.2 An act of government, such as a declaration of national emergency that requires substantially all Work to be stopped.

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents and the Contractor has stopped work in accordance with Section 9.7

3.113 *Insert the following at the end of Section 14.1.3:*

Any adjustment to the Contract Sum pursuant to this Section shall be made in accordance with the requirements of Article 7.

3.114 *In Section 14.1.4, replace the word "repeatedly" with the word "persistently."*

3.115 *Delete Section 14.2.1 and substitute the following:*

14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials, or otherwise fails to prosecute the Work, or any separable part of the Work, with the diligence, resources and skill that will ensure its completion within the time specified in the Contract Documents, including any authorized adjustments;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the Contract Documents and the respective agreements between the Contractor and the Subcontractors;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

3.116 *In Section 14.2.2, delete the parenthetical statement ", upon certification by the Initial Decision Maker that sufficient cause exists to justify such action," immediately following the word "Owner" in the first line.*

3.117 *In Section 14.2.4, replace the words "Initial Decision Maker" with the word "Architect"*

3.118 *Add the following Section 14.2.5:*

14.2.5 If, after termination for cause, it is determined that the Owner lacked justification to terminate under Section 14.2.1, or that the Contractor's default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Owner under Section 14.4.

3.119 *Delete the second sentence of Section 14.3.2 and substitute the following:*

Any adjustment to the Contract Sum made pursuant to this section shall be made in accordance with the requirements of Article 7.3.3.

3.120 *Delete Section 14.4.1 and substitute the following:*

14.4.1 The Owner may, at any time, terminate the Contract, in whole or in part for the Owner's convenience and without cause. The Owner shall give written notice of the termination to the Contractor specifying the part of the Contract terminated and when termination becomes effective.

3.121 *Delete Section 14.4.2 and substitute the following:*

14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders; and

.4 complete the performance of the Work not terminated, if any.

3.122 *Delete Section 14.4.3 and substitute the following:*

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, costs incurred by reason of such termination, and any other adjustments otherwise allowed by the Contract. Any adjustment to the Contract Sum made pursuant to this Section 14.4 shall be made in accordance with the requirements of Article 7.3.3.

3.123 *Add the following Sections 14.4.4, 14.4.5, and 14.5:*

14.4.4 Contractor's failure to include an appropriate termination for convenience clause in any subcontract shall not (i) affect the Owner's right to require the termination of a subcontract, or (ii) increase the obligation of the Owner beyond what it would have been if the subcontract had contained an appropriate clause.

14.4.5 Upon written consent of the Contractor, the Owner may reinstate the terminated portion of this Contract in whole or in part by amending the notice of termination if it has been determined that:

.1 the termination was due to withdrawal of funding by the General Assembly, Governor, or Budget and Control Board or the need to divert project funds to respond to an emergency as defined by Regulation 19-445.2110(B) of the South Carolina Code of Regulations, as amended;

.2 funding for the reinstated portion of the work has been restored;

.3 circumstances clearly indicate a requirement for the terminated work; and

.4 reinstatement of the terminated work is advantageous to the Owner.

14.5 CANCELLATION AFTER AWARD BUT PRIOR TO PERFORMANCE

Pursuant to Title 11, Chapter 35 and Regulation 19-445.2085 of the South Carolina Code of Laws and Regulations, as amended, this contract may be canceled after award but prior to performance.

3.124 *Insert the following sentence after the second sentence of Section 15.1.1:*

A voucher, invoice, payment application or other routine request for payment that is not in dispute when submitted is not a Claim under this definition.

3.125 *Delete Section 15.1.2 and substitute the following:*

15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Architect. Such notice shall include sufficient information to advise the Architect and other party of the circumstances giving rise to the claim, the specific contractual adjustment or relief requested and the basis of such request. Claims by either party arising prior to the date final payment is due must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later except as stated for adverse weather days in Section 15.1.5.2. By failing to give written notice of a Claim within the time required by this Section, a party expressly waives its claim.

3.126 *Delete Section 15.1.3 and substitute the following:*

15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, including any administrative review allowed under Section 15.6, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will issue Certificates for Payment in accordance with the initial decisions and determinations of the Architect.

3.127 *Insert the following at the end of Section 15.1.5.1:*

Claims for an increase in the Contract Time shall be based on one additional calendar day for each full calendar day that the Contractor is prevented from working.

3.128 *Insert the following Sub-Sections at the end of Section 15.1.5.2:*

.1 Claims for adverse weather shall be based on actual weather conditions at the job site or other place of performance of the Work, as documented in the Contractor's job site log.

.2 For the purpose of this Contract, a total of five (5) days per calendar month (non-cumulative) shall be anticipated as "adverse weather" at the job site, and such time will not be considered justification for an extension of time. If, in any month, adverse weather develops beyond the five (5) days, the Contractor shall be allowed to claim additional days to compensate for the excess weather delays only to the extent of the impact on the approved construction schedule and days the contractor was already scheduled to work. The remedy for this condition is for an extension of time only and is exclusive of all other rights and remedies available under the Contract Documents or imposed or available by law.

.3 The Contractor shall submit monthly with their pay application all claims for adverse weather conditions that occurred during the previous month. The Architect shall review each monthly submittal in accordance with Section 15.5 and inform the Contractor and the Owner promptly of its evaluation. Approved days shall be included in the next Change Order issued by the Architect. Adverse weather conditions not claimed within the time limits of this Subparagraph shall be considered to be waived by the Contractor. Claims will not be allowed for adverse weather days that occur after the scheduled (original or adjusted) date of Substantial Completion.

3.129 *Delete Section 15.1.6 and substitute the following:*

15.1.6 CLAIMS FOR LISTED DAMAGES

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor and Owner waive Claims against each other for listed damages arising out of or relating to this Contract.

15.1.6.1 For the Owner, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) costs suffered by a third party unable to commence work, (vi) attorney's fees, (vii) any interest, except to the extent allowed by Section 13.6 (Interest), (viii) lost revenue and profit for lost use of the property, (ix) costs resulting from lost productivity or efficiency.

15.1.6.2 For the Contractor, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest, except to the extent allowed by Section 13.6 (Interest); (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waive as against the Owner. Without limitation, this mutual waiver is applicable to all damages due to either party's termination in accordance with Article 14.

15.1.6.3 Nothing contained in this Section shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

3.130 *Add the following Section 15.1.7:*

15.1.7 WAIVER OF CLAIMS AGAINST THE ARCHITECT

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor waives all claims against the Architect and any other design professionals who provide design and/or project management services to the Owner, either directly or as independent contractors or subcontractors to the Architect, for listed damages arising out of or relating to this Contract. The listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest; (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waive as against the Owner. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

3.131 ***Delete the language of Sections 15.2, 15.3, and 15.4, including all Sub-Sections, and substitute the word "Reserved" for the deleted language of each Section and Sub-Section.***

3.132 *Add the following Sections 15.5 and 15.6 with their sub-sections:*

15.5 CLAIM AND DISPUTES - DUTY OF COOPERATION, NOTICE, AND ARCHITECTS INITIAL DECISION

15.5.1 Contractor and Owner are fully committed to working with each other throughout the Project to avoid or minimize claims. To further this goal, Contractor and Owner agree to communicate regularly with each other and the Architect at all times notifying one another as soon as reasonably possible of any issue that if not addressed may cause loss, delay, and/or disruption of the Work. If claims do arise, Contractor and Owner each commit to resolving such claims in an amicable, professional, and expeditious manner to avoid unnecessary losses, delays, and disruptions to the Work.

15.5.2 Claims shall first be referred to the Architect for initial decision. An initial decision shall be required as a condition precedent to resolution pursuant to Section 15.6 of any Claim arising prior to the date of final payment, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered, or after all the Architect's requests for additional supporting data have been answered, whichever is later. The Architect will not address claims between the Contractor and persons or entities other than the Owner.

15.5.3 The Architect will review Claims and within ten days of the receipt of a Claim (1) request additional supporting data from the claimant or a response with supporting data from the other party or (2) render an initial decision in accordance with Section 15.5.5.

15.5.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Architect when the response or supporting data will be furnished or (3) advise the Architect that all supporting data has already been provided. Upon receipt of the response or supporting data, the Architect will render an initial decision in accordance with Section 15.5.5.

15.5.5 The Architect will render an initial decision in writing; (1) stating the reasons therefor; and (2) notifying the parties of any change in the Contract Sum or Contract Time or both. The Architect will deliver the initial decision to the parties within two weeks of receipt of any response or supporting data requested pursuant to Section 16.4 or within such longer period as may be mutually agreeable to the parties. If the parties accept the initial decision, the Architect shall prepare a Change Order with appropriate supporting documentation for the review and approval of the parties and the Office of State Engineer. If either the Contractor, Owner, or both, disagree with the initial decision, the Contractor and Owner shall proceed with dispute resolution in accordance with the provisions of Section 15.6.

15.5.6 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

15.6 DISPUTE RESOLUTION

15.6.1 If a claim is not resolved pursuant to Section 15.5 to the satisfaction of either party, both parties shall attempt to resolve the dispute at the field level through discussions between Contractor's Representative and Owner's Representative. If a dispute cannot be resolved through Contractor's Representative and Owner's Representative, then the Contractor's Senior Representative and the Owner's Senior Representative, upon the request of either party, shall meet as soon as conveniently possible, but in no case later than twenty-one days after such a request is made, to attempt to resolve such dispute. Prior to any meetings between the Senior Representatives, the parties will exchange relevant information that will assist the parties in resolving their dispute. The meetings required by this Section are a condition precedent to resolution pursuant to Section 15.6.2.

15.6.2 If after meeting in accordance with the provisions of Section 15.6.1, the Senior Representatives determine that the dispute cannot be resolved on terms satisfactory to both the Contractor and the Owner, then either party may submit the dispute by written request to South Carolina's Chief Procurement Officer for Construction (CPOC). Except as otherwise provided in Article 15, all claims, claims, or controversies relating to the Contract shall be resolved exclusively by the appropriate Chief Procurement Officer in accordance with Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws, or in the absence of jurisdiction, only in the Court of Common Pleas for, or in the absence of jurisdiction a federal court located in, Richland County, State of South Carolina. Contractor agrees that any act by the State regarding the Contract is not a waiver of either the State's sovereign immunity or the State's immunity under the Eleventh Amendment of the United State's Constitution.

15.6.3 If any party seeks resolution to a dispute pursuant to Section 15.6.2, the parties shall participate in non-binding mediation to resolve the claim. If the claim is governed by Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws as amended and the amount in controversy is $100,000.00 or less, the CPOC shall appoint a mediator, otherwise, the mediation shall be conducted by an impartial mediator selected by mutual agreement of the parties, or if the parties cannot so agree, a mediator designated by the American Arbitration Association ("AAA") pursuant to its Construction Industry Mediation Rules. The mediation will be governed by and conducted pursuant to a mediation agreement negotiated by the parties or, if the parties cannot so agree, by procedures established by the mediator.

15.6.4 Without relieving any party from the other requirements of Sections 15.5 and 15.6, either party may initiate proceedings in the appropriate forum prior to initiating or completing the procedures required by Sections 15.5 and 15.6 if such action is necessary to preserve a claim by avoiding the application of any applicable statutory period of limitation or repose.

15.6.5 SERVICE OF PROCESS

Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any claims, claims, or controversies relating to the Contract; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on Contractor by certified mail (return receipt requested) addressed to Contractor at the address provided for the Contractor's Senior Representative or by personal service or by any other manner that is permitted by law, in or outside South Carolina. Notice by certified mail is deemed duly given upon deposit in the United States mail.

3.133 *Add the following Article 16:*

ARTICLE 16 PROJECT-SPECIFIC REQUIREMENTS AND INFORMATION

16.1. Inspection Requirements: *(Indicate the inspection services required by the Contract)*

☒ Special Inspections are required and are not part of the Contract Sum. *(see section 01400)*
☒ Building Inspections are required and are not part of the Contract Sum. *(see section 01400)*
The inspections required for this Work are:

(Indicate which services are required and the provider)

☒ Civil: _____
☒ Structural: _____
☐ Mechanical: _____
☐ Plumbing: _____
☐ Electrical: _____
☐ Gas: _____
☐ Other *(list):* _____

Remarks: All inspections will be by the Owner.

16.1.1 Contractor shall schedule and request inspections in an orderly and efficient manner and shall notify the Owner whenever the Contractor schedules an inspection in accordance with the requirements of Section 16.1. Contractor shall be responsible for the cost of inspections scheduled and conducted without the Owner's knowledge and for any increase in the cost of inspections resulting from the inefficient scheduling of inspections.

16.2 List Cash Allowances, if any. *(Refer to attachments as needed* If *none, enter NONE)*

None

16.3. Requirements for Record Drawings, if any. *(Refer to attachments as needed.* If *none, enter NONE)*

See technical specifications.

16.4. Requirements for Shop Drawings and other submittals, if any, including number, procedure for submission, list of materials to be submitted, etc. *(Refer to attachments as needed. If none, enter NONE)*

See technical specifications.

16.5. Requirements for signage, on-site office or trailer, utilities, restrooms, etc., in addition to the Contract, if any. *(Refer to attachments as needed. If none, enter NONE)*

See technical specifications.

16.6. Requirements for Project Cleanup in addition to the Contract, if any. *(Refer to attachments as needed. If none, enter NONE)*

See technical specifications.

16.7. List all attachments that modify these General Conditions. *(If none, enter NONE)*
None

SE-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 Agency)*

Name: University of South Carolina

Address: 743 Greene Street

Columbia, SC 29208

hereinafter referred to as "Agency", 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 Agency to construct

State Project Name: Upstate Administration Building Repairs

State Project Number: H34-9541-JV-B

Brief Description of Awarded Work, as found on the SE-330 or SE-332, Bid Form: The work consists of waterproofing repairs to the front and rear porches of the existing facility. Work includes, but is not limited to: sitework storm, grading, paving, exterior waterproofing systems, stone tiling, exterior wall modifications, and sheet metal flashings.

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

Name: GMK Associates, Inc.

Address: 1201 Main Street, Suite 2100

Columbia, SC 29201

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	**SURETY**
By: _____ **(Seal)**	**By:** _____ **(Seal)**
Print Name: _____	**Print Name:** _____
Print Title: _____	**Print Title:** _____ *(Attach Power of Attorney)*
Witness: _____	**Witness:** _____

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

SE-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 Agency 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 Agency has notified the Contractor and the Surety at the address described in paragraph 10 below, that the Agency 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 Agency, 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 Agency's right, if any, subsequently to declare a Contractor Default; or

3.2 The Agency 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 Agency'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 Agency, 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 Agency for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Agency and the contractor selected with the Agency'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 Agency the amount of damages as described in paragraph 7 in excess of the Balance of the Contract Sum incurred by the Agency 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 Agency and, within 60 days of waiving its rights under this paragraph, tender payment thereof to the Agency; or

4.4.2 Deny liability in whole or in part and notify the Agency, citing the reasons therefore.

5. Provided Surety has proceeded under paragraphs 4.1, 4.2, or 4.3, the Agency 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 Agency to the Surety demanding that the Surety perform its obligations under this Bond, and the Agency shall be entitled to enforce any remedy available to the Agency.

6.1 If the Surety proceeds as provided in paragraph 4.4 and the Agency refuses the payment tendered or the Surety has denied liability, in whole or in part, then without further notice the Agency shall be entitled to enforce any remedy available to the Agency.

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 Agency 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 Agency shall be those of the Contractor under the Contract, and the responsibilities of the Agency to the Surety shall those of the Agency under the Contract. To a limit of the amount of this Bond, but subject to commitment by the Agency of the Balance of the Contract Sum to mitigation of costs and damages on the Contract, the Surety is obligated to the Agency 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 Agency 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 Agency 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 Agency 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 Agency 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 Agency in settlement of insurance or other Claims for damages to which the Contractor si 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.

SE-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 Agency)*

Name: University of South Carolina

Address: 743 Greene Street

Columbia, SC 29208

hereinafter referred to as "Agency", 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 Agency to construct

State Project Name: Upstate Administration Building Repairs

State Project Number: H34-9541-JV-B

Brief Description of Awarded Work, as found on the SE-330 or SE-332, Bid Form: The work consists of waterproofing repairs to the front and rear porches of the existing facility. Work includes, but is not limited to: sitework storm, grading, paving, exterior waterproofing systems, stone tiling, exterior wall modifications, and sheet metal flashings.

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

Name: GMK Associates, Inc.

Address: 1201 Main Street, Suite 2100

Columbia, SC 29201

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 and Material Payment 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	**SURETY**
By: _____ **(Seal)**	**By:** _____ **(Seal)**
Print Name: _____	**Print Name:** _____
Print Title: _____	**Print Title:** _____ *(Attach Power of Attorney)*
Witness: _____	**Witness:** _____

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

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 Agency 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 Agency, 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 Agency 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 o ne 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 Agency, 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 Agency 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 Agency 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 Agency's prior right to use the funds for the completion of the Work.

7. The Surety shall not be liable to the Agency, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Agency 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 Agency or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Agency 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 Agency 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 Agency and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

SE-380 **CHANGE ORDER NO.:**_____

CHANGE ORDER TO CONSTRUCTION CONTRACT

AGENCY: University of South Carolina

PROJECT NAME: Upstate Administration Building Repairs and Renovations

PROJECT NUMBER: H34-9541-JV-B

CONTRACTOR: _____ **CONTRACT DATE:** _____

This Contract is changed as follows: *(Insert description of change in space provided below)*

ADJUSTMENTS IN THE CONTRACT SUM:

1.	**Original Contract Sum:**		$
2.	**Change in Contract Sum by previously approved Change Orders:**	$	
3.	**Contract Sum prior to this Change Order**		$ 0.00
4.	**Amount of this Change Order:**	$	
5.	**New Contract Sum, including this Change Order:**		$ 0.00

ADJUSTMENTS IN THE CONTRACT TIME:

1.	**Original Substantial Completion Date:**		
2.	**Sum of previously approved increases and decreases in Days:**		Days
3.	**Change in Days for this Change Order**		Days
4.	**New Substantial Completion Date:**		

CONTRACTOR ACCEPTANCE:

BY:_____ **Date:**_____
(Signature of Representative)

Print Name:_____

ARCHITECT RECOMMENDATION FOR ACCEPTANCE:

BY:_____ **Date:**_____
(Signature of Representative)

Print Name:_____

AGENCY ACCEPTANCE AND CERTIFICATION:

BY:_____ **Date:**_____
(Signature of Representative)

Print Name:_____

☐ Change is within Agency Construction Procurement Certification of: $_____

☐ Change is not within Agency Construction Procurement Certification of: $_____

Office of the State Engineer Authorization for change exceeding Agency Construction Procurement Certification:

AUTHORIZED BY:_____ **DATE:** _____
(OSE Project Manager)

USC SUPPLEMENTAL GENERAL CONDITIONS FOR CONSTRUCTION PROJECTS

WORK AREAS

1. The Contractor shall maintain the job site in a safe manner at all times. This includes (but is not limited to) the provision and/or maintenance of lighting, fencing, barricades around obstructions, and safety and directional signage.

2. Contractor's employees shall take all reasonable means not to interrupt the flow of student traffic in building corridors, lobbies, stairs and exterior walks. All necessary and reasonable safety precautions shall be taken to prevent injury to building occupants while transporting materials and equipment through the work area. Providing safe, accessible, plywood-shielded pedestrian ways around construction may be required if a suitable alternative route is not available.

3. At the beginning of the project, the USC Project Manager will establish the Contractor's lay-down area. This area will also be used for the Contractor's work vehicles. The lay-down area will be clearly identified to the contractor by the Project Manager, with a sketch or drawing provided to USC Parking Services. In turn, Parking Services will mark off this area with a sign containing the project name, Project Manager's name, Contractor name and contact number, and end date. Where this area is subject to foot traffic, protective barriers will be provided as specified by the Project Manager. The area will be maintained in a neat and orderly fashion.

4. Work vehicles parked in the lay down area (or designated parking areas) will be clearly marked and display a USC-furnished placard for identification. No personal vehicles will be allowed in this area, or in any areas surrounding the construction site. Personal vehicles must be parked in the perimeter parking lots or garages. Temporary parking permits can be obtained at the Contractor's expense at the USC Parking Office located in the Pendleton Street parking garage. Refer to the CAMPUS VEHICLE EXPECTATIONS (below) for additional information.

5. Contractor is responsible for removal of all debris from the site, and is required to provide the necessary dumpsters which will be emptied on a regular basis. Construction waste must not be placed in University dumpsters. The construction site must be thoroughly cleaned with all trash picked up and properly disposed of on a daily basis and the site must be left in a safe and sanitary condition each day. The University will inspect job sites regularly and will fine any contractor found to be in violation of this requirement an amount of up to $1,000 per violation.

6. The Contractor shall be responsible for erosion and sediment control measures where ground disturbances are made.

PROJECT FENCING

7. All construction projects with exterior impacts shall have construction fencing at the perimeter. Fencing shall be 6' chain link with black or green privacy fabric (80-90% blockage). For fence panels with footed stands, sandbag weights shall be placed on the inside of the fence. Ripped sandbags shall be replaced immediately.

8. For projects with long fencing runs and/or high profile locations, decorative USC banners shall be used on top of privacy fabric; banners should be used at a ratio of one banner for every five fence panels. USC Project Manager will make arrangements for banner delivery for Contractor to hang.

9. The use of plastic safety fencing is discouraged and shall only be used on a temporary basis (less than four weeks) where absolutely necessary. Safety fencing shall be a neon yellow-green, high-

visibility fencing equal to 'Kryptonight' by Tenax. Safety fencing shall be erected and maintained in a neat and orderly fashion throughout the project.

10. Vehicles and all other equipment shall be contained within a fenced area if they are on site for more than 3 consecutive calendar days.

BEHAVIOR

11. Fraternization between Contractor's employees and USC students, faculty or staff is strictly prohibited.

12. USC will not tolerate rude, abusive or degrading behavior on the job site. Heckling and cat-calling directed toward students, faculty or staff or any other person on USC property is strictly prohibited. Any contractor whose employees violate this requirement will be assessed a fine of up to $500 per violation.

13. Contractor's employees must adhere to the University's policy of maintaining a drug-free and tobacco-free campus.

HAZARDOUS MATERIALS & SAFETY COMPLIANCE

14. A USC Permit to Work must be signed prior to any work being performed by the general contractor or sub-contractor(s).

15. The contractor will comply with all regulations set forth by OSHA and SCDHEC. Contractor must also adhere to USC's internal policies and procedures (available by request). Upon request, the contractor will submit all Safety Programs and Certificates of Insurance to the University for review.

16. Contractor must notify the University immediately upon the discovery of suspect material which may contain asbestos or other such hazardous materials. These materials must not be disturbed until approved by the USC Project Manager.

17. In the event of an OSHA inspection, the Contractor shall immediately call the Facilities Call Center, 803-777-4217, and report that an OSHA inspector is on site. An employee from USC's Safety Unit will arrive to assist in the inspection.

LANDSCAPE & TREE PROTECTION

18. In conjunction with the construction documents, the USC Arborist shall direct methods to minimize damage to campus trees. Tree protection fencing is required to protect existing trees and other landscape features to be affected by a construction project. The location of this fence will be evaluated for each situation with the USC Arborist, Landscape Architect and Project Manager. Tree protection fencing may be required along access routes as well as within the project area itself. Fence locations may have to be reset throughout the course of the project.

19. The tree protection fence shall be 6' high chain link fence with 80-90% privacy screening unless otherwise approved by USC Arborist and/or Landscape Architect. If the tree protection fence is completely within a screened jobsite fence perimeter, privacy fabric is not required. In-ground fence posts are preferred in most situations for greater protection. If utility or pavement conflicts are present, fence panels in footed stands are acceptable. See attached detail for typical tree protection fencing.

20. No entry, vehicle parking, or materials storage will be allowed inside the tree protection zone. A 4"

layer of mulch shall be placed over the tree protection area to maintain moisture in the root zone.

21. Where it is necessary to cross walks, tree root zones (i.e., under canopy) or lawns the following protective measures shall be taken:

    a. For single loads up to 9,000 lbs., a 3/4" minimum plywood base shall be placed over 4" of mulch.
    b. For single loads over 9,000 lbs., two layers of 3/4" plywood shall be placed over 4" of mulch.
    c. Plywood sheets shall be replaced as they deteriorate or delaminate with exposure.
    d. For projects requiring heavier loads, a construction entry road consisting of 10' X 16' oak logging mats on 12" coarse, chipped, hardwood base. Mulch and logging mats shall be supplemented throughout the project to keep matting structurally functional.

22. Damage to any trees during construction shall be assessed by the USC Arborist, who will stipulate what action will be taken for remediation of damage. The cost of any and all remediation will be assumed by the contractor at no additional cost to the project. Compensation for damages may be assessed up to $500 per caliper inch of tree (up to 8") and $500 per inch of diameter at breast height (for trees over 8").

23. Damage to trunks and limbs, as well as disturbance of the root zone under the dripline of tree, including compaction of soil, cutting or filling, or storage of materials, shall qualify as damage and subject to remediation.

24. Any damage to existing pavements or landscaping (including lawn areas and irrigation) will be remediated before final payment is made.

TEMPORARY FACILITIES

25. Contractor will be responsible for providing its own temporary toilet facilities, unless prior arrangements are made with the USC Project Manager.

26. Use of USC communications facilities (telephones, computers, etc.) by the Contractor is prohibited, unless prior arrangements are made with the USC Project Manager.

CAMPUS KEYS

27. Contractor must sign a Contractor Key Receipt/Return form before any keys are issued. Keys must be returned immediately upon the completion of the work. The Contractor will bear the cost of any re-keying necessary due to the loss of or failure to return keys.

WELDING

28. A welding (hot work) permit must be issued by the University Fire Marshall before any welding can begin inside a building. The USC Project Manager will coordinate.

PROJECT EVALUATION & CLOSE-OUT

29. For all projects over $100,000, including IDCs, a Contractor Performance Evaluation (SE 397) will be reviewed with the GC at the beginning of the project and a copy given to the GC. At the end of the project the form will be completed by the USC Project Manager and a Construction Performance rating will be established.

30. Contractor must provide all O&M manuals, as-built drawings, and training of USC personnel on new equipment, controls, etc. prior to Substantial Completion. Final payment will not be made until

this is completed.

CAMPUS VEHICLE EXPECTATIONS

31. Personal vehicles must be parked in the perimeter parking lots or garages. Temporary parking permits can be obtained at the Contractor's expense at the USC Parking Office located in the Pendleton Street parking garage.

32. All motorized vehicle traffic on USC walkways and landscape areas must be approved by the USC Project Manager and Parking Division, have a USC parking placard, and be parked within the approved laydown area. Violators may be subject to ticketing, towing and fines.

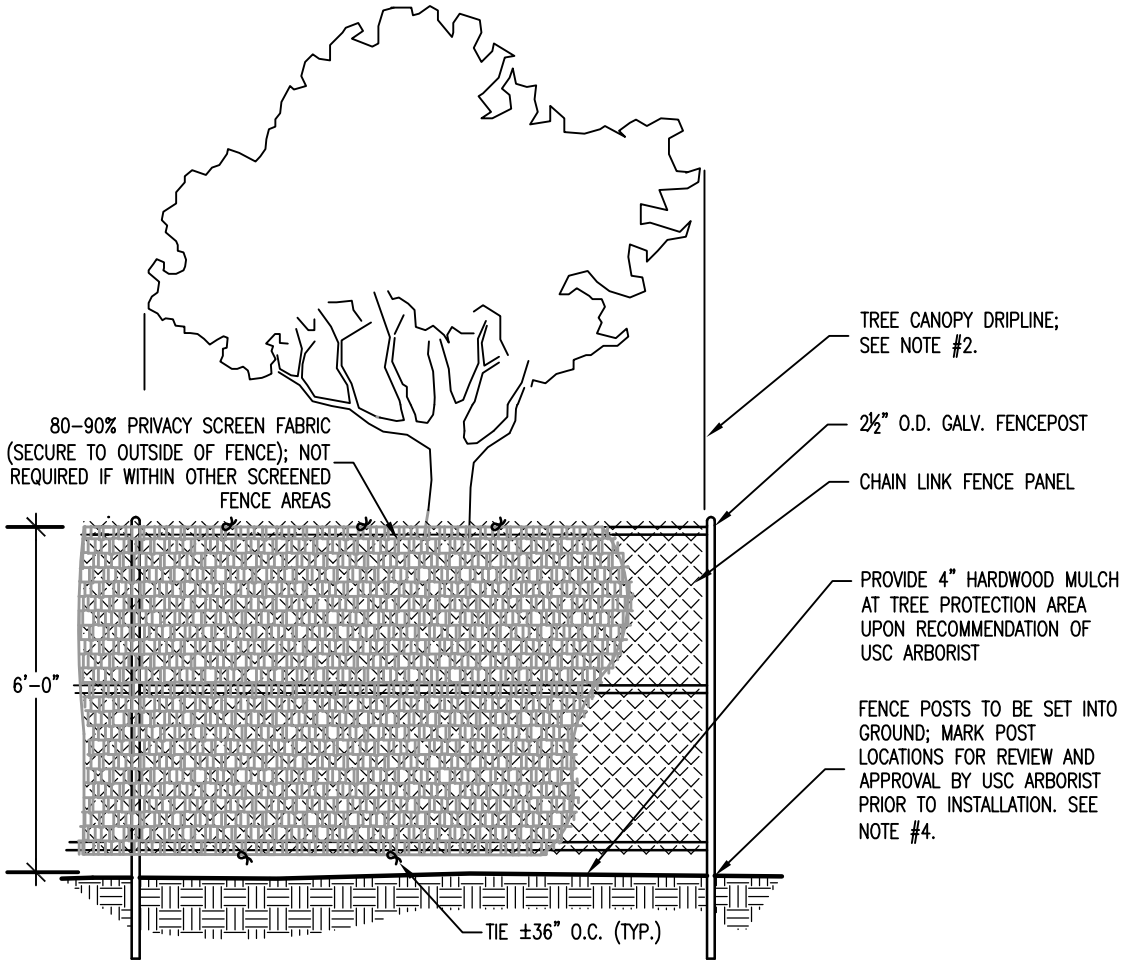
33. All motorized vehicles that leak or drip liquids are prohibited from traveling or parking on walks or landscaped areas.

34. Drivers of equipment or motor vehicles that damage university hardscape or landscape will be held responsible for damages and restoration expense.

35. All vehicles parked on landscape, hardscape, or in the process of service delivery, must display adequate safety devices, i.e. flashing lights, cones, signage, etc.

36. All drivers of equipment and vehicles shall be respectful of University landscape, equipment, structures, fixtures and signage.

37. All incidents of property damage shall be reported to Parking Services or the Work Management Center.



NOTES:

1. PROVIDE PROTECTION FENCING FOR ALL TREES WITHIN AREA OF DISTURBANCE AND CONSTRUCTION ACCESS.
2. PROTECTION FENCING SHALL BE IN PLACE PRIOR TO BEGINNING CONSTRUCTION.
3. PROTECTION FENCING TO BE PLACED AT THE OUTSIDE OF THE CANOPY DRIPLINE, OR AT A DISTANCE OF ONE FOOT PER ONE INCH OF TREE DIAMETER, MEASURED AT BREAST HEIGHT, WHICHEVER IS LARGER, UNLESS OTHERWISE INDICATED ON LANDSCAPE PLAN OR APPROVED BY UNIVERSITY ARBORIST.
4. IN–GROUND POSTS ARE STANDARD. IF EXISTING ROOTS, UTILITIES OR PAVEMENT PRECLUDE USE OF IN–GROUND POSTS, FOOTED STANDS ARE ACCEPTABLE. SAND BAGS SHALL BE PLACED ON THE INSIDE OF FENCE.
5. DAMAGE TO ANY TREES DURING CONSTRUCTION SHALL BE ASSESSED BY UNIVERSITY ARBORIST AND THE UNIVERSITY ARBORIST SHALL STIPULATE WHAT ACTION WILL BE TAKEN FOR REMEDIATION OF DAMAGE. THE COST OF ANY AND ALL REMEDIATION WILL BE ASSUMED BY CONTRACTOR AT NO ADDITONAL COST TO THE PROJECT.
6. DISTURBANCE OF ROOT ZONE UNDER DRIPLINE OF TREE, INCLUDING COMPACTION OF SOIL, CUTTING OR FILLING OR STORAGE OF MATERIALS SHALL QUALIFY AS DAMAGE AND SUBJECT TO REMEDIATION.

TREE PROTECTION FENCING (IN–GROUND) WITH SCREENING

NO SCALE REVISED 8.28.14

Technical Specifications

SECTION 01 2000

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Documentation of changes in Contract Sum and Contract Time.

C. Change procedures.

D. Correlation of Contractor submittals based on changes.

E. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

A. Section 00 5000 - Contracting Forms and Supplements: Forms to be used.

1.03 SCHEDULE OF VALUES

A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

B. Forms filled out by hand will not be accepted.

C. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization.

E. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

F. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

G. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. For each item, provide a column for listing each of the following:
   1. Item Number.
   2. Description of work.
   3. Scheduled Values.
   4. Previous Applications.
   5. Work in Place and Stored Materials under this Application.
   6. Authorized Change Orders.
   7. Total Completed and Stored to Date of Application.
   8. Percentage of Completion.
   9. Balance to Finish.
   10. Retainage.

E. Execute certification by signature of authorized officer.

F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.

H. Submit three copies of each Application for Payment.

I. Include the following with the application:
   1. Partial release of liens from major Subcontractors and vendors.
   2. Affidavits attesting to off-site stored products.

J. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.

B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.

C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change . Contractor shall prepare and submit a fixed price quotation within 3 days.

D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors.

E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
   1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
   2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
   3. For pre-determined unit prices and quantities, the amount will based on the fixed unit prices.
   4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.

F. Substantiation of Costs: Provide full information required for evaluation.
   1. Provide the following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.
   2. Support each claim for additional costs with additional information:
      a. Origin and date of claim.
      b. Dates and times work was performed, and by whom.
      c. Time records and wage rates paid.
      d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

J. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electronic document submittal service.

B. Preconstruction meeting.

C. Progress meetings.

D. Submittals for review, information, and project closeout.

E. Number of copies of submittals.

F. Submittal procedures.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.

1. The submittal service will be provided by the architect.
2. Besides submittals for review, information, and closeout, this procedure applies to requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
3. Contractor and Architect are required to use this service.
4. It is Contractor's responsibility to submit documents in PDF format.
5. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
6. Users of the service need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
7. Paper document transmittals will not be reviewed; emailed PDF documents will not be reviewed.
8. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Submittal Service: The selected service is:

1. Sharefile.

C. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

A. Architect will schedule a meeting after Notice of Award.

B. Attendance Required:

1. Owner.
2. Architect.
3. Contractor.

C. Agenda:

1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.

4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
5. Designation of personnel representing the parties to Contract and Architect.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Scheduling activities of a Geotechnical Engineer.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
1. Product data.
2. Shop drawings.
3. Samples for selection.
4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.05 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
1. Design data.
2. Certificates.
3. Test reports.
4. Inspection reports.

5. Manufacturer's instructions.
6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

3.06 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout:
1. Project record documents.
2. Operation and maintenance data.
3. Warranties.
4. Bonds.
5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.07 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
1. After review, produce duplicates.
2. Retained samples will not be returned to Contractor unless specifically so stated.

3.08 SUBMITTAL PROCEDURES

A. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

B. Transmit each submittal with a copy of approved submittal form.

C. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

E. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

F. Schedule submittals to expedite the Project, and coordinate submission of related items.

G. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

H. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

I. Provide space for Contractor and Architect review stamps.

J. When revised for resubmission, identify all changes made since previous submission.

K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

L. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01 3216

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, bar chart type.

1.02 SUBMITTALS

A. Within 7 days after date of Agreement, submit preliminary schedule defining planned operations for the first 45 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 3 days.

C. Within 7 days after review of preliminary schedule, submit draft of proposed complete schedule for review.

1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 3 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

1.03 QUALITY ASSURANCE

A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with one years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.04 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Sheet Size: Multiples of 8-1/2 x 11 inches.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification section number.

C. Identify work of separate stages and other logically grouped activities.

D. Provide sub-schedules to define critical portions of the entire schedule.

E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

F. Indicate delivery dates for owner-furnished products.

G. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

A. Include a separate bar for each major portion of Work or operation.

B. Identify the first work day of each week.

3.04 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Annotate diagrams to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

3.06 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Mock-ups.

C. Control of installation.

D. Tolerances.

E. Testing and inspection services.

F. Manufacturers' field services.

1.02 SUBMITTALS

A. Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Design Data: Submit for Architect'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.

C. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.
      k. When requested by Architect, provide interpretation of results.
   2. Test report submittals are for Architect'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.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

G. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.

1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.03 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.04 TESTING AND INSPECTION AGENCIES

A. Owner will employ services of an independent testing agency to perform certain specified testing; payment for cost of services will be derived from allowance specified in Section 01 2100; see Section 01 2100 and applicable sections for description of services included in allowance.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 3 EXECUTION

2.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

2.02 MOCK-UPS

A. Before installing portions of the Work where mockups are required, construct mockups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.

C. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

E. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

F. Accepted mock-ups shall be a comparison standard for the remaining Work.

G. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

2.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

2.04 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.

B. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. 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.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

2.05 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, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

2.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary sanitary facilities.

B. Temporary Controls: Barriers, enclosures, and fencing.

C. Security requirements.

D. Waste removal facilities and services.

E. Field offices.

1.02 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Use of existing facilities is not permitted.

C. Maintain daily in clean and sanitary condition.

1.03 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.04 FENCING

A. Construction: Contractor's option.

B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.05 EXTERIOR ENCLOSURES

A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.06 INTERIOR ENCLOSURES

A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.07 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

1.08 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.09 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations and procedures.

F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

C. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

E. Substitution Submittal Procedure:
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. The Architect will notify Contractor in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Prevent contact with material that may cause corrosion, discoloration, or staining.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Cutting and patching.

D. Surveying for laying out the work.

E. Cleaning and protection.

F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

D. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.
   6. Include in request:
      a. Identification of Project.
      b. Location and description of affected work.
      c. Necessity for cutting or alteration.
      d. Description of proposed work and products to be used.
      e. Effect on work of Owner or separate Contractor.
      f. Written permission of affected separate Contractor.
      g. Date and time work will be executed.

E. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.03 QUALIFICATIONS

A. For demolition work, employ a firm specializing in the type of work required.

B. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

C. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located.

D. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.04 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
   1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
   2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

G. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

H. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.05 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.
   2. Relocate items indicated on drawings.
   3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. Provide temporary connections as required to maintain existing systems in service.
   4. Verify that abandoned services serve only abandoned facilities.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

D. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.

E. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
   1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.

F. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

G. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

H. Clean existing systems and equipment.

I. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

J. Do not begin new construction in alterations areas before demolition is complete.

K. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

G. Restore work with new products in accordance with requirements of Contract Documents.

H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

J. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.

3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.10 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean filters of operating equipment.

F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.11 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

END OF SECTION

SECTION 02 4100

DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of built site elements.

B. Selective demolition of building elements for alteration purposes.

C. Abandonment and removal of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on Contractor's use of site and premises.

B. Section 01 1000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

C. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

D. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

E. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Site Plan: Showing:
   1. Vegetation to be protected.
   2. Areas for temporary construction and field offices.
   3. Areas for temporary and permanent placement of removed materials.

C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 3 EXECUTION

2.01 SCOPE

A. Remove other items indicated, for salvage, relocation, and recycling.

B. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   6. Do not close or obstruct roadways or sidewalks without permit.

7. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

E. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

G. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.

2.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

2.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 .

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.

2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
3. Verify that abandoned services serve only abandoned facilities before removal.
4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

2.05 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 02 4116
STRUCTURE DEMOLITION
(Demolition and Removal)

PART 1 - GENERAL:

1.1 SCOPE

This work includes the demolition and removal of all items necessary for the completion of the work as shown on the contract documents, including but not limited to, asphalt base and surfacing, concrete paving, and designated vegetation.

1.2 QUALITY ASSURANCE

1.2.1 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. South Carolina Highway Department Standard Specifications for Highway Construction.

PART 2 PRODUCTS: (This section not applicable).

PART 3 - EXECUTION:

3.1 REQUIREMENTS

The work includes demolition or removal of all existing materials indicated, specified or required. All materials resulting from demolition work, except as indicated or specified otherwise, shall become the property of the contractor and shall be removed from the limits of the owner's property. Remove all rubbish and debris from the site daily, unless otherwise directed.

3.1.1 DUST CONTROL

Take appropriate action to check the spread of dust to avoid the creation of a nuisance in the surrounding area. Comply with all dust regulations imposed by local air pollution agencies.

3.1.2 PERSONNEL

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights to meet the SCDOT standard for traffic control.

3.2 – EXISTING FACILITIES TO BE REMOVED

3.2.1 ASPHALT

Remove asphalt concrete, concrete and base materials completely where indicated within the limits as specified for the new work. Exercise extreme care in the demolition procedures to avoid damage to private and public property. The existing roadway materials are

indicated on the drawings. This information is not presented as a guarantee of the material to be encountered. Contractors are to make their own determinations as to the work involved.

3.2.2 MISCELLANEOUS REMOVALS

Remove completely all lawn and gravel within the limits specified for the new work. Exercise extreme care in the removal procedures to avoid damage to private and public property.

3.2.3 CONCRETE

Where concrete work to be removed abuts concrete to remain, saw concrete along straight lines to a depth of not less than two inches (2"). The remainder of the concrete shall be broken out, provided that the broken area is concealed in the finished work, and the remaining is sound. At locations where the broken face cannot be concealed, it shall be ground smooth or the saw cut shall be made entirely through the concrete.

3.2.4 SALVAGED MATERIALS

Items to be salvaged and delivered to the City include, any and all signage in the construction limits.

3.3 – CLEAN UP

Remove and transport all debris and rubbish in a manner that will prevent spillage on streets or adjacent areas. Clean up spillage from streets and adjacent areas.

3.4 - REGULATIONS

Comply with all Federal, State and local hauling and disposal regulations.

END OF SECTION

SECTION 03 4500

PRECAST ARCHITECTURAL CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural precast concrete stair risers.

1.02 REFERENCE STANDARDS

A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2011.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2014.

C. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2009.

D. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.

E. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

F. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; Precast/Prestressed Concrete Institute; 2007.

G. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; Precast/Prestressed Concrete Institute; Seventh Edition, 2010.

H. PCI MNL-122 - Architectural Precast Concrete; Precast/Prestressed Concrete Institute; 2007, Third Edition.

I. PCI MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete; Precast/Prestressed Concrete Institute; 1988, Second Edition.

J. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; Precast/Prestressed Concrete Institute; 2000.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.

C. Shop Drawings: Indicate layout, unit locations, configuration, connection details, support items, dimensions and relationship to adjacent materials.
   1. Include details of mix designs.

D. Samples: Submit two samples, 4 inch in size, illustrating surface finish, color and texture.

1.04 MOCK-UP

A. Provide a mock-up, 8 feet long by.3 feet wide and finish in accordance with approved sample.

B. Locate as determined by contractor.

C. Mock-up may remain as part of the Work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Handling: Lift and support precast units only from support points.

B. Protect units to prevent staining, chipping, or spalling of concrete.

PART 2 PRODUCTS

2.01 PRECAST UNITS

A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 40 - 40,000 psi.

1. Deformed billet-steel bars.
2. Galvanized in accordance with ASTM A767/A767M, Class I.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

B. Fine and Coarse Structural Aggregates: ASTM C33.

C. Water: Clean and not detrimental to concrete.

D. Air Entrainment Admixture: ASTM C260/C260M.

E. Grout:
1. Non-shrink, non-metallic, minimum 10,000 psi, 28 day strength.

2.04 ACCESSORIES

A. Bearing Pads: High density plastic; Shore A Durometer 75; 1/8 inch thick, smooth both sides.

2.05 FABRICATION

A. Fabricate in conformance with PCI MNL-117 and PCI MNL-135.

B. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.

C. Use form liners in accordance with manufacturer's instructions.

D. Maintain consistent quality during manufacture.

E. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items.

2.06 FABRICATION TOLERANCES

A. Conform to PCI MNL-117 and PCI MNL-135.

PART 3 EXECUTION

3.01 ERECTION

A. Erect units without damage to shape or finish. Replace or repair damaged panels.

B. Erect units level and plumb within allowable tolerances.

END OF SECTION

SECTION 03 9101

POLYMER MODIFIED CONCRETE RESTORATION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes repair to miscellaneous concrete surfaces (at front plaza deck, rear terrace and adjoining stairs to both areas) as specified.

1. Repairs to horizontal concrete substrate where deteriorated or damaged are included. Provide products specifically intended for this use.

B. Work includes preparation, inspection, and bonding of fresh concrete to existing concrete surfaces.

C. Also see Architectural, Civil and Structural requirements.

D. A set quantity of 100 SF is required to be included in your quote for polymer modified concrete restoration. Also, required is a per linear foot price (add/deduct) for this work. Any quantity above or below the set quantity amount shall result in an add or deduct to the Contract Sum based on the per linear foot price provided.

1.02 RELATED REQUIREMENTS

A. The provisions of the Instructions to Bidders, General Conditions, and Supplementary Conditions shall govern work under this Section.

B. Section 07 1406: Bitumen Based Waterproofing Assembly

C. Section 07 1813: Pedestrian Traffic Coating Assembly

D. Section 07 9210: Sealants for Building Envelope

1.03 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced, and to provide any clarifications for issues not covered within this specification.

B. AMERICAN CONCRETE INSTITUTION (ACI):

1. ACI 318 (2005) Building Code Requirements for Structural Concrete and Commentary

2. ACI RPMN (2008) Concrete Repair Manual

3. ACI SP-2 (2007) Manual of Concrete Inspection Tenth Edition

C. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO):

1. AASHTO M 182 (2005) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

D. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

1. ASTM C 1084 (2002) Standard Specification for Portland-Cement Content of Hardened Hydraulic-Cement Concrete

2. ASTM C 109/C 109M (2005) Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens)

3. ASTM C 1107/C 1107M (2007) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

4. ASTM C 114 (2006) Standard Test Methods for Chemical Analysis of Hydraulic Cement

5. ASTM C 136 (2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

6. ASTM C 150 (2005) Standard Specification for Portland Cement

7. ASTM C 157/C 157M (2006) Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete

8. ASTM C 171 (2003) Standard Specification for Sheet Materials for Curing Concrete

9. ASTM C 191 (2004) Standard Test Method for Time of Setting Hydraulic Cement by Vicat Needle

10. ASTM C 231 (2004) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

11. ASTM C 260 (2006) Standard Specification for Air-Entraining Admixtures for Concrete

12. ASTM C 33 (2003) Standard Specification for Concrete Aggregates

13. ASTM C 39/C 39M (2005e1) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

14. ASTM C 494/C 494M (2005a) Standard Specification for Chemical Admixtures for Concrete

15. ASTM C 642 (2006) Density, Absorption, and Voids in Hardened Concrete

16. ASTM C 666/C 666M (2003) Resistance of Concrete to Rapid Freezing and Thawing

17. ASTM C 672/C 672M (2003) Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals

18. ASTM D 570 (1998; R 2005) Standard Test Method for Water Absorption of Plastics

19. ASTM D 695 (2002a) Standard Test Method for Compressive Properties of Rigid Plastics

E. INTERNATIONAL CODE COUNCIL (ICC):

1. IBC (2012) International Building Code

2. IEBC (2012) International Existing Building Code

1.04 SUBMITTALS

A. Submit the following in accordance with the Submittals Section.

B. No work shall begin until all submittals have been received and approved and the Pre-Installation Conference has been completed.

C. Product data describing products and methods of mixing and application instructions.

1. Horizontal uses.

D. Product data stating compliance with specified performance criteria.

E. Provide a minimum of two (2) on site cured samples 12 inches by 12 inches in plan dimension and 1½ inches in thickness in locations selected by the Architect/Engineer/Consultant. The samples shall be checked for matches in color, shade, finish and texture.

F. Safety Data Sheets (SDS): Submit Safety Data Sheets with each specification section and include with Safety Plan.

1.05 QUALITY ASSURANCE

A. Concrete Repair Supplier: Regularly engaged in production of concrete repair materials.

B. Concrete Repair Product Applicator: Regularly engaged, experienced, and properly equipped for application of concrete repair materials.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original undamaged packages or acceptable bulk containers bearing the identification of the product, manufacturer, batch number, and expiration date.

B. Store packaged materials to protect them from elements or physical damage.

C. Do not use materials which have exceeded the products shelf life.

D. Do not use materials that show indications of moisture damage, lumping, or other deterioration.

E. Handle all products with appropriate precautions and care as stated on the Materials Safety Data Sheet.

1.07 JOB CONDITIONS

A. Do not place concrete repair materials when ambient temperature is at or below 40 degrees F or at or above 90 degrees F or exceeds manufacturer’s minimum or maximum temperatures.

B. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions in accordance with the manufacturer's instructions.

C. Do not place concrete repair products on surfaces covered with standing water, snow, or ice.

PART 2 - PRODUCTS

2.01 NON-SHRINK, POLYMER MODIFIED REPAIR MATERIALS

A. The polymer modified repair mortar shall be a blend of portland cement, well graded, clean, aggregates, polymers, and admixtures to produce a workable mix.

B. One or two component cement based, polymer modified repair mortar for horizontal, vertical and overhead patching.

C. High bond strength and rapid strength gain.

D. Freeze-thaw resistant.

E. The material shall not contain asbestos, chlorides, nitrates, added gypsum, added lime, or high alumina cements.

2.02 DESIGN MIX

A. General: Design concrete repair material mix to produce the following minimum physical properties.

1. Compressive Strength after 24 hours: Minimum 2000 psi, when tested in accordance with ASTM C 109.

2. Compressive Strength after 28 days: Minimum 6250 psi, when tested in accordance with ASTM C 109.

3. Bond Strength: Minimum 1200 psi, when tested in accordance with ASTM C 1042M.

4. Dry Cure Shrinkage: Not greater than .05% when tested in accordance with ASTM C 157.

B. Do not exceed maximum air content recommended by the manufacturer.

C. Use minimum amount of water necessary to produce a workable mix.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. Remove areas of unsound, weak, damaged, or loose concrete.

B. Loose particles, laitance, scaling, pop-outs/honeycombs, spalling, cracked, or debonded/delaminated concrete and foreign materials shall be removed with hand tools unless otherwise noted.

C. Clean newly exposed concrete free of all foreign matter including oil, grease, dust, and any other surface contaminants.

D. Substrate Priming: Substrate should be primed using the manufacturers recommended products, and strictly following the application requirements.

E. Where areas of exposed and/or deteriorating reinforcing steel are occurring, concrete shall be completely removed from around reinforcing not less than one inch.

F. Exposed reinforcing steel shall be mechanically cleaned to bare metal and coated with two coats of a zinc-rich primer paint or rust inhibitor as recommended by the concrete repair material manufacturer.

3.02 REPAIR

A. Patched areas should be allowed to cure sufficiently so that the material can be walked on without leaving footprints or other indentions.

B. Place concrete repair materials in strict accordance with manufacturer's instructions.

1. Deposit concrete repair materials in a continuous operation to a maximum thickness of 2 inches. If multiple lifts are required, allow each lift to set prior to application of additional lifts.

2. Place concrete repair materials to create tapers, fill voids and rebuild damaged and removed areas and to provide a level plane.

3. Concrete repair materials shall have a finished appearance to match the adjacent surface finish, level, texture, and color.

C. Provide temporary protection from premature drying, extremes in temperatures, rapid temperature changes, and inclement weather conditions until completion of curing as recommended by the material manufacturer.

3.03 TAPERED/SLOPED

A. Tapered areas should be allowed to cure sufficiently so that the material can be walked on without leaving footprints or other indentions.

B. Place concrete repair materials in strict accordance with manufacturer's instructions.

1. Deposit concrete repair materials in a continuous operation to a maximum thickness of 2 inches. If multiple lifts are required, allow each lift to set prior to application of additional lifts.

2. First layer shall be thin and worked into the primer. Then build the mortar onto this base layer.

3. Place concrete repair materials to create tapers, fill voids and rebuild damaged and removed areas and to provide a level, uniform taper.

4. Apply concrete to prepared substrate by steal towel from a feathered edge up to provide the required taper/slope.

5. Concrete repair materials shall have a finished appearance to match the adjacent surface finish, level, texture, and color.

C. Provide temporary protection from premature drying, extremes in temperatures, rapid temperature changes, and inclement weather conditions until completion of curing as recommended by the material manufacturer.

3.04 DEFECTIVE WORK

A. General: Refinish, or remove and replace concrete repair materials that do not meet the specified requirements, as determined by the Owner's Representative.

3.05 UNIT PRICED QUANTITIES

A. The Contractor shall maintain a log of all repair unit priced quantities used based on contract requirements.

B. Contractor shall notify Owner in writing when 80% of quantity is used for each unit price item.

C. Provide photograph or videotape documentation of repairs.

D. Locate quantities and show their locations on the applicable drawings.

E. Provide actual used quantities on each Application for Payment request.

END OF SECTION

SECTION 04 2000

UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Common Brick.

B. Mortar .

C. Reinforcement and Anchorage.

D. Accessories.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

B. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a.

C. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2013.

D. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2013.

E. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.

F. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2012.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.

1.04 MOCK-UP

A. Construct a masonry wall as a mock-up panel sized 8 feet long by 6 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 BRICK UNITS

A. Building (Common) Brick: ASTM C62, Grade MW; cored units.
   1. Nominal size: match existing.

2.02 MORTAR MATERIALS

A. Masonry Cement: ASTM C91/C91M, Type N.
   1. Colored Mortar: Premixed cement as required to match Architect's color sample.

B. Water: Clean and potable.

2.03 REINFORCEMENT AND ANCHORAGE

A. Single Wythe Joint Reinforcement: Truss or ladder type; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1483 inch side rods with 0.1483 inch cross rods;

width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

B. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face.

C. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
   1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
   2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
   3. Vertical adjustment: Not less than 3-1/2 inches.

2.04 ACCESSORIES

A. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
   1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
      a. Manufacturers:
         1) Advanced Building Products Inc; Mortar Break DT: www.advancedflashing.com.
         2) Advanced Building Products Inc; Mortar Break: www.advancedflashing.com.
         3) Mortar Net Solutions; Mortar Net with Insect Barrier: www.mortarnet.com.

B. Weeps: Molded PVC grilles, insect resistant.

C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.05 MORTAR MIXES

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Exterior, loadbearing masonry: Type N.
   2. Exterior, non-loadbearing masonry: Type N.

B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 COLD AND HOT WEATHER REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Brick Units:
   1. Bond: match existing.

2. Mortar Joints: match existing.

3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Remove excess mortar and mortar smears as work progresses.

C. Interlock intersections and external corners.

D. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.05 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

3.06 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.07 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.08 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.09 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.10 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Grout.

B. Products furnished, but not installed, under this Section include the following:

1. Anchor sections of adjustable masonry anchors for connecting to structural frame, installed under Division 05 Section "Structural Steel Framing."

C. Products installed, but not furnished, under this Section include the following:

1. Steel brick shelf angles, brick relieving angles and hung lintels anchored to masonry walls, furnished under Division 05 Section "Structural Steel Framing"
2. Loose steel lintels, furnished under Division 05 Section "Structural Steel Framing"
3. Anchor rods and embed plates indicated to be built into masonry, furnished under Division 05 Section "Structural Steel Framing"

D. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 03 Section Division 05 Section "Cast-in-Place Concrete" for reinforcing steel dowels for anchoring concrete unit masonry to cast-in-place concrete.
3. Division 05 Section "Structural Steel Framing" for furnishing loose lintels.
4. Division 07 Section "Water Repellents" for water repellents applied to unit masonry.
5. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
6. Division XX Section " XXXXX" for flashing
7. Division 04 Section "xxxxx" for clay masonry veneers

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

A. Product Data:

B. Contractor’s Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

C. Qualification Data:

1. Masonry Installer.
2. Post Installed Structural Anchor Installer

D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
1. Grout Aggregates
2. Grout Cementitious Materials

E. Material Certificates: For each of the following indicating compliance with the required standards and signed by manufacturers:

1. Grout Cementitious materials.

a. Submit material certificates not more than 90 days old demonstrating compliance with the specified ASTM standards.

2. Grout Coarse Aggregates

a. Submit material certificates not more than 90 days old demonstrating compliance with the specified ASTM standards.

3. Grout Fine Aggregates.

a. Submit material certificates not more than 90 days old demonstrating compliance with the specified ASTM standards.

4. Preblended Grout mixes. Include description of type and proportions of ingredients.

F. Design Mixtures:

1. Grout: For each type of grout

a. Indicate amounts of mixing water to be withheld for later addition at Project site.
b. Mix design submittals shall include test results and/or trial batch data that meet or exceed the required average compressive strengths required by ACI 301. In accordance with ASTM C476 all testing shall be completed per ASTM C10119.
c. Trial batches shall consist of identical cementitious materials, fine and course aggregates, and admixtures to be used for mix design.
d. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

2. Mortar: For each type of mortar

a. Indicate materials to be used
b. Indicate proportioning of ingredients.
c. Indicate repeatable means of measuring ingredient proportions.

d. When using the ASTM C270 property specification include test reports. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.

G. Research/Evaluation Reports:

1. Post installed structural anchors: See specification section 050520

H. Hot and Cold Weather Program: Describe in detail procedure for working in Hot and Cold Weather. Included detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Post Installed Structural Anchor Installer: See specification section 050520 for requirements

C. Limitations on Aggregates: For concrete masonry units containing recycled material or post-industrial waste, provide units free of impurities that will cause rusting, staining or popouts and with a record of successful in-service performance in conditions similar to those expected at Project site.

1. Ferrous material shall be removed by magnetic separation.
2. Aggregates shall contain no combustible materials.
3. Aggregates shall be graded and supplied in consist graduations from batch to batch.
4. Material shall be tested according to the following:

a. ASTM C40: Organic Impurities in Fine Aggregates for Concrete.
b. ASTM C 136: Sieve Analysis of Fine and Coarse Aggregate.
c. ASTM C 641: Staining Materials in Lightweight Concrete Aggregates.
d. ASTM C 151: Autoclave Expansion of Hydraulic Cement (for popouts.)

D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

E. Grout Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design grout mixtures.

F. Daily Log: Maintain a daily log of masonry work in progress for inspection by Owner, Architect, Special Inspector or Authority Having Jurisdiction.

1. Indicate on small scale plans where masonry was erected.
2. Indicate on small scale plans where masonry was grouted.
3. Identify crew and assigned work area.
4. Certify that the following tasks have been performed.

a. Inspection of construction and verification of compliance with requirements as indicated in schedule of special inspections.
b. Daily Cleaning.

G. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and

inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1. Review construction sequencing and required time allotted for inspections prior to grouting.
2. Review ACI 530 tolerance for placement of reinforcing steel.
3. Review hot and cold weather procedures.
4. Review typical details for reinforcement requirements
5. Review requirements for horizontal joint reinforcement
6. Review reinforcement placement tolerance
7. Review reinforcement anchorage requirements
8. Review reinforcement lap requirements
9. Review reinforced masonry construction sequence
10. Review limits on embedded items in grouted masonry
11. Review grouting procedures and requirement for mechanical vibration.
12. Review requirements for masonry protection

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Regional Materials: Provide CMUs that have been manufactured within 500 miles (800 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, bond beams and other special conditions.

2. Provide square edge units for outside corners unless otherwise indicated

C. Cell Layout:

1. All block shall be of standard two cell or open end configuration.
2. All block shall be configured such that it allows for both of the following:

    a. Placement of reinforcing as indicated with not less than 1/2" clear grout cover between the bar and the block.
    b. For the required bonding pattern the block will provide a minimum 3 inch by 3 inch continuous vertical column to receive grout.

D. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Density Classification:
    a. Lightweight unless otherwise indicated.

    b. Blended medium weight block to be used at food preparation areas receiving epoxy finish and where indicated.
        1) Provide units made with graded aggregates to achieve smoother surface texture for the application of paint finish. Match Architect's sample for surface texture.

3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: Not Permitted

E. Mortar Cement: ASTM C 1329.

F. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

G. Aggregate for Grout: ASTM C 404.

H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

I. Water: Potable.

2.4 REINFORCEMENT

A. Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60

2.5 MISCELLANEOUS ANCHORS

A. Post Installed Structural Anchors: See specification section 055020 for products

2.6 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.7 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime or mortar cement mortar unless otherwise indicated.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Preblended, Dry Grout Mix: Furnish dry grout ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

D. Mortar for Unit Masonry: Provide "Type S" mortar complying with ASTM C 270, Proportion or Property Specification unless indicated otherwise.

E. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 as follows:

    a. 28-day compressive strength of 3000 psi unless noted otherwise.
    b. Provide grout with a slump of 8 to 11 as measured according to ASTM C 143/C 143M.

3. Ready-Mixed Grout: Measure, batch, mix, and deliver grout according to ASTM C 476, and furnish batch ticket information.

a. Slump shall be adjusted on site as necessary, and grout shall be re-mixed at mixing speed for at least one minute before discharging to achieve the desired consistency.

4. Project-Site Mixed Grout: Mix preblended, dry grout mix according to ASTM C 476.

a. Mix in a mechanical mixer for a minimum of 5 minutes with sufficient water to achieve the desired consistency.
b. Hand mixing of grout is not permitted
c. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that foundations are "broom" clean and free of debris or other laitance that may compromise mortar bond.
4. Verify that reinforcing dowels are properly placed and extend to the proper elevation.

B. Before installation, examine rough-in and built-in construction for electrical, mechanical, piping and other systems to identify locations of built in construction..

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 TOLERANCES

A. Comply with the construction tolerances in ACI 5301.1 unless modified herein.

B. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

C. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet , 1/4 inch in 20 feet, or 1/2 inch (12 mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet , or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

D. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch , with a maximum thickness limited to 1/2 inch for typical bed joints.
2. For bed joints on foundations the minimum thickness shall be 1/4 inch and the maximum thickness shall be 3/4 inc.
3. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
4. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.]
6. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond. Bond each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Reinforced Masonry: Keep vertical cells aligned to maintain continuous unobstructed cells not less than 3 inches by 3 inches to receive reinforcing steel and grout.

E. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

F. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

G. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

H. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

I. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

J. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, leaving a minimum 1” clearance between masonry and structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1 inch clearance between end of anchor rod and end of tube. Space anchors 32 inches o.c. unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

A. General: Prepare mortar in accordance with current Portland Cement Association publications.

B. Prepare fresh mortar at the rate it will be used, in order to maintain consistent color and workability. Do not use mortar that has stiffened because of hydration. Discard when not used within the time recommended by mortar manufacturer or PCA publications, whichever is shorter. Retemper mortar carefully to avoid color changes, no more than twice per batch.

C. Measure mortar materials using cubic foot measuring box or other approved container of known volume, of size appropriate for operation. Use a consistent ratio of water to mortar materials, within the range recommended by the mortar manufacturer's written instructions.

D. Lay hollow CMUs as follows:

1. Only lay cmu on foundations after they have achieved a "broom" clean condition and are free of debris or other laitance that may compromise mortar bond.
2. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
3. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
4. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
5. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
6. With head joints filled to a minimum thickness equal to the face shell of the unit on both faces of the unit.

E. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

F. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

G. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

H. Immediately after placing a course of masonry clean mortar drippings and fins from cells to receive reinforcing. Care shall be taken to collect the loose material and remove it from the cell and not allowing it to collect at the bottom of the cell.

3.6 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 16 inches o.c. vertically and 16 inches o.c. horizontally.
4. Provide anchors at each course of masonry where infilling the webs of steel beam lintels in masonry walls.

3.7 ANCHORING MASONRY VENEERS

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry as follows:

1. Install preformed control-joint gaskets designed to fit standard sash block.

3.9 LINTELS

A. Install loose steel lintels where indicated.

B. Install shelf angles/hung lintels where indicated

C. Built in Place Lintels:

1. Provide lintels where shown and where openings of more than 12 inches for block-size units are shown without structural steel or other supporting lintels.
2. Construct from closed bottom lintel or channel concrete masonry units for the bottom course with reinforcing steel placed as indicated, supported on positioners and anchored in place. Bond beam units are not permitted for bottom course.
3. Provide bond beam units for additional courses indicated with reinforcing steel placed as indicated supported on positioners and anchored in place.
4. Fill the entire depth and length of the lintel grout in one grout pour. Grout joints are not permitted in lintels.
5. Temporarily support built-in-place lintels until cured.
6. Provide minimum bearing of 16 inches at each jamb unless otherwise indicated.

3.10 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602 and as follows:

1. Center all vertical reinforcing steel on the thickness of the concrete masonry unit unless noted otherwise.
2. Bar positioners must be anchored in place with mortar.
3. Sequencing:

a. Reinforcing steel from previous grout lift extends a lap distance out of hardened grout.
b. No additional reinforcing is placed, and additional masonry is laid up, but not exceeded the grout pour height limit.
c. Reinforcing bar positioner is placed in the bed joint of the second course of additional masonry, and below the last bed joint of additional masonry with

additional bar positioners installed such that spacing does not exceed 48 inches on center

d. The cells of additional masonry are cleaned of mortar droppings and mortar fins.
e. A lift of reinforcing steel is dropped into the previously laid masonry using the bar positioners to ensure proper location. The reinforcing steel shall extend above the proposed grout pour height by a minimum of one splice distance.
f. The grout lift is placed and consolidate.
g. The sequence is repeated.

4. Where a reinforced cell is noted to have the vertical reinforcing offset from the center of the concrete masonry unit then provide special two loop bar positioners to locate each vertical bar and the associated splice bar per the contract documents.

    a. Alternately a two loop bar positioner may be installed rotated parallel to the face shells to locate the vertical bar and the associated splice bar per the contract documents.

5. Where a reinforced cell is noted to have two vertical bars provide special four loop bar positioners to locate each vertical bar and the associated splice bar per the contract documents.

    a. Alternately a pair of two loop bar positioners may be installed rotated parallel to the face shells to locate each vertical bar and the associate splice bar per the contract documents.

6. A minimum of 1” clear shall be maintained between pairs of parallel bars occurring in the same vertical cell, lintel or bond beam.
7. A minimum of 1” clear shall be maintained between vertical bars or pairs of vertical bars and , piping or other embeds occurring in the same vertical cell.
8. A minimum of ½” shall be maintained between any reinforcing bar and the adjacent masonry unit.
9. Wet setting of reinforcing steel into previously placed grout is not permitted.

C. Conduits, Piping, Panels, Boxes and other Embedded Equipment

1. The maximum outside diameter of any vertical conduit or piping located in a grouted cell shall be as follows:

    a. 1.5 inches for 12 inch cmu
    b. 1.125 inches for 8 inch cmu
    c. 1 inch for 6 inch cmu
    d. Where vertically reinforced and grouted cells are not specifically located in the contract documents it is acceptable to relocate the vertically reinforced and grouted cell to the next adjacent cell to avoid a conduit or pipe of larger dimension than permitted. The typical center to center spacing of vertically reinforced and grouted cells shall be maintained.
    e. Where vertically reinforced and grouted cells are specifically located in the contract documents, conduit or pipes of dimensions larger than permitted shall be routed to avoid the vertically reinforced and grouted cells. In the case that the conduit or piping cannot be routed to avoid the vertically reinforced and grouted cell the Engineer shall be contacted for resolution.

2. Horizontal runs of conduit or pipe are not permitted in within lintels or bond beams
3. Horizontal runs of conduit or pipe passing through vertically reinforced and grouted cells are not permitted.

4. Piping containing either of the following shall not be located in grouted masonry:

    a. Liquid, gas or vapors at temperatures higher than 150 degrees Farenheit
    b. Under pressures in excess of 55 psi
    c. Containing water or other liquids when they are subject to freezing

5. Inset panels, boxes, fire extinguisher cabinets and other embedded items are not permitted in grouted cells.

    a. Where vertically reinforced and grouted cells are not specifically located in the contract documents it is acceptable to relocate the vertically reinforced and grouted cell to the next adjacent cell to avoid conflict with embedded equipment. The typical center to center spacing of vertically reinforced and grouted cells shall be maintained.
    b. Where vertically reinforced and grouted cells are specifically located in the contract documents and conflict with embedded equipment, the embedded equipment shall be surface mounted or relocated as allowed by the contract documents. Where contract documents do not allow for surface mounting or relocating the equipment the Engineer shall be contacted for resolution.

D. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Prior to grouting all grouted cells shall be inspected to ensure cells are free of loose mortar droppings or debris.

    a. All debris and mortar droppings shall be removed.
    b. All hardened mortar or mortar fins protruding more than 1/2 inch into cell shall be removed.

2. For grout pours of 60 inches or more, and other locations where specifically indicated provide cleanouts at the bottom of each grouted cell

    a. Where cleanout will is located at location and elevation where the finished wall is exposed the cleanout shall be created by removing the face shell of a full block to allow for a seamless appearance by patching with a full face shell.
    b. Where the cleanout will be concealed in finished construction the cleanout can be formed such that the grout will form the finished surface at the cleanout. Cleanout shall be a minimum of 4 inches by 4 inches.

3. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for grout properties and minimum grout space.
4. Limit height of vertical grout lifts and grout pours to not more than 60 inches.
5. Grout all courses of lintels and beams in one continuous operation for the full height of the lintel or beam. Do not allow cold joints in lintels and beams.
6. Grout lifts shall be terminated at top of walls shall be carefully consolidated to ensure grout is cured flush to top of masonry, and provides solid bearing beneath all bearing plates.
7. Grout lifts terminating at bond beams, except at top of wall shall stopped 1/2" down from top of bond beam
8. Typical grout lifts, not terminating at bond beam or top of wall shall be terminated a minimum of 1 1/2", but not more than 3" below a bed joint.
9. All grout lift terminations shall be coordinate with reinforcing steel layout to ensure proper lap distance of reinforcing steel. Grout pours shall not be terminated anywhere along the length of the splice.

10. All grout shall consolidated using internal vibration with a pencil type vibrator.

    a. Consolidate grout in each cell or bond beam immediately after placement. Top of bond beam or cell to desired height after initial consolidation.
    b. Reconsolidate grout in each cell or bond beam after initial water loss and settlement has occurred approximately 10 minutes after initial consolidation. Top of bond beam or cell to desired height after reconsolidation.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the schedule of special inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.13 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

END OF SECTION 042200

SECTION 04 4200
EXTERIOR STONE CLADDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cut limestone veneer at exterior walls.

B. Metal anchors and supports.

C. Sealing exterior joints.

1.02 REFERENCE STANDARDS

A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2013c.

B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2010.

C. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2012.

D. ASTM C568/C568M - Standard Specification for Limestone Dimension Stone; 2010.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).

G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).

H. ILI (HB) - Indiana Limestone Handbook; Indiana Limestone Institute of America, Inc.; 2007, 22nd Edition.

I. NBGQA (SPEC) - Specifications for Architectural Granite; National Building Granite Quarries Association, Inc.; www.nbgqa.com; Version 14-1, 2014.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on stone, mortar products, and sealant products.

C. Shop Drawings: Indicate layout, pertinent dimensions, anchorages, head, jamb, and sill opening details, and jointing methods.

D. Samples: Submit two stone samples 12x12 inch in size, illustrating color range and texture, markings, surface finish .

E. Samples: Submit mortar color samples.

F. Installation Instructions: Submit stone fabricator's installation instructions and field erection or setting drawings; indicate panel identifying marks and locations on setting drawings.

1.04 QUALITY ASSURANCE

A. Perform work in accordance with ILI Indiana Limestone Handbook.

B. Stone Fabricator: Company specializing in fabricating cut stone with minimum ten years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

1.05 MOCK-UP

A. Locate where directed. Install a 10' length of coping complete with joints, anchorage, flashing and sealers.

B. Mock-up may remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect stone from discoloration.

1.07 FIELD CONDITIONS

A. During temporary storage on site, at the end of working day, and during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored.

PART 2 PRODUCTS

2.01 STONE

A. Limestone: Indiana Oolitic Limestone; complying with ASTM C568/C568M Classification III - High Density.
   1. Grade: ILI Standard.
   2. Color: Buff.
   3. Surface Texture: Smooth.
   4. Acceptable Producers:
      a. Indiana Limestone Company: www.indianalimestonecompany.com.
      b. Mankato Kasota Stone, Inc: www.mankato-kasota-stone.com.
      c. Vetter Stone Co: www.vetterstone.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MORTAR

A. Mortar: ASTM C270, Type N, Proportion specification, using Portland cement of white color.

B. Mortar Color Additive: Mineral oxide pigment of selected color .

2.03 ANCHORS AND ACCESSORIES

A. Anchors and Other Components in Contact with Stone: Stainless steel, ASTM A666, Type 304.
   1. Sizes and configurations: As required for vertical and horizontal support of stone and applicable loads.

B. Support Components not in Contact with Stone: Stainless steel, ASTM A240, Type 304.

C. Setting Buttons and Shims: Plastic type.

D. Flashings: Specified in Section 07 6000.

E. Joint Sealant: ASTM C920 silicone sealant with movement capability of at least plus/minus 25 percent and non-staining to stone when tested in accordance with ASTM C1248.

F. Joint Backer Rod: ASTM C1330 open cell polyurethane of size 40 to 50 percent larger in diameter than joint width.

G. Back Coating: Bituminous.

2.04 STONE FABRICATION

A. Panel Size: As indicated on drawings.

B. Fabrication Tolerances: In accordance with NBGQA (SPEC).

C. Fabricate units for uniform coloration between adjacent units and over the full area of the installation.

D. Slope exposed top surfaces of stone and horizontal sill surfaces for natural wash.

E. Cut drip slot in bottom surface of work projecting more than 1/2 inch over wall openings. Size slot not less than 3/8 inch wide and 1/4 inch deep; full width of projection.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that support work and site conditions are ready to receive work of this section.

B. Verify that items built-in under other sections are properly located and sized.

3.02 PREPARATION

A. Clean stone prior to erection. Do not use wire brushes or implements that will mark or damage exposed surfaces.

B. Coat back surfaces with back coating. Allow coating to cure.

3.03 INSTALLATION

A. Install flashings of longest practical length and seal watertight to back-up. Lap end joint minimum 6 inches and seal watertight.

B. Erect stone in accordance with stone supplier's instructions and erection drawings.

C. Set stone with a consistent joint width of 3/8 inch.

D. Install anchors and place setting buttons to support stone and to establish joint dimensions.

E. Joints in Exterior Work: Seal joints with joint sealant over backer rod, following sealant manufacturer's instructions; tool sealant surface to concave profile.

3.04 TOLERANCES

A. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet; 1/2 inch in 50 feet.

B. Maximum Variation Between Face Plane of Adjacent Panels: 1/16 inch.

C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in any two stories.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.

E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.05 CUTTING AND FITTING

A. Obtain approval prior to cutting or fitting any item not so indicated on Drawings.

B. Do not impair appearance or strength of stone work by cutting.

3.06 CLEANING

A. Remove excess joint material upon completion of work.

B. Clean soiled surfaces with cleaning solution.

C. Use non-metallic tools in cleaning operations.

END OF SECTION

SECTION 04 5005

MINOR MASONRY RESTORATION AND CLEANING

PART 1 - GENERAL

1.01 SUMMARY

A. The base bid shall include minor inspection of specific masonry wall areas directly above the areas of work and repair work indicated below. See areas noted and 'clouded' on drawings.

1. Removal of 3-5 courses of brick is required to accomplish thru wall flashing replacement.

2. Recess and levels exist and base of wall has sloped brick.

3. Removal of all existing sealants in areas of work and replacement with new in accordance with Section 07 9210, Sealants for Building Envelope.

1.02 RELATED REQUIREMENTS

A. The provisions of the Instructions to Bidders, General Conditions, and Supplementary Conditions shall govern work under this Section.

B. Section 02 0500: Demolition and Removal

C. Section 07 6000: Sheet Metal

D. Section 07 9210: Sealants for Building Envelope

1.03 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced, and to provide any clarifications for issues not covered within this specification.

B. AMERICAN CONCRETE INSTITUTE (ACI):

1. ACI 530 (2005) Building Code Requirements for Masonry Structures Commentaries

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

1. ASTM C 144 (2004) Standard Specification for Aggregate for Masonry Mortar

2. ASTM C 150 (2005) Standard Specification for Portland Cement

3. ASTM C 207 (2006) Standard Specification for Hydrated Lime for Masonry Purposes

4. ASTM C 270 (2006) Standard Specification for Mortar for Unit Masonry

5. ASTM C 780 (2006) Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry

6. ASTM C 91 (2005) Masonry Cement

D. BRICK INDUSTRY ASSOCIATION (BIA):

1. BIA Tech Note 20 Rev II (2000) Cleaning Brick Masonry

E. Definitions

1. CLEANED SURFACE: All masonry surface that will be cleaned by a cleaning agent, an acid solution, by sand blasting, pressure steam, pressure water, or cleaning detergent; the method for which will be described in this section.

2. CRAZING: A term describing the minute surface cracking of masonry units.

3. BRICK: Masonry materials intended for cleaning.

4. EFFLORESCENCE: The white powder salt deposit left on the face of masonry units after moisture has evaporated.

5. POINTING: Placing pointing mortar into masonry joints and tooling to achieve a dense smooth finish.

6. SPALLING: The breaking or separation of a masonry unit face, parallel to the face plane; usually caused by pressure applied to the masonry unit edge or by pressure from behind the face caused by freeze/thaw cycling.

7. REPOINTING: Cutting into or mechanically raking existing masonry joints approximately 1/4 to 1/2-inch deep then placing pointing mortar into joints and tooling to achieve a dense smooth finish.

8. WEEP HOLES: Openings in vertical mortar joints at intervals along the bottom course of masonry, just above the structural supporting device or ledge, to permit moisture in the masonry cavity to migrate to the exterior.

F. INTERNATIONAL CODE COUNCIL (ICC):

1. IBC (2012) International Building Code

2. IEBC (2012) International Existing Building Code

G. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

1.04 SUBMITTALS

A. Submit the following in accordance with the Submittals Section.

B. No work will begin until all submittals have been received and approved and Pre-Construction Conference has been completed.

C. Shop Drawings: Indicate specific means and methods to require work per Contract if different than details of the contract drawings.

D. Product Data: Provide data on cleaning compounds, cleaning solutions, and other related products.

E. Samples: If new brick is required, submit four samples of face brick, units to illustrate color, texture and extremes of color range to match existing.

F. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, or methods.

G. Safety Data Sheets (SDS): Submit Safety Data Sheets with each specification section and include with Safety Plan.

1.05 PERFORMANCE REQUIREMENTS

A. Installation Requirements: Fabricator is responsible for installing system, including anchorage to substrate and necessary modifications to meet specified and drawn requirements and maintain visual design concepts in accordance with Contract Documents.

1. Drawings are diagrammatic and are intended to establish basic dimension of units, sight lines, and profiles of units.

2. Make modifications only to meet field conditions and to ensure fitting of system components.

3. Obtain Architect/Consultant/Engineer's approval of modifications.

4. Provide concealed fastening wherever possible.

5. Attachment considerations: Account for site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening and fracturing connection between units and building structure or between components themselves.

6. Obtain Architect/Consultant/Engineer's approval for connections to building elements at locations other than indicated in Drawings.

7. Accommodate building structure deflections in system connections to structure.

8. System shall accommodate movement of components without buckling, failure of joint seals, undue stress on fasteners, or other detrimental effects when subjected to seasonal temperature changes and live loads.

9. Provide thru-wall flashing system adhering to building code requirements.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1.

B. Adhere to BIA Technical Notes 7 thru 7F.

C. Maintain one copy of each document on site.

1. Construction Documents

2. ACI Standards

D. Restorer: Company specializing in masonry restoration with minimum three years documented experience specific to this project.

1.07 MOCKUP / SAMPLE AREA

A. Provide mockup/sample area of restored masonry. Mockup shall be approved by Architect/Consultant/Engineer and the Owner/Architect.

B. Locate where directed.

C. Acceptable panel and method of procedure will become the standard for work of this section.

1.08 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work, but after all submittals have been received of this section, under provisions of the contract.

B. Require attendance of parties directly affecting work of this section.

C. Review conditions of installation, installation procedures, and coordination with related work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site.

B. Deliver masonry neatly stacked and tied on pallets. Store clear of ground with adequate waterproof covering.

C. Store acid solution and restoration cleaner materials in manufacturer's packaging.

1.10 PROTECTION

A. Protect elements surrounding the work of this section from damage or disfiguration.

B. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.

C. Protect roof membrane, flashings and other surrounding areas from damage.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

C. Hot Weather Requirements: IMIAC - Recommended Practices and Guide Specification for Hot Weather Masonry Construction.

D. Do not sandblast or use process creating dust, dirt, or mist/spray when wind is over 10 mph.

1.12 COORDINATION

A. Coordinate work of this section with interfacing and adjacent work for proper sequencing. Ensure weather resistance at all times during construction and durability of work and protection of materials and finishes.

1.13 SCHEDULING

A. Coordinate scheduled cleaning and washing of repaired exterior masonry with the owner.

PART 2 - PRODUCTS

2.01 BRICK MASONRY

A. Contractor to salvage and reuse the brick whenever possible.

B. Contractor to match existing brick masonry units, and request approval with mockup/sample area.

2.02 CLEANING MATERIALS

A. Cleaning Agent: Detergent, Solvent cleaner or Acid solution.

B. Contractor to submit specific products and methods, with supporting date to substantiate is use.

2.03 MORTAR MATERIALS

A. Mortar

1. Historic or older brick work – Type "O".

B. Contractor to match existing mortar color.

C. Mortar strength and density shall be comparable to existing mortar.

D. Mortar color shall match existing conditions.

E. A pre-hydrated mortar is required.

2.04 ACCESSORIES

A. Anchors and Wall Ties:

1. Provide anchors and ties for cavity walls with integral drip located in the cavity and two piece assembly, mechanically secured to wall, similar to Dur-O-Wal Dove Tail Triangle or secure or anchor.

B. Thru-Wall Flashing:

1. 24 gauge stainless steel shall be used for thru-wall flashings at brick masonry.

2. Copper/Fiberglass Laminated Flashing is to be provided under new stone coping system.

a. Description: Asphalt free copper fabric flashing 7 ounce minimum weight.

b. Material: Copper sheet with 060 temper conforming to ASTM B 370 bonded with a proprietary rubber based adhesive, between two layers of fiberglass fabric weighing not less than 0.3 oz per sq. ft. per layer with a minimum of 20x20 threads per inch.

3. Counterflashing to be 24 gauge, Terne Coated Stainless Steel.

C. Weep Vents/Mortar Mat

1. Prefabricated metal or plastic sized to form the proper size opening in head joints. Provide aluminum and plastic inserts with grill or screen-type openings designed to allow the passage of moisture from cavities and to prevent the entrance of insects.

2. Provide mortar mat/fabric at base to provide drainage path and minimize mortar obstruction.

D. Metal Accessories:

1. Provide cleats, straps, anchoring devices, and similar accessory units as required for installation of work, noncorrosive, size and gauge required for performance.

E. Rivets:

1. Pop Rivets:

a. 1/8-inch (3-mm) to 3/16-inch (4.5-mm) diameter

b. Provide stainless steel rivet where structural integrity of seam is required.

c. Soldering is required.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces to be restored are ready for work of this section. Cleaning is only required to the extent necessary to complete the work and provide acceptable match.

3.02 PREPARATION

A. Carefully remove and store fixtures, fittings, finishing hardware, and accessories on or adjacent to the exterior walls where required to perform work.

B. Close off, seal, mask, and board up areas, landscaping, materials, and surfaces not receiving work of this section to protect from damage.

C. Construct dust proof and weatherproof partitions to close off occupied areas.

3.03 GENERAL INSTALLATION

A. Anchor units of work securely in place by methods indicated, providing for thermal expansion of units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.

1. Install units plumb, level, square, and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding construction.

2. Apply asphalt mastic on surfaces of units in contact with dissimilar metals.

3. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

4. Miter, lap seam and close corner joints at all conditions. Seal seams and joints watertight with sealants/adhesions/mastics in all laps.

5. Install expansion joints at frequency recommended by CDA. Do not fasten moving seams such that movement is restricted.

6. All terminations shall have side and end dams of the flashing material.

B. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

C. Form thru-wall flashings as indicated and to receive counterflashings where shown.

D. Counterflashing:

1. Fabricate counterflashings as 2 piece assemblies to permit installation of counterflashing after base flashings are in place.

2. Overlap all flashing 4" minimum and sealant/mastic within lap.

3.04 REBUILDING

A. Repair in accordance with the drawings after cutting out brick masonry with care in a manner to prevent damage to any adjacent remaining materials.

B. All broken bricks shall be repaired or cut out, as well as bedding mortars.

C. Needle, shore and support structure as necessary in advance of cutting out units.

D. Cut away loose or unsound adjoining masonry and mortar to provide firm and solid bearing for new work.

E. Build in reclaimed and masonry units following standard procedures and industry practices.

F. Mortar Mix: Colored and proportioned to match existing work.

G. Ensure that anchors ties, reinforcing and flashings are correctly located and built in.

H. Install built in masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line. Build in all openings, accessories and fittings.

3.05 THRU-WALL FLASHING

A. Provide as indicated. Unless indicated otherwise, extend flashing from a point 1/4 inch outside of exterior face of walls, upward across wall cavity, not less than 6 inches and onto backing wythe. Exterior edge of flashing shall be formed to receive a second piece of sheet metal counterflashing where required. Secure flashing as indicated and seal. Provide flashing in lengths as long as practicable. Lap ends not less than 1 1/2-inches for interlocking type and 4 inches for other types. Seal laps as necessary to ensure watertight construction. Provide dams at ends of flashing where masonry abuts concrete and where flashing ends within the masonry.

3.06 CLEANING EXISTING MASONRY (LIMITED AREAS)

A. Cleaning is only required to the extent necessary to complete the work and provide acceptable match at repairs.

B. Pressure Steam Cleaning: Apply pressure to masonry surfaces at locations, maintaining uniform depth and surface texture throughout.

C. Cleaning Detergent: Brush, Spray or Hand wash clean masonry surfaces at locations with detergent in accordance with the manufacturer's instructions. Saturate masonry with clean water and flush loose mortar and dirt.

D. Also remove all excessive mortar.

3.07 AGING

A. Rub in or dust new masonry work to match, as close as possible, adjacent original work.

B. Use carbon black in small amounts, rubbing in well with burlap rags or medium bristle brush.

C. After each application, dust off surplus and wash down with low-pressure hose. Allow surface to dry before proceeding with succeeding applications.

D. Continue process until acceptance.

3.08 CLEANING

A. As work proceeds and on completion, remove excess mortar, smears, droppings.

B. Clean surrounding surfaces.

END OF SECTION

SECTION 050520 - POST INSTALLED STRUCTURAL ANCHORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Wedge anchors
2. Cartridge injection adhesive anchors

B. This specification section is only intended for use when specifically required by the drawings or other referencing specifications and structural applications. This section is not intended for use in non-structural applications or where not specifically referenced by the drawings or other specification sections.

C. Related Sections include the following:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 05 Section "Structural Steel Framing" for anchorage of structural steel.
3. Division 05 Section "Cold Formed Metal Framing" for anchorage of cold form metal framing where specifically detailed in the contract documents.

1.3 PERFORMANCE REQUIREMENTS

A. The basis of design products are as specified in this specification or the contract documents. Product substitutions must have capacities equal to or greater than values calculated for each specific condition calculated when calculated using the data in the referenced ESR report and in accordance with the appropriate design procedure and standards required by the building code. See requirements for substitution submittals.

1.4 DEFINITIONS

A. Post Installed Structural Anchors: Anchors supporting and/or anchoring structural elements of the building which are installed into hardened concrete or masonry and that are specified in the contract documents or performance based shop drawing design submittals for structural elements.

B. Wedge Anchors: A torque-controlled anchor, with an integral cone expander and single piece steel expansion clip providing 360-degree contact with the base material while not requiring oversized holes for installation and an impact section to prevent thread damage with required nuts and washers.

C. Cartridge Injection Adhesive Anchors: An anchor system consisting of rod insert, nut, washer and a cartridge type, two-component polymer or hybrid mortar adhesive system dispensed and mixed through a static mixing nozzle supplied by the manufacturer.

1.5 SUBMITTALS

A. Contractor’s Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

B. Product Data:

1. Wedge Anchors
2. Cartridge Injection Adhesive Anchors

C. Research/Evaluation Reports:

1. Submit ICC reports for the following:

a. Wedge Anchors
b. Cartridge Injection Adhesive Anchors

D. Substitutions:

1. Substitution requests may only be made using products with ICC-ESR reports for the product in the specific substrate.
2. Substitution request shall include signed and sealed calculations demonstrating that the product is capable of providing equivalent performance of the specified product for each specific location and condition when calculated using the data in the referenced ESR report and in accordance with the appropriate design procedure and standards required by the building code.
3. Substitution request shall specify the diameter and embedment depth of the substituted product
4. Any increase in material labor cost resulting from the substitution shall be the responsibility of the contractor.

E. Manufacturer's Instruction: Manufacturer's Installation Instructions

F. Qualification Data: Submit installer qualification data as stated in Quality Assurance section. Qualifications shall be submitted in a letter format for each type of anchor to be installed, and shall include the following:

1. The specific product to be used
2. Complete description of installation procedure
3. Personnel to be trained on anchor installation
4. Date of Manufacturer training
5. Manufacturer's training certificates or letter from manufacturer certifying training was complete with a list of individuals that were trained.

1.6 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

a. Coordinate meeting with individual preinstallation conferences for the following
b. Structural Steel Framing
c. Cold-Formed Metal Framing

B. Installer Qualifications: The installer shall be experienced in installing anchors equal to type, and into the substrate material required for this project

C. Installer Training: Conduct a thorough training session with the manufacturer's representative. Each individual responsible for the installation of anchors shall attend the training session. Training shall consist of a review of the complete process for the installation of the anchors and the use of proper equipment for drilling and installing the anchors, to include but not limited to:

1. Hole drilling procedure. Clarify acceptability of rotary hammer drilling and/or core drilling.
2. Hole drilling equipment
3. Type and diameter of drill bits
4. Hole preparation and hole cleaning technique
5. Hole cleaning equipment
6. Adhesive injection technique
7. Adhesive injection equipment
8. Anchor rod, nut and washer material requirements and associated cleaning requirements
9. Anchor and Anchor rod installation
10. Anchor tightening
11. Adhesive curing requirements

D. Certifications: All anchors shall have an ICC ESR Evaluation report indicating conformance with the current applicable Acceptance Criteria for the building code applicable to the project.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Keep anchors, rod materials, nuts and washers in manufacturer's packaging with label intact until needed for use.

B. Keep anchors free of dirt and debris.

C. Store anchors in a clean dry area

D. Protect anchors from corrosion and deterioration.

E. Store anchors and adhesives in strict accordance with manufacturer's requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Nuts: Having a proof load stress equal or greater than the minimum tensile strength of the associated anchor where type and strength is not specifically indicated by anchor or adhesive manufacturer.

B. Washers: Of type and material compatible with nuts unless specifically indicated by anchor or adhesive manufacturer.

C. Plate Washers: Provide ASTM A 36 plate washers of size and configuration specifically indicated.

2.2 CORROSION RESISTANCE

A. Anchors and Anchor Bodies

1. Uncoated Carbon Steel: Carbon steel anchors uncoated and free from oil, lubricants and other deleterious substances.Acceptable for use as follows:

a. Interior dry conditions

2. Zinc Plated: Zinc plating in accordance with ASTM B633, Type III Fe/Zn 5 (SC1) Acceptable for use as follows:

a. Interior dry conditions

3. Hot Dip Galvanized: Carbon steel anchors with hot-dipped galvanized in accordance with ASTM A 153. Acceptable for use as follows:

a. Interior dry conditions
b. Exterior conditions
c. Anchoring galvanized steel elements

4. Stainless Steel: AISI Type 304 or 316 stainless steel and complying with ASTM F 593. Acceptable for use as follows:

a. Anchoring treated lumber elements
b. Anchoring stainless steel elements

B. Nuts

1. Uncoated carbon steel: Acceptable for use as follows:

a. With Uncoated Anchors

2. Hot Dip Galvanized: Hot-dipped galvanized in accordance with ASTM A 153. Acceptable for use as follows:

a. With Zinc Plated Anchors
b. With Hot Dip Galvanized Anchors

3. Stainless Steel: ASTM F594. Acceptable for use as follows:

a. With Stainless Steel Anchors

C. Washers

1. Uncoated carbon steel: Acceptable for use as follows:

a. With uncoated anchors

2. Hot Dip Galvanized: Hot-dipped galvanized in accordance with ASTM A 153. Acceptable for use as follows:

    a. With Hot Dip Galvanized Nuts

3. Stainless Steel: AISI Type 304 or 316 stainless steel. Acceptable for use as follows:

    a. With Stainless Steel Nuts

D. Plate Washers:

1. Uncoated carbon steel: Acceptable for use as follows:

    a. With Uncoated Nuts

2. Hot Dip Galvanized: Hot-dipped galvanized in accordance with ASTM A 153. Acceptable for use as follows:

    a. With Hot Dip Galvanized Nuts

2.3 WEDGE ANCHORS

A. Provide anchors with length identification markings conforming to ICC-ES AC01 or ICC-ES AC193 as appropriate based on the anchor substrate..

B. Size: As indicated on drawings

C. Embedment depth: As indicated on the drawings but not less than the manufacturer's documented minimum embedment depth. Where not specifically indicated use manufacturer's minimum documented embedment depth.

1. Embedment depth is from surface of concrete or masonry. Anchor lengths and extent of threads shall account for embedment depth, connected elements, plate washers, washers, nut and appropriate stick thru.

D. Concrete Anchors:

1. Anchors shall be tested in accordance with ACI 355.2 and the most recent issue of ICC-ES AC193 including the following:

    a. All mandatory testing
    b. Shear and tension in cracked concrete.
    c. Critical and minimum edge distances and spacing

2. Anchors design shall be in accordance with ACI 318 Appendix D
3. Where not specifically indicated otherwise in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

    a. Hilti Kwik Bolt TZ with nut and washer, of required finish, ICC ESR-1917
    b. Approved equal (See substitution requirements)

E. Masonry Anchors:

1. Anchors for masonry shall be tested in accordance with most recent edition of ICC-ES AC01 including the following

    a. All mandatory testing
    b. Seismic tension and shear
    c. Critical and minimum edge distances and spacing

2. Anchors design shall be in accordance with ACI 530
3. Where not specifically indicated otherwise in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

    a. Hilti Kwik Bolt 3 with nut and washer, of required finish, ICC ESR-1385.
    b. Approved equal (See substitution requirements)

2.4 CARTRIDGE INJECTION ADHESIVE ANCHORS

A. Provide anchors with length identification markings conforming to ICC-ES AC58 or ICC-ES AC308.

B. Size: As indicated on drawings

C. Embedment depth: As indicated on the drawings but not less than the manufacturer's documented minimum embedment depth. Where not specifically indicated use manufacturer's minimum documented embedment depth.

1. Embedment depth is from surface of concrete or masonry. Anchor lengths and extent of threads shall account for embedment depth, connected elements, plate washers, washers, nut and appropriate stick thru.

D. Adhesive: Two component epoxy or two component hybrid system.

E. Concrete Anchors:

1. Anchors shall be tested in accordance with the most recent issue of ICC-ES AC308 including the following:

    a. All mandatory testing
    b. Shear and tension in cracked concrete.
    c. Critical and minimum edge distances and spacing

2. Anchors design shall be in accordance with ACI 318 Appendix D as amended by the specific design provisions of ICC-ES AC308
3. Where not specifically indicated otherwise in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

    a. HAS-E Standard or HAS SS rods, washers, and nuts of required finish with Hilti HIT RE 500-SD Adhesive Anchorage System for anchorage to concrete, ICC ESR-2322.
    b. Approved equal (See substitution requirements)

4. Where Hilti HIT-HY 200, ICC ESR-3187 system is specifically indicated in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

a. For anchors 3/8” to 3/4” diameter: HIT-Z Standard or HIT-Z-R SS rods, washers, and nuts of required finish.
b. Approved equal (See substitution requirements)

F. Masonry Anchors:

1. Anchors for masonry shall be tested in accordance with most recent edition of ICC-ES AC58 including the following

a. All mandatory testing
b. Seismic tension and shear
c. Critical and minimum edge distances and spacing

2. Anchors design shall be in accordance with ACI 530
3. Where not specifically indicated otherwise in contract documents or approved performance based shop drawings submittal anchors shall be as follows:

a. Grouted Masonry: HAS-E Standard or HAS SS rods, washers, and nuts of required finish with Hilti HIT HY 70 Adhesive Anchorage System for anchorage to masonry, ICC ESR-2682.
b. Approved equal (See substitution requirements)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.
2. Installation constitutes acceptance of existing conditions and responsibility of satisfactory performance.

3.2 INSTALLATION, GENERAL

A. Where manufacturer recommends the use of special tools for installation of anchors, such tools shall be used.

B. Match mark and drill, match drill or use other methods to ensure anchors are properly located.

C. Do not adjust anchor location after installation. Coordinate with EOR for modifications to connected element where anchors are incorrectly located.

D. All facets of hole drilling, hole cleaning, anchor installation, anchor torqueing shall be in strict accordance with the ICC-ESR report and manufacturer’s data.

E. Drill holes perpendicular to substrate surface.

F. Drill holes with rotary impact hammer drills using carbide-tipped bits or core drills using diamond core bits as indicated in the ICC-ESR report.

G. Drill bits and core bits shall be of diameters indicated in the ICC-ESR report.

H. All holes shall be cleaned with compressed air to remove all drilling dust and other deleterious substances.

I. Remove water from holes to attain a surface dry condition unless specifically permitted otherwise by ICC-ESR report.

J. Base Material Strength: Unless otherwise specified, do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

K. Embedded Items: Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging prestressing tendons, electrical and telecommunications conduit, and gas lines.

L. Perform anchor installation in strict accordance with manufacturer instructions and ICC-ES report.

M. Anchors shall be installed perpendicular to the substrate face within plus or minus 5 degrees unless specifically permitted otherwise by ICC-ESR report.

N. Install plate washers where specifically indicated or where connected elements have oversized holes.

O. Install a round washer under nuts. Round washers are in addition to plate washers where plate washers are required.

3.3 WEDGE ANCHORS

A. Protect threads from damage during anchor installation.

B. Set anchors to manufacturer's recommended torque, using a torque wrench. Following attainment of 10% of the specified torque, 100% of the specified torque shall be reached within 7 or fewer complete turns of the nut. If the specified torque is not achieved within the required number of turns, the anchor shall be removed and replaced unless otherwise directed by the Engineer.

3.4 CARTRIDGE INJECTION ADHESIVE ANCHORS

A. Clean all holes per manufacturer instructions using manufacturer's approved tools to remove loose material and drilling dust prior to installation of adhesive.

B. Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.

C. Follow manufacturer recommendations to ensure proper mixing of adhesive components.

D. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface.

E. Remove excess adhesive from the surface.

F. Shim anchors with suitable device to center the anchor in the hole.

G. Do not disturb or load anchors before manufacturer specified cure time has elapsed.

H. Observe manufacturer recommendations with respect to installation temperatures.

I. Hilti HIT-HY200 system anchors shall be installed using the Hilti Safe Set Technology.

1. For conditions using HAS rods the Hilti hollow drill bit and Hilt vacuum system shall be employed.

3.5 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the schedule of special inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Remove and replace misplaced or malfunctioning anchors. Fill empty anchor holes and patch failed anchor locations with high-strength non-shrink, nonmetallic grout. Anchors that fail to meet proof load or installation torque requirements shall be regarded as malfunctioning.

B. Galvanizing Repairs: Prepare and repair damaged galvanized coatings with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 050520

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Structural steel.

2. Embed Plates
3. Bearing Plates
4. Loose Lintels
5. Shelf Angles anchored to steel structure
6. Brick Shelf Angles, Brick Relieving Angles and Hung Lintels anchored to masonry walls
7. Hung Lintels attached to the steel frame
8. Nonshrink Grout.

B. Products furnished, but not installed under this Section:

1. Loose Steel Lintels, installed under Division 04 Section "Unit Masonry"
2. Brick Shelf Angles, Brick Relieving Angles and Hung Lintels anchored to masonry walls and associated anchors, installed under Division 04 Section "Unit Masonry"
3. Anchor rods and embed plates indicated to be built into masonry, installed under Division 04 Section "Unit Masonry".
4. Anchor rods and embed plates indicated to be cast into cast-in-place concrete, installed under Division 03 Section "Cast-in-place-Concrete"

C. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 05 Section "Metal Stairs."
3. Division 05 Section "Post Installed Structural Anchors" for wedge, and adhesive anchors
4. Division 09 painting Sections and Division 09 Section "High-Performance Coatings" for special surface-preparation and priming requirements.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges" and as modified herein.

B. Architecturally Exposed Structural Steel (AESS): Structural steel designated as architecturally exposed structural steel in the Contract Documents.

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC 360

1.5 SUBMITTALS

A. Contractor's Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

B. Fabricator's Certificate of Compliance Per Division 01 Section "Collective Inspections and Structural Testing"

C. Product Data:

1. Primers

2. Paints
3. Electrodes

a. Indicate what welding process will be used with each electrode
b. Submit electrodes for both shop and field welding

4. Shear stud connectors.
5. Deformed bar anchors.
6. Nonshrink grout.
7. Post installed structural anchors: See specification section 050520

D. Shop Drawings: Show fabrication of structural-steel components.

1. All anchor rods shall be detailed with a minimum 2" projection above top of nut in the final installed condition unless noted otherwise.
2. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
3. Include embedment drawings showing plan location and elevation of all embedded items.
4. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
5. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
6. Include scale drawings of all gusset plates.
7. Provide minimum 1/4" thick cap plates at the ends of all exposed HSS members, and at the top of all HSS columns.
8. Equally space filler beams or joists between columns and/or other dimensioned beams unless noted otherwise.
9. Where delegated design submittals are required the delegated design submittal must be included with associated shop drawings or the submittal will not be reviewed.

E. As-built anchor rod and embed survey

F. Welding certificates

1. Submit welding certificates for all individuals expected to be performing field welding

G. Welding Procedure Specifications (WPS's) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each field welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).

2. Electrode manufacturer and trade name, for demand critical welds.

H. Qualification Data:

1. Fabricator
2. Structural Steel Erector
3. Post Installed Structural Anchor Installer: See specification section 050520

I. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

J. Research/Evaluation Reports:

1. Post Installed Structural Anchors per specification section 050520

K. Material Test Reports
L. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Structural Steel and Architectural Structural Steel Installer Qualifications: The erector shall be experienced in installing structural steel equal in material, design and scope to the structural steel required for this project.

B. Post Installed Structural Anchor Installer: See specification section 050520 for requirements

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.

2. AISC 360.
3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

E. Preinstallation Conference: Conduct conference at Project site.

1. Review special inspection and testing and inspecting agency procedures for field quality control.
2. Review items requiring special inspection and testing that must be tested and inspected prior to installation of decking, concrete slabs, or other items that might limit access to the item to be tested or inspected
3. Review welding requirements
4. Review electrode storage requirements
5. Review pre-construction bolt installation verification
6. Review bolt installation calibration requirements

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. Channels, Angles-Shapes:

1. ASTM A 36 unless noted otherwise
2. ASTM A 572/A 572M, Grade 50 where indicated.

B. Plate and Bar:

1. ASTM A 36 unless noted otherwise
2. ASTM A 572/A 572M, Grade 50 where indicated.

C. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

1. Square or Rectangular HSS: Fy=46 KSI
2. Round HSS: Fy=42 KSI
3. Casings:

a. Structural steel casing consistent with tested assemblies
b. Maximum dimensions of casings shall be as noted on drawings, or as required to fit within the elements concealing the BRB’s.

4. Debonding Agent: Manufacturer’s standard agent suitable to maintain separation of steel core and grout encasement and consistent with tested assemblies
5. Fill Material: Manufacturer’s standard grout suitable for use as a confining fill material and consistent with tested assemblies.

D. Welding Electrodes:

1. Comply with AWS D1.1 requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Thread Studs: ASTM A 108, Grades 1015 through 1020, Full Threaded-stud type, cold-finished carbon steel; AWS D1.1, Type B.

B. Headed Stud Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

C. Deformed Bar Anchors (DBA's): ASTM A496; AWS D1.1

D. Threaded Rods: ASTM A 36 unless noted otherwise.

1. Nuts: ASTM A 563 heavy hex carbon steel.
2. Washers: ASTM A 36/A 36M carbon steel.
3. Finish:

a. Plain for unprimed steel or steel receiving standard shop primer.
b. Hot-dip zinc coating, ASTM A 153/A 153M, Class C for hot galvanized steel or steel to receive high performance top coating.

E. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

1. Finish:

a. Plain for unprimed steel or steel receiving standard shop primer.
b. Hot-dip zinc coating, ASTM A 153/A 153M, Class C for hot galvanized steel or steel to receive high performance top coating.

F. Post Installed Structural Anchors: See specification section 055020 for products

2.3 PRIMER

A. Standard Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

1. Typical all primed steel unless noted otherwise

B. Special Primer: Provide shop primer that complies with Division 09 [**painting Sections.**] [**Section "High-Performance Coatings"** as applicable**.**]

2.4 PAINT

A. Galvanizing Repair Paint: ASTM A 780.

2.5 NONSHRINK GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

F. Deformed Bar Anchors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of deformed bar anchors according to AWS D1.1/D1.1M and manufacturer's written instructions.

G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type:

a. Snug tightened unless noted otherwise

B. Weld Connections:

1. Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.8 CLEANING

A. Clean and prepare faying surfaces in class “B” slip critical connections according to SPSC-SP6 “Commercial Blast Cleaning.”

B. Clean and prepare steel surfaces in class “A” slip critical connections that are to remain unprimed according to SSPC-SP 2, "Hand Tool Cleaning" unless noted otherwise.

C. Clean and prepare steel surfaces that are to remain unprimed according to SSPC-SP 2, "Hand Tool Cleaning" unless noted otherwise.

D. Clean and prepare steel surfaces that are to receive standard primer according to SSPC-SP 3, "Power Tool Cleaning."

E. Clean and prepare steel surfaces that are to receive special primer according to the associated painting specification. When not specifically noted the minimum cleaning shall be SSPC-SP 6, "Commercial Blast Cleaning."

2.9 STANDARD PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.
6. Top flanges of beams to receive field welded headed studs

B. Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

C. Stripe paint corners, crevices, bolts, welds, and sharp edges.

D. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.10 SPECIAL PRIMING:

A. All steel located in exterior spaces shall be shop primed per Division 09 Section ["High Performance Coatings","Exterior Painting"]

B. All steel located in interior spaces but to remain exposed shall be shop primed per Division 09 Section [Interior Painting]

2.11 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize loose and hung lintels, shelf angles, all exposed exterior steel and all steel located in exterior masonry walls unless noted otherwise. Coordinate with drawings and specifications.

a. Galvanized elements to be top coated shall not be quenched, and shall be swept blast to ensure proper adhesion of top coats.

2.12 SOURCE QUALITY CONTROL

A. Testing Agency: Fabricator will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports as required.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M.

E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified as-built survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Where ungrouted anchor rod sleeves are required caulk the annular surface between the sleeve and the anchor rod to prevent grout from entering the sleeves.

2. Set plates for structural members on wedges, shims, or setting nuts as required.
3. Weld plate washers to top of baseplate as indicated.
4. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
5. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

    a. Use grout forms and grout surcharging as required to ensure that grout completely fills the space below bearing or base plate, and no voids remain.

6. Paint base plates, anchor bolts and sections of columns below grade and below finished floor with Coal Tar Mastic Paint.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

G. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

1. For slip crtitical connections enlarge hole to next standard hole size and provide next standard bolt size.

I. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

J. Shelf Angles anchored to steel frame:

1. Sequencing of shelf angle installation shall be as indicated in drawings
2. Unless noted otherwise do not permanently attach shelf angles until concrete slabs have been poured and cured.
3. Once slabs have been poured and cured coordinate final elevation of shelf angle with contract documents and masonry contractor and permanently fasten.

K. Pour stops and edge angles: Pour stops and edge angles shall be field installed based on global building control lines to ensure overall building geometry is maintained.

1. Do not located based on local member geometry.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: As indicated on shop drawings.

B. Finger Tight Bolts: All joints noted as finger tight shall be hand tightened as required to install elements. Do not tighten by mechanical means

1. Provide jam nuts to prevent nut from backing off.
2. After initial tightening turn nut and jam nut in opposite direction to bind them against one another.

C. Weld Connections:

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
3. Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
4. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

D. Post Installed Structural Anchors: See specification section 050520 for products

3.5 FIELD PAINTING

A. Field painting of structural steel for finished appearance in exposed conditions or for high performance coating systems is specified in Division 09 painting sections.

3.6 FIELD QUALITY CONTROL

A. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B. Touchup Painting: At all exterior and exposed interior conditions promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.

1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
2. Apply a primer of same type as shop primer used on adjacent surfaces. Coordinate with Part 2 priming requirements

END OF SECTION 051200

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This specification section addresses structural cold-formed elements specifically designed and detailed in the contract documents. These elements do not require delegated design to be completed via the shop drawing process.

B. This Section includes the following:

1. Exterior non-load-bearing wall framing.

C. Related Sections include the following:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 05 Section "Structural Steel" for masonry shelf angles and connections.
3. Division 05 Section "Post Installed Anchors" for wedge, expansion and adhesive anchors
4. Division 09 Section "Non-Structural Metal Framing" for interior non-load-bearing, non-structural, metal-stud framing and ceiling-suspension assemblies.
5. Division 06 Section "Sheathing" for sheathing of cold formed walls and roofs other than sheet steel sheathing.
6. Division 05 Section "Post Installed Structural Anchors" for wedge, and adhesive anchors

1.3 DEFINITIONS

1.4 PERFORMANCE REQUIREMENT

A. Framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

1. Upward and downward movement of:

a. Design gap 3/4" inch.
b. 100% movement up and down
c. Horizontal Drift of 0 inch

B. Powder Actuated Fasteners: The basis of design product is as specified in this specification and the contract documents. Product substitutions must have capacities equal to or greater than values indicated in the referenced ESR report for each specific condition. See requirements for substitution submittals.

1.5 SUBMITTALS

A. Shop Drawings

1. Custom Clips

B. Product Data:
1. Galvanizing Repair Paint
2. Bridging
3. Punched Studs, Rafters and Joists
4. Unpunched Joists
5. Tracks
6. Grout
7. Shims
8. Miscellaneous structural clips and accessories
9. Post installed structural anchors: See specification section 050520

C. Contractor’s Statement of Responsibility Per Division 01 Section "Collective Inspections and Structural Testing"

D. Welding certificates.

1. Submit welding certificates for all individuals expected to be performing field welding

E. Welding Procedure Specifications (WPS's) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code -Steel" and AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel," for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

F. Research/Evaluation Reports:

1. For cold-formed metal framing in fire resistance assemblies submit reports per the assembly specification
2. Submit ICC reports for the following:

a. Vertical deflection clips
b. Mechanical fasteners
c. Power actuated fasteners
d. Single Deflection Track
e. Post installed structural anchors: See specification section 050520

G. Substitutions:

1. Substitution requests may only be made using products with ICC-ESR reports specific to the product application shown in the contract documents.
2. Any increase in material or labor cost resulting from the substitution shall be the responsibility of the contractor.

H. Qualification Data:

1. Post Installed Structural Anchor Installer per specification section 050520

2. Power Actuated Fastener Installer: Submit installer qualification data as stated in Quality Assurance section. Qualifications shall be submitted in a letter format for each type of anchor to be installed, and shall include the following.

   a. The specific product to be used

   b. Complete description of installation procedure

   c. Manufacturer’s training certificates

1.6 QUALITY ASSURANCE

A. Post Installed Structural Anchor Installer: See specification section 050520 for requirements

B. Installer Qualifications: The installer shall be experienced in installing cold formed steel equal in material, design and scope to that required for this project.

C. Power Actuated Fastener Installer: All installers shall be experienced in installing anchors equal to type and into the substrate material required for the project. All installers shall have a manufacturer’s training certificate.

D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

E. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

F. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" including 2004 supplement and its "Standard for Cold-Formed Steel Framing - General Provisions."

G. Section Properties: All section properties are shall conform to The Steel Stud Manufacturer's Association's, "Product Technical Information", 2001, ICBO ER-494P.

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

   1. Review special inspection and testing and inspecting agency procedures for field quality control.
   2. Review Power Actuated Fastener Installer requirements

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

C. Store cold-formed metal framing on supports off the ground

D. Keep cold-formed metal framing fee of dirt and foreign matter.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

1. Clark Steel Framing.
2. Dietrich Metal Framing; a Worthington Industries Company.
3. MarinoWare; a division of Ware Industries.
4. The Steel Network, Inc.
5. Simpson Strong Tie Company Inc.

2.2 MATERIALS

A. Steel Sheet for Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: 50, Class 1 or 2.
2. Coating: G60 or better.

2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated, but not less than 43 mils.
2. Flange Width: As indicated, but not less than 1-5/8 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated, but not less than 43 mils.
2. Flange Width: As indicated, but not less than 1-1/2 inches.

C. Steel Box Headers: Manufacturer's standard C-shapes used to form header beams in a boxed configuration, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated, but not less than 43 mils.
2. Flange Width: As indicated, but not less than 1-1/2 inches.

A. Vertical Deflection Clips: Manufacturer's standard bypass or head clips as required by detailing condtions, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

B. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement,

with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: As indicated, but not less than 43 mils.
2. Flange Width: 1 inch plus twice the design gap.
3. Flanges: Provide flanges with slotted holes at regular intervals to allow for positive attachment of studs while allowing for vertical movement up to the design gap dimension.

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, grade and coating as follows:

1. Grade:
   a. ST33H for 30, 33, and 43 mil products unless noted otherwise.
   b. ST50H for 54,68, and 97 mil product unless noted otherwise.

2. Coating: G60.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Bracing, bridging, and solid blocking.
2. Anchor clips.
3. Foundation clips.
4. Gusset plates: minimum 54 mils unless specifically noted otherwise.
5. Joist hangers and end closures.
6. Hole reinforcing plates.
7. Backer plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel, and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C. Acceptable bolt configuration as follows:

1. Hex-headed bolts
2. Headless bolts, with encased end threaded

   a. Tack welded nut on threaded end at specified embedment depth
   b. Alternately, provide a nut at specified embedment depth and jam nut below the nut at specified embedment depth

C. Post installed structural anchors: See specification section 050520

D. Power-Actuated Anchors: Basis of design product as indicated on drawings. See requirements for substitution submittals. Where not specifically indicate the basis of design fasteners shall be Hilti X-U fasteners in accordance with ICC ESR-2269.

1. Diameter: 0.157” unless noted otherwise

2. Concrete Embedment: 1 ½ inches unless noted otherwise
3. Steel Embedment: The lesser of ½ inch or the tip fully penetrating base metal.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A 780.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

C. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

D. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.7 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to drawings, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

C. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

E. Cut framing members by sawing or shearing; do not torch cut.

F. All joist studs, joists, and rafters shall be cut such that the extreme edge of web openings are a minimum of 10 inches away from member ends, bearing points, or attachments of other structure.

G. Post installed structural anchors: See specification section 050520

H. Fasten cold-formed metal framing members as noted in the drawings. Where not specifically indicated fasten by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

1. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
2. Locate mechanical fasteners and install according to drawings, and the following requirements:

a. Minimum edge distance and center to center spacing of fasteners shall be three fastener diameters unless noted otherwise.
b. Minimum screw penetration shall leave at least 3 exposed threads on the backside of connection unless noted otherwise.

I. Install framing members in one-piece lengths unless splice connections are indicated. Provide tracks and structural fascia track in longest lengths practical. Splice per typical details.

1. Do not splice diagonal strap bracing unless specifically indicated.

J. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

K. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

L. Install insulation, specified in Division 07 Section "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

M. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

N. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. All studs shall be cut such that the extreme edge of web openings are a minimum of 10 inches away from member ends, bearing points and attachment of other structure.

B. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

1. Anchor Spacing: As indicated

C. Fasten both flanges of studs to bottom track only, unless otherwise indicated. Do not fasten studs to top track unless specifically indicated. Space studs as follows:

1. Stud Spacing:As indicated, 16" where not specifically indicated.

D. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

E. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support as indicated in details.

F. Install horizontal bridging in wall studs, spaced in rows indicated in drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track (as occurs): Install row of horizontal bridging within 18 inches of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

a. Install solid blocking at centers indicated, but not more than 96 inches.

2. Bridging: As indicated on drawings. Where not specifically indicated provide combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs.

a. Provide straps on each face of stud and fasten to each stud flange with (1)-#10 screws.
b. Only splice straps at solid blocking.
c. Fasten strap to solid blocking with (8)-#10 screws. At splices fasten all screws through both plies of splice.
d. Provide solid blocking at centers not exceeding 96 inches.
e. Securely fasten solid blocking to stud webs using 54 mil clips and (4)-#10 screws from blocking to clip and clip to stud web.

3. bars installed according to manufacturer's written instructions.

G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

A. Testing and Inspection: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports in accordance with the schedule of special inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 07 1300
SHEET WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sheet membrane waterproofing.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete substrate.

1.03 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2006a (Reapproved 2013).

B. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single Ply Roof Membrane; 2013.

C. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems; 2014.

D. ASTM D5602/D5602M - Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens; 2011.

E. ASTM D6134 - Standard Specification for Vulcanized Rubber Sheets Used in Waterproofing Systems; 2007 (Reapproved 2013).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for membrane.

C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

D. Manufacturer's Installation Instructions: Indicate special procedures.

1.05 QUALITY ASSURANCE

A. Membrane Manufacturer Qualifications: Company specializing in waterproofing sheet membranes with three years experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years experience.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

PART 2 PRODUCTS

2.01 WATERPROOFING APPLICATIONS

A. EPDM Rubber Sheet Waterproofing: Use at porch under slate tile.
   1. Horizontal Surfaces: Adhesive bonded to substrate.
   2. Cover with drainage panel.

2.02 MEMBRANE MATERIALS

A. EPDM Rubber Membrane: Ethylene-propylene-diene terpolymer rubber sheet complying with ASTM D4637/D4637M Type I unreinforced and with soil burial resistance requirement of ASTM D6134.
   1. Thickness: 0.060 inch, minimum.
   2. Sheet Width: As large as is practical, with factory vulcanized splices.
   3. Field Seaming: Contact cement and lap edge sealant.
   4. Ultimate Elongation: 300 percent, minimum, measured in accordance with ASTM D412.

5. Tensile Strength: 1200 pounds per square inch, measured in accordance with ASTM D412.
6. Puncture Resistance: Withstanding 55 pounds-force, minimum, when tested in accordance with ASTM D5602/D5602M.
7. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
8. Flashing: Cured EPDM rubber sheet.
9. Manufacturers:
    a. Carlisle Coatings & Waterproofing Incorporated; Sure-Seal EPDM Membrane: www.carlisle-ccw.com.
    b. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

A. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.

B. Flexible Flashings: Type recommended by membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.

C. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions. Vacuum substrate clean.

C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

D. Fill non-moving joints and cracks with a filler compatible with waterproofing materials.

E. Seal moving cracks with sealant, not rigid filler, using procedures recommended by sealant and waterproofing manufacturers.

F. Prepare building expansion joints as indicated on drawings.

G. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer. Protect conditioner from rain or frost until dry.

H. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate according to ASTM D5295/D5295M.
    1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.
    2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, rutted cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in the reference standard.
    3. Remove and replace areas of defective concrete as specified in Section 03 3000.
    4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in the referenced standard.
    5. Test concrete surfaces as described in the referenced standards. Verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

3.03 INSTALLATION - MEMBRANE

A. Install membrane waterproofing in accordance with manufacturer's instructions.

B. Roll out membrane. Minimize wrinkles and bubbles.

C. Adhesive Bonded Membrane: Apply adhesive in accordance with manufacturer's instructions. Bond sheet to substrate except those areas directly over or within 3 inches of a control or expansion joint.

D. Overlap edges and ends and seal by method recommended by manufacturer, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.

E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

F. Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.

G. Install building expansion joints as indicated on drawings.

H. Install flexible flashings. Seal items penetrating through membrane with flexible flashings. Seal watertight to membrane.

I. Seal membrane and flashings to adjoining surfaces. Install termination bar at all edges. Install counterflashing over all exposed edges.

3.04 PROTECTION

A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION

SECTION 07 1406

BITUMEN BASED WATERPROOFING SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Base Bid includes a modified bitumen, fluid applied waterproofing system over the existing concrete surfaces at the entrance plaza deck and stairs.

1. Minimum 120 mils rubberized asphalt for base coat, polyester reinforcing and minimum 90 mils top coat.

2. Assembly to include a protection/drainage mat.

3. A two-ply base flashing system of neoprene or modified bitumen base material.

B. Limited concrete repairs per Section 03 9101, Polymer Modified Concrete Restoration shall be included to provide suitable substrate.

C. Acceptable Waterproofing Manufacturers Systems:

1. Carlisle, CCW-500-R

2. CETCO, Strata Seal HR

3. Hydrotech, Monolithic Membrane 6125

4. Soprema, Sopra-Seal H

D. Each area shall be flood tested in accordance with ASTM D 5957.

E. Sealant to be compatible with waterproofing system and in accordance with Section 07 9210, Sealants for Building Envelope.

1.02 RELATED REQUIREMENTS

A. The provisions of the Instructions to Bidders, General Conditions, and Supplementary Conditions of these specifications shall govern work under this Section.

B. Section 02 0500: Demolition and Removal

C. Section 03 9101: Polymer Modified Concrete Restoration

D. Section 07 6000: Sheet Metal

E. Section 07 9210: Sealants for Building Envelope

1.03 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced, and to provide any clarifications for issues not covered within this specification.

B. ASTM INTERNATIONAL (ASTM):

1. ASTM C 272 (2007) Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions

2. ASTM C 518 (2004) Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

3. ASTM C 578 (2007) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

4. ASTM C 836 (2006) High Solids Content, Cold Liquid Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.

5. ASTM C 957 (2006) High Solids Content, Cold Liquid Applied Elastomeric Waterproofing Membrane with Intergral Wearing Surface.

6. ASTM D 1056 (2007) Flexible Cellular Materials – Sponge or Expanded Rubber.

7. ASTM D 1621 (2004) Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

8. ASTM D 1751 (2004) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

9. ASTM D 1752 (2004) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

10. ASTM D 1777 (2007) Standard Test Method for Thickness of Textile Materials

11. ASTM D36 (2006) Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)

12. ASTM D 4491 (2004) Standard Test Methods for Water Permeability of Geotextiles by Permittivity

13. ASTM D 4716 (2004) Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head

14. ASTM D 5329 (2004) Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphaltic and Portland Cement Concrete Pavements

15. ASTM D 5957 (2005) Standard Guide for Flood Testing Horizontal Waterproofing Installations

16. ASTM D 896 (2004) Standard Practice for Resistance of Adhesive Bonds to Chemical Reagents

17. ASTM E96/E96M (2005) Standard Test Methods for Water Vapor Transmission of Materials

C. TCNA TILE COUNCIL OF NORTH AMERICA

D. NATIONAL ROOFING CONTRACTORS ASSOCATION (NRCA):

1. The NRCA Green Roof Systems Manual, 2007 Edition.

1.04 SUBMITTALS

A. Submit the following in accordance with Division 01, Submittals.

B. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

C. Product Data: Provide data for material description, physical properties, recommended storage conditions, shelf life, precautions, flexible flashings, joint cover sheet, and joint and crack sealants, with temperature range for application of waterproofing membrane.

D. Manufacturer's Installation Instructions: Including special procedures and perimeter conditions requiring special attention.

E. Applicator: Provide documentation for the following:

1. Company specializing in performing the work of this section approved by manufacturer with five (5) years experience with specific system type required.

2. The Contractor shall have completed five (5) projects of a similar size and system type in the last two (2) years.

F. Information Card(s)

1. For each assembly, submit a photocopy or typewritten information card containing the information as listed at the end of this section.

G. Safety Data Sheets (SDS): Submit Safety Data Sheets with each specification section and include with Safety Plan.

1.05 QUALITY ASSURANCE

A. Qualifications of Applicator

1. Applicator shall be approved in writing by the system manufacturer and shall have a minimum of 5 years experience as an approved applicator with the manufacturer.

2. Contractor shall be certified/approved to provide the required warranty.

3. Applicator shall also have applied 5 installations of similar size and scope as this project, within the previous 3 years.

1.06 PRE-WATERPROOFING CONFERENCE

A. Prior to starting application of roof assembly including the waterproofing membrane system, arrange and attend a pre-waterproofing conference to ensure a clear understanding of drawings and specifications. Give the Architect/Consultant/Engineer 7 days advance written notice of the time and place of the meeting. Ensure that the mechanical and electrical subcontractor, flashing and sheet metal subcontractor, and other trades that may perform other types of work on or over the membrane after installation, attend this conference.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's unopened and undamaged containers bearing the following information:

1. Name of manufacturer.

2. Name of contents and products code.

3. Net volume of contents.

4. Lot or batch number.

5. Storage temperature limits.

6. Shelf life expiration date.

7. Mixing instructions and proportions of contents.

8. Safety information and instructions.

9. Store and protect materials from damage and weather in accordance with manufacturer's instructions.

B. Store materials at temperatures between 50 and 90 degrees F (10 and 32 degrees C). Keep out of direct sunlight.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not apply if ambient temperatures are expected to fall below 40 degrees F (5 degrees C) or if rain is expected before the application has time to cure.

1.09 WARRANTY

A. Contractor and manufacturer warranties shall be exclusive and independent of each other. Each warranty shall be issued directly to the Owner and dated as noted below.

B. Furnish the Three-Year Contractor Warranty as provided at the end of this section. The warranty period shall be not less than 3 years from the date of substantial completion.

1. If the Contractor fails to perform repairs within 72 hours of written notification, the warranty will not be voided because of work being performed by others to repair deficiencies/failures regardless of manufacturer’s warranty to the contrary.

C. Manufacturer's Warranty

1. Furnish manufacturer's no monetary limitation (no-dollar-limit) materials and workmanship warranty for the system. The warranty period shall be not less than 5 years from the date of substantial completion. The warranty shall be issued directly to the Owner. The warranty shall provide that if within the warranty period the system becomes non-watertight or shows evidence of failure, rupture or excess weathering due to deterioration of the system resulting from defective materials or installed workmanship the repair or replacement of the defective materials and correction of the defective workmanship shall be the responsibility of the manufacturer. Repairs that become necessary because of defective materials and

workmanship while the system is under warranty shall be performed within 7 days after notification, unless additional time is approved by the Owner. Failure to perform repairs within the specified period of time will constitute grounds for having the repairs performed by others and the cost billed to the manufacturer.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Acceptable Waterproofing Manufacturers Systems:

1. Carlisle, CCW-500-R
2. CETCO, Strata Seal HR
3. Hydrotech, Monolithic Membrane 6125
4. Soprema, Sopra-Seal H

2.02 MEMBRANE COMPOUND MATERIAL

A. A primer and two-application and reinforcing system, specifically designed for application onto concrete surfaces for garden roof systems is required.

B. Contractor is to provide a waterproofing system, which adheres to this scope of work, and is installed in accordance with the manufacturer's printed instructions. Catalog data describing the specific coating system intended to be used and application procedures; is required.

2.03 ACCESSORIES

A. Flashing Fabric: Polyester, non-woven, stitch or spun bonded heat-set fabric to be used at all locations.

1. Minimum 1.5 ounce/square yard.

B. Prefabricated Drainage Course

1. A composite drainage system consisting of a three-dimensional, crush-proof, drainage core and a filter fabric meeting the following physical properties.

PROPERTY	TEST METHOD	VALUES
CORE:		
Compressive Strength	ASTM D 1621	minimum -30,000 psf
Thickness	ASTM D 1777	-.25 in
Flow, Q @ 3600 psf & Hydraulic gradient of 1	ASTM D 4716	minimum -7 gpm/ft width
FABRIC:		
Flow	ASTM D 4491	Minimum -150 gpm/ft^2

C. Surface Primer: Selected manufacturers recommended primer.

D. Extruded edge flashings components

E. Reinforced Mortar Bed: Minimum 2 inch polymer modified or epoxy mortar bed and as recommended by the waterproofing manufacturer for the application. Reinforced mortar bed shall be sloped to match slope of the existing patio/plaza deck.

F. Separation Sheet/Protection Course: (or approved equal)

1. A fiberglass reinforced rubberized asphalt sheet.

2. A fire resistant, fiberglass reinforced, granular surfaced, rubberized asphalt cap sheet.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify substrate surfaces are durable; free of frozen matter, dampness, loose particles, cracks, pits, projections, or foreign matter detrimental to adhesion or application of waterproofing system.

B. Verify that substrate surfaces are smooth, and not detrimental to full contact bond of waterproofing materials.

3.02 PREPARATION

A. Care shall be taken during the preparation and application process.

1. Contractor is responsible for any and all damages that result from the removal, preparation and application process.

2. This applies to this property, its occupants and all surrounding properties.

3. Protect adjacent surfaces not designated to receive waterproofing.

B. Surface must be free of all contaminants and cleaned of all dirt, loose excess mortar/stucco or foreign materials.

1. Chalking must be minimized to acceptable levels for proper application of primer and coating system.

C. Repair all damaged concrete surfaces of substrate.

1. All cracks and voids shall be filled and patching completed as necessary.

2. See following criteria for repair of cracks in concrete surfaces.

Crack Size and Product Description	And Method of Treatment
.004-.010 (4-10 mils)	Hairline shrinkage cracks of this size will usually be filled by normal procedures.
.010-.032 (10-32 mils)	Elastomeric coatings will fill and span cracks up to 1/32 inch. A credit card width or greater needs to be treated with a manufacturers recommended filler material in a separate step.
.032-.125 (32-125 mils)	Cracks from 1/32 inch to 1/8 inch (125 mils) require treatment with the manufacturers recommended sealant applied in a 2 inch wide band, crowned at the center and feathered at the edges to conceal the repair.
.125-.250 (125-150 mils)	Cracks greater than 1/4-inch shall be brought to the attention of the Architect/Consultant/Engineer immediately. You shall repair these dimension cracks in accordance with Section 03 9101, Polymer Modified Concrete Restoration.
.250-.500 (250-500 mils)	Cracks greater than 1/2-inch shall be brought to the attention of the Architect/Consultant/Engineer immediately. You shall repair these dimension cracks in accordance with Section 03 9101, Polymer Modified Concrete Restoration.

3.03 SPECIAL PRECAUTIONS

A. Protect waterproofing materials during transport and application. Do not dilute primers and other materials, unless specifically recommended by materials manufacturer. Keep containers closed except when removing contents. Do not mix remains of unlike materials. Thoroughly remove residual materials before using application equipment for mixing and transporting materials. Do not permit equipment on the project site that has residue of materials used on previous projects. Use cleaners only for cleaning, not for thinning primers or membrane materials. Ensure that workers and others who walk or rest on cured membrane wear clean, soft-soled shoes to avoid damaging the waterproofing materials.

3.04 APPLICATION

A. Squeegee apply each application in accordance with manufacturer's instructions.

B. Thoroughly work fluid applied materials into joints, crevices, and open spaces.

C. Apply two coats of waterproofing material.

D. Apply waterproofing material free of runs, drops, ridges, waves, laps, brush marks, and variations in color.

E. Provide fabric reinforcing at all locations, including angle or directional changes.

3.05 FIELD QUALITY CONTROL

A. Moisture Test - Prior to application of fluid-applied waterproofing, measure moisture content of substrate with a moisture meter in the presence of the Roof Architect/Consultant/Engineer. An acceptable device is the Delmhorst Moisture Mete, Model BD7/2D/CS, Type 21E. Similar meters by other manufacturers, which are suitable for the purpose, may be used as approved by the Contracting Officer. Do not begin application until mete reading indicates “dry” range.

B. Film Thickness - Measure wet film thickness every 100 square feet during application by placing flat metal plates on the substrate or using a mil-thickness gauge especially manufactured for the purpose.

C. Flood Test – Complete flood test of all areas in accordance with ASTM D 5957 and provide a summary report of tests and documentation that all areas passed.

3.06 INFORMATION CARD(S)

A. Install a photoengraved or etched aluminum information card (for exterior display) at location to be determined by Architect/Consultant/Engineer. Information listed on the Information Card is located at the end of this section

B. A card shall be provided for each differing assembly and be a minimum size of 8-1/2 by 11 inches.

C. Secure with removable stainless steel screws at approved location.

D. A hard copy of each card is required in the Close-Out Documents.

END OF SECTION

BITUMEN BASED WATERPROOFING SYSTEM

WHEREAS,_____ of

(Address)_____

_____, Telephone:_____ herein called the "Contractor", has performed bitumen based waterproofing system work on the following project:

Owner:_____

Address:_____

_____, Telephone:_____

Name and Type of Building:_____

Address:_____

Area of Work:_____

Date of Acceptance:_____

Guarantee Period: **Three Years** Date of Expiration: _____

AND WHEREAS, the Contractor has contracted to warrant said work against leaks and faulty or defective materials and workmanship for the designated Guarantee Period; NOW, THEREFORE, the Contractor hereby warrants, subject to the terms and conditions herein set forth, that during the Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition.

This Warranty is made subject to the following terms and conditions:

1. Warranty covers work made by contractor to said roof assembly under this contract and does not cover work by others or future defects not directly attributable to work performed.

2. Specifically excluded from this Warranty are damages to the work, other parts of the building and building contents caused by: a) lightning, windstorm, hailstorm, and other unusual phenomena of the elements; b) fire c) failure of the assembly system substrate including cracking, but excluding hairline cracking, settlement, excessive deflection, deterioration, and decomposition; d) faulty construction of parapet walls, copings, vents, equipment supports, and other edge conditions and penetrations not included in the project; e) repeated vapor condensation on the bottom of assembly; and f) activity on the assembly by others including construction contractors, maintenance personnel, other persons, and animals whether authorized or unauthorized by Owner. When the work has been damaged by any of the foregoing causes, the Warranty shall be null and void until such damage has been repaired by the Owner or by another responsible party so designated.

3. The Contractor is responsible for damages to work covered by this Warranty.

4. During the Warranty Period, if the Owner allows alteration of the work by anyone other than the Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on the roof, this Warranty shall become null and void upon the date of said alterations, but only to extent said alterations affect work covered by this Warranty. If the Owner engages the Contractor to perform said alterations, the Warranty shall not become null and void, unless the Contractor, prior to proceeding with said work, shall have notified Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a termination of this Warranty.

5. During the Warranty Period, if the original use of the roof is changed and it becomes used for, but was not originally specified for other use or service more severe than originally specified, this Warranty shall become null and void upon the date of the said change, but only to the extent said change affects work covered by this Warranty.

6. The Owner shall promptly notify the Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

7. Contractor will promptly inspect reported leaks and if found to be attributed to work performed, make the required repairs.

    a. If leaks are found to be from other sources, contractor shall so inform owner and make the needed repairs. There will be no charge for this service call.

    b. Future service calls and leak repairs not attributed to contractors work will be for Owner's account. Cost of repairs will be at a fair and reasonable rate. Materials required will be at cost plus 15%.

8. This Warranty is recognized to be the only warranty of Contractor on said work, and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to him in cases of assembly failure. Specifically, this Warranty shall not operate to relieve Contractor of his responsibility for performance of the original work, regardless of whether Contract was a contract directly with Owner, or a subcontract with Owner's General Contractor.

IN WITNESS WHEREOF, this instrument has been duly executed this _____ day of _____, 20_____.

Contractor's Signature:_____

Typed Name:_____

As Its (position):_____

Date:_____

BITUMEN BASED WATERPROOFING SYSTEM INFORMATION CARD

1. Contract Number:_____
2. Date Work Completed:_____
3. Project Specification Designation:_____
4. Substrate Material:_____
5. Slope of Substrate:_____
6. Drains Type/Manufacturer:_____
7. Waterproofing
   a. Bitumen Based Waterproofing (Hot Rubberized)
   b. Primer
   c. Polyester Reinforcing Fabric (type and thickness)
   d. Materials Manufacturer(s)
   e. Base Flashing System
8. Root Barrier
   a. Type
   b. Thickness
   c. Manufacturer's Name
9. Protection Board
   a. a. Type
   b. b. Thickness
   c. c. Manufacturer's Name
10. Drainage Mat Material
11. Medium
    a. Material
    b. Thickness (type extensive, intensive, etc.)
    c. Type
    d. Vegetation
12. Statement of Compliance or Exception:_____
    _____

Contractor's Signature _____ Date Signed_____

SECTION 07 1813

PEDESTRIAN TRAFFIC COATING ASSEMBLY

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes providing the elastomeric coating system for the rear terrace and stairs of the building.

1. Complete removal of the existing coating system is required.

2. All concrete surfaces of these areas shown in the Contract Documents are included.

3. Minor and miscellaneous concrete repairs are included within this project as required to provide a suitable substrate in accordance with Section 03 9101, Polymer Modified Concrete Restoration.

B. The preparation of the existing surface, including the existing coating, is included within this project.

C. Removal of all existing sealants in areas of work and replacement with new in accordance with Section 07 9210, Sealants for Building Envelope and compatible with coating system.

D. A three (3) year contractor warranty and a five (5) year manufacturer's warranty are required.

1. Any additional requirements greater than those identified in the Contract Documents shall be included within the Bid (i.e. mil thickness, surface preparation, etc.) to attain the required warranties.

E. The existing conditions include:

1. A large portion of the terrace is considered 'slab on grade' where soil/fill exists directly below the concrete. Coating must be approved for applications on grade.

2. The existing surfaces include:

a. A large percentage of the terrace has an existing coating system in place (85% +/-). Removal of the existing coating is required.

b. The stair structures are corroded in several areas which will require repairs as necessary to provide a suitable substrate for the traffic coating and associated sealants.

1.02 RELATED REQUIREMENTS

A. The provisions of the Instructions to Bidders, General Conditions, and Supplementary Conditions of these specifications shall govern work under this Section.

B. Section 02 0500: Demolition and Removal

C. Section 03 9101: Polymer Modified Concrete Restoration

D. Section 04 5005: Minor Masonry Restoration and Cleaning

E. Section 07 9210: Sealants for Building Envelope

1.03 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced, and to provide any clarifications for issues not covered within this specification.

B. American Society for Testing and Materials (ASTM):

1. ASTM C 836 (2005) High Solids Content, Cold Liquid Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.

2. ASTM C 957 (2005) High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Intergral Wearing Surface.

3. ASTM D 1056 (2000) Flexible Cellular Materials – Sponge or Expanded Rubber.

4. ASTM D 1751 (2004) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

5. ASTM D 1752 (2004) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.04 SUBMITTALS

A. Submit the following in accordance with the Submittals Section.

B. No work will begin until all submittals have been received and approved and Pre-Maintenance/work Conference has been completed.

C. Certified letter from manufacturer acknowledging he has read this specification section and can provide coating system(s) to meet this section and provide the warranty required.

D. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

E. Product Data: Provide data for material description, physical properties, recommended storage conditions, shelf life, precautions, and temperature range for the coating system.

F. Product Data: Provide data for material description, physical properties, recommended storage conditions, shelf life, precautions, flexible flashings, and joint and crack sealants, with temperature range for the coating system.

G. Data for wet and dry film thicknesses of each application coat.

H. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

I. Applicator: shall meet the qualification requirements including:

1. Company specializing in performing the work of this section approved by manufacturer.

2. The contractor shall have completed three projects of a similar size and nature in the last three years.

J. Information Card(s)

1. For each assembly, submit a photocopy or typewritten information card containing the information as listed at the end of this section.

K. Safety Data Sheets (SDS): Submit Safety Data Sheets with each specification section and include with Safety Plan.

1.05 QUALITY ASSURANCE

A. Qualifications of Applicator

1. Applicator shall be approved in writing by the system manufacturer and shall have a minimum of 5 years experience as an approved applicator with the manufacturer.

2. Contractor shall be certified/approved to provide the required warranty.

3. Applicator shall also have applied 5 installations of similar size and scope as this project, within the previous 3 years.

1.06 PRE-INSTALLATION MEETING

A. Prior to starting application of coating system, arrange and attend a pre-installation meeting to ensure a clear understanding of drawings and specifications. Give the Architect/Consultant/Engineer 7 days advance written notice of the time and place of the meeting. Ensure that the mechanical and electrical subcontractor, flashing and sheet metal subcontractor, and other trades that may perform other types of work on or over the membrane after installation, attend this conference.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's unopened and undamaged containers bearing the following information:

1. Name of manufacturer.

2. Name of contents and products code.

3. Net volume of contents.

4. Lot or batch number.

5. Storage temperature limits.

6. Shelf life expiration date.

7. Mixing instructions and proportions of contents.

8. Safety information and instructions.

9. Store and protect materials from damage and weather in accordance with manufacturer's instructions.

B. Store materials at temperatures between 50 and 90 degrees F (10 and 32 degrees C). Keep out of direct sunlight.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not apply if ambient temperatures are expected to fall below 40 degrees F (5 degrees C) or if rain is expected before the application has time to cure.

B. Do not apply when there is ice, frost, or any other type of moisture on the substrate to receive coating materials.

1.09 WARRANTY

A. Contractor and manufacturer warranties shall be exclusive and independent of each other. Each warranty shall be issued directly to the Owner and dated as noted below.

B. Furnish the Three-Year Contractor Warranty as provided at the end of this section. The warranty period shall be not less than 3 years from the date of substantial completion.

1. If the Contractor fails to perform repairs within 72 hours of written notification, the warranty will not be voided because of work being performed by others to repair deficiencies/failures regardless of manufacturer's warranty to the contrary.

C. Manufacturer's Warranty

1. Furnish manufacturer's no monetary limitation (no-dollar-limit) materials and workmanship warranty for the system. The warranty period shall be not less than 5 years from the date of substantial completion. The warranty shall be issued directly to the Owner. The warranty shall provide that if within the warranty period the system becomes non-watertight or shows evidence of failure, delamination, rupture or excess weathering due to deterioration of the system resulting from defective materials or installed workmanship the repair or replacement of the defective materials and correction of the defective workmanship shall be the responsibility of the manufacturer. Repairs that become necessary because of defective materials and workmanship while the system is under warranty shall be performed within 30 days after notification, unless additional time is approved by the Owner. Failure to perform repairs within the specified period of time will constitute grounds for having the interim repairs performed by others with no affect to the warranty.

PART 2 - PRODUCTS

2.01 DESCRIPTION OF COATING SYSTEM

A. Primer.

B. Three coat system: Base Coat, Intermediate Coat, and Finish Coat.

C. Aggregate/Surfacing.

2.02 MATERIALS

A. Primers: Are required. Use the specific primer recommended for each condition or surface.

B. Base Coat: High solids, self leveling and flashing grade, single component moisture curing coating.

C. Intermediate Coat: High solids, self leveling, and flashing grade, single component, moisture curing coating used as an intermediate coat and/or finish coat.

D. Finish Coat: High solids, self leveling, and flashing grade, single component, and moisture curing coating used as an intermediate coat and/or finish coat.

E. Aggregate: Rounded, silica aggregate for broadcast into intermediate coat to refusal.

F. Sealant and associated accessories are covered in Section 07 9210, Sealants for Building Envelope.

2.03 MANUFACTURERS

A. Manufacturers must meet all requirements of the contract including:

1. Certification acknowledging reading this specification section.

2. Providing the requirement manufacturer's warranty.

B. Upon confirmation of all the above requirements, the below manufacturers may be considered.

1. BASF Sonoshield Sonoguard Deck Coating System

2. Pecora-Deck Deck Coating System (802/804/806).

3. Sikalastic Deck Coating System (720/745)

4. Neogard Peda-Gard Deck Coating System (FC7520/FC7962)

2.04 MEMBRANE COMPOUND MATERIAL

A. A primer/sealer, specifically designed for application onto aged concrete and repaired concrete surfaces is required.

1. A conditioner may be required based on the existing coating type.

B. Contractor is to provide a three-coat system independent of the primer application, which adheres to this scope of work, and is installed in accordance with the manufacturer's printed instructions. Catalog data describing the specific coating system intended to be used, and application procedures; is required.

2.05 ACCESSORIES

A. Patching Mortar: Patching mortar for concrete repairs. See Section 03 9101, Polymer Modified Concrete Restoration for additional requirements.

B. Sealants in accordance with Section 07 9210, Sealants for Building Envelope.

C. Flashing or Joint Fabric: Min. 24 mil thick polyester, fabric to be used at all locations where extra reinforcement is required at cracks, terminations and transitions areas and as indicated by the coating manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify substrate surfaces are durable; free of frozen matter, dampness, loose particles, cracks, pits, projections, or foreign matter detrimental to adhesion or application of coating system.

B. Verify that substrate surfaces are smooth, and not detrimental to full contact bond of coating materials.

C. Complete any necessary compatibility or adhesion testing required for the existing conditions.

D. Any conditions which are not included within the scope of this project that will affect the successful application of this project must be brought to the attention of the Owner and the Architect/Consultant/Engineer immediately.

3.02 PREPARATION

A. Care shall be taken during the preparation and application process.

1. Contractor is to completely seal all entrances and other opening to the underside/interior of facility in the immediate area of work during the preparation of the concrete surfaces.

2. Contractor is responsible for any and all damages that result from the removal, preparation and application process.

3. This applies to this property, its occupants and all surrounding properties.

4. Protect adjacent surfaces not designated to receive coating.

5. Remove and/or protect numbering, lettering, drains, rails, seats, etc. as necessary to complete the work.

B. Concrete substrate shall be properly cleaned using sandblast, waterblast, shot blast mechanical methods or as recommended by the manufacturer.

1. Surface must be free of all contaminants and cleaned of all dirt, loose and excess mortar materials.

2. Coating chalking, peeling, delamination or excessive materials must be minimized to acceptable levels for proper application of primer and coating system.

C. Wire brush or sand blast all metal penetrating area to receive coating free of contaminants.

D. Repair all damaged concrete surfaces.

1. Fill low areas, voids, honeycombs, excessive rough and spalled areas.

2. All cracks and voids shall be filled and patching completed as necessary and as recommended by the traffic coating system manufacturer.

3. All high spots shall be grinded to be leveled with adjacent areas.

4. See Section 03 9001, Polymer Modified Concrete Restoration, for additional criteria for repair of cracks in concrete surfaces.

3.03 SPECIAL PRECAUTIONS

A. Protect materials during transport and application. Do not dilute primers and other materials, unless specifically recommended by materials manufacturer. Keep containers closed except when removing contents. Do not mix remains of unlike materials. Thoroughly remove residual materials before using application equipment for mixing and transporting materials. Do not permit equipment on the project site that has residue of materials used on previous projects. Use cleaners only for cleaning, not for thinning primers or membrane materials. Ensure that workers and others who walk or rest on cured membrane wear clean, soft-soled shoes to avoid damaging the materials.

3.04 APPLICATION

A. Roll, squeegee or brush-apply coatings in accordance with manufacturer's instructions.

B. Thoroughly work coating materials into joints, crevices, and open spaces.

C. Apply base coat of material at a total rate of 50 sq ft/gal to a minimum uniform thickness of 25 wet mils thick (or minimum dry film thickness of 16).

D. Apply intermediate coat of material to a minimum uniform thickness of 20 wet mils thick (or minimum dry film thickness of 12).

E. While intermediate coating is still fluid, uniformly broadcast aggregate at a minimum rate of 50 pounds per 100 square feet into coat.

F. Apply finish coat of material to a minimum uniform thickness of 20 wet mils thick (or minimum dry film thickness of 12).

G. Total minimum dry film thickness of 42 mils and provide the required warranty.

H. Apply material free of runs, drops, ridges, waves, laps, brush marks, and variations in color.

I. Provide fabric reinforcing at all locations in accordance with this section.

J. Allow coating system to cure prior to allowing traffic on system.

3.05 FIELD QUALITY CONTROL

A. Moisture Test - Prior to application of fluid-applied coating, measure moisture content of substrate with a moisture meter in the presence of the Architect/Consultant/Engineer. An acceptable device is the Delmhorst Moisture Meter, Model BD7/2D/CS, Type 21E. Similar meters by other manufacturers, which are suitable for the purpose, may be used as approved by the Architect/Consultant/Engineer. Do not begin application until meter reading indicates “dry” range.

B. Film Thickness - Measure wet film thickness every 100 square feet during application by placing flat metal plates on the substrate or using a mil-thickness gauge especially manufactured for the purpose.

C. Contractor is to provide adequate lighting when nighttime work is to be performed.

3.06 INFORMATION CARD(S)

A. Install a photoengraved or etched aluminum information card (for exterior display) at location to be determined by Architect/Consultant/Engineer. Information listed on the Information Card is located at the end of this section

B. A card shall be provided for each differing assembly and be a minimum size of 8-1/2 by 11 inches.

C. Secure with removable stainless steel screws at approved location.

D. A hard copy of each card is required in the Close-Out Documents.

END OF SECTION

PEDESTRIAN TRAFFIC COATINGS INFORMATION CARD

1. Contract Number: _____

2. Substantial Completion Date: _____

3. Project Specification Number: _____

4. Substrates

   a. Concrete (existing): _____

   b. Concrete (repairs): _____

   c. Coating (existing): _____

5. Sealant Joints: _____

6. Preformed Tape System: _____

7. Preformed Joints: _____

8. Coating System

   a. Primer: _____

   b. Base Coat: _____

   c. Intermediate Coat: _____

   d. Aggregate (surfacing): _____

   e. Finish Coat: _____

9. Concrete Patching Materials

   a. Concrete: _____

   b. Epoxy: _____

10. Statement of Compliance or Exception: _____
    _____
    _____

Contractor Signature: _____

Date Signed: _____

PEDESTRIAN TRAFFIC COATING WARRANTY

WHEREAS,_____ of

(Address)_____

_____, Telephone:_____ herein called the "Pedestrian Traffic Coating Contractor", has performed Pedestrian Traffic Coating work on the following project:

Owner:_____

Address:_____

_____, Telephone:_____

Name and Type of Building:_____

Address:_____

Area of Work:_____

Date of Acceptance:_____

Guarantee Period: **Three Years** Date of Expiration: _____

AND WHEREAS, the Waterproofing Contractor has contracted to warrant said work against leaks and faulty or defective materials and workmanship for the designated Guarantee Period; NOW, THEREFORE, the Waterproofing Contractor hereby warrants, subject to the terms and conditions herein set forth, that during the Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work, and as are necessary to maintain said work in watertight condition.

This Warranty is made subject to the following terms and conditions:

1. Warranty covers only repairs made by contractor to said Traffic Coating under this contract and does not cover work by others or future defects not directly attributable to work performed.

2. Specifically excluded from this Warranty are damages to the work, other parts of the building and building contents caused by: a) lightning, windstorm, hailstorm, and other unusual phenomena of the elements; b) fire c) failure of the Traffic Coating system substrate including cracking, but excluding hairline cracking, settlement, excessive deflection, deterioration, and decomposition; d) faulty construction of parapet walls, copings, vents, equipment supports, and other edge conditions and penetrations not included in the project; e) repeated vapor condensation on the bottom of Traffic Coating; and f) activity on the Traffic Coating by others including construction contractors, maintenance personnel, other persons, and animals whether authorized or unauthorized by Owner. When the work has been damaged by any of the foregoing causes, the Warranty shall be null and void until such damage has been repaired by the Owner or by another responsible party so designated.

3. The Waterproofing Contractor is responsible for damages to work covered by this Warranty.

4. During the Warranty Period, if the Owner allows alteration of the work by anyone other than the Traffic Coating Contractor, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on the Traffic Coating System, this Warranty shall become null and void upon the date of said alterations, but only to extent said alterations affect work covered by this Warranty. If the Owner engages the Traffic Coating Contractor to perform said alterations, the Warranty shall not become null and void, unless the Traffic Coating Contractor, prior to proceeding with said work, shall have notified Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a termination of this Warranty.

5. During the Warranty Period, if the original use of the Traffic Coating System is changed and it becomes used for, but was not originally specified for other use or service more severe than originally specified, this Warranty shall become null and void upon the date of the said change, but only to the extent said change affects work covered by this Warranty.

6. The Owner shall promptly notify the Waterproofing Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for Waterproofing Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

7. Contractor will promptly inspect reported leaks and if found to be attributed to work performed, make the required repairs.

   a. If leaks are found to be from other sources, contractor shall so inform owner and make the needed repairs.

   b. Future service calls and leak repairs not attributed to contractors work will be for Owner's account. Cost of repairs will be at a fair and reasonable rate. Materials required will be at cost plus 15%.

8. This Warranty is recognized to be the only warranty of Waterproofing Contractor on said work, and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to him in cases of Traffic Coating failure. Specifically, this Warranty shall not operate to relieve Waterproofing Contractor of his responsibility for performance of the original work, regardless of whether Contract was a contract directly with Owner, or a subcontract with Owner's General Contractor.

IN WITNESS WHEREOF, this instrument has been duly executed this _____ day of _____, 20_____.

Waterproofing Contractor's Signature:_____

Typed Name:_____

As Its (position):_____

Date:_____

SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at cavity wall construction.

B. Batt insulation and vapor retarder in exterior wall and ceiling construction.

1.02 REFERENCE STANDARDS

A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2014.

B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2014.

D. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.

E. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies; 2011.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation Over Metal Stud Framed Walls, Continuous: Extruded polystyrene board.

B. Insulation in Metal Framed Walls: Batt insulation with integral vapor retarder.

C. Insulation Above Ceilings: Batt insulation with no vapor retarder.

2.02 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene Board Insulation: Extruded polystyrene board; ASTM C578; with either natural skin or cut cell surfaces, and the following characteristics:
   1. Type: ASTM C578, Type IV.
   2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
   4. R-value; 1 inch of material at 72 degrees F: 5, minimum.
   5. Board Edges: Square.
   6. Water Absorption, Maximum: 0.3 percent, by volume.
   7. Manufacturers:
      a. Dow Chemical Co: www.dow.com.
      b. Owens Corning Corporation: www.ocbuildingspec.com.
      c. Kingspan Insulation LLC; GreenGuard XPS TYPE IV 25 PSI: www.trustgreenguard.com.

2.03 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
   1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
4. Formaldehyde Content: Zero.
5. Thermal Resistance: R of 11.
6. Thickness: 4 inch.
7. Facing: Asphalt treated mesh reinforced Kraft paper, one side.
8. Manufacturers:
    a. CertainTeed Corporation: www.certainteed.com.
    b. Johns Manville Corporation: www.jm.com.
    c. Owens Corning Corporation: www.ocbuildingspec.com.

2.04 ACCESSORIES

A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.

B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.

C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install rigid insulation directly to steel studs or exterior grade sheathing at 16 inches on center with manufacturer recommended mechanical fasteners. Tape all joints with manufacturer's minimum 4 inch wide sealant tape; comply with ASTM E2357.

B. Install boards horizontally on walls.
    1. Install in running bond pattern.
    2. Butt edges and ends tightly to adjacent boards and to protrusions.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

D. Tape insulation board joints.

3.03 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior wall and ceiling spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.04 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 6000

SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes all sheet metal items and accessories specified or as required to complete the work. Applicable edge metal systems shall adhere to the general requirements of ANSI/SPRI ES-1, 2003, in accordance with the IBC 2012.

1.02 RELATED REQUIREMENTS

A. The provisions of the Instructions to Bidders, General Conditions, and Supplementary Conditions shall govern work under this Section.

B. Section 02 0500: Demolition and Removal

C. Section 04 5005: Minor Masonry Restoration and Cleaning

D. Section 07 1406: Bitumen Based Waterproofing Assembly

E. Section 07 1813: Pedestrian Traffic Coating Assembly

F. Section 07 9210: Sealants for Building Envelope

1.03 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced, and to provide any clarifications for issues not covered within this specification.

B. ALUMINUM ASSOCIATION, INC. (AA):

1. AA DAF-45 (2003) Designation System for Aluminum Finishes.

2. AA SAA-46 (1979) Standards for Anodized Architectural Aluminum.

C. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI):

1. ANSI/SPRI ES-1 (2003) Wind Design Standard for Edge Systems Used with Low Slope Roof Systems

2. ANSI/ASME A112.6.4 (2008) Roof, Deck and Balcony Drains

D. AMERICAN WELDING SOCIETY (AWS):

1. AWS D1.1/D1.1M (2006) Structural Welding Code – Steel

2. AWS D1.2/D1.2M (2004) Structural Welding Code – Aluminum

E. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

1. ASTM A 167 (2004) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

2. ASTM A 48 / A 48M (2003) Gray Iron Castings

3. ASTM A 653/A 653M (2010) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

4. ASTM A 792 / A 792M (2010) Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process

5. ASTM A 924 / A 924M (2006) Steel Sheet, Metallic-Coated by the Hot-Dip Process

6. ASTM B 209 (2010) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

7. ASTM B 32 (2004) Solder Metal

8. ASTM B 370 (2003) Copper Sheet and Strip for Building Construction

9. ASTM B 69 (2005) Rolled Zinc

10. ASTM D 1970 / D 1970 M (2011) Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection

11. ASTM D 41 / D 41 M (2011) Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing

12. ASTM D 4586 / D 4586 M (2012) Standard Specification for Asphalt Roof Cement, Asbestos-Free

13. ASTM D 4601 / D 4601 M (2012) Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing

F. COPPER DEVELOPMENT ASSOCIATION, INC (CDA):

1. Copper, Brass, Bronze Design Handbook.

G. FACTORY MUTUAL (FM):

1. FM DS 1-49 (Latest Edition) Perimeter Flashing

H. INTERNATIONAL CODE COUNCIL (ICC):

1. IBC (2012) International Building Code

2. IEBC (2012) International Existing Building Code

I. NATIONAL ROOFING CONTRACTOR'S ASSOCIATION (NRCA):

1. NRCA Roofing and Waterproofing Manual, Fifth Edition.

2. The NRCA Architectural Sheet Metal and Metal Roofing Manual, 2006 Edition.

J. SHEET METAL & AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA):

1. SMACNA - Architectural Sheet Metal Manual, Seventh Edition

K. REVERE COPPER PRODUCTS, INC.:

1. Copper and Common Sense, Eight Edition

1.04 SUBMITTALS

A. Submit the following in accordance with the Submittals Section.

B. No work will begin until all submittals have been received and approved and Pre-Construction Conference has been completed.

C. Drawings:

1. Details shall be in strict accordance with the drawings provided.

2. All details are based on the guidelines of the NRCA Construction Details, Fifth Edition, The NRCA Green Roof Systems Manual, 2007 Edition and SMACNA Architectural Sheet Metal Manual, Seventh Edition.

3. Contractor shall provide shop drawings with the following information for all new sheet metal flashings and components:

a. Type and gage of metal, configuration, dimensions, fastening and anchoring methods to include type fastener and frequency of attachment, provisions for expansion and contraction flashing closures and trim.

b. Any deviation/variation requested due to manufacturers requirements must be submitted in writing for approval.

c. Any items of concern should be brought up at the Pre-Construction Conference.

D. Samples:

1. One sample of each type of material to be used on this project shall be provided at the Pre-Construction Conference.

E. Color Samples of Kynar 500 (Hylar 5000) finishes from manufacturer standard color selections. A minimum of twelve (12) color selections shall be provided.

F. Safety Data Sheets (SDS): Submit Safety Data Sheets with each specification section and include with Safety Plan.

1.05 CONFORMANCE AND COMPATIBILITY

A. The contractor shall ensure all materials provided are compatible with the other components of the system, are acceptable for the specified use, and meet the requirements of the specifications.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery:

1. Package and protect materials during shipment.

2. Materials shall be delivered to the site in an undamaged condition, and in a timely order for incorporation in the work.

B. Storage:

1. Do not store more materials on the roof than can be installed the same day and remove unused materials at the end of each day.

2. Materials shall be stored, handled, and installed in a manner to protect them from all damage during the entire construction period.

3. Immediately remove damaged materials from the job site and replace with new material.

C. Handling:

1. Materials shall not be laid on newly installed in areas prone to blow or fall from area of work.

1.07 DIFFERING SITE CONDITIONS

A. The contractor will notify the Architect/Consultant/Engineer immediately of any unforeseen site condition.

B. The contractor will be required to secure the areas and dry-in at no cost to the Owner until the problem is resolved.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Shall conform to the respective reference specifications and other requirements specified herein.

B. Edge metal systems shall adhere to the general requirements of ANSI/SPRI ES-1, 2003.

C. Sheet Metal:

1. Furnish sheet metal items in 8 to 10 foot lengths.

2. Vertical face of sheet metal components shall be a minimum of 4 inches unless otherwise indicated or approved.

3. Single pieces less than 8 feet may be used to connect shop fabricated inside and outside corners and at end runs.

4. Provide accessories and other items essential to complete the sheet metal installation.

a. These accessories shall be made of the same material as the items to which they are applied.

5. Fabricate sheet metal items of the materials specified and to the gage, thickness, or weight as specified, unless required by SMACNA to be heavier gage or size.

6. Finish:

a. Provide Kynar 500 (Hylar 5000) finish for all exposed sheet metal items unless otherwise indicated. Color shall be as selected by Owner.

7. Exterior vertical face of sheet metal components shall extend a minimum of 2-inches below top edge of wall.

2.02 TYPES AND GAGES OF METALS

A. Steel Sheet, Galvalume AZ50, gage as specified for specific components below:

1. 24 gage (counterflashings, edge metals and copings)

B. Stainless Steel (for thru wall flashing). See Section 04 5005, Minor Masonry Restoration and Cleaning.

1. ASTM A 167, Series 302 or 304, 22 gage and soldered.

C. Cleats:

1. 1 gage/thickness heavier than metal attached; 22 gage maximum for galvalume cleats.

D. Use the same metal or a metal compatible with the item fastened when connecting to existing metal.

2.03 OTHER MATERIALS

A. Fasteners:

1. Fasteners shall be compatible with the materials being fastened and shall provide for secure, firm attachment.

2. Exposed fasteners shall have domed head with integral metal washer and rubber gasket.

3. Fasteners shall be stainless steel, bronze or copper as a minimum.

4. Only stainless steel fasteners shall be used to connect dissimilar metals.

B. Membrane Liner and Waterproof Underlayment:

1. Smooth surfaced modified bitumen meeting ASTM D 1970 / D 1970 M for waterproof underlayment is required.

C. Butyl Tape:

1. Double-sided butyl tape of width as required.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Requirements:

1. Provide new metal for all work unless otherwise indicated.

2. Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry and free of defects and projections, which might affect application.

3. For installation of items or criteria not provided, refer to NRCA Construction Details, Fifth Edition and SMACNA Architectural Sheet Metal Manual, Seventh Edition.

4. Provide sheet metal flashing in angles formed where decks abut walls, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight.

5. Join sheet metal together as indicated.

6. Increase attachment of all components by 100% at corner locations as defined by ASCE-7.

7. All materials indicated to be reused shall be removed without damage and stored for protection until required.

8. Provide pre-fabricated inside and outside corners at all sheet metal intersection pieces.

9. Sheet metal shall be fabricated to conform to the contours of surfaces to which applied.

10. All sheet metal to have waterproof membrane underlayment installed behind or below the metal components. Waterproof underlayment shall have minimum 4 inch laps and sealed at all terminations and penetrations.

11. Provide conforming sheet metal closures at all flashing termination conditions.

12. Provide accessories and fastenings as required to provide a securely attached, watertight construction.

B. Workmanship:

1. Make lines, arises and angles sharp and true.

2. Free exposed surfaces from visible wave, warp and buckle and tool marks.

3. Fold back exposed edges neatly to form a 1/2-inch hem on concealed side.

4. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

C. Fastening:

1. Confine fastening of sheet metal generally to sheet metal only where noted or specified.

2. Confine fastening of flashing to one edge only.

3. Space fasteners 4 inches on center and staggered or as otherwise indicated.

4. Face fastening will not be permitted.

D. Continuous Cleats:

1. Provide continuous cleats where indicated or specified.

2. Cleats shall be of the same material as material being attached and one gage/increment thicker.

3. Form with integral drip to engage sheet metal to be attached.

4. Attach securely at maximum 6 inches on center, increased to 3 inches on center at corners as defined by ASCE-7.

5. Kick out shall receive 3/4 inch wide lock.

E. Attachment Clips (Wind Cleats)

1. Space clips for counterflashing and raised metal edges evenly not over 24 inches on center and 12 inches on center at corners.

2. Clips shall be not less than 2 inches wide and 6 inches long and of the same metal and 1 gage thicker as the sheet metal being installed.

3. Secure one end of the clip with two fasteners and the cleat folded back over the heads.

4. Lock the bottom end onto the newly installed counterflashing a minimum of 1/2 inch.

F. Rivets and Screws:

1. Install were indicated or required.

2. Provide compatible fasteners and washers where required to protect surface of sheet metal and to provide a watertight connection.

3. Rivets shall be one inch on center unless noted otherwise. Rivets shall be sealed with compatible sealant and match sheet metal finish.

G. Seams:

1. Lap Seams:

a. Overlap seams of flashing not less than 4 inches, or as otherwise indicated.

b. Completely and neatly fill the joints with two strips of 1/8 inch by 1/2-inch partially cured butyl tape or butyl sealant in an approved manner.

2. Soldering:

a. Soldering is required and shall be done in accordance with SMACNA criteria for all metals that can be soldered.

H. Protection from Dissimilar Metals:

1. Paint with heavy-bodied bituminous paint or apply butyl tape, surfaces in contact with dissimilar metal, or separate the surfaces by means of waterproof underlayment as approved by Architect/Consultant/Engineer.

2. Any wood, nailers or other rough carpentry using Copper Azole (CA), Alkaline Copper Quaternary (ACQ) or Micronized Copper Quaternary (MCQ) treatment will require verification of the following:

a. Separation of metal roof, metal wall and sheet metal from the roof carpentry is required using waterproof underlayment as a minimum.

b. Type of fasteners acceptable for attachment into these woods (such as stainless steel).

1) Fasteners for wood to wood connectors.

2) Fasteners thru metal into wood.

I. Expansion and Contraction:

1. Provide expansion and contraction joints at not more than 40 foot intervals for metal.

2. Where the distance between the last expansion joint and the end of the continuous run is more than half the required interval, an additional joint shall be required.

3. Space joints evenly.

3.02 SPECIFIC COMPONENTS

A. Counterflashing:

1. Form the flashing to the required shapes before installation. Provide 4 inch vertical face, minimum, unless otherwise indicated.

2. Metal work shall adhere to details shown.

3. All inside and outside corners and termination pieces shall be shop fabricated.

4. Cleats and locking clips to be one gage/increment thicker than metal being attached.

B. Reglets:

1. New reglets shall be cut 1-1/4 inch deep.

2. Sheet metal shall be fabricated with friction cleat and supplemented with lead wedge anchorage.

3. After completion of all work, the sealant of all reglets shall be completely cleaned and new sealant installed as specified in Section 07 9210, Sealants for Building Envelope.

C. Copings:

1. Provide sheet metal coping as indicated and with termination closure flashing.

2. Edge metals/closures/copings shall have waterproof underlayment installed under coping and turned down minimum 2 inches each side of wall, and extend over wall assembly a minimum of 2 inches.

3. Continuous cleats, one gage/increment thicker than metal coping, shall be installed on interior and exterior sides.

4. Sheet metal coping shall be attached with continuous cleats on outer face and screw fastening at maximum 12 inches on center on inner face, unless otherwise indicated or approved.

5. Joints methods shall be lapped.

6. All inside and outside corners shall be pre-fabricated with 12-inch legs in each direction measured from inside corner.

D. Closure Conditions:

1. Provide prefabricated sheet metal closures at all flashing terminations to ensure a watertight condition.

2. A minimum three inches of coverage between/over the components shall be provided.

3. Metal counterflashings shall provide a minimum of 3” coverage over component being flashed.

END OF SECTION

SECTION 07 9210

SEALANTS FOR BUILDING ENVELOPE

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes removal and replacement of all exterior sealant systems for the entire building exterior, windows and doors as well as all masonry/control joints of the entire building.

B. Color of the sealant is to match the surface to which it is being applied.

C. General Guidelines:

1. Joints shall not be less than 1/4-inch in width and not greater than 1 1/4-inch in width.

2. Joint width shall be 4 times greater than anticipated movement.

1.02 RELATED REQUIREMENTS

A. The provisions of the Instructions to Bidders, General Conditions, and Supplementary Conditions of these specifications shall govern work under this Section.

B. Section 04 5005: Minor Masonry Restoration and Cleaning

C. Section 07 1406: Bitumen Based Waterproofing Assembly

D. Section 07 1813: Pedestrian Traffic Coating Assembly

E. Section 07 6000: Sheet Metal

1.03 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced, and to provide any clarifications for issues not covered within this specification.

B. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

1. ASTM C 1193 (2005) Standard Guide for Use of Joint Sealants

2. ASTM C1472 (2006) Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width

3. ASTM C 717 (2007) Standard Terminology of Building Seals and Sealants

4. ASTM C 920 (2011) Standard Specification for Elastomeric Joint Sealants

5. ASTM E 2099 (2007) Standard Practice for the Specification and Evaluation of Pre-Construction Laboratory Mockups of Exterior Wall Systems

C. SEALANT WATERPROOFING RESTORATION INSTITUTE (SWRI):

1. Sealants: The Professional's Guide, 2013.

2. Validation Program

1.04 SUBMITTALS

A. Submit the following in accordance with the Submittals Section.

B. No work will begin until all submittals have been received and approved and Pre-Construction Conference has been completed.

C. Manufacturer's Catalog Data

1. Sealants

2. Tapes

a. Butyl

b. Preformed

3. Primers

4. Backstop materials

5. Data for the sealants shall include shelf life, recommended cleaning solvents, modulus and type cure.

D. Manufacturer's Standard Color Chart

1. Sealants:

a. Submit color for each varying surface color.

E. Manufacturer's Instructions

1. Sealants/Tapes: Submit application instructions, precautions and mixing instructions for multi-component sealants.

F. Samples

1. Sealants: Submit one tube of each color for each sealant type to be used.

G. Sample Installations – Mock-Up:

1. Finished Joint:

a. Before sealant work is started, submit a sample of each type of finished joint where directed.

b. Sample shall show the workmanship, bond and color of sealant.

c. The workmanship, bond and color of sealant throughout the project shall match the approved sample joints.

H. Certificates of Compliance or SWRI Validation Program

1. Sealants – Liquid Sealants

2. Tapes – Pre-cured Silicone

3. Tapes – Butyl

4. Primers

5. Bond breakers

6. Backstops

7. Submit certificates from the manufacturers attesting that materials meet the specified requirements and compatible for specified use. For liquid sealants and pre-cured sealants, SWRI Validation will be accepted.

I. Safety Data Sheets (SDS): Submit Safety Data Sheets with each specification section and include with Safety Plan.

1.05 ENVIRONMENTAL CONDITIONS

A. The ambient temperature shall be within the limits of 40 and 100 degrees F when sealant is applied.

B. Joint application should consider the expansion/contraction state of the joint at the time of application and during curing cycle.

1.06 DELIVERY AND STORAGE

A. Delivery:

1. Deliver materials to the job site in unopened in manufacturers' external shipping containers, with brand names, date of manufacture, color, and material designation clearly marked thereon.

2. Elastomeric sealant containers shall be labeled to identify type, class, grade and use.

B. Carefully handle and store materials to prevent inclusion of foreign materials or subjection to sustained temperatures exceeding 100 F degrees or less than 40 degrees F.

1. Adhere to more stringent temperature restrictions of the Manufacturer as required for specific products.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide sealant that has been tested and suitable for each specific substrates to which it will be applied.

B. Exterior Sealant – A polyurethane based or silicone based product adhering to the below requirements shall be used.

1. Modulus

a. Low Modulus

1) To be used for exterior insulation and finish systems, coatings and preformed silicone tape (pre-cured sealant) joints.

b. Medium Modulus

1) To be used for majority of building envelope joints.

c. High Modulus

1) To be used to wet seal glass.

2. Grade – NS, a non-sag sealant shall be used.

3. Type – A type S, single component, or type M, multi-component may be used.

4. Locations and Colors

a. Colors will be selected from standard color charts after mock-ups for each condition field of at least 3 choices is provided.

5. Class

a. A Class 50 shall be provided unless specifically approved or noted otherwise.

6. Use

a. Sealant use for each condition or application shall adhere to use classification of ASTM C 920.

C. Sealant Tapes:

1. Butyl (for sheet metal laps)

a. Provide a partially cured butyl tape, thickness 1/8 inch by a minimum of 1/2 inch wide.

b. Locations shall be as follows:

1) Lap joints of all metals.

2) Beneath cover plates of cap and counterflashings.

3) Where noted or specified elsewhere.

2. Preformed Tape System – Silicone Based (Joints greater than 1 inch in width):

a. Provide a preformed tape system equal to Dow 123.

b. Color shall match adjacent surfaces and be approved by Owner.

c. Width and shape as indicated on drawings.

2.02 PRIMER FOR SEALANT

A. Provide a non-staining, quick drying type and consistency recommended by the sealant manufacturer for the particular application.

2.03 BOND BREAKERS

A. Provide the type and consistency recommended by the sealant manufacturer for the particular application.

B. Liquid applied bond breakers are not permitted.

2.04 BACKSTOPS

A. Provide glass fiber roving or neoprene, butyl, polyurethane or polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer.

B. Backstop material shall be compatible with sealant.

C. Do not use absorptive materials.

2.05 CLEANING SOLVENTS

A. Provide type recommended by the sealant manufacturer.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. Surfaces shall be clean, dry to the touch, and free from dirt, frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion.

B. When resealing an existing joint, completely remove the existing caulking/sealant and any foreign matter, dirt, dust or debris, prior to application of new sealant.

C. Use compatible materials when existing silicone sealants exist.

3.02 SEALANT PREPARATION

A. Prepare surfaces in strict accordance with the Contract Documents and any Manufacturers printed instructions.

3.03 APPLICATION OF SEALANTS

A. Backstops:

1. Install backstops dry and free of tears or holes.

2. Tightly pack the back or bottom of joint cavities with backstop material to provide a joint of the depth specified.

3. Install backstops in the following locations:

a. Where indicated.

b. Where backstop is not indicated but joint cavities exceed the acceptable maximum depths specified in paragraph entitled, "Joint Width to Depth Ratios".

B. Primer:

1. Immediately prior to application of the sealant, clean out dust/dirt/loose particles from joints.

2. Where recommended by sealant manufacturer, apply primer to joints in concrete, masonry and metal surfaces in accordance with sealant manufacturer's instructions.

3. Do not apply primer to exposed finish surfaces.

C. Bond Breaker:

1. Provide bond breakers to the back or bottom of joint cavities, as recommended by the sealant manufacturer for the type joint and sealant specified.

2. Carefully apply the bond breaker to avoid contamination of adjoining surfaces or breaking bond with surfaces other than those covered by the bond breaker.

D. Sealants:

1. Provide a sealant compatible with the materials to which it is applied.

2. Do not use a sealant that has exceeded its shelf life or has jelled and cannot be discharged in a continuous flow from the gun.

3. Apply the sealant in accordance with the manufacturer's instructions with a gun having a nozzle that fits the joint width.

4. Force sealant into joints to fill the joints solidly without air pockets.

5. Tool sealant after application to ensure adhesion.

6. Sealant shall be uniformly smooth and free of wrinkles.

7. Upon completion of sealant application, roughen partially filled or unfilled joints, apply sealant and tool smooth as specified.

3.04 APPLICATION OF BUTYL TAPES

A. Surfaces shall be cleaned and prepared as noted below.

B. No exposed applications of butyl tapes/sealants are permitted.

C. At each lap, provide 2 continuous applications of tape approximately 1 inch apart within the lap.

D. Directly after tapes are installed, set and secure metal.

3.05 APPLICATION OF PREFORMED (PRE-CURED SEALANTS) TAPES

A. Surfaces shall be cleaned and prepared as noted below.

B. Prime surfaces.

C. Mask (tape) exterior edge on each side of tape joint.

D. Provide even, uniform application of silicone-based sealant on each side of joint.

E. Directly after sealant is installed, install preformed silicone-based tape.

F. Remove tape and clean all surfaces.

3.06 PROTECTION AND CLEANING

A. Protection:

1. Protect areas adjacent to joints from sealant smears.

2. Masking tapes may be used for this purpose, if removed 5 to 10 minutes after joint is filled.

B. Final Cleaning:

1. Masonry and Other Porous Surfaces:

a. Immediately scrape off fresh sealant that has been smeared on masonry and rub clean with a solvent as recommended by the sealant manufacturer.

b. Allow excess sealant to cure for 24 hours then remove by wire brushing or sanding.

2. Metal or Non-Porous Surfaces:

a. Remove excess sealant with a solvent-moistened cloth.

3.07 UNIT PRICED QUANTITIES

A. Contractor shall maintain a log of all repair unit priced quantities used based on contract requirements.

B. Contractor shall notify Owner in writing when 80% of quantity is used for each unit price item.

C. Provide photograph or videotape documentation of repairs.

D. Locate quantities and show their locations on the applicable drawings.

E. Provide actual used quantities on each Application for Payment request.

END OF SECTION

SECTION 08 1113

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thermally insulated steel doors.

1.02 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003 (R2008).

C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2011).

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.

E. ASTM C1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus; 2011.

F. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.

G. ICC A117.1 - Accessible and Usable Buildings and Facilities; International Code Council; 2009 (ANSI).

H. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.

I. NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2013.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
   2. Republic Doors: www.republicdoor.com.
   3. Steelcraft, an Allegion brand: www.allegion.com/us.

2.02 DOORS

A. Requirements for All Doors:
   1. Accessibility: Comply with ICC A117.1 and ADA Standards.
   2. Door Top Closures: Flush with top of faces and edges.
   3. Door Edge Profile: Beveled on both edges.

4. Door Texture: Smooth faces.
5. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
6. Galvanizing : Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness
7. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors:
1. Custom: NAAMM HMMA 860; Physical Performance Level A.
2. Core: Polystyrene.
3. Thickness: 1-3/4 inch.
4. Insulating Value: U-value of 0.50, when tested in accordance with ASTM C1363.

2.04 ACCESSORY MATERIALS

A. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.

2.05 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. Coordinate frame anchor placement with wall construction.

C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

D. Coordinate installation of hardware.

3.04 TOLERANCES

A. Clearances Between Door and Frame: As specified in ANSI A250.8 - SDI-100.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 7100

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for hollow steel doors.

B. Thresholds.

C. Weatherstripping, seals and door gaskets.

1.02 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. BHMA A156.1 - American National Standard for Butts and Hinges; Builders Hardware Manufacturers Association, Inc.; 2006 (ANSI/BHMA A156.1).

D. BHMA A156.3 - American National Standard for Exit Devices; Builders Hardware Manufacturers Association; 2008 (ANSI/BHMA A156.3).

E. BHMA A156.4 - American National Standard for Door Controls - Closers; Builders Hardware Manufacturers Association, Inc.; 2008 (ANSI/BHMA A156.4).

F. BHMA A156.7 - American National Standard for Template Hinge Dimensions; Builders Hardware Manufacturers Association; 2003 (ANSI/BHMA A156.7).

G. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; Builders Hardware Manufacturers Association; 2012 (ANSI/BHMA A156.13).

H. BHMA A156.18 - American National Standard for Materials and Finishes; Builders Hardware Manufacturers Association, Inc.; 2012 (ANSI/BHMA A156.18).

I. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2012 (ANSI/BHMA A156.22).

J. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.

K. ICC A117.1 - Accessible and Usable Buildings and Facilities; International Code Council; 2009 (ANSI).

L. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.

M. NFPA 101 - Life Safety Code; National Fire Protection Association; 2012.

N. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.

B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

C. Convey Owner's keying requirements to manufacturers.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.

C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.

D. Keying Schedule: Submit for approval of Owner.

E. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

PART 2 PRODUCTS

2.01 DOOR HARDWARE - GENERAL

A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

B. Provide all items of a single type of the same model by the same manufacturer.

C. Provide products that comply with the following:
   1. Applicable provisions of federal, state, and local codes.
   2. Accessibility: ADA Standards and ICC A117.1.
   3. Applicable provisions of NFPA 101, Life Safety Code.
   4. Fire-Rated Doors: NFPA 80.
   5. All Hardware on Fire-Rated Doors : Listed and classified by UL as suitable for the purpose specified and indicated.

D. Finishes: All door hardware the same finish unless otherwise indicated.
   1. Primary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
   2. Secondary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
      a. Use secondary finish in kitchens, bathrooms, and other spaces containing chrome or stainless steel finished appliances, fittings, and equipment; provide primary finish on one side of door and secondary finish on other side if necessary.
   3. Finish Definitions: BHMA A156.18.
   4. Exceptions:
      a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.
      b. Hinges for Fire-Rated Doors: Steel base metal with painted finish.
      c. Door Closer Covers and Arms: Color to be selected by Architect from manufacturer's standard colors.

2.02 HINGES

A. Hinges: Provide hinges on every swinging door.
   1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   2. Provide ball-bearing hinges at all doors having closers.
   3. Provide hinges in the quantities indicated or as required by the reused existing door frame.
   4. Provide non-removable pins on exterior outswinging doors.

B. Butt Hinges: Comply with BHMA A156.1 and A156.7; standard weight, unless otherwise indicated.
   1. Provide hinge width required to clear surrounding trim.
   2. Utilize hinge metal thickness as required by the existing frame.

C. Quantity of Hinges Per Door:
   1. Match existing.

D. Manufacturers - Hinges:
   1. Assa Abloy McKinney: www.assaabloydss.com.
   2. Bommer Industries, Inc: www.bommer.com.
   3. Hager Companies: www.hagerco.com.
   4. Stanley Black & Decker: www.stanleyblackanddecker.com.

2.03 LOCKS AND LATCHES

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
   1. Hardware Sets indicate locking functions required for each door.
   2. If no hardware set is indicated for a swinging door provide an office lockset.
   3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
   4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.

B. Lock Cylinders: Manufacturer's standard tumbler type, pin quantity to match existing core.
   1. Provide cams and/or tailpieces as required for locking devices required.

C. Keying: Grand master keyed.
   1. Key to existing keying system.

2.04 MORTISE LOCKSETS

A. Locking Functions: As defined in BHMA A156.13, and coordinated with exit device function:

B. Manufacturers - Mortise Locksets:
   1. Assa Abloy Corbin Russwin, Sargent, or Yale: www.assaabloydss.com.
   2. Best Access Systems, division of Stanley Security Solutions: www.bestlock.com.
   3. Hager Companies: www.hagerco.com.
   4. Schlage, an Allegion brand: www.allegion.com/us.

2.05 EXIT DEVICES

A. Locking Functions: Functions as defined in BHMA A156.3, and as follows:
   1. Entry/Exit, Always-Locked: Key outside retracts latchbolt but does not unlock lever, no latch holdback.

B. Manufacturers:
   1. Assa Abloy Corbin Russwin, Sargent, or Yale: www.assaabloydss.com.
   2. DORMA Group North America: www.dorma-usa.com/usa.
   3. Hager Companies: www.hagerco.com.
   4. Von Duprin, an Allegion brand: www.allegion.com/us.

2.06 CLOSERS

A. Closers: Complying with BHMA A156.4.
   1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
   2. Provide a door closer on every exterior door.
   3. At outswinging exterior doors, mount closer in inside of door.

B. Manufacturers - Closers:
   1. Assa Abloy Corbin Russwin, Norton, Rixson, Sargent, or Yale: www.assaabloydss.com.
   2. DORMA Group North America: www.dorma-usa.com/usa.
   3. Hager Companies: www.hagerco.com.
   4. LCN, an Allegion brand: www.allegion.com/us.

2.07 GASKETING AND THRESHOLDS

A. Gaskets: Complying with BHMA A156.22.
   1. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
   2. On each exterior door, provide door bottom sweep, unless otherwise indicated.

B. Thresholds:
   1. At each exterior door, provide a threshold unless otherwise indicated.
   2. Field cut threshold to frame for tight fit.

C. Fasteners At Exterior Locations: Non-corroding.

D. Manufacturers - Gasketing and Thresholds:
   1. Assa Abloy McKinney: www.assaabloydss.com.

2. Hager Companies: www.hagerco.com.
3. National Guard Products, Inc: www.ngpinc.com.
4. Pemko Manufacturing Co: www.pemko.com.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Use templates provided by hardware item manufacturer.

C. Do not install surface mounted items until finishes applied to substrate are complete.

D. Mounting heights for hardware from finished floor to center line of hardware item: As listed in Schedule, unless otherwise noted:
   1. For steel doors: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."

E. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor; anchor thresholds with stainless steel countersunk screws.

3.03 ADJUSTING

A. Adjust work under provisions of Section 01 7000.

B. Adjust hardware for smooth operation.

C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.04 CLEANING

A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

HARDWARE SETS

4.01 GENERAL

A. These Hardware Sets indicate requirements for single doors of that type, with conditional requirements for pairs and other situations.

4.02 SWING DOORS -- MAY NOT BE LEFT UNLOCKED

A. HW-31: Exit Device, Always-Locked:
   1. Closer.
   2. Exit Device, Rim, Always-Locked.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gypsum wallboard.

B. Joint treatment and accessories.

1.02 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2012.

B. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

C. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2011.

D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.

E. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2014a.

F. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.

G. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.

H. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2013.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 3 years of documented experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.02 BOARD MATERIALS

A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
      a. Mold-resistant board is required at all locations.
   3. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Ceilings: 5/8 inch.
   4. Mold-Resistant Paper-Faced Products:
      a. American Gypsum; M-Bloc.
      b. Continental Building Products; Mold Defense.
      c. Georgia-Pacific Gypsum; ToughRock Mold-Guard.
      d. National Gypsum Company; Gold Bond XP Gypsum Board .

B. Exterior Soffit Board: Exterior gypsum soffit board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Ceilings and soffits in protected exterior areas, unless otherwise indicated.
2. Type C Thickness: 5/8 inch.
3. Edges: Tapered.
4. Products:
    a. Georgia-Pacific Gypsum; ToughRock Fireguard C Soffit Board.

2.03 ACCESSORIES

A. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.
    1. Types: As detailed or required for finished appearance.
    2. Manufacturers - Finishing Accessories:
        a. Same manufacturer as framing materials.

B. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
    1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
    2. Ready-mixed vinyl-based joint compound.

C. Screws for Attachment to Steel Members Less Than 0.033 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium plated for exterior locations.

D. Screws for Attachment to Steel Members From 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 BOARD INSTALLATION

A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
    1. Seal joints, cut edges, and holes with water-resistant sealant.

D. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

3.03 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

B. Corner Beads: Install at external corners, using longest practical lengths.

3.04 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
    1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
    2. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
    1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.05 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 3033

STONE TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stone tile for floor applications.

B. Tile trim accessories.

C. Protective coatings for stone tile.

1.02 RELATED REQUIREMENTS

A. Section 07 1300 - Sheet Waterproofing.

1.03 REFERENCE STANDARDS

A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile - Version; 2013.1.

B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2013.1.

C. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar; 2013.1.

D. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement; 2013.1.

E. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2013.1.

F. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 2013.1.

G. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 2013.1.

H. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 2013.1.

I. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 2013.1.

J. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2013.1.

K. ANSI A118.4 - American National Standard Specifications for Latex-Portland Cement Mortar; 2013.1.

L. ANSI A118.7 - American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation; 2013.1.

M. ASTM C629/C629M - Standard Specification for Slate Dimension Stone; 2010.

N. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation - Version; 2013.1.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on stone tile, mortar, grout, adhesives and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, perimeter conditions, junctions with dissimilar materials, control and expansion joints, accessories, and setting details.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Tile: 10 square feet of each size, color, and surface finish combination.

1.05 QUALITY ASSURANCE

A. Maintain one copy of the ANSI A108/A118/A136.1 and TCNA (HB) on site.

B. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

1.06 MOCK-UP

A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.

B. Construct tile mock-up where indicated on the drawings, incorporating all components specified for the location.
   1. Minimum size of mock-up is indicated on the drawings.
   2. Approved mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.01 STONE TILE

A. Stone Tile General Requirements: Provide tiles that are dimensionally consistent, accurately cut, and free of defects that would impair their function, including cracks, seams, and starts. Do not exceed color variation range in excess of values published by manufacturer for each variety specified.
   1. For stone varieties with strong directional pattern, provide tile with pattern aligned approximately parallel to tile edge.

B. Slate Tile: Stone complying with requirements of ASTM C629/C629M, and as follows:
   1. Versailles Pattern Tile: Natural cleft finish, various sizes configured for combined pattern, 8 x 8 inch, 8 x 16 inch, 16 x 16 inch, and 16 x 24 inch in 1 inch thickness, gauged, S771. Color to match the existing tile in the lobby of the building.

2.02 TILE TRIM ACCESSORIES

A. Manufacturer:
   1. Schluter Systems LP: www.schluter.com.
   2. Substitutions: Not permitted.

B. Tile Trim Accessories: Provide mortar or adhesive set tile trim accessories as indicated on drawings. If not specifically indicated, provide accessories as required to prevent exposure of unfinished tile edges at corners, transitions, and terminations. If tile trim accessories are not detailed or otherwise specifically identified, provide units that are consistent in style and finish with other accessories in the same space, dimensioned appropriately for each application.
   1. Applications: Use tile trim accessories in the following locations:
      a. Open edges of floor tile.

2.03 MORTAR MATERIALS

A. Manufacturers:
   1. Laticrete International, Inc: www.laticrete.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Mortar Bed Materials: Latex-modified mortar mixture of Portland cement, sand, latex additive, and water.
   1. Product: Provide Laticrete 226 Thick Bed Mortar gauged with Laticrete 3701 Mortar Admix.

C. Mortar Bond Coat Materials:
   1. Latex-Portland Cement Type: ANSI A118.4.

a. Provide Laticrete 254 Platinum Multipurpose Thin-Set Mortar.

2.04 GROUT MATERIALS

A. Manufacturers:
   1. Laticrete International, Inc: www.laticrete.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Standard Grout: Polymer modified cement grout, as specified in ANSI A118.7.
   1. Product: Provide Laticrete Tri-Poly Fortified Unsanded Grout (1600 Series), gauged with Laticrete 1776 Admix Plus.
   2. Color: As selected.

2.05 ACCESSORY MATERIALS

A. Cleavage and Drainage Mat: Schluter - Troba or architect approved equal.

B. Waterproofing Membrane at Floors: As specified in Section 07 1300.

2.06 SEALERS AND COATINGS

A. Manufacturers:
   1. DuPont Stone Tech Professional: www.dupont.com/Stone_Tech_Professional.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Color Enhancing Sealer: Solvent-based sealer for deeper color and surface shine.
   1. Product: Stone Tech Professional Enhancer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive stone tile.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.03 INSTALLATION - GENERAL

A. Install stone tile and tile accessories in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay stone tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit stone tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place stone tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

E. Form internal angles square and external angles bullnosed.

F. Install tile trim accessories in strict accordance with manufacturer's instructions.

G. Sound stone tile after setting. Replace hollow sounding units.

H. Allow stone tile to set for a minimum of 48 hours prior to grouting.

I. Grout stone tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

3.04 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Over exterior concrete substrates, install in accordance with TCNA (HB) Method F103B, with standard grout.

B. Cleavage and Drainage Mat: Install per manufacturers instructions

C. Waterproofing Membrane: Install as specified in Section 07 1300.

D. Mortar Bed Thickness: 2 inch, unless otherwise indicated.

3.05 CLEANING

A. Clean stone tile and grout surfaces thoroughly.

B. Apply sealer in strict accordance with manufacturer's instructions. Remove excess material promptly.

END OF SECTION

SECTION 09 9000

PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Marble, granite, slate, and other natural stones.
   6. Floors, unless specifically so indicated.
   7. Glass.
   8. Acoustical materials, unless specifically so indicated.
   9. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of all substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, submit each color in each sheen available.
   3. Allow 30 days for approval process, after receipt of complete samples by Architect.
   4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

1.04 MOCK-UP

A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.

B. Locate where directed.

C. Mock-up may remain as part of the work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:
1. Behr Process Corporation: www.behr.com.
2. Diamond Vogel Paints: www.diamondvogel.com.
3. Duron, Inc: www.duron.com.
4. Glidden Professional, a product of PPG Architectural Coatings: www.gliddenprofessional.com.
5. Benjamin Moore & Co: www.benjaminmoore.com.
6. PPG Architectural Finishes, Inc: www.ppgaf.com.
7. Pratt & Lambert Paints: www.prattandlambert.com.
8. Sherwin-Williams Company: www.sherwin-williams.com.

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
4. Supply each coating material in quantity required to complete entire project's work from a single production run.
5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:

1. Provide coatings that comply with the most stringent requirements specified in the following:
    a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.
2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
3. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint CE-OP-3A - Concrete/Masonry, Opaque, Alkyd, 3 Coat:
1. One coat of block filler.
2. Semi-gloss: Two coats of alkyd enamel.

B. Paint GE-OP-3L - Gypsum Board and Plaster, Opaque, Latex, 3 Coat:
1. One coat of latex primer sealer.
2. Flat: Two coats of latex.

C. Paint ME-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
1. One coat of alkyd primer.
2. Semi-gloss: Two coats of alkyd enamel.

D. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
2. Semi-gloss: Two coats of alkyd enamel.

E. Paint MgE-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
1. One coat galvanize primer.
2. Semi-gloss: Two coats of alkyd enamel.

2.04 PAINT SYSTEMS - INTERIOR

A. Paint MI-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
1. Touch-up with alkyd primer.
2. Semi-gloss: Two coats of alkyd enamel.

B. Paint MgI-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
1. One coat galvanize primer.
2. Semi-gloss: Two coats of alkyd enamel.

C. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
1. One coat of alkyd primer sealer.
2. Eggshell: Two coats of latex enamel.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of coatings until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

H. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

I. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

J. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

D. Sand wood and metal surfaces lightly between coats to achieve required finish.

E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION

SECTION 31 1000
SITE CLEARING
(Clearing and Grubbing)

PART 1 – DESCRIPTION

1.1 The clearing work covered by this section consists of cutting, removing and properly disposing of vegetation and debris. Trees specifically identified on the plans to be preserved shall be adequately delineated and flagged by the CONTRACTOR, such that the balance of the work may be performed in a safe and harmless manner in the vicinity of preserved trees. Such tree preservation will be considered part of the work and shall be in conformance with applicable local codes and regulations. Clearing and grubbing shall be performed in areas as called for on the plans, the limits of which shall coincide with the construction limits and in general shall extend five (5) feet beyond top of cut and toe of fill, not to exceed the limits of the Owner's property.

1.2 RELATED WORK

Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.2.1 Reference the following specifications for related work:

31 2000 Unclassified Excavation and Grading

1.2.2 Clearing and grubbing activities shall conform to Section 201 of the "Standard Specifications for Highway Construction" dated 2007, published by the South Carolina Department of Transportation, except that grubbing shall be performed on all cleared excavation and embankment areas and shall include the complete removal of all stumps, roots and embedded debris.

1.3 The grubbing work covered by this section consists of removing and properly disposing of all surface vegetation and debris. Where the material being removed is high in organic matter content, such as root mat and other vegetative matter, it shall be considered vegetation and removed as part of the work of grubbing. Where material being removed consists predominantly of soils, such removal will be considered part of the work covered by Section 02210 of these specifications, entitled Unclassified Excavation and Grading.

1.4 The work of clearing and grubbing shall also include the removal and satisfactory disposal of crops, weeds and other annual growth, fences, steps, walls, chimneys, column footings, other footings, foundation slabs, basements, other foundation components, signs, junked vehicles, and other rubble and debris, and the filling of holes and depressions. This work shall also be performed in all non-wooded areas within the construction limits, shown on the project plans upon which seeding and mulching, sprigging or sodding is to be performed.

As a part of the work of clearing and grubbing, the CONTRACTOR will be required to cut off and plug at the right of way or construction limits, as directed by the ENGINEER, any private water or sewer line intercepted during the construction of the project, as well as cut off and remove from the construction area any septic tank or portion thereof during the construction of the project.

1.5 Clearing and grubbing operations shall be completed sufficiently in advance of grading operations as may be necessary to prevent any of the debris from the clearing and grubbing operations from interfering with the excavation or embankment operations.

1.6 The CONTRACTOR shall obtain, at his own expense, all necessary permits pertaining to clearing and grubbing work not already secured by the ENGINEER. The CONTRACTOR shall then provide a copy of any and all required permits to the ENGINEER.

PART 2 – MATERIALS:

Topsoil shall be considered to mean original surface soil, typical of the area, which is capable of supporting native plant growth, and shall be free of large stones, roots, brush, waste construction debris and other undesirable material.

PART 3 – INSTALLATION:

3.1 Clearing and grubbing shall be performed in areas as called for on the plans, the limits of which shall coincide with the construction limits and in general shall extend 5 feet beyond top of cut or toe of fill, not to exceed the limits of the OWNER's property. Clearing and grubbing activities shall conform to the "Standard Specifications for Highway Construction" dated 2007, published by the South Carolina Department of Transportation, except that grubbing shall be performed on all cleared excavation and embankment areas and shall include the complete removal of all stumps, roots and embedded debris.

3.2 The CONTRACTOR shall perform all clearing and grubbing operations before construction operations begin.

3.2.1 Where adjacent areas within the site but outside the limits of construction are disturbed as a result of clearing and grubbing activities, the CONTRACTOR shall remove all debris and restore to the original grades and equal or better condition.

3.2.2 The CONTRACTOR shall exercise caution to protect and maintain all existing utilities and underground works which are to remain. Any existing utilities or underground works which are to remain that are disturbed during construction shall be repaired or replaced at the CONTRACTOR's expense.

3.2.3 The CONTRACTOR must comply with all local, state and federal laws, ordinances and regulations in the removal and disposal of clearing and grubbing of all vegetation, timber, waste and all surface debris that must be hauled from the Project Site. No burning of materials will be allowed on site. The CONTRACTOR shall properly dispose of all cleared materials at his expense, in conformance with all applicable local and state laws and ordinances with the exception of any materials to be reused or recycled as directed elsewhere in this contract.

3.3 Stripping and Storage of Topsoil
All topsoil suitable for reuse, in the opinion of the ENGINEER, shall be stripped to its full depth, all topsoil to be moved shall be free of large stone, roots, brush, waste construction materials and other undesirable matter.

3.3.1 Topsoil stripping shall be accomplished from all topsoiled areas to be disturbed.

3.3.2 Existing lawn sods may be left to decompose with the topsoil. Heavier stands of weeds and grasses shall be removed as directed by the ENGINEER prior to the stripping operations.

3.3.3 The topsoil shall be kept separate from other excavated materials and stored in stockpiles, the location of which shall be as directed by the ENGINEER. Topsoil shall be stockpiled so that it shall not be subject to abnormal erosion and loss, and so that it does not impede the flow of drainage runoff. The directed locations of topsoil stockpiles will, when construction sequence permits, be located in areas that have previously been graded to design rough grade.

3.3.4 Any excess topsoil shall be hauled off the OWNER's property by the CONTRACTOR at CONTRACTOR expense.

END OF SECTION

SECTION 31 1000
SITE CLEARING
(Erosion Control)

PART 1 – DESCRIPTION:

1.1. Erosion and sedimentation control shall be provided by the CONTRACTOR for all areas of the site denuded or otherwise disturbed during construction. The CONTRACTOR shall be responsible for all installation, materials, labor, and maintenance of erosion and sediment control devices, as well as removal of temporary erosion and sediment control devices shown on the plans or required to protect all downstream properties, natural waterways, streams, lakes, ponds, catch basins, drainage ditches, roads, gutters, natural buffer zones, and man made structures.

1.2. Erosion and sediment control procedures and facilities shall conform to all legally regulated procedures for the control of erosion and sedimentation.

1.3. RELATED WORK
See the following sections for related work.

31 1000	Engineering Fabrics
31 1000	Plain Rip Rap
31 1000	Stone for Erosion Control
31 1000	Silt Fence
32 9200	Seeding and Mulching

1.4 REFERENCES
Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specification or regulation unless noted otherwise.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National Specifications and/or Regulations or meet the requirements of the latest revision of these specifications or regulations.

1.5 SPECIAL REFERENCES
Erosion and sediment control procedures and facilities shall conform to all of Section 815 of the "Standard Specifications for Highway Construction" dated 2007 or latest edition, published by the South Carolina Department of Transportation and South Carolina Stormwater Management and Sediment Control Handbook as published by EQC, Bureau of Water, SC Department of Health and Environmental Control.

PART 2 – MATERIALS:

2.1. Washed stone to be used in temporary sediment basins shall be of strong, durable nature, resistant to weathering and shall be graded to conform to local and state Department of Transportation requirements.

2.2. Refer to other sections within these specifications as listed in Item 1.3 above for other material specification required in the installation of erosion and sediment control facilities.

PART 3 – INSTALLATION:

3.1 General Requirements

3.1.1 The CONTRACTOR shall follow the erosion control construction sequence schedule as shown on the contract drawings, except that should circumstances dictate that extra precaution be taken to prohibit erosion and sedimentation on the project, the CONTRACTOR will, at his own expense, take preventative measures as needed.

3.1.2 The CONTRACTOR is required to maintain all erosion and sediment control facilities to insure proper performance throughout the construction phase and until such time all disturbed areas are permanently stabilized.

3.1.3 Upon completion of construction or successful permanent stabilization of all areas which were disturbed before or during construction operations or as indicated on the construction drawings, whichever occurs last, the CONTRACTOR shall remove all temporary erosion and sediment control devices and facilities from the project site. The CONTRACTOR shall retain these items for future use or properly dispose of these items offsite.

3.1.4 The CONTRACTOR shall provide temporary or permanent ground cover as called for on the construction plans within thirty (30) working days after disturbance of any areas on the site.

END OF SECTION

SECTION 31 1000
SITE CLEARING
(Stone for Erosion Control)

PART 1 – DESCRIPTION

The work covered by this section consists of the furnishing, stockpiling if directed, placing and maintaining an approved stone liner placed in or at ditches, swales, pipe inlets, pipe outlets, and at other locations designated on the plans or directed by the ENGINEER. The CONTRACTOR shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications.

1.1. RELATED WORK

Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.1.1. Reference the following specifications for related work:

01016	References to National and State Standard Specifications
31 1000	Erosion control
31 1000	Plain Rip Rap

1.1.2. The stone for erosion control shall conform to all of Section 815 of the “Standard Specifications for Highway Construction” dated 2007 or latest edition, published by the South Carolina Department of Transportation and South Carolina Stormwater Management and Sediment Control Handbook as published by EQC, Bureau of Water South Carolina Department of Health and Environmental Control.

1.2. REFERENCES

Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specification or regulation unless noted otherwise.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National or State Specifications and/or Regulations or meet the requirements of the latest revision of these specifications and regulations.

PART 2 - MATERIALS

2.1 Stone for erosion control shall conform to SCDOT Section 800 requirements.

2.2 Stone for erosion control shall be resistant to the action of air and water, be of a hard, durable nature and shall range in size as follows:

Class	Size
A	2" - 6"
B	5" - l5"

2.3 All stone shall meet the approval of the ENGINEER. While no specific gradation is required, the various sizes of stone shall be equally distributed within the required size range. The size of an individual stone particle will be determined by measuring along its long dimension.

PART 3 - INSTALLATION

3.1 Unless otherwise directed by the ENGINEER, the stone shall be placed on slopes less than the angle of repose of the material and to the line, grade and slope as indicated on the plans. The stone shall be placed so that the smaller stones are uniformly distributed throughout the mass. All stone shall be placed in a neat, uniform layer with an even surface meeting the approval of the ENGINEER.

3.2 At locations where stone is required for channel changes and drainage ditches, the stone shall be placed prior to diverting the water into the channel changes and drainage ditches.

3.3 At locations where stone is required at the outlet of pipe culverts, the stone shall be placed immediately after completion of the pipe culvert installation.

END OF SECTION

SECTION 31 1000
SITE CLEARING
(Temporary Silt Fence)

PART 1 – DESCRIPTION:

The work covered by this Section consists of the furnishing, installing, maintaining, replacing as needed, and removing of temporary silt fence. The CONTRACTOR shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications. All materials and procedures shall conform to the latest version of local and state Department of Transportation requirements.

1.1. RELATED WORK

Any reference to standard specifications refers to the most current published date published of the following specifications unless otherwise noted.

1.1.1. Reference the following specifications for related work:

31 1000	Erosion Control
31 1000	Stone for Erosion Control

All applicable local design manuals, codes and/or ordinances for Erosion and Sedimentation Control. (Where these design manuals, local codes and ordinances are more stringent then the State Department of Transportation, these codes and/or ordinances will control the erosion and sedimentation control procedures to be followed.)

The temporary silt fence shall conform to the “Standard Specifications for Roads and Structures” dated 2007 or latest edition, published by the South Carolina Department of Transportation.

PART 2 – MATERIALS:

2.1. GENERAL REQUIREMENTS

Temporary silt fence shall be a water permeable filter type fence for the purposes of removing suspended particles from the water passing through it.

2.2. POSTS

Steel posts must be used. Steel posts shall be at least 5 feet in length, approximately 1-3/8 inches wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches, and shall have a means of retaining wire and fabric in the desired position without displacement.

2.3. WOVEN WIRE FENCE

Wire fence fabric shall be at least 32 inches high, and shall have at least 6 horizontal wires. Vertical wires shall be spaced 12 inches apart. The top and bottom wires shall be at least 10 gage. All other wires shall be at least 12-1/2 gage.

2.4. SILT FENCE FILTER FABRIC

The filter fabric shall conform to all of Section 815.02 of the “Standard Specifications for Highway Construction” dated 2000, published by the South Carolina Department of Transportation and the South Carolina Stormwater Management and Sediment Control Handbook as published by EQC, Water Bureau, South Carolina Department of Health and Environmental control.

Silt fence which incorporates filter fabric meeting the requirements of these State Specifications but which fail to perform in an acceptable manner shall be replaced with silt fences which are capable of acceptable performance. All silt fences shall meet the local governmental requirements as well as the State's requirements.

PART 3 – INSTALLATION:

3.1. GENERAL REQUIREMENTS

3.1.1. The CONTRACTOR shall install temporary silt fence as shown on the plans or as required by field conditions. The silt fence shall be constructed at the locations shown on the plans and at all other locations necessary to prevent sediment transport, as directed by the ENGINEER.

3.1.2. Class A synthetic filter fabric may be used only in conjunction with woven wire fence fabric backing. Filter fabric shall be attached to the wire fence fabric by wire or other acceptable means.

3.1.3. Class B synthetic filter fabric may be used without the woven wire fence fabric backing, subject to the following conditions:

- Post spacing is reduced to a maximum of 6 feet.
- The proposed fabric has been approved by the ENGINEER as being suitable for use without the woven wire fence fabric backing.
- Fence posts shall be inclined toward the runoff source at an angle of not more than 20^{o} from vertical.
- Posts shall be installed so that no more than 3 feet of the post shall protrude above the ground. Where possible, the filter fabric from a continuous roll cut to the length of the barrier shall be used to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with overlap to the next post. At the time of installation, the fabric will be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

3.2. MAINTENANCE AND REMOVAL

3.2.1. The CONTRACTOR shall inspect temporary silt fences at least once a week and after each rainfall and shall make any required repairs and remove and dispose of silt accumulation immediately. Should the fabric of the silt fence collapse, tear, decompose or become ineffective, the CONTRACTOR will replace it promptly at his own expense. The CONTRACTOR shall remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence.

3.2.2 The CONTRACTOR shall remove all temporary silt fence and associated appurtenances once all disturbed areas upland of the fence are properly and satisfactorily stabilized as called for on the plans.

END OF SECTION

SECTION 31 2000
EARTH MOVING
(Earthwork)

PART 1 - DESCRIPTION:

The Contractor shall furnish all labor, material, equipment, and supplies, and shall perform all earthwork including excavation and backfill, pavement removal, sheathing, bracing, shoring, pumping or bailing, dewatering, restoration and cleanup; all as indicated, specified and/or necessary to complete the work.

1.1 Any reference to SCDOT standard specifications was obtained from the "Standard Specifications for Highway Construction" dated 2007 published by the South Carolina Department of Transportation. Unless otherwise noted, the most current date published applies.

1.2 RELATED WORK: Reference the following specifications for related work:

31 1000	**Erosion Control**
32 9200	**Seeding and Mulching**

PART 2 - MATERIALS:

2.1 FILL MATERIAL: Shall be classified as ML-low plasticity silt or better by the Unified Soil Classification System and tabulated below:

	Unified Class	Description
Class I		1/4" - 1-1/2" well graded stone including coral, slag, cinders, crushed stone and crushed shells
Class II	GM	Coarse gravel well graded
	GP	Coarse gravel poorly graded
	SW	Coarse sands well graded
	SP	Coarse sands poorly graded
Class III	GM	Silty-sandy gravel
	GC	Clayey-sandy gravel
	SM	Silty-sands
	SC	Clayey-sands
Class IV	ML	Inorganic silts and fine sands

Fill material shall exhibit a plasticity index of less than 20, and Standard Proctor maximum density at optimum moisture greater than 90 pounds per cubic foot.

2.1.1 THE FOLLOWING MATERIALS ARE UNACCEPTABLE:

	Unified Class	Description
Class IV	CL	Inorganic clays - low plasticity

		MH	Inorganic elastic silts
		CH	Inorganic clays - high plasticity
Class V	OL		Organic silts
		OH	Organic clays
		PT	Highly organic soil

PART 3– CONSTRUCTION:

3.1 EXISTING FACILITIES:

3.1.1 Existing Utilities Shown on the Drawings: It shall be the Contractor's responsibility to conduct the work in such a manner as to avoid damage to or interference with any utilities services shown on the drawings. If such damage, interference, or interruption of service shall occur as a result of his work, then it shall be the Contractor's responsibility to promptly notify the Engineer of the occurrence and to repair or correct it immediately, at his own expense, and to the satisfaction of the Engineer and the Owner of the Utility.

3.1.2 Existing Utilities Not Shown on the Drawings: It shall be the Contractor's responsibility to exercise all reasonable precaution in the performance of the work to avoid damage to or interference with any utilities services, even though not shown on the drawings. If such damage, interference, or interruption of service shall occur as the result of this work, then the Contractor's responsibility will be the same as stipulated in Paragraph 2.1 above.

3.2 EXCAVATION AND BACKFILL - GENERAL REQUIREMENTS:

3.2.1 Pavement, gutters, sidewalks, aprons and curbs which will be disturbed by excavation shall be removed and disposed of as a part of ordinary excavation. That which is to be removed shall be cut or sawn along clean straight lines from that which is to remain. Remove enough such that a minimum of twelve inches of undisturbed earth remain between the excavation and that which is to remain.

3.2.2 Where required, and as approved by the Engineer, sheeting and bracing shall be used to prevent injury to persons, caving of trench walls and to conform with all governing laws and ordinances. Sheeting and bracing shall be left in place until the trench is refilled to a safe limit. The top portion may then be removed, but the lower portion shall remain undisturbed.

3.2.3 It is the responsibility of the Contractor to provide an adequate dewatering system where required. The system shall be capable of removing any water that accumulates in the excavation and maintaining the excavation in a dry condition while construction is in progress. The surface of the ground shall be sloped away from the excavation or piping provided to prevent surface water from entering the excavation. Disposal of water resulting from the dewatering operation shall be done in a manner that does not interfere with normal drainage, and does not cause damage to any portion of the work or adjacent property. All drains, culverts, storm sewers and inlets subject to the dewatering operation shall be kept clean and open for normal surface drainage. The dewatering system shall be maintained until backfilling is completed or as otherwise directed by the Engineer. All damage resulting from the dewatering operation shall be repaired by the Contractor to the satisfaction of the Engineer and at no cost to the Owner.

3.3 The Contractor shall erect, maintain, and safeguard temporary bridges, walkways, or crossings where it is necessary to maintain traffic. Where trenches are open in the vicinity of pedestrian or vehicular travel lanes, suitable carriers will be constructed and maintained and the work will be further protected from sunset to sunrise with a sufficient number of lights or flares to fully protect the public from accidents on account of construction.

3.4 If the specified depth for foundations proves insufficient to reach firm ground, the Engineer shall be notified and will furnish instructions for proceeding with the work.

3.5 Rock, wherever used as a name for excavation material, shall mean boulders exceeding one-half cubic yard in volume or solid ledge rock, which in the opinion of the Engineer, requires for its removal drilling and blasting, or wedging or sledging and barring. Where rock excavation is necessary, the Contractor shall excavate the same as near the neat lines of the trench as practicable and he shall take all due precautions in the pursuance of the work. He will be held strictly responsible for all injury to life and to public and private property.

3.5.1 Rock shall be removed from the excavation to the following limits:

a. Trenches - The diameter of the pipe plus 8-inches on each side, extending six inches below the pipe wall and bell.

b. Structures - 12-inches beyond the vertical plane of the structure on all sides and on the bottom only to the depth necessary for proper installation.

3.6 Blasting: Prior to commencing any blasting operations the Contractor shall notify the Engineer and either the Local Fire Department - Fire Prevention Section or the County Fire Administrator (as applicable) and obtain blasting permits as required. The Contractor must furnish proof (certification) of insurance specifically covering any and all obligations assumed pursuant to the use of explosives.

All blasting operations shall be conducted in strict accordance with any and all decrees, rules, regulations, ordinances, laws as may be imposed by any regulatory body and/or agency having jurisdiction over the work relative to handling, transporting, use and storage of explosives. Blasting shall be done only by competent, and experienced men whose activities shall be conducted in a workmanlike manner. Satisfactory information must be provided to the Engineer, that the blaster meets or exceeds the qualifications enumerated in OSHA Regulations Part 1926, Subpart U, Section 1926.901 - Blaster Qualifications.

3.6.1 Overburden: Undisturbed overburden may be deemed adequate in lieu of matting but only after the actual depth of the undisturbed overburden has been determined and adjudged sufficient by the Engineer. Under no circumstances will loose or fill overburden be adequate without the use of weighted mats.

3.6.2 Permission to Blast: The Contractor shall not be allowed to blast before 9 a.m. or after 3 p.m. without approval of the Engineer and Owner. Blasting will not occur within any rights-of-way maintained by any agency (D.O.T., R.R., Gas, Owner, etc.) without specific approval of the controlling agency and only in accordance with their respective requirements (as exceeded herein).

The Contractor shall be held responsible for any and all injury to persons or damage to public or private property.

PART 4 – STRUCTURE EXCAVATION AND BACKFILL:

4.1 Structure Excavation shall be made at the locations shown on the plans and to the exact subgrade required. Bottom of excavations shall be level and in firm, solid material, with soft material or voids treated as specified. Excavated areas shall be kept free of water during the construction period. Where either will stand, footing trenches may be cut to the exact size of the footings; otherwise, forms shall be used. Where necessary, sides of excavations shall be shored and sheathed, or cofferdams built, as required for protection of the work and personnel.

4.1.1 Wherever excavation for a foundation extends below the water table or where specifically indicated on the plans, washed stone shall be placed to a minimum thickness of 12 inches, unless otherwise shown, prior to placing the foundation. The washed stone shall be compacted to 90% of maximum as determined by the Standard Proctor test (ASTM D698).

4.1.2 If the specified depth for foundations proves insufficient to reach firm ground, the Engineer shall be notified for furnishing instructions and proceeding with the work.

4.1.3 An adequate dewatering system shall be provided at all structure excavations and elsewhere as directed by the Engineer. If a well-point system is used, the Contractor shall submit plans to the Engineer for approval. The system shall be capable of removing any water that accumulates in the excavation and maintaining the excavation in a dry condition while construction is in progress. The surface of the ground shall be sloped away from the excavation or piping provided to prevent surface water from entering the excavation. Disposal of water resulting from the dewatering operation shall be done in a manner that does not interfere with normal drainage, and does not cause damage to any portion of the work or adjacent property. All drains, culverts, storm sewers and inlets subject to the dewatering operation shall be kept clean and open for normal surface drainage. The dewatering system shall be maintained until backfilling is complete or as otherwise directed by the Engineer. All damage resulting from the dewatering operation shall be repaired by the Contractor to the satisfaction of the Engineer and at no cost to the Owner.

4.2 Structure Backfill shall be done with material free from large clods, frozen earth, organic material or any foreign matter, and shall evenly and carefully be placed and tamped in horizontal layers. Compaction equipment specifically designed for these purposes must be present and operational at the job site and shall be utilized throughout to obtain uniform compaction. The degree of compaction and the density shall be determined by the Standard Proctor Test (ASTM D698), with compaction requirements as follows:

Percent of Maximum Density at Optimum Moisture	Location
98	Top 12" of fill pavement or surfacing.
98	Full depth beneath all roads (paved or unpaved), driveways, sidewalks, undercut backfill for structure excavation, and lot fill.
95	All other areas not defined above.

4.2.1 No backfill shall be placed against a structural wall until all connecting structural members are in place. It shall be the Contractor's responsibility to provide compaction to such a degree that subsidence after placing shall not be detrimental to the stability or appearance of the structure, adjacent ground, or paved areas. The Contractor shall provide adequate protection to all structures during backfilling and shall use every precaution to avoid damaging or defacing them in any way. Contractor shall be responsible for the protection of all structures from damage or flotation prior to backfill being placed.

4.2.2 Unless otherwise approved by the Engineer, liquid-retaining structures shall not be backfilled until tested for leakage.

PART 5 – UNSTABLE SUBGRADE:

5.1 Should unstable soil, organic soil, or soil types classified as fine-grained soils (silts and clays) by ASTM D-2487 be encountered in the bottom of pipe trenches or structure excavations, such soils shall be removed to a depth and width determined by the Engineer, properly disposed of and shall be backfilled with crushed stone conforming to the Department of Transportation Specifications, Size 57. Placement shall not exceed 12-inches loose and compacted to 90% of the dry density determined by the Standard Proctor test ASTM D698 (Class C concrete may be substituted in place of #57 stone at the Contractor's option. A 24-hour cure must be given before proceeding with the work).

PART 6 – SITE GRADING:

Site grading shall conform to the grades indicated by the finish contours on the plans. Where topsoil, pavement, gravel or crushed stone surfacing and other items are shown, rough grade shall be finished to such depth below finish grade as necessary to accommodate these items. All areas where structures are to be built on fill shall be stripped to such depth as necessary to remove turf, roots, organic matter and other objectionable materials.

6.1 Excavation shall be made to the exact elevations, slopes and limits shown on the plans.

6.1.1 Material excavated may be used as fill material as long as it meets the material requirements established herein. Acceptable material must be stockpiled neatly onsite and clear of all unsuitable materials to be removed from the site.

6.2 Fill: Shall incorporate only acceptable materials defined herein. It shall not contain organic material, roots, debris or rock larger than 6 inches in diameter.

6.2.1 Where fill is to be placed, all existing vegetation, roots and other organic matter down to 12 inches below grade shall be stripped and disposed of as directed.

6.2.2 After clearing existing vegetation, at the Engineer's discretion, the site may require proof rolling to insure that all unstable material has been removed. Proof rolling shall be done in the Engineer's presence, utilizing a fully loaded pan or tandem axle truck.

6.2.3 Fill shall be placed in successive compacted layers not to exceed 6 inches compacted thickness. Each layer shall be spread evenly and compacted as specified below before the next layer is placed.

6.2.4 Rock shall not be incorporated in fill sections supporting pavement or structures.

6.2.5 Where natural slopes exceed 3:1, horizontal benches shall be cut to receive fill material. Slopes of less than 3:1 and other areas shall be scarified prior to placing fill material.

6.2.6 Borrow material, as required, shall be provided by the Contractor at his own expense. Borrow material on site may be utilized provided it complies with these specifications.

6.3 Compaction: Unless otherwise noted, each layer of fill and backfill and the top 12 inches of existing subgrade material in cuts shall be compacted by approved equipment as specified below. The degree of compaction and the density shall be determined by the Standard Proctor Test (ASTM D698).

	Percent of Max. Dry Density at Optimum Moisture Content
Top 12 inches of fill under pavement or surfacing	98%
Fill under roads, structures, and lots	98%
Fill and backfill in other areas	95%

Material too dry for proper compaction shall be moistened by suitable watering devices, turned and harrowed to distribute moisture, and then properly compacted. When material is too wet for proper compaction, operations shall cease until such material has sufficiently dried.

PART 7 – COMPACTION TESTS:

The Contractor shall provide compaction tests by an independent testing agency selected by the Contractor and approved by the Engineer. The compaction tests shall be taken at appropriate locations and frequency to demonstrate that the backfill (or fill) has been placed to meet the minimum compaction density required. The testing agency shall submit written test records to the Engineer for all compaction tests performed. Minimum testing shall be:

1. One test per 250 L.F. of trench cut for every 2 feet of backfill placed.

2. One test per 10,000 square feet of fill placed for every foot of fill thickness.

In the event that the soil compaction is not in compliance with these specifications, then the Contractor shall take corrective action, at no cost to the Owner, to compact the soils within the limits of the specifications. The Engineer shall be notified within 24 hours of any failing compaction tests. Any retesting of failed areas shall be performed only after corrective measures have been made by the Contractor to bring the compacted soils into compliance. All retesting shall be performed with the Engineer present.

PART 8 – SITE RESTORATION:

8.1 General: All surfaces disturbed by the Contractor in the work shall be restored to a condition equal to or better than that which existed prior to commencement of the work, except as otherwise specified herein.

8.2 Pipe drains, headwalls, catch basins, curbs and gutters, and all incidental drainage structures shall be restored using like materials and details at no additional cost to the Owner. The Contractor shall maintain drainage during construction.

8.3 All cuts, fills and slopes shall be neatly dressed off to the required grade or subgrade, as indicated on the plans.

8.4 Grassed areas shall be restored at no additional cost to the Owner. Disturbed areas shall be covered with two (2) inches of topsoil, furnished by the Contractor from an approved source and of approved existing grade, line and cross section.

8.5 Paved surfaces shall be restored in accordance with the provisions of Section 32 1216.

END OF SECTION

SECTION 31 2000
EARTH MOVING
(Unclassified Excavation and Grading)

PART 1– DESCRIPTION:

This portion of the project includes the excavation, undercut excavating, grading, earthwork and compaction required as shown on the plans and all other associated miscellaneous items of earthwork construction, as shown on the plans. The CONTRACTOR shall furnish all materials, labor, equipment and incidental items necessary to complete this portion of the work as detailed on the plans and as called for in these Specifications.

1.1. Any reference to standard specifications refers to the most current published date published of the following specification or regulation unless otherwise noted.

All unclassified excavation shall be in accordance with Section 203 and in the event “Borrow Fill” is required, of the latest version of the "Standard Specifications for Highway Construction", published by the South Carolina Department of Transportation, unless otherwise directed herein.

1.2. Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted:

Reference the following specifications for related work:

31 1000	Clearing and Grubbing
31 2000	Excavating, Backfilling, and Compacting for Utilities
32 9200	Seeding and Mulching
ASTM D698C	
State Highway Specifications referred to in Section 1.1	

1.3. Definitions

Trench Rock: That rock within the trenching limits that must be removed for utility construction.

Mass Rock: That rock which must be removed by blasting to permit reaching one foot below the design finish grade.

Geotechnical Engineer, also known as the “Project Geotechnical Engineer”: Professional soils engineer hired by the CONTRACTOR and approved by the ENGINEER for this project.

Surveyor: Licensed surveyor hired by the CONTRACTOR and approved by the ENGINEER for this project.

PART 2 – MATERIALS:

2.1. Topsoil shall be considered to mean original surface soil, typical of the area, which is capable of supporting native plant growth, and shall be free of large stones, roots, brush, waste, construction debris and other undesirable material or contamination.

2.2. All fill used for site grading operations should consist of a clean (free of organics and debris) low plasticity soil (plasticity index less than 30).

PART 3 – INSTALLATION:

3.1. General Requirements

3.1.1. In the event a subsurface investigation report has been prepared for this project, all excavation, filling and grading shall be performed in accordance with the recommendations of the subsurface report, and under the direction of the project geotechnical ENGINEER.

3.1.2. Construction stakeout will be by a licensed survey firm provided by the CONTRACTOR. Exact locations and grade points are to be staked or fixed by the surveying firm before construction. The CONTRACTOR shall not disturb any benchmarks, reference stakes or property line monuments. In the event it becomes necessary to remove any benchmark, reference stake or property line monument in the performance of the work, the CONTRACTOR shall reference such points in preparation for replacement. If any such points are disturbed or damaged, they shall be replaced by a Registered Land Surveyor in the state where the work is located at the expense of the CONTRACTOR.

3.1.3. Existing utility lines (either overhead or underground), sidewalks, fencing, pavement or other structures shown on the drawings, shown to the CONTRACTOR or mentioned in the plans and specifications shall be kept free of damage by the CONTRACTOR's operations. It shall be the responsibility of the CONTRACTOR to verify the existence and location of all underground utilities within the Project Site. The omission from or the inclusion of utility locations on the plans is not to be considered as the non-existence of or a definite location of existing underground utilities. Any existing construction damaged by the CONTRACTOR shall be restored to an equal condition as that existing at the time prior to damage, at the CONTRACTOR's expense. If any existing utility is inadvertently damaged during construction, the CONTRACTOR shall notify the utility, the ENGINEER and the OWNER of said damaged utility at once so that emergency repairs may be made at the CONTRACTOR's expense and to the satisfaction of the party having jurisdiction of the utility.

3.2. UNCLASSIFIED EXCAVATION

3.2.1. Upon completion of the stripping operations, and after all excavation of the site has been completed to the lines and grades shown on the drawings, the exposed subgrade in cut areas should be proofrolled as specified herein for areas to receive fill. Any areas which deflect, rut or pump excessively during the proofrolling or fail to "tighten up" after successive passes should be undercut to suitable soils and replaced with compacted fill.

3.2.2. All site excavation shall be unclassified regardless of the nature of the materials encountered with the exception of rock excavation. Only that material which in the opinion of the ENGINEER cannot be removed with a caterpillar D-9 or equal, equipped with a properly fitted single tooth ripper, or removed by a caterpillar 225 backhoe or equal, equipped with rock teeth, will be regarded as rock. The ENGINEER should be notified immediately if rock is encountered. All excavation materials which are not required for fills shall be considered as waste and shall be disposed of off the OWNER's property unless directed otherwise by the OWNER in writing.

3.2.3. All site excavation of previously stockpiled or buried construction, clearing or demolition debris or any other refuge shall be properly disposed of offsite at the CONTRACTOR's expense. The CONTRACTOR shall obtain all necessary Federal, State or Local permits for transporting and disposing of such material, at his expense.

3.2.4. Rock in the bottom of roadway cuts shall be excavated to a depth of 1 foot below the roadbed and ditches. Rock in building pad areas shall be excavated to a depth of 1 foot below finished grade or as indicated on the grading plans.

3.2.5. The CONTRACTOR shall provide all sheeting, shoring, underpinning and bracing required to hold the sides of the excavation and for the protection of all adjacent structures. The CONTRACTOR shall be held responsible for any damage to any part of the work by failure of excavated sides or bottoms.

3.3. BLASTING

3.3.1. Any and all blasting operations shall be conducted in strict accordance with existing ordinances and regulations relative to storage and use of explosives. Blasting shall be done only by experienced men and extreme caution and care shall be exercised to prevent injury to persons or damage to any pipe, mains, wires, drains, buildings, railroad tracks or other property above or below the surface of the ground. The CONTRACTOR shall use safety nets or other equivalent measures as approved by the ENGINEER to reduce the possibility of flying rock as a result of blasting operations. The CONTRACTOR shall be held strictly responsible for any injury to persons or damage to public or private property.

3.3.2. The CONTRACTOR shall submit blasting plans to the ENGINEER for review and shall not proceed with blasting operations until approval has been granted. As directed by the ENGINEER, blasting operations shall be monitored to insure that vibration levels produced by blasting are within tolerable limits.

3.3.3. The CONTRACTOR shall obtain at his expense, all Federal, State and Local permits required to perform blasting operations.

3.4. DEWATERING

3.4.1. The CONTRACTOR shall control the grading in all areas so that the surface of the ground will be properly sloped, diked or ditched to prevent water from entering into excavated areas. The CONTRACTOR shall maintain sufficient personnel and equipment to promptly and continuously remove all water, from any source, entering or accumulating in the excavation or other parts of the work. All water pumped or drained from these areas shall be disposed of in a suitable manner without damaging adjacent property or other work under construction.

3.5. EMBANKMENTS, FILLS AND BACKFILLS

3.5.1. Upon completion of the stripping operations, the exposed subgrade in areas to receive fill should be proofrolled with a loaded dumptruck or similar pneumatic-tired vehicle with a minimum loaded weight of 25 tons, under the supervision of the geotechnical ENGINEER. The proofrolling procedure should consist of four complete passes of the exposed areas with two of the passes being in a direction perpendicular to the preceding ones. Any areas that deflect, rut or pump excessively during the proofrolling or fail to "tighten up" after successive passes should be undercut to suitable soils and replaced with compacted fill.

3.5.2. Embankments and fills shall be constructed at the locations and to the lines and grades indicated on the drawings. Material shall be placed in horizontal layers not to exceed 8 inches in loose depth and thoroughly compacted prior to placing each following layer. All fill material shall be free from roots or other organic material, trash, and from all stones having any one dimension greater than 6 inches. Stones larger than 4 inches, maximum dimension, shall not be permitted in the upper 6 inches of fill or embankment. Fill areas shall be kept level with graders or other approved devices.

3.5.3. Embankment and fill compaction shall be accomplished by thoroughly compacting each layer with sheep foot rollers, pneumatic rollers, and mechanical tampers in places inaccessible to rollers, or other equipment. When material has too much moisture, grading operations shall be limited to drying soil by spreading and turning for drying by the sun and aeration. When material is dry, moisture shall be added by sprinkling by approved means.

3.5.4. All embankments and fills shall be compacted to the following percentages of the maximum dry density as determined by the Standard Proctor Density Test, ASTM D-698, Method C.

3.5.5. The following table shall be used unless otherwise specified:

TABLE OF COMPACTION

Type Fill or Embankment	Zone	Minimum Density %

Structure	All Depths	98
Roadway and	Top l2 Inches	98
Other Areas	Remainder	95

Embankment types are defined as follows:

Structure - beneath concrete slabs of buildings, floors, foundations, etc.
Roadway and Parking - beneath all roads, streets, truck operations, and automobile parking lots

3.5.6. Where backfilling is required after the completion of drainage structures, all forms, trash, and construction debris shall be removed from excavation before backfilling begins. Backfill shall be placed in horizontal layers of 6 inches in loose depth. Compaction shall conform to requirements in the above table. Heavy rollers, crawler equipment, trucks or other heavy equipment shall not be used for compacting backfill within 5 feet of structure walls or other facilities which may be damaged by their weight or operation. No backfilling shall begin until concrete and masonry walls are properly cured.

3.5.7. The CONTRACTOR shall carry the top of embankments, fills, or backfills to the surrounding grade so that upon compaction and subsequent settlement, the grade will be at proper elevation. Should settlement occur during the guarantee period of the contract, the CONTRACTOR shall provide sufficient fill to bring area up to finished grade and shall reseed as required.

3.6. PROOFROLLING SCHEDULE

3.6.1. Proofrolling under the observation of the geotechnical ENGINEER will be performed using a loaded dumptruck or similar pneumatic-tired vehicle with a minimum loaded weight of 25 tons as specified herein and as follows.

3.6.2. Immediately following stripping, all areas to receive fill shall be proofrolled as specified herein.

3.6.3. Immediately following the completion of excavation to proposed grades in cut areas, proofrolling shall be performed as specified herein.

3.6.4. Immediately prior to stone base course placement in pavement areas and following final floor slab preparation, all subgrade areas will be proofrolled. Any local areas that deflect, rut or pump under the roller shall be undercut and replaced with compacted fill material as specified herein.

3.7. SOIL INSPECTION AND TESTS

3.7.1. All excavated and fill material shall be removed, selected, placed and compacted under supervision of a representative of a commercial soils testing laboratory which will be selected by the CONTRACTOR and approved by the ENGINEER. A commercial soil testing laboratory shall be any firm properly equipped to perform such compaction tests and who has in their employment a Professional ENGINEER experienced in testing and soil mechanics. The laboratory representative shall have the authority to approve or disapprove the condition of the subgrade on which fill is to be placed, filled material, placement methods, compaction methods, and shall make compaction density tests as necessary to determine that the specified density is obtained. The CONTRACTOR shall notify the laboratory at least three (3) days prior to starting fill operations in order that suitability of material for compaction may be checked and no material shall be used that has not been previously checked and approved by the laboratory. The laboratory shall be notified before any cut is made or fill is placed in order that the laboratory representative may be present during all grading operations. The CONTRACTOR shall remove, replace, recompact and retest all fills failing to meet the density requirements at his own expense.

3.7.2. A soil testing laboratory shall be retained by the CONTRACTOR and approved by the ENGINEER to supervise fill placement and compaction. Extra time and trips caused by excessive delay, failure of the

CONTRACTOR to properly coordinate with the laboratory, or failure of the CONTRACTOR to properly compact fill material shall be the responsibility of the CONTRACTOR.

3.7.3. Field density tests shall be performed by the OWNER's testing agency for each one foot of fill material placed at the following frequency: once per day.

3.7.4. A minimum of one field density test shall be made for each 5,000 square feet of fill placement in building areas.

3.7.5. A minimum of one field density test shall be made for each 10,000 square feet of fill placement in all other areas where pavement is to be placed.

3.7.6. Prior to final acceptance, the Soils ENGINEER and Surveyor shall submit certification specifying that the project compaction criteria and subgrading elevations have been satisfactorily obtained. The CONTRACTOR is responsible for the certification statement from the Surveyor. This certification should be in the form of a letter accompanied by a stamped as-built drawing showing spot elevations.

3.8. BORROW AND WASTE MATERIALS

3.8.1. Borrow

In the event borrow material is required, the borrow material shall be checked for suitability for compaction and approved by the soils testing laboratory. The CONTRACTOR shall notify the laboratory at least three (3) days in advance of beginning borrow operations. Borrow excavation shall be performed in accordance with referenced State Highway construction Specification in which state the project is located except where modified herein.

3.8.2. Waste

Excavated materials not suited for backfill and excavated material in excess of that needed to complete the work shall be wasted on the project site where directed by the ENGINEER or hauled off the OWNER's property at the CONTRACTOR's expense. Waste areas shall be left in a graded and sloped condition to allow natural drainage of surrounding area.

3.9. RESIDUAL SOIL AREAS

If proof rolling indicates that on-site virgin soils supporting any roadway, parking, building or other structural areas are not adequate as determined by the Soils ENGINEER, then these unsuitable areas shall be repaired by the CONTRACTOR. The necessary repair procedure shall be determined by the Soils ENGINEER and may include scarifying, drying and recompaction procedures or undercutting and replacement procedures.

3.10. FINAL GRADING

3.10.1. On completion of all grading, all graded areas (except building pads and pavement areas in rough grading contracts and all cut slopes steeper than 4:l slope) shall be provided with 4 inches of topsoil and brought to the finished grades shown on the drawings. Areas disturbed by operations of the CONTRACTOR shall be properly returned to their original condition with a topsoil covering of 4 inches.

3.10.2. After the entire graded area has been brought to the finished grades shown on drawings, all areas shall be left smooth and free from erosion, ridges, ditches and evidence of ponding. Final grades shall be free from all roots, debris, rock and soil lumps and left in readiness for seeding.

3.10.3. Prior to acceptance of the entire project, the CONTRACTOR shall correct all embankments and graded areas of all damages due to washes, settlement, erosion, equipment ruts or any other cause at his expense.

3.10.4. Prior to final acceptance, the CONTRACTOR shall provide certification as specified in paragraph 3.7.6 that all grades are + .1 foot of the finished grades shown on project drawings.

3.10.5. The CONTRACTOR shall stabilize all disturbed areas, unless otherwise directed, by seeding and mulching per section 02933 of these specifications or other means of stabilization called for by the contract drawings.

3.11. CLEAN-UP

Upon completion or termination of the work, and before final payment is made, the CONTRACTOR shall remove from site all equipment, waste materials and rubbish resulting from his operations. In the event of his failure to do so, the same may be done by the OWNER at the expense of the CONTRACTOR.

END OF SECTION

SECTION 31 2000
EARTH MOVING
(Excavating, Backfilling & Compacting For Utilities)

PART 1 – DESCRIPTION:

The CONTRACTOR shall furnish all labor, material, equipment, and supplies, and shall perform all earthwork including excavation and backfill, pavement removal, sheathing, bracing, shoring, pumping or bailing, dewatering, restoration and cleanup, all as indicated, specified and/or necessary to complete the work.

1.1 Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.2 Related Work
Reference the following Specifications Sections for related work:

31 1000	Erosion Control
32 1216	Pavement Repair and Resurfacing
32 9200	Seeding and Mulching
32 1313	Cast-in-Place Concrete

Reference the following National Specifications for related work

D-2487	ASTM Uniform Soil Classification System, 1991 (US Army Corp of Engineers Standard as revised by the US ACE and the Bureau of Reclamation in 1952)
D-698	ASTM Compaction Testing
P-1926	OSHA Regulations

1.2. References
1.2.1 Any reference to Standard National or State Specifications and/or Regulations refers to the most current published date of the specification or regulation unless otherwise noted.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National Specifications and/or Regulations or meet the requirements of the latest revision of these specifications or regulations.

1.2.2. Any reference to SCDOT standard specifications was obtained from the “Standard Specifications for Highway Construction” dated 2007, published by the South Carolina Department of Transportation.

PART 2 – MATERIALS:

2.1 Fill Material shall be classified as ML-low plasticity silt or better by the Unified Soil Classification System and tabulated below:

	Unified Class	Description
Class I		1/4" - 1-1/2" well graded stone including coral, slag, cinders, crushed stone and crushed shells
Class II	GM	Coarse gravel well graded
	GP	Coarse gravel poorly graded
	SW	Coarse sands well graded
	SP	Coarse sands poorly graded
Class III	GM	Silty-sandy gravel
	GC	Clayey-sandy gravel
	SM	Silty-sands

	SC	Clayey-sands
Class IV	ML	Inorganic silts and fine sands

Fill material shall exhibit a plasticity index of less than 20 and Standard Proctor maximum density at optimum moisture greater than 90 pounds per cubic foot.

The following materials are unacceptable

	Unified Class	Description
Class IV	CL	Inorganic clays - low plasticity
	MH	Inorganic elastic silts
	CH	Inorganic clays - high plasticity
Class V	OL	Organic silts
	OH	Organic clays
	PT	Highly organic soil

2.2 Washed Stone

Stone material where indicated shall be crushed stone or gravel of strong, durable nature and shall conform to standard size No. 57 stone in SCDOT Appendix 6:

1 ½"	100%
1"	95-100%
½"	25-60%
#4	0-10%
#8	0-5%

2.3 Class C Concrete

Minimum 28-day compressive strength of 2000 psi.

PART 3– CONSTRUCTION:

3.1 EXISTING FACILITIES

3.1.1 Existing Utilities Shown on the Drawings

It shall be the CONTRACTOR's responsibility to conduct the work in such a manner as to avoid damage to or interference with any utilities services shown on the drawings. If such damage, interference, or interruption of service shall occur as a result of his work, then it shall be the CONTRACTOR's responsibility to promptly notify the ENGINEER of the occurrence and to repair or correct it immediately, at his own expense, and to the satisfaction of the ENGINEER and the OWNER of the Utility.

3.1.2 Existing Utilities Not Shown on the Drawings

It shall be the CONTRACTOR's responsibility to exercise all reasonable precaution in the performance of the work to avoid damage to or interference with any utilities services, even though not shown on the drawings. If such damage, interference, or interruption of service shall occur as the result of this work, then the CONTRACTOR's responsibility will be the same as stipulated in Paragraph 3.1.1 above.

3.2 EXCAVATION AND BACKFILL - GENERAL REQUIREMENTS

3.2.1 Pavement, gutters, sidewalks, aprons and curbs which will be disturbed by excavation shall be removed and disposed of as a part of ordinary excavation. That which is to be removed shall be cut or sawn along clean straight lines from that which is to remain. Remove enough such that a minimum of twelve inches of undisturbed earth remain between the excavation and that which is to remain.

3.2.2 Where required, and as approved by the ENGINEER, sheeting and bracing shall be used to prevent injury to persons, caving of trench walls and to conform with all governing laws and ordinances. Sheeting and bracing shall be left in place until the trench is refilled to a safe limit. The top portion may then be removed, but the lower portion shall remain undisturbed.

3.2.3 It is the responsibility of the CONTRACTOR to provide an adequate dewatering system where required. The system shall be capable of removing any water that accumulates in the excavation and maintaining the excavation in a dry condition while construction is in progress. The surface of the ground shall be sloped away from the excavation or piping provided to prevent surface water from entering the excavation. Disposal of water resulting from the dewatering operation shall be done in a manner that does not interfere with normal drainage, and does not cause damage to any portion of the work or adjacent property. All drains, culverts, storm sewers and inlets subject to the dewatering operation shall be kept clean and open for normal surface drainage. The dewatering system shall be maintained until backfilling is completed or as otherwise directed by the ENGINEER. All damage resulting from the dewatering operation shall be repaired by the CONTRACTOR to the satisfaction of the ENGINEER and at no cost to the OWNER.

3.3 The CONTRACTOR shall erect, maintain, and safeguard temporary bridges, walkways, or crossings where it is necessary to maintain traffic. Where trenches are open in the vicinity of pedestrian or vehicular travel lanes, suitable carriers will be constructed and maintained and the work will be further protected from sunset to sunrise with a sufficient number of lights or flares to fully protect the public from accidents on account of construction.

3.4 If the specified depth for foundations proves insufficient to reach firm ground, the ENGINEER shall be notified and will furnish instructions for proceeding with the work.

3.5 Rock, wherever used as a name for excavation material, shall mean boulders exceeding one-half cubic yard in volume or solid ledge rock, which in the opinion of the ENGINEER, requires for its removal drilling and blasting, or wedging or sledging and barring. Where rock excavation is necessary, the CONTRACTOR shall excavate the same as near the neat lines of the trench as practicable and he shall take all due precautions in the pursuance of the work. He will be held strictly responsible for all injury to life and to public and private property.

3.5.1 Rock shall be removed from the excavation to the following limits:

3.5.1.1 Trenches - The diameter of the pipe plus 8-inches on each side, extending six inches below the pipe wall and bell.

3.5.1.2 Structures - 12-inches beyond the vertical plane of the structure on all sides and on the bottom only to the depth necessary for proper installation.

3.6 BLASTING

Prior to commencing any blasting operations the CONTRACTOR shall notify the ENGINEER, OWNER and either the Local Fire Department - Fire Prevention Section or the County Fire Administrator (as applicable) and obtain blasting permits as required. Blasting must be done by a licensed blaster. Blasting and magazine permits must be obtained from the South Carolina Department of Labor, Licensing, and Regulation. The CONTRACTOR must furnish proof (certification) of insurance specifically covering any and all obligations assumed pursuant to the use of explosives.

All blasting operations shall be conducted in strict accordance with any and all decrees, rules, regulations, ordinances, laws as may be imposed by any regulatory body and/or agency having jurisdiction over the work relative to handling, transporting, use and storage of explosives. Blasting shall be done only by competent and experienced men whose activities shall be conducted in a workmanlike manner. Satisfactory information must be provided to the ENGINEER, that the blaster meets or exceeds the qualifications enumerated in OSHA Regulations Part 1926, Subpart U, Section 1926.901 - Blaster Qualifications.

The CONTRACTOR shall protect all structures from the effects of the blast and repair any resulting damage. If the CONTRACTOR repeatedly uses excessive blasting charges or blasts in an unsafe or improper manner, the ENGINEER may direct the CONTRACTOR to employ an independent blasting consultant to supervise the preparation for each blast and approve the quantity of each charge.

3.6.1 Overburden

Undisturbed overburden may be deemed adequate in lieu of matting but only after the actual depth of the undisturbed overburden has been determined and adjudged sufficient by the ENGINEER. Under no circumstances will loose or fill overburden be adequate without the use of weighted mats.

3.6.2 Permission to Blast

The CONTRACTOR shall not be allowed to blast before 9 a.m. or after 3 p.m. without approval of the ENGINEER and OWNER. Blasting will not occur within any rights-of-way maintained by any agency (D.O.T., R.R., Gas, OWNER, etc.) without specific approval of the controlling agency and only in accordance with their respective requirements (as exceeded herein). The CONTRACTOR shall be held responsible for any and all injury to persons or damage to public or private property.

3.6.3 The CONTRACTOR shall not use excavated rock as backfill material. Dispose of rock which is surplus or not suitable for use as rip rap.

3.6.4 Monitoring

The CONTRACTOR shall notify the ENGINEER prior to any blasting. Additionally, the CONTRACTOR shall notify the ENGINEER before any charge is set. Following review by the ENGINEER regarding the proximity of permanent structures to the blasting site, the ENGINEER may direct the CONTRACTOR to employ an independent, qualified specialty sub-contractor, approved by the ENGINEER, to monitor the blasting by use of seismograph, identify the areas where light charges must be used, conduct pre-blast and post-blast inspections of structures, including photographs or videos, and maintain a detailed written log.

3.7. STRUCTURE EXCAVATION AND BACKFILL

3.7.1 Structure Excavation shall be made at the locations shown on the plans and to the exact subgrade required. Bottom of excavations shall be level and in firm, solid material, with soft material or voids treated as specified. Excavated areas shall be kept free of water during the construction period. Where earth will stand, footing trenches may be cut to the exact size of the footings; otherwise, forms shall be used. Where necessary, sides of excavations shall be shored and sheathed, or cofferdams built, as required for protection of the work and personnel.

3.7.1.1 Wherever excavation for a foundation extends below the water table or where specifically indicated on the plans, washed stone shall be placed to a minimum thickness of 12 inches, unless otherwise shown, prior to placing the foundation. The washed stone shall be compacted to 90% of maximum as determined by the Standard Proctor test (ASTM D698).

3.7.1.2 If the specified depth for foundations proves insufficient to reach firm ground, the ENGINEER shall be notified for furnishing instructions and proceeding with the work.

3.7.1.3 An adequate dewatering system shall be provided at all structure excavations and elsewhere as directed by the ENGINEER. If a well-point system is used, the CONTRACTOR shall submit plans to the ENGINEER for approval. The system shall be capable of removing any water that accumulates in the excavation and maintaining the excavation in a dry condition while construction is in progress. The surface of the ground shall be sloped away from the excavation or piping provided to prevent surface water from entering the excavation. Disposal of water resulting from the dewatering operation shall be done in a manner that does not interfere with normal drainage, and does not cause damage to any portion of the work or adjacent property. All drains, culverts, storm sewers and inlets subject to the dewatering operation shall be kept clean and open for normal surface drainage. The dewatering system shall be maintained until backfilling is complete or as otherwise directed by the ENGINEER. All damage resulting

from the dewatering operation shall be repaired by the CONTRACTOR to the satisfaction of the ENGINEER and at no cost to the OWNER.

3.8. STRUCTURE BACKFILL shall be done with material free from large clods, frozen earth, organic material or any foreign matter, and shall evenly and carefully be placed and tamped in horizontal layers. Compaction equipment specifically designed for these purposes must be present and operational at the job site and shall be utilized throughout to obtain uniform compaction. The degree of compaction and the density shall be determined by the Standard Proctor Test (ASTM D698), with compaction requirements as follows:

Percent of Maximum Density at Optimum Moisture	Location
98	Top 12" of fill pavement or surfacing
98	Full depth beneath all roads (paved or unpaved), driveways, sidewalks, undercut backfill for structure excavation, and lots
95	All other areas not defined above

3.8.1 No backfill shall be placed against a structural wall until all connecting structural members are in place. It shall be the CONTRACTOR's responsibility to provide compaction to such a degree that subsidence after placing shall not be detrimental to the stability or appearance of the structure, adjacent ground, or paved areas. The CONTRACTOR shall provide adequate protection to all structures during backfilling and shall use every precaution to avoid damaging or defacing them in any way. CONTRACTOR shall be responsible for the protection of all structures from damage or flotation prior to backfill being placed.

3.8.2 Unless otherwise approved by the ENGINEER, liquid-retaining structures shall not be backfilled until tested for leakage.

3.9. UNSTABLE SUBGRADE

Should unstable soil, organic soil, or soil types classified as fine-grained soils (silts and clays) by ASTM D-2487 be encountered in the bottom of pipe trenches or structure excavations, such soils shall be removed to a depth and width determined by the ENGINEER, properly disposed of and shall be backfilled with crushed stone conforming to the Department of Transportation Specifications, Size 57. Placement shall not exceed 12-inches loose and compacted to 90% of the dry density determined by the Standard Proctor Test ASTM D698 (Class C concrete may be substituted in place of #57 stone at the CONTRACTOR's option. A 24-hour cure must be given before proceeding with the work).

3.10. SITE GRADING

Site grading shall conform to the grades indicated by the finish contours on the plans. Where topsoil, pavement, gravel or crushed stone surfacing and other items are shown, rough grade shall be finished to such depth below finish grade as necessary to accommodate these items. All areas where structures are to be built on fill shall be stripped to such depth as necessary to remove turf, roots, organic matter and other objectionable materials.

3.10.1 Excavation shall be made to the exact elevations, slopes and limits shown on the plans. Material excavated may be used as fill material as long as it meets the material requirements established herein. Acceptable material must be stockpiled neatly onsite and clear of all unsuitable materials to be removed from the site.

3.10.2 Fill shall incorporate only acceptable materials defined herein. It shall not contain organic material, roots, debris or rock larger than 6 inches in diameter.

3.10.2.1 Where fill is to be placed, all existing vegetation, roots and other organic matter down to 12 inches below grade shall be stripped and disposed of as directed.

3.10.2.2 After clearing existing vegetation, at the ENGINEER's discretion, the site may require proof rolling to insure that all unstable material has been removed. Proof rolling shall be done in the ENGINEER's presence, utilizing a loaded dumptruck or similar pneumatic-tired vehicle with a minimum loaded weight of 25 tons.

3.10.2.3 Fill shall be placed in successive compacted layers not to exceed 6 inches compacted thickness. Each layer shall be spread evenly and compacted as specified below before the next layer is placed.

3.10.2.4 Rock shall not be incorporated in fill sections supporting pavement or structures.

3.10.2.5 Where natural slopes exceed 3:1, horizontal benches shall be cut to receive fill material. Slopes of less than 3:1 and other areas shall be scarified prior to placing fill material.

3.10.2.6 Borrow material, as required, shall be provided by the CONTRACTOR at his own expense. Borrow material on site may be utilized provided it complies with these specifications.

3.11. COMPACTION Unless otherwise noted, each layer of fill and backfill and the top 12 inches of existing subgrade material in cuts shall be compacted by approved equipment as specified below. The degree of compaction and the density shall be determined by the Standard Proctor Test (ASTM D698).

	Percent of Max. Dry Density at Optimum Moisture Content
Top 12 inches of fill under pavement or surface	98%
Fill under roads and structures	95%
Fill and backfill in other areas	90%

Material too dry for proper compaction shall be moistened by suitable watering devices, turned and harrowed to distribute moisture, and then properly compacted. When material is too wet for proper compaction, operations shall cease until such material has sufficiently dried.

3.12. COMPACTION TESTS

The CONTRACTOR shall provide compaction tests by an independent testing agency selected by the CONTRACTOR and approved by the ENGINEER. The compaction tests shall be taken at appropriate locations and frequency to demonstrate that the backfill (or fill) has been placed to meet the minimum compaction density required. The testing agency shall submit written test records to the ENGINEER for all compaction tests performed. Minimum testing shall be one test per 500 CY of material placed at the ENGINEER's option and one test per 10,000 square feet of fill placed for every foot of fill thickness.
In the event that the soil compaction is not in compliance with these specifications, then the CONTRACTOR shall take corrective action, at no cost to the OWNER, to compact the soils within the limits of the specifications. The ENGINEER shall be notified within 24 hours of any failing compaction tests. Any retesting of failed areas shall be performed only after corrective measures have been made by the CONTRACTOR to bring the compacted soils into compliance. All retesting shall be performed with the ENGINEER present.

3.13. SITE RESTORATION

3.13.1 General
All surfaces disturbed by the CONTRACTOR in the work shall be restored to a condition equal to or better than that which existed prior to commencement of the work, except as otherwise specified herein.

3.13.2 Pipe drains, headwalls, catch basins, curbs and gutters, and all incidental drainage structures shall be restored using like materials and details at no additional cost to the OWNER. The CONTRACTOR shall maintain drainage during construction.

3.13.3 All cuts, fills and slopes shall be neatly dressed off to the required grade or subgrade, as indicated on the plans.

3.13.4 Grassed areas shall be restored at no additional cost to the OWNER. Disturbed areas shall be covered with two (2) inches of topsoil, furnished by the CONTRACTOR from an approved source and of approved quality, then shall be fertilized, and seeded to match existing adjoining areas. All ditches shall be restored to their existing grade, line and cross section.

3.13.5 Paved surfaces shall be restored in accordance with the provisions of Section 32 1216.

END OF SECTION

SECTION 32 1313
CONCRETE PAVING
(Concrete Formwork)

PART 1 - GENERAL:

1.1 - DESCRIPTION

1.1.1 Form cast-in-place concrete indicated on drawings and subsequently remove such forms except earth forms.

1.1.2 Related Work Described Elsewhere

1.1.2.1 Concrete Reinforcement, Section 03200
1.1.2.2 Cast-In-Place Concrete, Section 03300

1.2 – QUALITY ASSURANCE

1.2.1 Qualifications of Workmen

Provide superintendent or foreman who will be present during this portion of work, who shall be thoroughly familiar with materials being installed, referenced standards and requirements of this work, and who shall direct work performed under this section.

1.2.2 Codes and Standards

1.2.2.1 In addition to complying with pertinent codes and regulations, comply with pertinent recommendations contained in publication ACI 347 of the American Concrete Institute, "Recommended Practice for Concrete Formwork".

1.2.2.2 Where provisions of pertinent codes and standards conflict with this specification, the more stringent provisions shall govern.

1.3 - SUBMITTALS

1.3.1 Manufacturer's Data

Submit two (2) copies manufacturer's data and installation instructions for proprietary materials, including form coatings, manufactured form systems, ties and accessories to the owner for approval.

1.4 – PRODUCT HANDLING

1.4.1 Protection

Use means necessary to protect formwork materials before, during and after installation and to protect installed work and materials of other trades.

1.4.2 Replacements

In the event of damage, immediately make repairs and replacements necessary at no additional cost to the owner.

PART 2 - PRODUCTS:

2.1 - MATERIALS

2.1.2 Forms for Smooth Finished Exposed Concrete

Plywood, metal, metal-framed plywood faced, or other acceptable panel type materials providing continuous, straight surfaces.

2.1.2.1 Plywood shall comply with U.S. Product Standard PS-1, "B-B High Density Overlaid Concrete Form", Class I.

2.1.2.2 Furnish in largest practicable sizes to minimize joints.

2.1.2.3 Furnish in thickness sufficient to withstand pressure of newly placed concrete without bow or deflection.

2.1.3 Forms for Other Unexposed Concrete

Plywood, lumber, metal or other material acceptable to the owner; lumber shall be dressed on at least two (2) edges and one (1) side for tight fit.

2.2 – ACCESSORIES

2.2.1 Form Ties

2.2.1.1 Factory fabricated, adjustable length, removable or snap off metal ties, designed to prevent deflection and to prevent spilling upon removal.

2.2.1.2 Do not use form ties fabricated on job site or wire ties.

2.2.2 Form Coatings

Commercially formulated compounds that will not bond with, stain or adversely affect concrete surfaces, and will not impede wetting of surfaces to be cured with water or curing compounds.

2.3 - FORMWORK DESIGN

2.3.1 Safety

Design, erect, support, brace and maintain formwork to safely support vertical and lateral loads until such loads can be supported by structure.

2.3.1.1 Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position.

2.3.2 Removable

Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete or adjacent materials.

2.3.3 Tighten

Tighten formwork to prevent leakage of wet concrete. Solidly butt joints and provide backup material at joints to prevent leakage and fins.

2.3.4 Side Forms

Side forms of footings may be omitted and concrete placed directly against excavation.

PART 3 - EXECUTION:

3.1 – SURFACE CONDITIONS

3.1.1 Inspection

3.1.1.1. Before work of this section, inspect installed work of other trades and verify that such work is complete to the point where this installation may properly begin.

3.1.1.2 Verify that forms may be constructed in accordance with pertinent codes and regulations, referenced standards and original design.

3.1.2 Discrepancies

3.1.2.1 In the event of discrepancy, immediately notify the owner.

3.1.2.2 Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.

3.2 - FORM CONSTRUCTION

3.2.1 General

3.2.1.1 Construct to dimensions shown, level, plumb and alignment.

3.2.1.2 Fabricate for easy removal without hammering or prying against concrete surfaces.

3.2.1.3 Examine drawings and specifications and consult with other trades relative to provision for openings.

3.2.1.4 Set required time to be embedded in concrete.

3.2.1.5 Keep form sufficiently wetted to prevent joints opening before concrete placement.

3.2.1.6 Brace and tie forms so as to maintain position and shape. Space forms apart and securely tie together, using metal spreader ties that give positive tying and accurate spreading.

3.2.1.7 Exercise care in form layout to avoid necessity for cutting in-place concrete.

3.2.2 Footing Forms

Footing side forms may be of earth, provided soil will stand without caving and sides are made with neat cuts to minimum dimensions shown on drawings. Make necessary provisions to prevent cave-ins during concrete placement.

3.2.3 Forms for Exposed Construction

Provide sharp, clean corners ar intersecting planes, without visible edges or offsets.

3.2.4 Form Coatings

Coat form surfaces before reinforcement is placed. Do not allow excess coating material to accumulate in forms or to come into contact with surfaces to be bonded to fresh concrete.

3.3 – FORM REMOVAL

3.3.1 General

Do not remove forms until concrete is twenty-four (24) hours old.

3.3.2 Non-Supporting Formwork

3.3.2.1 Formwork not supporting concrete, such as walls and similar parts of the work, may be removed after cumulatively curing at not less than fifty degrees fahrenheit (50 F) for twenty-four (24) hours after concrete placement, provided that:

3.3.2.1.1 Concrete is sufficiently hard to not be damaged by removal.

3.3.2.1.2 Curing and protection operations are maintained.

3.4 – FORM RE-USE

3.4.1 Form re-use shall be subject to advance approval by the owner.

3.4.2 Unless specifically approved in advance by the owner, form re-use shall in no way delay or change schedule for concrete placement from schedule obtainable if all forms were new.

END OF SECTION

SECTION 32 1313
CONCRETE PAVING
(Concrete Sidewalks)

PART 1 - GENERAL:

1.1 – SCOPE - The work shall include construction of sidewalks on a prepared sub-grade as specified herein and to the dimensions, typical section(s) and notations as shown on the drawings. Construction shall be to the lines and grades as shown on the drawings and/or as directed by the landscape architect.

1.2 – QUALITY ASSURANCE

Reference 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.

1.2.1 South Carolina State Highway Department Standard Specifications, latest edition.

1.2.2 AASHTO M-213, Joint Material.

1.2.3 ASTM A-82, Specification for Cold Drawn Steel Wire for Concrete Reinforcement.

1.2.4 ASTM A-185, Standard Specifications for Welded Steel Wire Fabric Steel Bars for Concrete Reinforcement.

1.3 –WORKMANSHIP - The contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed by the landscape architect.

PART 2 - PRODUCTS:

2.1 - FORMS shall be of wood or metal and of a depth equal to or greater than the typical section shown on the drawings. Provide flexible or curved forms where required or directed to prevent a "chord" effect between tangent points when placing forms in areas having specified radii as indicated on the drawings.

2.1.1 Forms shall be free from warp and of sufficient strength when staked to hold the alignment specified during concrete placing and finishing operations.

2.1.2 All forms shall be cleaned and oiled prior to placement of concrete.

2.2 - PORTLAND CEMENT CONCRETE

Concrete shall be 3,000 psi, twenty-eight (28) day, as defined by the South Carolina State Highway Department Standard Specifications, 1986 Edition, Section 700, "Portland Cement Concrete for Structures". All concrete shall be ready mixed as produced by a reputable manufacturer, acceptable to the landscape architect. Submit current approved South Carolina Highway Department mix design to landscape architect prior to pouring concrete.

2.3 – Expansion Joints - Bituminous preformed joint filler complying with requirements of AASHTO M-213

shall be used.

PART 3 - EXECUTION:

3.1 - CONSTRUCT FORMS to the exact sizes, shapes, lines and dimensions shown and as required to obtain accurate alignment, location and grades.

3.2 - PLACE WELDED STEEL WIRE FABRIC one inch (1") from the bottom of the slab. Fabric is to be placed on stools and the fabric pulled up as the concrete is poured.

3.3 – PLACING CONCRETE - Concrete shall be placed on a prepared sub-grade conforming to the details. Deposit and consolidate concrete in a continuous operation within limits of construction joints until the placing of a panel or section is completed. Bring slab surfaces to the correct level with a straight edge and strike off. Use bull floats or darbies to smooth the surface, leaving it free of lumps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.

3.4 – JOINTS - Expansion joints shall be three-fourths inch (3/4") thick extending for the full depth of the sidewalk section(s). The maximum distance between expansion joints shall be thirty feet (30').

3.4.1 Contraction (weakened) joints shall be placed at five foot (5') intervals and shall be formed by cutting the finished sidewalk section(s) with a masonry trowel or by other approved methods.

3.4.2. The manner of construction of all joints shall be approved by the landscape architect and shall, after edging, present a smooth acceptable finish.

3.5 – CONCRETE FINISHES - All concrete sidewalks shall be given a broomed finish. Concrete slabs that provide the foundation for brick paving shall be given a wood float finish.

3.6 – PROTECTION - Concrete shall be protected and cured in the manner specified for Portland Cement Concrete Pavement, Section 501 of the South Carolina State Highway Department Standard Specifications, 1986 Edition.

END OF SECTION

SECTION 32 9200
TURF AND GRASSES
(Grassing)

PART 1 - GENERAL:

1.01 - LIMITS OF WORK

All areas disturbed by grading and construction operations except as covered by surface construction or where noted on the plans, including the areas where surplus material is stockpiled, shall be put into perennial vegetation by seeding or sodding as directed on the plans. If not directly noted on the plans then revegetation shall be by seeding.

1.02 - SCOPE

The type of work required includes the following: Fine grading and preparation of grass areas, seeding, and sodding.

1.03 - LINES AND GRADES

The contractor shall provide his own lines and grades for the work required.

1.04 - STANDARDS AND SPECIFICATIONS

Generally, materials and methods shall conform to the South Carolina State Highway Department Standard Specifications for Highway Construction, latest edition, Section 810, and as specified herein.

1.05 - SUBMITTALS

Submit five (5) copies of type written instructions recommending procedures to be followed by the owner for proper maintenance and care of grasses. Submit proof that all materials meet the requirements of this section. Bag tag figures will be evidence of purity and germination of seed. No seed will be accepted with a date of test of more than nine (9) months prior to date of use. Where fertilizer is furnished from bulk storage, the contractor shall furnish a supplier's certification of weight and analysis.

PART 2 - PRODUCTS:

2.01 - GRASS SEED

Provide fresh, clean, new crop seed complying with the tolerance for purity and germination established by the Official Seed Analysis of North America and certified by the Seed Certification Department of Clemson University, as follows:

A. PENNISETUM GLAUCUM (Browntop Millet)

Testing ninety-eight percent (98%) purity and eighty-five percent (85%) germination.

B. CYNODON DACTYLON (Bermudagrass)

Testing ninety-eight percent (98%) purity and eighty-five percent (85%) germination.

C. LOLIUM MULTIFLORUM (Domestic Italian Rye)

Testing ninety-eight percent (98%) purity and ninety percent (90%) germination.

D. EREMOCHLOA OPHIUROIDES (Centipede)

Germination varies.

E. EREMUCHLOA OPHIUROIDES (Centipede Sod)

Centipede sod shall be weed free, moist, freshly dug and actively growing.

2. 02 - OTHER PLANTING MATERIALS

Provide the following materials, all meeting or exceeding regulations of the South Carolina State Department of Agriculture, as follows:

A. Fertilizer: 15-15-15 (50% organic) with trace elements.

B. Basic Slag: Standard Grade.

C. Agricultural Sulfur: Standard Grade.

2.03 - SPECIAL REQUIREMENTS

Where construction activities are stopped in an area for over twenty-one (21) days, the entire area must be vegetated within fourteen (14) days from ceasing construction activities. This shall be in accordance with the requirements as outlined in the "NPDES General Permit for Stormwater Discharge From Construction Activities that are Classified as Associates with Industrial Activity" by EPA Regulations Permit No. SCR100000. This is in addition to the requirements for a permanent grass cover and shall be at no additional cost to the owner. The contractor shall make every effort to complete permanent grassing operations at the earliest practical date in order to complete a grass cover sufficient to protect the site from wind and water erosion.

PART 3 - EXECUTION:

3.01 - PLANTING SEASONS

Summer dates are:

3/15 to 9/1 for hulled Bermuda and unhulled Bermuda
5/15 to 9/1 for Browntop Millet

Winter dates are:

9/1 to 3/15 for unhulled Bermuda.
9/1 to 5/15 for Common Rye.

Year round seeding for centipede, except for September.

3.02 - GENERAL REQUIREMENTS

A. Equipment

Equipment required for proper execution of these operations shall be present on the job site and in good working order.

B. Maintain Grades

Maintain grades in a true and even condition, including necessary repairs to previous grades and topsoiled areas.

3.03 - SOIL PREPARATION

Limit preparation to areas which will be planted in the near future.

A. Fine Grading

Fine grade all areas to receive grassing. Care shall be taken not to disturb existing trees. Perform this work only during period of favorable weather.

B. After Fine Grading

After fine grading, clean surface of all stones and other objects larger than one inch (1") in any direction. Also, remove roots, sticks, grade stakes and other extraneous matter.

C. Aerate and Disc

Aerate and disc to a depth of three inches (3") to four inches (4") to promote acceptance and germination of seeds.

3.04 - pH READING

Test pH reading. If reading is below 6.0, adjust to that level with an application of slag; if reading is above 6.5, adjust to that level with an application of sulfur. The testing laboratory shall be by Clemson University Soil Testing Laboratory or a laboratory approved by the Extension Service.

3.05 - INITIAL APPLICATION OF FERTILIZER

A. Flat Areas

Apply at rate of eight pounds (8lbs.) per 1,000 square feet. Distribute fertilizer and slag or sulfur uniformly over areas incorporating into soil to a depth of two inches (2") by means of hand raking, harrowing, or other approved method. At the contractors option, this operation may be combined with topsoil spreading specified above. NOTE: No pure nitrogen shall be applied.

B. Slopes and Swales

Combine with grassing operations as specified below. Correct any surface irregularities resulting from this operation by hand raking if necessary, and perform any other required "clean up" work before planting is begun.

3.06 - PLANTING

A. Temporary Lawn Seed (per 1,000 square feet)

Eight pounds (8 lbs.) of fertilizer, 15-15-15; five pounds (5 lbs.) rye grass seed; nine ounces (9 oz.) unhulled bermudagrass seed, thirty-five pounds (35 lbs) of wood fiber, one gallon (1 gal.) tac material mixed with water.

B. Permanent Lawn Seed (per 1,000 square feet)

1. Centipede Seed Mix

Summer		Winter
6-8 oz. Commercial Centipede	Same	
1-1/2 lbs. Hulled & Unhulled Bermuda		1-1/2 lbs. Unhulled Bermuda
& 6 oz. Browntop Millet		3 lbs. Common Rye
8 lbs. Fertilizer	Same	

C. Sodding

Sod shall be viable, weed free and recently harvested. Sod shall be placed on the prepared topsoil. The surface on which sod is to be laid shall be firm and free of footprints. Begin by placing sod along a straight edge and work outward. Sod of the next course shall be matched against the edge of the first line in such a way that the joints between the individual sod pieces do not coincide. Successive courses are matched against the last line laid, in the same manner. The joints shall be closely laid, filled with topsoil and rolled lightly. Surface sod shall be smooth and free of depressions.

D. Establish Lawns

It is the responsibility of the contractor to establish a complete vegetative cover with viable healthy plants.

E. Hydroseeding (Temporary or Permanent Lawn per 1,000 square feet)

To the mixtures stated above, add thirty-five pounds (35 lbs.) of wood fiber, one gallon (1 gal.) tac material mixed with the manufacturer's recommended rate of water.

F. Seeding for Temporary Erosion Control Only (per 1,000 square feet)

August 1 to April 1: Three pounds (3lbs.) of rye grass seed and four pounds (4lbs.) of fertilizer.

April 1 to August 1: One-half pound (1/2lb.) browntop millet seed and four pounds (4lbs.) of fertilizer.

3.07 - MAINTENANCE

A. Begin maintenance immediately after any lawn area is planted and continue until the completion of the project.

B. Maintain Lawns

Maintain lawns by weeding, cultivating, mowing at least twice, trimming, hydroseeding,

seeding, or re-sodding and other operations such as re-grading and re-planting as required to establish an acceptable stand of grass.

C. Provide Adequate Protection

Provide adequate protection at all times for all grass areas. Lay or place planks over grass for the movement of heavy materials or equipment.

D. Repair or Replace

Repair or replace, at no additional cost to the owner, any portion of grassed areas not in good viable condition if so determined by the owner before or on the date of completion for work done prior to that time.

3.08 - ACCEPTANCE

Lawns will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, uniform stand of specified grass is established, free of weeds, bare spots and surface irregularities. A full stand of grass is not required where irrigation has not been installed.

END OF SECTION

SECTION 32 9200
TURF AND GRASSES
(Seeding and Mulching)

PART 1 – DESCRIPTION:

The work covered by this section consists of furnishing all labor, materials, and equipment to perform all necessary operations to topsoil, fine grade, fertilize, mulch and maintain temporary and permanent seeding of all graded, cleared, or disturbed areas during construction. The work covered by this section shall be in conformance with the latest version of local and state Department of Transportation requirements.

1.1. RELATED WORK

See following sections for related work.

31 1000	Clearing and Grubbing
31 2000	Unclassified Excavation and Grading
31 1000	Erosion Control
SS-A617A	FS Liquid Mulch Binder

1.2 REFERENCES

Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specification or regulation unless otherwise noted.

The work covered by this section shall be in conformance with Section 810 of the "Standard Specifications for Highway Construction" dated 2007 or latest edition, published by the South Carolina Department of Transportation and the Sediment Control handbook as published by EQC, Bureau of Water, SC Department of Health and Environmental Control.

PART 2 – MATERIALS:

2.1. TOPSOIL

Topsoil shall be from stockpiles created from stripping and required excavation. Should additional topsoil be required in excess of that obtained from stripping and excavation, the contractor shall obtain material from other sources on the site where authorized by the OWNER, or from approved sources off the site. The topsoil shall be natural, friable soil, possessing characteristics of representative soils in the vicinity which produce heavy growths of crops of grass. It shall be obtained from naturally well-drained areas, shall be reasonably free from subsoil, brush, objectionable weeds, and other litter and shall be free from toxic substances, clay lumps, stones, roots and other objects larger than 1 inch in diameter, or any other material which might be harmful to plant growth or be a hindrance to grading, planting, and maintenance operations.

2.2. FERTILIZER

Fertilizer shall be the product of an approved commercial fertilizer manufacturer and shall be 5-10-5 grade, uniform in composition, free-flowing material suitable for application with approved standard equipment. The fertilizer shall conform to the applicable State fertilizer laws and shall be delivered to the site in bags or other convenient containers each fully labeled and bearing the name, trademark, and warranty of the producer.

2.3. LIME

Lime shall be ground limestone containing not less than 85% of total carbonates and shall be ground to such fineness that at least 50% will pass through a 100-mesh sieve and at least 90% will pass through a

20-mesh sieve. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing the 100-mesh sieve, but no additional payment will be made for the increased quantity.

2.4. MULCH

Mulch shall be straw from wheat or oats. Materials for securing mulch may be one of the following.

- Mulch Netting: Lightweight plastic, cotton, jute, wire orpaper nets shall be used.
- Peg and Twine: Bailing twine and soft wood pegs 1/2" x 1" x 12".
- Liquid Mulch Binder: RC-2 cut back asphalt conforming to the requirements of Federal Specifications SS-A67lA, and asphalt emulsion shall conform to the requirements of Federal Specification SS-A-674, Type V.
- Seed: Seed used shall conform to all state laws and regulations of the SCDA. Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be acceptable. The seed used shall be that shown in seeding schedule specified herein or on the plans.

PART 3 – INSTALLATION:

3.1. SEEDBED PREPARATION

3.1.1. Clearing

Prior to or during grading and tillage operations, the ground surface shall be well drained, cleared of all brush, roots, stones larger than 2 inches in diameter, or any other material which may hinder proper grading, tillage, or subsequent maintenance operations.

3.1.2. Fine Grading

Areas to be seeded shall be graded as shown on the drawings or as directed and all surfaces shall be left in an even and properly compacted condition so as to prevent the formation of depressions where water will stand. Areas to be topsoiled shall be graded to a smooth surface and to a grade that will allow topsoiling to finished grade.

3.1.3. Topsoiling

Immediately prior to placing topsoil, the subgrade, where excessively compacted by traffic or other causes, shall be loosened by scarifying to a depth of at least 2 inches to permit bonding of the topsoil to the subgrade. Topsoil shall be uniformly spread by approved equipment in sufficient quantity to provide a compacted layer of 4 inches in thickness over the designated areas and in such manner that planting can proceed with little additional soil preparation or tillage. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to the proposed planting or to proper grading. Topsoil shall be graded to the lines indicated or as directed and any irregularities in the surface resulting from topsoiling or other operations shall be corrected to prevent formations of depressions where water will stand.

3.1.4. Tillage

After topsoiled areas required to be seeded have been brought to the grades shown on the plans and as specified, they shall be thoroughly tilled to a depth of 3 inches by approved methods, until the condition of the soil is acceptable to the ENGINEER. Any objectionable undulations or irregularities in the surface resulting from tillage or other operations shall be removed before planting operations are begun. The work shall be performed only during periods when satisfactory results are likely to be obtained. When conditions are such, by reason of drought, excessive moisture or other factors, that results are not likely to be satisfactory, the ENGINEER will stop the work and it shall be resumed only when, in his opinion, the desired results are likely to be obtained.

3.2. LIMESTONE, FERTILIZER AND SEED

3.2.1. General
Seasonal limitations for seeding operations, the kinds and grades of fertilizers, the kinds of seed, and the rates of application of limestone, fertilizer, and seed shall be as shown in the seeding schedule.

3.2.2. Equipment to be used for the application, covering, or compaction of limestone, fertilizer, and seed shall have been approved by the ENGINEER before being used on the project. Approval may be revoked at any time if equipment is not maintained in satisfactory working condition, or if the equipment operation damages the seed.

3.2.3. Limestone, fertilizer, and seed shall be applied within 24 hours after completion of seedbed preparation unless otherwise permitted by the ENGINEER, but no limestone or fertilizer shall be distributed and no seed shall be sown when the ENGINEER determines that weather and soil conditions are unfavorable for such operations.

3.2.4. During the application of fertilizer, adequate precautions shall be taken to prevent damage to structures or any other appurtenances. The CONTRACTOR shall either provide adequate covering or change methods of application as required to avoid such damage. When such damage occurs, the CONTRACTOR shall repair it, including any cleaning that may be necessary.

3.3. Limestone and Fertilizer
Limestone may be applied as a part of the seedbed preparation, provided it is immediately worked into the soil. If not so applied, limestone and fertilizer shall be distributed uniformly over the prepared seedbed at a specified rate of application and then harrowed, raked, or otherwise thoroughly worked or mixed into the seedbed.

3.3.1. If liquid fertilizer is used, storage containers for the liquid fertilizer shall be located on the project and shall be equipped for agitation of the liquid prior to its use. The storage containers shall be equipped with approved measuring or metering devices which will enable the ENGINEER to record at any time the amount of liquid that has been removed from the container. Application equipment for liquid fertilizer, other than a hydraulic seeder, shall be calibrated to insure that the required rate of fertilizer is applied uniformly.

3.4. SEEDING
Seed shall be distributed uniformly over the seedbed at the rate indicated in the seeding schedule, and immediately harrowed, dragged, raked, or otherwise worked so as to cover the seed with a layer of soil. The depth of covering shall be as directed by the ENGINEER. If two kinds of seed are to be used which require different depths of covering, they shall be sown separately.

3.4.1. When a combination seed and fertilizer drill is used, fertilizer may be drilled in with the seed after limestone has been applied and worked into the soil. If two kinds of seed are being used which require different depths of covering, the seed requiring the lighter covering may be sown broadcast or with a special attachment to the drill, or drilled lightly following the initial drilling operation.

3.4.2. When a hydraulic seeder is used for application of seed and fertilizer, the seed shall not remain in water containing fertilizer for more than 30 minutes prior to application unless otherwise permitted by the ENGINEER.

3.4.3. Immediately after seed has been properly covered, the seedbed shall be compacted in the manner and degree approved by the ENGINEER.

3.5. MODIFICATIONS
When adverse seeding conditions are encountered due to steepness of slope, height of slope, or soil conditions, the ENGINEER may direct or permit that modifications be made in the above requirements

which pertain to incorporating limestone into the seedbed; covering limestone, seed, and fertilizer; and compaction of the seedbed.

3.5.1. Such modifications may include but not be limited to the following.

3.5.1.1. The incorporation of limestone into the seedbed may be omitted on (a) cut slopes steeper than 2:1 (b) on 2:1 cut slopes when a seedbed has been prepared during the excavation of the cut and is still in an acceptable condition; or (c) on areas of slopes where the surface of the area is too rocky to permit the incorporation of the limestone.

3.5.1.2. The rates of application of limestone, fertilizer, and seed on slopes 2:l or steeper or on rocky surfaces may be reduced or eliminated.

3.5.1.3. Compaction after seeding may be reduced or eliminated on slopes 2:1 or steeper, on rocky surfaces, or on other areas where soil conditions would make compaction undesirable.

3.6. MULCH

3.6.1. General
All seeded areas shall be mulched unless otherwise indicated on the plans or directed by the ENGINEER. Application rate of mulch shall be indicated in seeding schedule.

3.6.2. Mulching
Mulch shall be applied within 36 hours after the completion of seeding unless otherwise permitted by the ENGINEER. Care shall be exercised to prevent displacement of soil or seed or other damage to the seeded area during the mulching operations.

3.6.3. Mulch shall be uniformly spread by hand or by approved mechanical spreaders or blowers that will provide an acceptable application. An acceptable application will be that which will allow some sunlight to penetrate and air to circulate but also partially shade the ground, reduce erosion, and conserve soil moisture.

3.6.4. Mulch Binding
Mulch shall be held in place using devices approved by the ENGINEER as per manufacturers recommendations. During application, the CONTRACTOR shall take adequate precautions to prevent damage to structures or appurtenances.

3.7. MAINTENANCE

3.7.1. General
The CONTRACTOR shall be responsible for the proper care and maintenance of the seeded areas until the work under the entire contract has been completed and accepted by the ENGINEER. Maintenance shall consist of repair and replacement of eroded areas, watering, refertilizing, reliming, reseeding, and remulching as necessary to provide an even, fixed growth of grass. In addition, the CONTRACTOR shall provide protection against traffic and shall erect the necessary barricades and warning signs immediately after planting is completed.

3.7.2. Mowing
The seeded areas shall be mowed with approved mowing equipment as per seeding schedule. If weeds or other undesirable vegetation threaten to smother the planted species, such vegetation shall be removed at no cost to the OWNER.

3.8 INSPECTION AND TESTING

3.8.1 Fertilizer and Lime

The ENGINEER shall be furnished with duplicate copies of invoices for all fertilizer and lime used on the project. Invoices for fertilizer shall show the grade furnished. Invoices for lime shall show total minimum carbonates and minimum percentages of the material furnished that pass 100-mesh and 20-mesh sieve. Upon completion of the project, a final check of the total quantities of fertilizer and lime used will be made against the total area topsoiled and seeded, and if the minimum rates of application have not been met, the ENGINEER may require the distribution of additional quantities of these materials to make up the minimum application specified at no additional cost to the OWNER.

3.8.2 Seed

The ENGINEER shall be furnished duplicate signed copies of a statement from the Vendor, certifying that each container of seed delivered is fully labeled and in full accordance with the specifications in this section and the seeding schedule.

END OF SECTION

SECTION 33 0500
COMMON WORK RESULTS FOR UTILITIES
(Force Mains and Gravity Sewers)

PART 1 – DESCRIPTION:

The CONTRACTOR shall furnish all labor, materials, equipment and supplies and shall perform all Work necessary for the construction of the sewers, complete, tested and ready for use. The sewers shall be constructed to the lines and grades shown and shall be the size shown on the plans.

1.1. RELATED WORK

See the following sections for related specifications.

01016	References to National and State Standard Specifications and Regulations
31 2000	Excavation, Backfilling & Compacting for Utilities
31 1000	Erosion and Sediment Control
32 1216	Paving Repair and Resurfacing
32 9200	Seeding and Mulching
32 1313	Cast in Place Concrete

1.2. REFERENCES

Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specifications and/or regulations listed in Section 01016 of these specifications unless noted otherwise.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National Specifications and/or Regulations or meet the requirements of the latest revision of these specifications or regulations.

PART 2 – MATERIALS:

All materials for sewer pipe shall be new and shall be furnished by the CONTRACTOR in accordance with the following requirements unless shown otherwise on the plans.

2.1. GRAVITY SEWERS (8-INCH THROUGH 16-INCH)

2.1.1. Ductile Iron Pipe

- Pipe: AWWA C151 "Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water and Other Liquids." Thickness Class 51 for push-on and MJ pipe and Class 53 for flanged pipe, unless shown otherwise on the drawings
- Fittings: AWWA C110, grey or ductile iron, or compact ductile iron conforming to AWWA C153
- Joints: AWWA C111 push-on unless shown otherwise
- Linings: AWWA C104 cement lining, standard thickness, with bituminous seal coat

2.1.2. PVC Sewer Pipe

- Pipe: ASTM D3034; "Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings." SDR 35 with a minimum cell classification of 12454-B
- Fittings: ASTM D3034. Fittings in sizes through 8" shall be molded in one piece with elastomeric joints and minimum socket depths as specified in Sections 6.2 and 7.3.2. Fittings 10" and larger shall be molded or fabricated in accordance with Section 7.11 with manufacturer's standard pipe bells and gaskets
- Joints: ASTM D-3212, Elastomeric gaskets conforming to ASTM F477

2.1.3. PVC Force Main Sewer Pipe

- Pipe: ASTM 2241; "Polyvinyl Chloride (PVC) Force Main Sewer Pipe and Fittings Based on Controlled Inside Diameter". PVC plastic with a minimum cell classification of 12454-C as defined in ASTM D-1784
- Fittings: ASTM D-3034 lateral hubs
- Joints: ASTM D-3212, elastomeric seal gaskets conforming to ASTM F-477

2.2. FORCE MAINS

2.2.1. Ductile Iron Pipe (3-Inch Through 12-Inch)

- Pipe: AWWA C151 "Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water and Other Liquids." Thickness Class 51 for push-on and MJ pipe and Class 53 for flanged pipe, unless shown otherwise on the drawings
- Fittings: AWWA C110, grey or ductile iron
- Joints: AWWA C111 push-on or mechanical for general buried service; flanged for exposed service unless shown otherwise on the drawings

2.2.2. PVC Pipe (4-Inch Through 12-Inch)

- Pipe: AWWA C900 "Polyvinyl Chloride (PVC) pressure pipe. Pipe provided shall be cast iron pipe equivalent O.D. Pipe shall be pressure Class 150 (DR=18) unless shown otherwise on the drawings
- Fittings: Cement lined, cast or ductile iron fittings conforming to AWWA C110, or compact ductile iron conforming to AWWA C153
- Joints: Pipe, elastomeric gasket, push-on joints, conforming to AWWA C900. Joints may be either integral bell and spigot or couplings. Fittings; AWWA C111, push-on

2.2.3. PVC Pipe (1-Inch Through 4-Inch)

- Pipe: ASTM D-2241 "Polyvinyl Chloride (PVC) pressure water pipe. Pipe provided shall be iron pipe size. Pipe shall be pressure Class 200 (SDR 21) unless shown otherwise on the drawings.
- Fittings: Cement lined, gray-iron or ductile iron conforming to AWWA C104 and C110 for fittings size 4-inch through 12-inch or compact fittings conforming to AWWA C153. Fittings less than 4-inch shall be PVC, Class 200, IPS with bells conforming to ASTM F477.
- Joints: Pipe or compact ductile iron fittings conforming to AWWA C153, elastomeric gasket, push-on joints, conforming to ASTM F477 and ASTM 3139. Joints may be either integral bell and spigot or couplings.

2.3. SEWAGE AIR AND VACUUM VALVES

Sewage Air and Vacuum Valves in sewer force mains shall be the type specifically designed for use with sewage. Valves shall be designed to vent large quantities of air when the line is being filled and to allow air to re-enter the line when it is being drained. Overall height of valve body without accessories shall be not less than fifteen (15”) inches. Materials shall include cast iron body and cover, bronze float stem and guide, rubber seat and stainless steel float. Valves shall be furnished with provisions for backflushing. Valves shall be designed for working pressure of 150 psi.

2.4. SEWAGE AIR RELEASE VALVES

Sewage Air Release Valves in sewer force mains shall be the type designed for use with sewage. Valves shall be designed to operate (open) while pressurized allowing entrained air in a sewage force main to escape through the air release orifice and prevent media from escaping. Materials shall include cast iron body and cover, rubber seat, stainless steel float stem and internal linkages. The valves shall be sized according to the detail drawings and designed for minimum working pressures of 150 psi.

2.5. **STEEL ENCASING PIPE**

Steel Encasing Pipe shall be smooth wall meeting or exceeding ASTM A-139, Grade B 35,000 psi minimum yield strength with a minimum wall thickness as defined below:

CARRIER PIPE	Casing Pipe	Thickness D.O.T.	R.R	Recommended* Min. Tunnel
6-Inch Ductile Iron	14"	.250“	.281"	48"
8-Inch Ductile Iron	18”	.250”	.281”	48”
10-Inch Ductile Iron	20"	.250"	.344"	48"
12-Inch Ductile Iron	22"	.250"	.375"	48"
16-Inch Ductile Iron	28"	.312"	.469”	48"
18-Inch Ductile Iron	30"	.312"	.469"	48"
20-Inch Ductile Iron	32"	.375"	.501"	48"
24-Inch Ductile Iron	36"	.375"	.532"	48"

2.5. CARRIER PIPE SUPPORTS

Carrier Pipe Supports within Steel Casing shall be steel plate, cold formed structural collar with flanges and a minimum of four support legs welded to the collar. Each support leg shall have a foot or skid welded on the end extending beyond the front and back edge of the collar. The front and rear of each foot shall be angled inwardly towards the collar to serve as a stable, effective skid during installation of the carrier pipe. The carrier support shall be securely fastened to the carrier pipe with a heavy duty one-half (½") inch grade five (5) bolt and locking nut passing between the flanges, compressing the collar against the carrier pipe. The support device shall be a Spider or approved equal.

2.6. UTILITY LINE MARKING TAPE

Utility Line Marking Tape shall be acid and alkali resistant polyethylene film two (2”) inches wide and four (4) mil thick. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to three feet. The metallic core of the tape shall be encased in a protective jacket or by other means to prevent corrosion. The tape shall bear a continuous printed marking describing the specific utility, i.e. "SEWER."

PART 3 – INSTALLATION:

3.1. TRENCH EXCAVATION AND BACKFILL

3.1.1. Excavation shall conform to the lines and grades shown on the drawings. No trench shall be opened more than two hundred (200’) feet in advance of the completed pipe Work without the written permission of the ENGINEER. The lines of excavation of trenches shall be made so there will be a clearance of at least eight (8”) inches on each side of the barrel of the pipe. Excavation shall not be carried below the established grades and any excavation below the required level shall be backfilled and

thoroughly tamped as directed by the ENGINEER, at the CONTRACTOR's expense. Bell holes shall be excavated accurately by hand.

3.1.2. During excavation, CONTRACTOR shall separate materials suitable for backfill from those defined unsuitable. Do not use the following materials for pipe foundation or trench backfill within the zones indicated below:

- All zones: material classified as peat (PT), organic soil (OL)(OH) under the Unified Soil Classification (USC) System, ASTM D-2487 and all materials too wet or too dry to achieve minimum compacted density requirements
- Six inches beneath pipe: soft or unstable material and rock
- Beside pipe: any material containing more than 75% fines passing #200 sieve

Suitable material shall be stockpiled near the trench for use as backfill. Unsuitable material shall be removed immediately or shall be stockpiled separately for dewatering or drying and later removal. Where no excavated material is suitable for backfill, furnish suitable material from borrow sites at no additional cost to the OWNER.

3.1.3. All unstable soil, organic soil, or soil types classified as inorganic clays and inorganic elastic silts (Class IV, Unified Class CL or lower) that are encountered at the bottom of pipe trenches or structure excavations shall be removed to a depth and width determined by the ENGINEER and properly disposed of. The resulting undercut shall be backfilled and compacted with sandy soils which meets or exceeds the requirements of Class I or Class II soil, Unified Class SP or better. Placement and compaction shall conform to the compaction specifications herein and on the plans.

3.1.4. All necessary dewatering pumping and bailing shall be performed in such a manner as to keep the trench in a satisfactory condition for pipe laying.

3.1.5. Backfilling shall be done with material free from large clods, frozen earth, organic material and any foreign matter.

3.1.5.1. Around the pipe and to a depth of twelve (12”) inches above the pipe the backfill shall be carefully placed and compacted in layers not to exceed six (6”) inches compacted thickness. The backfill shall be select and free of rock. Do not place backfill material on either side of the gravity sewer that is finer than the material upon which it is placed. Backfill with coarser material to the top of the pipe.

3.1.5.2. Twelve (12”) inches above the crown of the pipe the backfill may contain rock but less than six (6”) inches in diameter. Backfill layers shall be horizontal and not exceed twelve (12”) inches loose or eight (8”) inches compacted.

3.1.5.3. Compaction shall be performed with suitable pneumatic compactors or approved equal equipment. Compaction equipment specifically designed for trench compaction shall be present, operational and at the jobsite at all times. Compaction equipment shall be utilized throughout the length and depth of the trench to achieve uniform compaction density.

3.1.5.4. Compaction density shall be determined by the Standard Proctor Test (ASTM D-698) and shall meet the minimum standards in Section 02222, Excavating, Backfilling & Compacting for Utilities.

3.1.5.5. Surplus material shall be disposed of by the CONTRACTOR at his expense.

3.1.5.6. Clean shoulders and pavement of excess material immediately after backfilling is complete.

3.2. LAYING SEWERS

3.2.1. Gravity Sewers

All sewers shall be laid and jointed in accordance with approved manufacturer's recommendations and shall be laid true to line and grade proceeding upgrade with the spigot pointing in the direction of flow.

The sections of pipe shall be laid and fitted together so that, when complete, the sewer will have smooth and uniform invert, with full-length of the barrel resting on the trench bottom or bedding prepared for the pipe. Holes shall be excavated to accommodate pipe bells. The pipe shall be kept thoroughly clean. Each pipe shall be inspected for defects before lowering pipe into trench. Water shall not be allowed to rise around joints until they have been made tight. All sewers shall be constructed with a minimum of three (3) feet of cover, unless justified by the Engineer and approved by the SC DHEC. (e.g. ductile iron pipe may have less than three (3) feet [Reg R.61-67.300.A.12].)

3.2.1.1. All gravity sewer shall be bedded in accordance with Section D, Pipe Bedding and Backfilling Chapter 9 Section D Page 183 in WPCF (WEF) manual of Practice NO. FD-5 (ASCE Manual No. 60), ASTM D2321 for Flexible Pipe (PVC) and Section F2.9 page 202 in WPCF (WEF) Manual No. FD-5 for Rigid Pipe (Ductile Iron) Chapter 9, Section F2.9 for the proposed depth of sewer, and as detailed in the contract drawings.

3.2.1.2. The exposed end of all pipes shall be closed by means of an approved plug to prevent earth or other substances from entering the pipe. The interior of the sewer shall be kept free from all dirt, cement or superfluous materials of every description as the work progresses.

3.2.2. Force Mains

All pipe for force main sewers shall be laid and jointed in accordance to approved manufacturer's recommendations, contract drawings and as specified herein.

3.2.2.1. Each pipe shall be inspected for defects before lowering pipe into the trench. Any defective pipe shall be immediately removed from the site.

3.2.2.2. Water shall not be allowed to rise around the joints until they have been made tight. The exposed end of all pipes shall be closed by means of an approved plug to prevent earth or other foreign substances from entering the pipe. The interior of the pipe shall be kept clean and free of all dirt, stone or foreign material as work progresses.

3.2.2.3. The force mains shall be properly bedded according to the manufacturer's recommendations, contract drawings and the minimum standards defined below.

- All Pipe IN ROCK OR WET TRENCHES: Washed stone bedding from 4-inches below pipe to springline of pipe.
- ALL OTHER CONDITIONS: Hand carve trench to shape of lower quadrant of barrel

3.2.2.4. Concrete Blocking: All bends, tees and plugs shall be blocked with 3000 psi concrete from the pipe to undisturbed ground to the dimensions shown on the plans. Plant mix concrete is preferred although field mix concrete (Sacrete or equal) may be used as long as it is properly mixed outside of the trench in clean containers with potable water. The concrete mix shall be placed and rodded or consolidated by suitable means to minimize voids and shall receive a twenty-four (24) hour cure before being backfilled. If the ground is soft, restrained joint fittings shall be used as directed by the ENGINEER. All blocking shall meet the requirements of SC DHEC Regulation subsection 67.300.D.3.

3.2.2.5Utility Line Marking Tape: This tape shall be placed above all PVC pipe used in the force main construction. It shall be placed between lifts of backfill approximately twelve (12") inches above the top of the pipe.

.3.2.2.6 Air Release Valves: Automatic sir relief valves shall be placed at high points in the force main sewer to prevent air locking in accordance with SC DHEC Regulation subsection 67.300.D.4.

3.2.22.7. Connection to manholes: Force mains tying onto manholes shall enter the manhole a vertical distance of not more than two (2) feet above the flow line of the receiving manhole.

3.3.0. BORING AND JACKING

Where required, smooth wall or spiral weld steel pipe shall be jacked through dry bores slightly larger than the pipe, bored progressively ahead of the leading edge of the advancing pipe. As the boring and jacking operation progresses, each new section of the encasement pipe shall be butt-welded to the section previously jacked in place.

3.3.3.1. Obstructions encountered during the boring and jacking operation or deflections in the bore resulting in less than thirty (30”) inches of soil cover above the casing, shall require the bore to be abandoned. The abandonment procedure consists of cutting off the excess pipe, capped then filled with Portland cement grout (1:3 parts cement to sand) at sufficient pressure to fill all voids before moving to a new location.

3.3.3.2. The carrier pipe shall be fully supported along its entire length within the casing pipe. Support may be accomplished by securely fastening pressure treated lumber to the carrier pipe or by using "spiders." Either method shall be first submitted to the ENGINEER for approval, detailing the means of fastening the support devices and spacing of supports.

3.3.3.3. Length of encasements shall be determined as follows.

- Cut sections - Ditch line to ditch line
- Fill sections - 5 feet beyond toe of slope
- Curb sections - 3 feet beyond curb
- Future highway or railroad R/W - Extend full width of R/W or unless otherwise noted.

3.3.3.4. Materials and workmanship shall also be governed by the requirements set for by the agency issuing the encroachment (Railroad, Department of Transportation, Pipeline Co., Etc.). Any specific conditions other than listed herein pertaining to the encroachment are listed in the Special Conditions.

3.4 SEPARATION OF SEWERS AND WATER MAINS (R-61.67.300.A.14.(AA0 –(F))

3.4.1 Portable Water Supply Interconnections. There shall be no physical connection between a public or private potable water supply system and a sewer or appurtenances thereto which may permit the passage of any sewerage or polluted water into the potable supply. No potable water pipe shall pass through or come in contact with ant part of a sewer manhole.

3.4.2 Horizontal and Vertical Separation from potable Water Mains: Sewers shall be laid at least 10 feet horizontally from any existing or proposed potable water main. The distance shall be measured from pipe edge to edge. In cases where it s not practical to maintain a ten(10) foot separation, SC DHEC may allow deviation on a case by case basis, if supported by the design engineer. Such deviation may allow installation of the sewer closer to a potable water main, provided that the water main is in a separate trench or on an undisturbed earth self located on one side of the sewer and at an elevation so that the bottom of the water mains is at least eighteen (18) inches above the top of the sewer.

3.4.3 Crossing: Sewers crossing potable water mains shall be laid to provide a minimum vertical separation of eighteen (18) inches between the outside of the water main and the outside edge of the sewer. This shall be the case where the potable water main is either above or below the sewer main. Whenever possible, the potable water main shall be located above the sewer main. When a new sewer crosses a new potable water main, a full length of pipe shall be used for both the sewer line and the potable water main, and the crossing shall be arranged so that the joints of each line be as far as possible from the point of crossing and each other. When a potable water main crosses under a sewer, adequate structural support shall be provided for the sewer line to prevent damage to the potable water main while maintaining line and grade.

3.4.4 Force mains: There shall be at least a ten (10) foot horizontal separation between the sanitary force mains and potable water mains. There shall be an eighteen (18) inch vertical separation at

crossings as required in DHEC Regulation R.61- sub section 67.300.A.14.b and subsection 67.3000.A.14.c.

3.4.5 Special conditions: When it is impossible to obtain the distance specified Subsection 67.300.A.14.b, subsection 67.300.A.14.d, SC DHEC may allow an alternative design. An alternative design shall:

3.4.5.1 Maximize the distance between the sewer line and the potable water main and the joints of each.

3.4.5.2 Use pipe materials which meet the requirements as specified in SCDHEC Regulation 61-58.4 (DX)(10 for the sewer line

3.4.5.3 Allow enough distance to make repairs to one of the lines without damaging the other.

3.5 INSTALLATION OF JOINTS

3.5.1. Mechanical Joints
The socket, gasket or spigot of the pipe shall be cleaned of all foreign matter. The gland shall be slipped on the spigot end, followed by the gasket and the pipe end pushed into the bell. The ring gasket shall be properly seated so that it is totally confined under pressure within the bell. The loose gland shall be moved into position against the face of the gasket and the nuts and bolts loosely assembled with the fingers and then made up tight with a suitable ratchet wrench.

3.5.2 Push-On Joints
The joint shall be thoroughly cleaned, prepared, lubricated and installed in accordance with the requirements, instructions and recommendations of the manufacturer and ENGINEER.

3.5.3 Solvent Cements Joints
The joint shall be thoroughly cleaned, prepared and installed in accordance with the requirements, instructions and recommendations of the manufacturer and ENGINEER.

3.5.4 Grooved Joints
Joints shall be installed in accordance with manufacturers' published installation instructions.

3.6. TESTING

All pipe installations shall be tested as specified herein. The Testing shall meet all of the requirements of AWWA C-600 (DIP) or AWWA C-605 (PVC) and SC DHEC Regulation subsection 67..300.D.5. Tests shall be performed by CONTRACTOR at his expense in the presence of ENGINEER or his representative. Testing shall not be performed until such time that all Work which may affect the results of the testing has been completed. Where a test section fails to meet test requirements, CONTRACTOR shall make corrections as specified herein and retest the section. The correct/retest procedure shall continue until such time as test requirements are met. All gravity lines will be lamped by the ENGINEER. The CONTRACTOR shall furnish two (2) personnel to assist the ENGINEER in removing and replacing manhole covers, and in carrying ENGINEER's tripod, hoist and other equipment necessary to perform this task.

3.6.1. Air Test: All gravity sewer pipe

3.6.1.1. Procedure

3.6.1.1.1. Air test shall be conducted in strict accordance with the testing equipment manufacturer's instructions, including all recommended safety precautions. No one will be allowed in the manholes during testing. Equipment used for air testing shall be equipment specifically designed for this type of test, and is subject to approval of the ENGINEER.

3.6.1.1.2. The test shall be performed only on clean sewer mains after services are installed and the pipe is completely backfilled. Clean sewer mains by propelling snug fitting inflated rubber ball through the pipe with water. After completely cleaned, plug all pipe outlets with suitable test plugs. Brace each plug securely.

3.6.1.1.3. For pipe within test sections above the ground water table, add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to the starting pressure of 4 psig. After the starting pressure is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure. When pressure decreases to 3.5 psig, start stopwatch. Determine the time that is required for the internal air pressure to reach 2.5 psig.

3.6.1.1.4. For pipe with test sections below the ground water table, determine the starting pressure for the test section, in psig, as follows.

- Determine the maximum depth of pipe within the test section in feet.
- Multiply this depth by 0.67 and add 9.3 feet.
- Multiply the result in part 2 by 0.43 and round to the nearest 0.5 psig. After this starting pressure is obtained, continue the test in accordance with the procedure in the paragraph above.

3.6.1.2. Requirement

The test section shall be acceptable if the elapsed time for pressure drop of 1.0 psig is greater than the sum of the times shown below for all pipe sizes within the test section.

	PIPE DIAMETER (INCHES)								
LENGTH	4	6	8	10	12	15	18	21	24
25	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38
50	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17
75	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55
100	0:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34
125	0:22	0:50	1:28	2:18	3:18	5:09	7:26	9:55	11:20
150	0:26	0:59	1:46	2:45	3:58	6:11	8:30	"	"
175	0:31	1:09	2:03	3:13	4:37	7:05	"	"	"
200	0:35	1:19	2:21	3:40	5:17	"	"	"	12:06
225	0:40	1:29	2:38	4:08	5:40	"	"	10:25	13:36
250	0:44	1:39	2:56	4:35	"	"	8:31	11:35	15:07
275	0:48	1:49	3:14	4:43	"	"	9:21	12:44	16:38
300	0:53	1:59	3:31	"	"	"	10:12	13:53	18:09
350	1:02	2:19	3:47	"	"	8:16	11:54	16:12	21:10
400	1:10	2:38	"	"	6:03	9:27	13:36	18:31	24:12
450	1:19	2:50	"	"	6:48	10:38	15:19	20:50	27:13
500	1:28	"	"	5:14	7:34	11:49	17:01	23:09	30:14

3.6.1.3. Corrective Measures

If elapsed time is less than the specified amount, CONTRACTOR shall locate and repair leaks and repeat the test until elapsed time exceeds the specified amount.

3.6.2. Infiltration/Exfiltration Test (Use All Manholes)

3.6.2.1. The use of this method for sewer pipe, in lieu of air tests may be used as an alternate test method.

3.6.2.2. Procedure

3.6.2.2.1. Infiltration: Immediately following a period of heavy rain, a test of Work constructed up until that time shall be made. Three (3) measurements shall be made at one (1) hour intervals to compute the amount of the infiltration. Tests for manholes only shall be conducted on individual manholes. Tests for pipe and manholes shall be performed on test sections not exceeding 3.500 linear feet of collector sewer and shall include both pipe and manholes. The ENGINEER reserves the right to use his judgement as to whether the ground is sufficiently saturated and/or whether the fall of rain is adequate to permit making infiltration tests. In the event that sufficient rain does not occur before the date of completion, the CONTRACTOR shall be required to conduct the tests at any time during a thirty (30) day period following this date. Should the ENGINEER determine that certain pipe or manholes cannot be tested by infiltration methods, the ENGINEER may direct the filling of lines and the measurement of exfiltration. The allowable rate of exfiltration shall be the same as for infiltration.

3.6.2.2.2. Exfiltration: Determine test sections as outlined for infiltration tests. Install a temporary water plug at the inlet and outlet of the test section. Fill test section with clean water up to the bottom of the lowest manhole frame within the test section. Allow time for saturation of pipe and manholes refilling test section as required. Beginning with a full test section, allow at least eight (8) hours to elapse without adding water. Measure the water level at the beginning and end of the elapsed time above. Compute the volume of water lost in gallons per hour.

3.6.2.3. Test Requirements

- The rate of water loss/gain shall be less than the rate, in gallons per hour, calculated for the test section using the following allowances:
- Sewer main and manholes with or without service laterals; 100 gallons per 24 hours per inch of sewer main diameter per mile of sewer main (gpd/in-mi)
- Manholes only; 1 gallon per 24 hours per vertical foot of manhole

3.6.2.4. Corrective Measures

If actual leakage rate is greater than required leakage rate, CONTRACTOR shall locate and repair leaks and repeat the test until actual leakage is less than the required rate.

3.6.3. Deflection Test

3.6.3.1. Use all gravity sewer, eight (8”) inch diameter through fifteen (15”) inch diameter except ductile iron.

3.6.3.2. Procedure

Tests shall be performed by the CONTRACTOR in the presence of the ENGINEER no sooner than thirty (30) days after completion of backfill. The OWNER, at his option, may require a second test within the guarantee period of the project. A nine (9) arm mandrel and proving ring, as manufactured by Wortco, Inc. or an approved equal, will be provided by the CONTRACTOR. The mandrel shall be manually pulled, from manhole, through the entire length of mainline pipe. The mandrel and proving ring shall remain the property of the CONTRACTOR.

3.6.3.3. Requirement
All pipes shall allow passage of the test mandrel. The mandrel and proving ring shall be sized at five (5%) percent less than the ASTM dimension for the pipe in accordance with the following table.

NOM. DIA	L	ASTM D3034 SDR 35 D	ASTM D2680 D
8"	8"	7.28"	7.40"
10"	10"	9.09"	9.31"
12"	12"	10.79"	11.22"
15"	15"	13.20"	14.09"

L = Mandrel Contact Length
D = I.D. of Proving Ring

3.6.3.4. Corrective Measures
All pipe that fails the deflection test shall be removed, replaced and retested at no additional expense to the OWNER.

3.6.4. Force Main Pressure Test

3.6.4.1 The pressure/leakage test of water mains shall be in accordance with Standard AWWA C600, latest revision. The allowable leakage shall not exceed that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

L = Allowable leakage in gallons per hour
S = Length of line tested in feet
D = Nominal diameter of pipe, in inches
P = Average test pressure, in psi - 1.50 average system pressure in the area, but not less than 100 psi.

3.6.4.2. Where practicable, pipe lines shall be tested in lengths of no more than two thousand (2000') feet.

3.6.4.3. Duration of test shall be not less than two (2) hours where joints are exposed, and not less than twenty-four (24) hours where joints are covered, unless directed by the ENGINEER.
3.6.4.4. All visible leaks at exposed joints, and all leaks evident on the surface where joints are covered, shall be repaired and leakage minimized, regardless of total leakage as shown by test.

3.6.4.5. All pipe, fittings, and other material found to be defective under test shall be removed and replaced at the CONTRACTOR's expense.

3.6.4.6. Lines which fail to meet tests shall be repaired and retested as necessary, until test requirements are complied with.

END OF SECTION

SECTION 33 4100
STORM UTILITY DRAINAGE PIPING
(Corrugated High Density Polyethylene
Culvert Pipe (HDPE)

PART 1 – DESCRIPTION:

1.1. This section contains specifications for the materials, construction, measurement, and payment for furnishing corrugated high density polyethylene culvert pipe (HDPE) of the size, shape, type, and dimensions indicated on the plans and installing them to provide drainage structures at places designated on the plans or in accordance with these specifications and true to the lines and grades shown on the plans. This work includes the furnishing and installing of necessary tee, wye, elbow, and bend joints, and making connections to existing and/or new structures, including drilling and chipping as is necessary to complete the work.

PART 2 – MATERIALS:

2.1 Provide corrugated high density polyethylene culvert pipe conforming to the requirements of **AASHTO M 294**, Type S, as required.

2.1.1 For **AASHTO M 294**, Type S pipe, provide pipe with an outer corrugated high density pipe wall and a smooth inner liner. Use only **AASHTO M 294**, Type S pipe in permanent applications.

2.1.2 Use only materials from sources complying with the **SCDOT Qualified Product Listing Policy 30** and appearing on the **SCDOT Qualified Product Listing 30**.

2.2 Have manufacturer furnish with each shipment of materials a certification showing brand name, the shipping date and to whom it is shipped, and the quantity and size of pipe represented. Ensure that the certificate contains a statement that the material meets the **SCDOT** specifications and is essentially the same as that qualified by the Department. Ensure that the shipped pipe is plainly marked with the manufacturer's name, trademark, nominal size, specification designation **AASHTO M 294**, Type S, plant designation code, the date of manufacture or an appropriate code, and certification stamp from PPI or NTPEP. Ensure that the shipped fittings are plainly marked with the manufacturer's identification symbol and specification designation **AASHTO M 294**, Type S. Furnish a materials safety data sheet and installation instructions with each shipment. Ensure that all HDPE pipe is certified by the **PPI** or **AASHTO NTPEP** third party certification programs.

2.3 When geotextile for drainage filtration is required, follow **SCDOT Supplemental Specifications for Geotextile for Drainage Filtration**.

PART 3 – INSTALLATION:

3.1 HANDLING AND STORAGE (HDPE)

3.1.1 Inspect pipe before it is installed. Check pipe for proper markings and for signs of damage due to fabrication or shipment. Pipe may be rejected due to improper marking, incorrect pipe type, size, or strength. Pipe may also be rejected due to damage which may include, but is not limited to cuts, gouges, delaminations, bulges, flat areas, bubbles, dents, tears, breaks, gaps, missing or malformed corrugations, or deformations that would adversely affect the strength or function of the pipe. Damage to the end of the pipe including damage to bell or spigot, or ends that are not normal to the walls or centerline of the pipe that prevent satisfactory joint installation may also be rejected. Defective or damaged gaskets may require replacement, but are not cause for rejection of pipe that meets the above requirements.

3.1.2 Handle and store pipe such that no damage occurs to the pipe. Unload the pipe at a site that is relatively flat and level, free of debris, and away from construction traffic.

3.2 TRENCH FOR PIPE (HDPE)

3.2.1 Lay the pipe in a trench where possible. Excavate trenches to the required grade and to a width sufficient to allow for proper jointing of the pipe and for thorough compaction of the structural backfill material under and around the pipe. Excavate the trench to a width which is 1.5 times the pipe outside diameter plus 12 inches, 1.0 times the pipe outside diameter plus 24 inches, or the width required to safely fit compaction equipment and personnel between the pipe and the trench walls, whichever is greater. When using controlled low strength material (CLSM) backfill, excavate the trench to a minimum width of the outside diameter of the pipe plus 12 inches. Make certain that the trench bottom gives full support to the pipe throughout its length.

3.2.2 Where pipe culverts will be placed in new embankments, first construct the embankments to a height of approximately 1/2 the diameter of the pipe above the top of the designated. Construct the embankment for a distance of not less than 5 times the diameter of the pipe on each side of the pipe location, after which excavate the trench in the embankment as described in this section above.

3.2.3 When excavating for pipe culverts, if rock, hard pan, or other unyielding foundation material is encountered, excavate the hard unyielding material below the elevation of the bottom of the pipe or pipe bell to a minimum depth of 8 inches below the bottom of the pipe.

3.2.4 Follow OSHA safety requirements for trenching. If trench width or wall slopes are changed due to safety requirements, backfill the trench outside of the normal trench dimensions with either embankment material or backfill material described in **Subsection 3.7**.

3.2.5 When supports such as trench boxes are used, ensure that support of the pipe and its embedment are maintained throughout the installation. Ensure that sheeting is sufficiently tight to prevent washing out of native soil from behind the trench box. Follow pipe manufacturer's trench box recommendations to comply with OSHA safety requirements while preventing loss of support in the bedding and structural backfill when moving trench boxes. Use sloped trench walls or CLSM when either structural backfill or trench box safety requirements cannot be followed.

3.2.6 Do not disturb the installed pipe and its embedment when moving trench boxes. Do not use trench boxes below the top of the pipe zone unless methods are used for maintaining the integrity of the

embedment material. As supports are moved, all voids left by the trench walls below the top of the pipe zone must be filled with specified structural backfill described in **Subsection 3.7**, compacted per these specifications.

3.2.7 Provide for temporary diversion of water or pumping as may be necessary in order to permit dry installation of the culvert. Keep trenches free from water until any joint sealant material has hardened sufficiently.

3.3 FOUNDATION FOR PIPE (HDPE)

3.3.1 Unless noted otherwise in the plans, support pipe using foundation material that meets the minimum requirements of the roadway embankment.

3.3.2 When a firm foundation is not encountered at the required grade, remove unstable material at least 1 diameter on each side of the pipe and deep enough to provide appropriate support to the pipe. Backfill and compact with soil and methods specified for the embankment materials up to the bottom of the bedding. Provide trench suitable to accommodate site conditions and obstructions.

3.4 BED FOR PIPE (HDPE)

3.4.1 For bedding material use well-graded sand or gravel meeting the requirements of A-1 (**AASHTO M 145**).

3.4.2 Uniformly graded coarse-grained soils A-3 (**AASHTO M 145**) can be used if provisions are made to evaluate and control possible migration of site soils into open voids. Completely wrap bedding with geotextile for drainage filtration when uniformly graded materials are used to prevent migration of site soils into bedding.

3.4.3 Ensure that trenches are free of water when placing bedding.

3.4.4 Support the pipe by placing uncompacted bedding material for a depth of 10.0% of the pipe outside diameter or 3 inches (6 inches when placing pipe on rock) whichever is greater. Prepare bedding material at pipe joints and projected hubs if present to prevent excess loading and to provide uniform support in these areas.

3.4.5 Compact bedding material that is outside of the middle third pipe diameter to ensure proper support of the pipe. Ensure that bedding material outside the middle third of pipe is compacted to a minimum of 95.0% of the maximum dry density when measured in accordance to **SC-T-29**. Ensure that compaction of bedding material does not cause the pipe to move.

3.4.6 Do not use controlled low strength material (CLSM), flowable fills or concrete for pipe bedding.

3.5 LAYING PIPE (HDPE)

3.5.1 Begin pipe laying at the downstream end of the culvert with the bell or groove ends and outside laps upstream.

3.5.2 Make certain each section of pipe has a full firm bearing throughout its length, true to line and grade given. Make certain that all supports are uniform (without point loading from irregular backfill) and that bells have been properly accommodated. Remove pipe that settles before final acceptance or which is not in alignment and re-lay without extra compensation.

3.5.3 Before laying the pipe or during the pipe laying operations, construct adequate outfall ditches and inlets free of obstructions in order that proper drainage is provided.

3.5.4 When pipes are connected to drainage structures, install or cut pipe flush with inside face of drainage structure. When pipes are connected to end treatments such as slabs or headwalls, install or cut pipe flush with exposed face of end treatment. When pipe culverts are installed connecting to pipe of different material of connection details, use a standard drainage structure.

3.6 JOINTS (HDPE)

Follow joint material manufacturer's recommendations for installation procedure. Follow pipe manufacturer's recommendations for proper joint seating. Follow **ASTM D 2321** for joint installation procedures. Order pipe and appropriate joint material from pipe manufacturer.

3.6.1 Standard Joint

Use a bell and spigot type connection with an elastomeric rubber seal meeting **ASTM F477** and meeting the requirements specified in the plan and by the pipe manufacturer. Ship pipe with gasket installed. Certify that the pipe and gasket system meet or exceed the laboratory 10 psi internal pressure test of **ASTM D 3212**. Provide, to the Engineer, manufacturer's certification that gaskets are manufactured in accordance with the requirements of **ASTM F 477** and do not have any visible cracking when tested according to **ASTM D 1149**. Store bell and spigot type pipe in alternating rows to prevent bell flattening. Cover gaskets with a protective wrap during storage to prevent damage to the gasket. Inspect pipe to ensure that pipe joint components are clean and free from damage or defect before installation. Mark or verify that the pipe ends are marked to indicate the insertion stop position. If pipe bell is manufactured separately from pipe, ensure it is securely installed before proceeding with installation. Lubricate inside and leading edge of bell with a lubricant, specified by the pipe manufacturer, that does not cause damage or deterioration to the gasket material. Use installation methods that do not damage pipe, bell, spigot or gasket. Push the spigot end of the pipe being laid into the bell end of the pipe already installed up to the marked insertion stop point while maintaining true line and grade. Follow manufacturer recommendations on construction devices to use to prevent damage to the pipe. Do not use excessive force that may result in over-assembled joints or dislodged gaskets. If pipe is not fully installed to the marked insertion point, disassemble joints, clean and reinstall joint as described above. Ensure that pipe installed has proper line and grade before installing next pipe section.

3.6.2 Field Fabricated Joint

Use field fabricated joints only outside of roadbed and driveways. Splice two field cut pieces of HDPE pipe, using a split coupler band with an elastomeric rubber seal meeting **ASTM F 477**.

3.6.2.1 Wrap entire joint with a geotextile for drainage filtration to prevent the migration of soils into the pipe or to meet a silt tight designation per **AASHTO M 294**. Geotextile fabric shall extend 12 inches either side of the joint and overlap at least 18 inches. No additional payment will be made for the use and installation of split coupler bands.

3.7 PIPE STRUCTURAL BACKFILL (HDPE)

3.7.1 For structural backfill material use well-graded sand or gravel meeting the requirements of A-1 (**AASHTO M 145**).

3.7.2 Uniformly graded coarse-grained soils A-3 (**AASHTO M 145**) can be used for backfill if provisions are made to evaluate and control possible migration of fines into open voids. Completely wrap backfill with geotextile for drainage filtration when uniformly graded materials are used to prevent migration of site soils into bedding. If uniformly graded coarse-grained soils A-3 (**AASHTO M 145**) are used for both the bedding and the backfill, wrap the entire bedding and backfill envelope with geotextile for drainage filtration.

3.7.3 Controlled low strength material (CLSM) and controlled density fill are flowable fills that may be used for structural backfill in the haunch area and above. Select a flowable fill mix design that can be excavated. When using CLSM backfill excavate the trench to a width that is a minimum of the outside pipe diameter plus 12 inches but no wider than the outside pipe diameter plus 20 inches. Do not use CLSM when placing perforated pipe. When using CLSM ensure that the pipe is not displaced while using methods that do not damage the pipe.

3.7.4 Ensure that trenches are free of water when placing and compacting structural backfill.

3.7.5 Thoroughly compact the structural backfill material in layers not exceeding 6 inches of compacted material. The first lift must be sufficiently below the spring line such that the material can be worked into the haunch zone of the pipe. Perform compaction by the use of mechanical tampers with the assistance of hand tamps when necessary. Thoroughly compact the structural backfill under the haunches of the pipe and ensure that the backfill soil is in continuous uniform contact with the side and joints of the pipe. Exercise sufficient care to prevent damaging or misaligning the pipe with the compaction equipment.

3.7.6 Install and compact structural backfill on both sides of pipe before adding the next lift of backfill material. Evenly distribute structural backfill on both sides of the pipe for its full length. Ensure that Pipe Structural Backfill process does not cause joint separation or displacement of the installed pipe.

3.7.7 Ensure that the compaction of structural backfill is a minimum of 95.0% of the maximum dry density when measured in accordance with **SC-T-29**. To ensure appropriate compaction, divide the pipe placement into 50-foot lots.

3.7.8 The Contractor will test the compaction of each 6-inch lift in each 50-foot lot starting from the pipe bedding up to the minimum cover depth for the pipe. This compaction testing will be performed on alternating sides of the pipe at random locations within the 50-foot lot to ensure that the material within the pipe embedment zone has been compacted to 95.0% of the maximum dry density for the structural backfill when measured in accordance with **SC-T-29**. For all tests, insert the nuclear gauge probe to its full depth or within 2 to 3 inches of the bottom of the layer being tested, whichever is less. In the event of a non-conforming compaction measurement, recompact the entire 50-foot lot before the compaction is tested again at the same location and one other location within the 50-foot lot. Continue reworking the structural backfill until all tests indicate conformance with the compaction requirements.

3.7.9 Complete structural backfill installation up to the minimum cover elevation above the pipe or to the top of the trench when the top of the pipe is within 3 feet of the finished grade. Confirm that structural backfill material in pipe trench meets or exceeds the embankment compaction requirements before applying final pavement surface.

3.8 COVER HEIGHT (HDPE)

Ensure that the minimum and maximum cover is in accordance with the height of cover tables in the **SCDOT Standard Drawings**.

3.9 CONSTRUCTION LOADS (HDPE)

Fill height requirements may dictate that more fill is required during construction than for final design. In all cases, install backfill to the minimum construction fill height specified in the **SCDOT Standard Drawings** before driving heavy equipment over pipe. Maintain this minimum cover until heavy equipment usage is discontinued so that damage does not occur to the pipe. Install and remove backfill required due to the construction loading on the pipe at no expense to **SCDOT**. Repair all damage or displacement at no expense to **SCDOT**.

3.10 STRUCTURES AND END TREATMENTS (HDPE)

3.10.1 When not included in the plans, follow **SCDOT Standard Drawings** for connections of pipe to drainage structures, manholes, end treatments, or other buried structures.

3.10.2 Construct end treatment (minimum Class B riprap, pipe end structure, concrete slab, wingwall/apron system, etc.) as indicated in the plans or **SCDOT Standard Drawings**.

3.11 INSTALLATION INSPECTION (HDPE)

3.11.1 Visually inspect 100% of pipe for cuts, gouges, delaminations, bulges, flat areas, dents, tears, breaks or gaps during all phases of the installation process. Inspect joints for missing, damaged, or improperly installed gaskets and fully engaged bells and spigots.

3.11.2 When improper installation or damage is noted in any prior inspection (visual, compaction, installation, etc.) of the pipe, repair the pipe installation to the satisfaction of the Engineer. The Engineer may perform additional inspections until confidence is restored that the remaining pipe has been installed in accordance with these specifications and is performing satisfactorily.

3.11.3 For HDPE pipe, when installed pipe deflections exceed 5.0% of the inside diameter, prepare a report for submittal to the Engineer. This report must address: structural integrity, environmental conditions, design service life of the pipe, and recommended remediation. Upon acceptance by the Engineer, and at a minimum, implement the following: Replace the pipe at locations where the measured deflection exceeds 7.5% of the nominal inside diameter of the pipe. Repair or remediate locations as recommended in the report.

3.12 INSTALLING PIPE CULVERT UNDER EXISTING PAVEMENT (HDPE)

On projects where the original approach pavement structure is being retained, lay the pipe culvert as herein specified. Repair the portion of the pavement structure removed due to the excavation of the trench using the same type of materials used in the original construction.

3.13 PLACING PIPE UNDER RAILROADS & OTHER TRANSPORTATION FACILITIES (HDPE)

When the plans include the installation of pipe under railroads or other transportation facilities not under the jurisdiction of the Department, unless otherwise provided, install the pipe using such methods, materials, and procedures required by the owner. There is no extra compensation for this change in methods, materials, and procedures. This requirement does not apply to the installation under roadways.

3.14 CLEANING OUT PIPE (HDPE)

Thoroughly clean out the entire length of newly installed pipe culverts. No additional payment will be made for the cleaning out of newly installed pipe culverts.

END OF SECTION

SECTION 33 4100
STORM UTILITY DRAINAGE PIPING
(Drainage Structures and Inlets)

PART 1 – DESCRIPTION:

PVC surface drainage inlets shall include the drain basin type as indicated on the contract drawing and referenced within the contract specifications. The ductile iron grates for each of these fittings are to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer.

1.1. RELATED WORK
Any reference to standard specifications refers to the most current published date of the following specifications unless otherwise noted.

1.1.1. Reference the following specifications for related work:
- AASHTO – T99 Foundation Compaction
- ASTM A48 Grey iron Casting

PART 2 – MATERIALS:

2.1. DRAIN BASINS

2.1.1 The drain basins required for this contract shall be manufactured from PVC pipe stock, utilizing a thermoforming process to reform the pipe stock to the specified configuration.

2.1.2 The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system

2.1.3 This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The flexible elastomeric seals shall conform to ASTM F477.

2.1.4 The pipe bell spigot shall be joined to the main body of the drain basin or catch basin.

2.1.5 The raw material used to manufacture the pipe stock that is used to manufacture the main body and pipe stubs of the surface drainage inlets shall conform to ASTM D1784 cell class 12454.

2.2 . GRATES & FRAMES

2.2.1. The grates and frames furnished for all surface drainage inlets shall be ductile iron for sizes 8”, 10”, 12”, 15”, 18”, 24” and 30” and shall be made specifically for each basin so as to provide a round bottom flange that closely matches the diameter of the surface drainage inlet.

2.2.2. Grates for drain basins shall be capable of supporting various wheel loads.

2.2.3. 12” and 15” square grates will be hinged to the frame using pins.

2.2.4 Ductile iron used in the manufacture of the castings shall conform to ASTM A536 grade 70-50-05.

2.2.5 Grates and covers shall be provided painted black.

PART 3 – INSTALLATION:

3.1 The specified PVC surface drainage inlet shall be installed using conventional flexible pipe backfill materials and procedures.

3.2 The backfill material shall be crushed stone or other granular material meeting the requirements of class 1 or class 2 material as defined in ASTM D2321. Bedding and backfill for surface drainage inlets shall be well placed and compacted uniformly in accordance with ASTM D2321.

3.3 The drain basin body will be cut at the time of the final grade.

3.4 No brick, stone or concrete block will be required to set the grate to the final grade height.

3.5 For load rated installations, a concrete slab shall be poured under and around the grate and frame. The concrete slab must be designed taking into consideration local soil conditions, traffic loading, and other applicable design factors.

3.6 For other installation considerations such as migration of fines, ground water, and soft foundations refer to ASTM D2321 guidelines.

END OF SECTION